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**Wayfinding Pasifikafuturism: An Indigenous Science Fiction Vision of
the Ocean in Space**

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Abstract

This thesis examines science fiction space stories written by Indigenous¹ writers and asks how these texts look to the past while commenting on the present and providing transformative imaginaries of our existence as Indigenous peoples in the future. It also investigates how these texts challenge the inherent colonialism of the science fiction genre and its norm of the white, male, heteronormative, cisgender point of view. This thesis comprises two sections, creative and critical. Twenty percent provides the critical analyses and eighty percent makes up the creative section.

The critical component is in two parts. The first part defines the specific point of view adopted in this thesis, which is that of science fiction literature written by Māori and Pasifika authors as the Indigenous peoples of the Pacific. This point of view is captured within the term I have developed and called, “Pasifikafuturism”, a theoretical construct that situates Oceanic science fiction in the afterlife of colonisation and seeks to move beyond postcolonialism to create Pacific conceptions of the future.

Pasifikafuturism is located alongside other Alternative Futurisms² with which it has commonalities, including Afrofuturism, Indigenous Futurism, Queer Indigenous Futurism, Chicanafuturism, Latinofuturism, and Africanfuturism. Pasifikafuturism is identified within the context of the Pacific Ocean and the ancestral practices and methodologies of wayfinding and waka³ building.

¹ In this thesis I follow the practice of other Indigenous scholars and writers in capitalising the word Indigenous to privilege Indigenous peoples and to denote the word Indigenous as a proper noun. As the editors of *Indigenous Archaeologies* explain, “the capital ‘I’ emphasizes the nationhood of individual groups while use of the plural ‘peoples’ internationalizes Indigenous experiences, issues and struggles, and acts against the notion of an Indigenous homogeneity” (Smith et al. 14). In the literature I have reviewed, the term “Indigenous” is often used interchangeably with the term “First Nations” and I acknowledge that some people prefer to be referred to as First Nations or by their preferred identification. I have used the preferred form of identification when it is specified.

² Alternative Futurisms have grown out of “first contact” scenarios between Indigenous peoples and invading Empires and will be discussed in a forthcoming publication titled *The Routledge Handbook to Alternative Futurisms*.

³ In this thesis, the Māori word “waka” is used interchangeably with the Fijian word “waqa” and words from other Indigenous Pacific languages that refer to ocean-going vessels, including vaka and va’a.

The second part of the critical study comprises a close reading of two science fiction space stories written by Indigenous authors. The first is Witi Ihimaera's space novella *Dead of Night*, a story about six people travelling through space to the end of the universe, or Te Kore. The second is Nnedi Okorafor's novella *Binti* in which the titular protagonist, a young Indigenous woman from the Himba tribe in Namib, is the first person in her community to travel into space to attend an intergalactic university.

In the creative portion of this thesis, Pasifikafuturism is explored imaginatively in an original novel titled *Na Viro*,⁴ which is shaped and informed by my critical research. *Na Viro* is a work of science fiction set in interstellar space and the Pacific. Tia, the protagonist in *Na Viro*, is a young Fijian woman who travels into space to rescue her sister from a whirlpool.

This thesis argues that science fiction, and specifically space stories, can be used as a lens through which to examine the histories and ancestral knowledge of Indigenous peoples adversely impacted by colonialism; and as a way of reclaiming and re-growing Indigenous knowledge that has survived. Furthermore, I use Pacific wayfinding as a methodological framework to enable the envisioning of transformative futures in science fiction stories where our knowledges are centralised, privileged, and respected.

⁴ Na Viro is a Fijian phrase which translates into English as “the whirlpool”.

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Critical Component

Envisioning the Dream of the Indigenous Journey through Oceanic Space

Chapter One: Introduction

The focus of this thesis is science fiction written by Indigenous authors, more specifically science fiction as it relates to the Pacific Ocean within the framework of what I call “Pasifikafuturism”. My research question in the critical part of this thesis asks how space stories can be used to provide a lens through which to examine the present social position of Indigenous Pasifika peoples, and to investigate how our histories, and ancestral knowledges have been adversely impacted by the destructive incursions of colonialism. My research works with the Pacific science of wayfinding as both a methodology and a metaphorical framework to enable the envisioning of transformative futures in science fiction stories where our knowledges are centralised, privileged, and respected. I wish to envision the dream of the Indigenous journey through Oceanic space. That is, an Indigenous Oceanic conception of the cosmos in story.

In my development of a dialectic or tidalectic approach to writing about “Pasifikafuturism”, I first need to discuss some of the terminology that I use in this thesis. I start with the term “Pasifika”. Alice Te Punga Somerville writes, in relation to Aotearoa, New Zealand, that “colloquially, migrants from elsewhere in the Pacific are often known by the umbrella term Pasifika (a transliteration of Pacific also spelled “Pasifica”, “Pacifika”, “Pacifica”, and “Pasefika”)”. She uses the term “Pasifika” to refer to “New Zealand based non-Māori Pacific people” (xxi). The Ministry of Pacific Affairs’ “Pacific diversity statement” asserts that the term “Pacific peoples”:

is a ‘canopy’ term used to encompass a variety of Pacific Island nations and communities who are linguistically, culturally, and geographically distinctive from each other. Pacific peoples are used [*sic*] to accentuate plurality and acknowledge the many Pacific nations and territories that are grouped together

when this term is used. Other words that are used in a similar fashion include Pacific Islanders, Pasifika Peoples, Tangata Pasifika and Pacificans. In its broadest sense, 'Pacific peoples' covers indigenous peoples from the Island nations in the South Pacific, and in its narrowest sense Pacific peoples in New Zealand (2).

It is odd that this definition of "Pacific peoples" by a government agency in Aotearoa excludes Indigenous peoples from the island nations of the North Pacific, including Federated States of Micronesia, Republic of the Marshall Islands, Northern Mariana Islands, Guam, Palau, and Hawaii. I speculate that this may be a reflection of our colonial past in the Pacific, as the Northern Pacific islands were colonised by the United States⁵ and we in the south were colonised by Europeans. It is also unclear as to whether this definition encompasses the Indigenous peoples of the "French Pacific", including the islands of French Polynesia and New Caledonia that were colonised by France.

These multiple definitions of "Pasifika" and "Pacific peoples" group us all together to include those living in their home island nations and their diasporic kin (in the broadest relational sense) who are migrants to Aotearoa, as distinct from Māori with sovereign status as tangata whenua of Aotearoa and as partners with the Crown as encoded in Te Tiriti o Waitangi. However, there is also an historical, geographic, and cultural connection between Pasifika peoples and Māori in terms of our place in the Pacific Ocean and our shared ancestry as ocean navigators or wayfinders. Te Punga Somerville acknowledges this connection when she says that "Aotearoa is part of a geographic region and Māori are part of ancestral and ongoing stories of cross-oceanic navigation" (97). In this thesis, I focus on the Pacific Ocean and the pan-Pacific interconnections that Pacific peoples have through wayfinding technologies, to locate

⁵ See Chang Hall and Kauanui.

all Māori and Pasifika peoples from the Pacific region, including those in the North and South Pacific, in the use of the term “Pasifikafuturism”.

As a queer Indigenous woman of Fijian ancestry, I argue that the histories of Indigenous peoples and knowledge of Indigenous sciences are not always accessible in our memory because of the deliberate attempts of the colonial project to erase them in the past, present, and future. Examples of colonial attempts at this erasure abound, such as the state-sponsored policy of assimilation in Aotearoa and the requirement that mission schools teaching Māori children must use English as the language of instruction in order to receive state subsidies.⁶ Bensemman (cited in Benton) notes that Māori language was “regarded as a handicap to be literally beaten out of school children” (68). Another example is The Tohunga Suppression Act 1907, an Act of the New Zealand Parliament aimed at replacing tohunga, traditional Māori healers, with “modern” medicine. There are many other examples of colonial attempts at erasure of Indigenous peoples, too numerous to elaborate here, and the pernicious legacy of the colonial efforts to erase us is ongoing. Neocolonial projects of major powers currently at work in the Pacific today are still trying to erase not only our past but also our very existence. However, we are still here, and our stories, histories, and knowledges continue to exist. In some instances, customary knowledge and science which seem lost are recoverable and in revival. I frame my approach in this thesis within an Oceanic cultural aesthetic with a focus on customary Pacific methods of waka building and ancestral techniques of navigation known as “wayfinding”, which I discuss in more depth below. One way we survive, adapt, and evolve, is via the writing and publication of science fiction, and I believe it is possible to engage in anti-colonial mindscapes that embody the spirit of struggle and survival for Indigenous peoples in the Pacific and elsewhere on Earth.

⁶ Native Schools Act 1858.

Science fiction studies in the Western academy were brought into critical focus by the 1970s scholarship of Darko Suvin (Canavan 3). Suvin defines the science fiction genre as the “literature of cognitive estrangement” that runs from the “ideal extreme of exact recreation of the author’s empirical environment to exclusive interest in a strange newness, a *novum*” (372-373). The introduction of a *novum* is an innovation that marks a clear distinction between the science fiction world and the “real” world (Crowley 240). Canavan states that “the *novum* separates SF from mimetic (or “realistic”) fiction, which seeks to mirror reality rather than differentiate itself from reality” (3). Accordingly, Canavan’s view is that “the science of SF for Suvin-style critics is more social science than physical science; the real heart of the genre is not in force, motion, or chemical formulae, but social organization, group psychology, sociology, and economics” (2-3). Hence, the definition of “science” in science fiction depends on what counts as science.

I contend that Pacific knowledges provide an Indigenous theoretical approach to the “science” in science fiction. Pacific knowledges are our “science”, although I assert that the systematised “science” of Western definition does not fully encompass the breadth of Pacific knowledge. Customary Pacific knowledges such as storytelling, wayfinding, and waka building are part of our Indigenous “science”. Pacific cultures are dynamic, able to respond and adapt to change. The resurgence of the art of wayfinding is an example of how it is possible to recover and affirm customary knowledge, impacted by the colonial project, as an evolving, living practice.

In this thesis, I apply the recovered science of wayfinding as a methodological framework for investigating the power of Indigenous authors to wayfind “strange newness” in counter histories that envision and reweave connections between past,

present, and future through the transformative possibilities of science fiction storytelling.

For Pacific peoples, I argue that Suvin's "strange newness" is not new to us. We are well acquainted with the science fiction trope of the arrival of the aliens who kill, abduct, and take over. For us, this is not fiction—it is part of our history and our ongoing experience in the present. European colonists portrayed the Pacific to their audience in Europe as exotic isles in "a far flung sea", full of fierce cannibals who engaged in strange tattooing practices and homosexuality. These stories were propagated in speculative fiction of the time. For example, Daniel Defoe's (1719) eighteenth century homoerotic novel *The Life and Adventures Robinson Crusoe* presents colonial tropes of cannibalism and slavery.⁷ Ballantyne's (1857) nineteenth century novel *The Coral Island: A Tale of the Pacific Ocean* invokes "ferocious savages" and "Feejee islanders" with cannibalistic appetites. The publication of this type of speculative fiction, replete with racist colonial themes and bloodthirsty imperialism, fed European reading audiences hungry for the colonial adventure ethos, and played an integral part in what Tracey Banivanua-Mar (Fijian, Chinese) calls the "cultural cartography" (267) underpinning colonisation and life at the colonial frontier in the Pacific. It was in this time of literary service to the furtherance and justification of colonial incursion into the Pacific and other Indigenous lands that science fiction appeared. Anishinaabe scholar Grace Dillon notes that science fiction emerged in the "mid nineteenth century context of evolutionary theory and anthropology profoundly intertwined with colonial ideology" (*Walking the Clouds: An Anthology of Indigenous Science Fiction* 2). Dillon writes that, historically, science fiction "has tended to disregard varieties of space-time thinking of traditional societies" and to narrate the

⁷ See Jooma for further discussion on homoeroticism in *Robinson Crusoe*.

atrocities of colonialism as “adventure stories” (*Walking the Clouds: An Anthology of Indigenous Science Fiction* 2).

John Rieder states that “the thesis that colonialism is a significant historical context for early science fiction is not an extravagant one. Indeed, its strong foundation in the obvious has been well recognized by scholars of science fiction” (2). Why then would we Indigenous peoples embrace such a genre? In relation to African American descendants of Indigenous peoples of the African continent forcibly transplanted to the Americas as slave labour and the enslavers’ policies aimed at destruction of their culture, Isiah Lavender III argues that “*all* black cultural production in the New World is sf” (emphasis in original) (187).

Given the colonial context in which science fiction began, I assert that the characteristic estrangement of science fiction can be viewed as what Nalo Hopkinson refers to as one of “massa’s tools” (2), a creolised reference to Audre Lorde’s famous line that “the master’s tools will never dismantle the master’s house” (3). Hopkinson argues that “we’ve been taught all our lives how superior European literature is...it’s what we’re instructed to read, to analyse, to understand, how we’re taught to think. They gave us those tools. I think that now they are our tools, too” (7-8). Hopkinson’s conclusion is that our stories can “take the meme of colonizing the natives and, from the experience of the colonizee, critique it, pervert it, fuck with it” (9). Following Hopkinson, I posit that science fiction can be used as a tool to write about identity and culture in the afterlife of colonisation and imperialism in the Pacific. In taking the “fiction” out of science fiction, Pasifikafuturism takes its lead from its fictive kin, which will be discussed in depth in Chapter Two.

I choose to focus on Pasifika themes because I am a second-generation immigrant New Zealander of Fijian heritage, from the islands of Serua and Ono-i-lau

(on my mother's side), and Scottish and Welsh heritage (on my father's side); a diasporan Fijian born and raised in Aotearoa, New Zealand. As such, I am in the position of being what lawyer, academic, and science fiction author Ambelin Kwaymullina (Palyku) (2018) defines as a "settler" (197), albeit an Indigenous one with an understanding that I am manuhiri (visitor) and an awareness of the need to yield space to tangata whenua. In my writing I swim in a constantly shifting pool of identity, navigating many currents in order to write my "self" into existence. The complexity of my own family histories and the fact that there are many and varied ancestral currents and tides that carry me along is not unique to me as a person of mixed-race Pasifika lineage in New Zealand. The population of Pacific peoples in Aotearoa is approximately 8.1 percent.⁸ Around two-thirds of that number were born in New Zealand.⁹ Whether we are born here or not, the diasporic Pacific population in New Zealand is certainly growing.

My own family histories are a useful prism through which to view the complexities of Pasifika stories of border crossings. While I recognise and acknowledge my Celtic Scottish and Welsh ancestry, I identify most strongly with my Fijian ancestry. I was born and raised here in the Pacific and my sense of belonging and place is in the Pacific rather than in Northern Europe. This cultural identification casts me into waters where I must navigate the liminality, the "between-ness" (Refiti 2009) of being mixed-race, half caste, kai loma in Fijian, afakasi in Samoan, hafekasi in Tongan. My Fijian self-identity flows from the islands of Fiji, from the strong threads of my heritage and ancestry rooted in Fijian soil, and it is my Fijian island identity that informs my research.

⁸ See Statistics New Zealand "2018 Census Population and Dwelling Counts".

⁹ See Statistics New Zealand "2013 Census Quickstats About Culture and Identity".

The farthest island in the Fijian archipelago¹⁰ is Ono-i-Lau, one of several islands in the Lau group, and it was here that my maternal grandfather was born. Ono-i-Lau is closer to Tonga than it is to Viti Levu and it has strong links to Tonga. Ma'afu, the Tongan Prince, was a self-made Fijian Chief and, in 1869, the Lauan Chiefs agreed to grant Ma'afu the title of Tui Lau, or King of Lau (Spurway 267). Tongan language and culture pervade Lau. My Lauan relations speak both Tongan and Lauan and observe the customary cultural dress and ceremonial practices of both peoples. Therefore, I claim links to Tonga as well as Fiji. There is no border between Lau and Tonga, except on the colonisers' maps. As Epeli Hau'ofa observes

the nature of the spread of our islands allowed a great deal of mobility within the region. The sea provided waterways that connected neighbouring islands into exchange groups that tended to merge into one another allowing the diffusion of cultural traits through most of Oceania. (*We Are the Ocean* 53)

The deep connection between Tonga and Fiji exemplifies the many connections between all Pacific islands. We are ocean-going peoples.

My maternal grandmother's birthplace Serua Island sits off the coast of Viti Levu, the largest island of Fiji to where the capital Suva and the seat of the colonial government was moved from its first location in Levuka (on Ovalau to the east of Viti Levu) (Harrison 351). After the withdrawal of the colonial English government and upon achieving independence in 1970, Fijian governing structures struggled to maintain balance. Since 1987, Fiji has been subject to what Naidu refers to as a "coup culture" cycle of "election-coup-military dictatorship-election" (124). The state of government in Fiji today is effectively that of a military backed regime led by Frank Bainimarama, the

¹⁰ Fiji is an archipelago of more than 330 islands and more than 500 islets, amounting to a total area of 194,000 square kilometres of which around ninety percent is ocean and only ten percent is land (Encyclopaedia Britannica).

former head of the Republic of Fiji Military Forces and the leader of the 2006 coup— a decidedly post-apocalyptic, dystopic, political scenario.

One aspect of Indigenous Oceanic science fiction or Pasifikafuturism, which engages directly with our colonial past, is science fiction set in a post-apocalyptic dystopia. In line with Lavender’s thinking, I would go so far as to say that all Pasifikafuturism in some way references the post-apocalyptic or dystopic ravages of settler colonialism. Settler colonialism is inherently utopian with a focus on extraction, appropriation, and erasure. Sargent explains that the basic utopia settler colonials wanted to find was food, shelter, clothing and a better future. Settler colonials participated in the “sales pitch”, in “being conned” that they were heading to a future which was “plausible but really too good to be true”. As Sargent notes, “most stayed in the colonies and imposed a European culture on the earlier inhabitants or got rid of the earlier culture by killing the inhabitants” (200-201). Whiteness is integral to settler colonial utopia and produces dystopian conditions for the Indigenous peoples in those lands, actively working to erase us in order to install settler futurity. Accordingly, the focus on the post-apocalyptic and the dystopian is simply a reflection of our lived past and present, our reality, and we write about it.

Examples of post-apocalyptic and dystopic science fiction by Indigenous Pacific authors include Albert Wendt’s novel *Black Rainbow*, an allegorical thriller set in a dystopian future, which satirises the Rainbow Warrior bombing; Chris Baker’s novel *Kokopu Dreams*, which is a spiritual quest for utu (revenge) set in a post-apocalyptic pandemic dystopia; and Ambelin Kwaymullina’s young adult trilogy *The Tribe*, which is set in a dystopian future in Australia. This post-apocalyptic, dystopic focus reveals the reality for Indigenous peoples living with the ongoing effects of the brutal incursions of settler colonialism over the past 500 years in Oceania and the effects of

neocolonialism in the present day, where climate change is threatening the very existence of low-lying Pacific nations.

Colonial practices of extraction, appropriation, and erasure continue today in the Pacific. We only have to look at the US government's treatment of the Marshall Islands, destroying islands and lagoons and contaminating the environment with radiation from sixty-seven nuclear weapons' tests between 1946 and 1958. The US government forced the people of Bikini Atoll and Enewetak off their islands prior to the detonation of a fifteen-megaton hydrogen bomb named "Castle Bravo" in 1954. Bikinians were moved to Kili in the south where they had no ancestral ties to land and no nearby reef to fish, starving them in the process. Other Marshallese, like those on Rongelap, were exposed to radiation fallout from Castle Bravo. The US military continues with missile tests in the present, by sending intercontinental ballistic missiles from the US mainland to Kwajalein Lagoon. The people of Kwajalein can no longer fish in the lagoon due to the toxic poison from the missiles. The Compact of Free Association between the US and the Republic of the Marshall Islands provides the US with the ability to use this lagoon as a missile testing range until 2066 with an option to use it until 2086 (Underwood 11). In the 1970s, the US government deposited 73,000 cubic metres of contaminated radioactive topsoil on Runit Island (in Enewetak Atoll) and covered it with a 46cm dome of concrete known as the "Runit Dome". The dome has cracked and leaks radioactive material into the environment (Hamilton). At the end of the Second World War, the Pacific Phosphate Company made the people of Banaba in Kiribati give up their island, moving them to the Fijian island of Rabi. From 1900 to 1979, the company (then owned by the governments of the United Kingdom, Australia, and New Zealand), strip-mined away 90% of the surface of Banaba. The company also strip-mined 80% of the surface of the nearby island of Nauru for phosphate (Williams and Macdonald). In

the 1960s and 1970s, New Zealand was involved in ongoing protests against French nuclear testing on Mururoa Atoll in French Polynesia. We still live with the effects of these neocolonial and recolonising environmental catastrophes in the Pacific.

Extraordinarily high rates of diabetes, cancer and other illnesses afflict Indigenous Oceanic peoples in the wake of these ecological tragedies, not to mention the destruction of our culture, history, food, lands, fisheries, and seas.

To say that we have lived through the apocalypse and are now surviving in a post-apocalyptic, dystopic present, places us directly within a narrative found in science fiction. Dillon notes that science fiction is a terrain in which Indigenous peoples can confront colonialism and neocolonialism with the warrior ethic that Taiaiake Alfred urges us to embrace as “thinkers, teachers, writers, and artists” (*Walking the Clouds: An Anthology of Indigenous Science Fiction* 3). What better form than science fiction for envisioning and navigating our future, for resistance, and writing beyond Empire? It is crucial to move past postcolonialism (which writes back) toward wholly Indigenous forms, and I argue that Indigenous writers are doing this already in 2020. Science fiction is an excellent form to keep extending the narrative, to confirm not just our existence but also our vitality, our growth, and the essence of our cultural selves.

My focus in this thesis is on Indigenous science fiction set in space. I will chart an alternative cartography for the Pacific Ocean and interstellar space as metaphors for each other. In Indigenous value systems, the high seas and outer space are not seen as aqua nullius or spatio nullius as the West views them. They are spaces of connection and relationship. In trying to find science fiction space stories written by Māori and Pasifika authors, I have looked to the many short stories and novels written by Indigenous Oceanic authors in the speculative fiction genre, in addition to those

mentioned above.¹¹ However, with the exception of Ihimaera's novella *Dead of Night* and Katerina Mataira's novels *Te Ātea* (1975) and *Ngā Waituhi o Rēhua* (2012), which are written in te reo Māori, and are therefore inaccessible to me, there is a marked absence of Māori or Pasifika-authored science fiction set in space. Accordingly, I have chosen to explore my research questions through a close reading of Ihimaera's novella *Dead of Night* and Nnedi Okorafor's novella *Binti*.

Ihimaera's novella *Dead of Night* is a post-apocalyptic story set entirely in space. The novella first appeared in 2006 in *Are Angels OK?: The Parallel Universes of New Zealand Writers and Scientists*, an anthology edited by scientist Paul Callaghan and writer Bill Manhire. The editors aim was to put ten of New Zealand's leading imaginative writers together with ten physicists to see what would happen, what "collaborations and collisions might take place" (12). Ihimaera worked with physicist Howard Carmichael and cosmologist David Wiltshire in creating the story *Dead of Night*. The text that I explore in this thesis is taken from Ihimaera's 2007 collection *Ask the Posts of the House*.

In his author's notes accompanying the 2007 text, Ihimaera states that the story could be about three possible scenarios:

1)... a man, lost in the mist, who comes across five people he has seen before in a dream, and his dream is about being on a spaceship called the *Endeavour* journeying to the end of time and space, or 2) ...a story about six people travelling to the end of the universe ... [or] 3) ... a story evolving out of a man's brain at the moment of death (300-301).

¹¹ For instance, Witi Ihimaera's novel *Sky Dancer* and short story "The Thrill of Falling"; Albert Wendt's *The Adventures of Vela*; Lani Wendt Young's *Telesa* series: *The Bone Bearer*, *I am Daniel Tahī*, *Telesa: The Covenant Keeper*, and *When Water Burns*; Bryan Kamaoli's steampunk story in Witi Ihimaera and Tina Makereti's collection *Black Marks on the White Page*, "Ke Kāhea: The Calling" (249); and Nic Low's collection *Arms Race* which contains a number of futuristic stories including "Facebook Redux".

Whatever ending a reader chooses, Ihimaera notes that he wrote two endings for the story, both of which appear in *Are Angels OK* and *Ask the Posts of the House*, with the alternative ending appearing in the author's notes of each publication. Ihimaera names the ending that appears in *Are Angels OK* an "interventionist 'second chance' ending". This ending proceeds along a more linear conception of time. The ending appearing in *Ask the Posts of the House* is the original one Ihimaera wrote, which he calls a "circular ending" (301). This ending has a more cyclical conception of time, which says that if you travel to the end of the universe, you will inevitably return to your beginning. A cyclical conception of time is not a new concept for Indigenous Pacific peoples. Hau'ofa describes the Fijian notion of circular time as the past "going ahead of us, leading into the future, which is behind us" (*We Are the Ocean* 67).

The other text I will examine is Nnedi Okorafor's novella *Binti*, the first book in *Binti: The Complete Trilogy*. Binti, the main character of the series, is a young woman from the Himba Indigenous tribe of Namib. Binti's tribal affiliation is central to her character as she travels into space to go to university on the planet Oomza. She is a mathematical genius and scientist and uses her Indigenous knowledge of tribal technologies to survive and broker communication between species at war. The Binti series is set in a post-apocalyptic, "post-climate change Africa embroiled in regional and interstellar conflict" (Crowley 237). By centring Indigenous people and a Himba woman as protagonist, the Binti series challenges what Okorafor calls the "ancestral bloodline" of science fiction, being "Western-rooted science fiction, which is mostly white and male".¹²

Okorafor refers to herself as a "Naijamerican (Nigerian American), a Diasporan and an Africanfuturist".¹³ She draws a distinction between Africanfuturism and

¹² See Okorafor "Sci-Fi Stories That Imagine a Future Africa".

¹³ See Okorafor "Africanfuturism Defined".

Afrofuturism. Africanfuturism is specifically “rooted in African culture, history and point of view as it then branches into the Black Diaspora, and it does not privilege the West”. Afrofuturism, on the other hand, is concerned with African American themes relating to “those who are direct descendants of the stolen and enslaved Africans of the transatlantic slave trade”. Okorafor was born and raised in the US, and her parents were born and raised in Nigeria. She travelled to Nigeria from a young age “to meet and connect with family”.¹⁴ In speaking about where she draws her inspiration, Okorafor states, “I follow my muse and my muse is definitely from my father’s hometown of Arondizuogu, Nigeria”.¹⁵ Okorafor’s experience has some parallels with my own as a second-generation immigrant of Indigenous Pacific ethnicity in Aotearoa, and as an author who wishes to privilege Pacific culture over that of the West.

1.1. Methodology

I use a mix of methodologies in this thesis to delineate my cultural context as a diasporic, kai loma Fijian living in Aotearoa. By way of this mixed method, qualitative research, I am reconstructing existing methodologies through my Indigenous lens to examine our telling of science fiction story. Certain elements of Pacific culture and particularly Fijian values and concepts are central to my research. Unaisi Nabobo-Baba provides an explanation of the importance of Fijian research elements in her formulation of the Fijian Vanua Research Framework (Fijian VRF). This framework is an Indigenous theoretical approach which “borrows from critical theory and Kaupapa Māori theorising and is inspired by Tongan Kakala framing”. The Fijian VRF is framed and “embedded in indigenous Fijian world views, knowledge systems, lived experience,

¹⁴ See Okorafor "Interview with Nigerian Newspaper, the Daily Trust".

¹⁵ Ibid.

representations, cultures and values. It gives power and recognition to things Fijian...The philosophy behind Vanua Framing is one of the interconnectedness of people to their land, environment, cultures, relationships, spirit world, beliefs, knowledge systems, values and God(s)” (143). As Nabobo-Baba suggests, where Fijians do not live in the vanua or live outside Fiji, they may find that the “Fijian VRF needs to be used with other methodologies (multiple methodologies) to address appropriately their research questions and their realities, as has been suggested in the case of Kaupapa Māori Research” (153). Linda Tuhiwai Smith writes that:

indigenous methodologies are often a mix of existing methodological approaches and indigenous practices. The mix reflects the training of indigenous researchers, which continues to be within the academy, and the parameters and common sense understandings of research which govern how indigenous communities and researchers define their activities (144).

In my position as a diasporic Fijian living outside Fiji, I open a dialogue in this thesis about Pasifikafuturism using a mix of Indigenous methodologies and theoretical approaches including storytelling, talanoa, envisioning the future, and dialectic or tidalectic theory. To guide these approaches, I work with the Micronesian etak navigational system of moving references, also known as “wayfinding”, as a research philosophy to frame the work. I employ this mixed research agenda to shine a light on the importance of the Pacific Ocean to Indigenous Pacific peoples through a cultural and historic lens, and to engage in postcolonial discourse that writes back to and beyond Empire. Tuhiwai Smith notes that this kind of postcolonial literature “assumes that the centre does not necessarily have to be located at the imperial centre... the centre can be shifted ideologically through imagination and... this shifting can recreate history” (37).

In this thesis I put the methodology of wayfinding into dialogue with the expression of Pacific peoples in the present, through future imaginaries in the form of a science fiction story set in space. Storytelling is an integral element of Pasifika culture. Some of our most important legends are stories of our ancestors' epic journeys of navigation across the Pacific Ocean. These legends contain customary knowledge and technologies passed down through the generations by oral storytelling. For example, the legend of Maui hauling the North Island up out of the ocean is oral history of ancestral science when looked at through the theory of wayfinding. As Barclay-Kerr notes, this legend provides a metaphor for exploration and discovery, in that Maui's skill as a fisherman enabled him to pull lands such as Aotearoa out of the sea (87, 90). I look to this customary knowledge to provide a Pacific methodological framework for engaging with Indigenous science fiction literature as a means of creating transformative Indigenous imaginaries in the present.

1.1.1. Tidalectics

Turning to Kamau Brathwaite's neologism "tidalectics", DeLoughrey (2010) in her postcolonial study of literatures of diaspora in the Caribbean and Pacific islands, explains the term as being a "vision of fluid time-space" which has "much in common with the Pacific wayfinding system of moving islands, named 'etak' in the Caroline Islands of Micronesia" (3). This Pacific style of ocean navigation is different to the Western reliance on instrumentation. Wayfinding moves through space on the water rather than hovering above the sea, as required by the two-dimensional Western view needed in the use of maps. DeLoughrey notes that "Pacific navigators have developed a complex system of charting a vessel's movement through space where the voyaging canoe is perceived as stable while the islands and cosmos move towards the traveller"

(Routes and Roots: Navigating Caribbean and Pacific Island Literatures 3).

DeLoughrey uses Brathwaite's theory of "tidalectics" as a methodological tool to provide "a framework for exploring the complex and shifting entanglement between sea and land, diaspora and indigeneity, and routes and roots" (*Routes and Roots: Navigating Caribbean and Pacific Island Literatures 2*). DeLoughrey (2019) extends this methodology to put the social sciences and the humanities into dialogue, in order to ground the Anthropocene in specific places such as postcolonial islands (*Allegories of the Anthropocene*). The tidalectic methodology is an apt framework for examining the metaphorical relationship between the Pacific Ocean and interstellar space, as it requires what DeLoughrey refers to as a "multiscalar method of telescoping between space (planet) and place (island) in a dialectic or 'tidalectic' way to see how they mutually inform each other" (*Allegories of the Anthropocene 2*). Hessler notes that Brathwaite's formulation of "tidalectics" provides an "oceanic worldview" that joins the steadiness of land with the rhythmic fluidity of water and the tides (31). As stated by Lewis, "Etak is a polydimensional system that involves both direction and time, and therefore movement. The etak conception of moving islands is an essentially dynamic one" (142). The "tidalectic" and "etak" approaches can be shifted into a Pasifikafuturism frame if we consider the polydimensional aspect of science fiction that may be developed from Pacific conceptions of Oceanic space and time, as exemplified in wayfinding theory.

1.1.2. Wayfinding

Waka builder and master navigator Hoturoa Barclay-Kerr defines wayfinding as "the ability to travel across thousands of miles of ocean safely and efficiently, using nothing but the ancestral knowledge of the past and the clues provided by nature to find land far below the distant horizon" (88). I use wayfinding theory as an intersection of

methodology and an organising conceptual metaphor in this thesis. Wayfinding techniques are cultural knowledge that come from connection and relationship with the environment that enabled our ancestors to navigate across vast spaces without the aid of modern tools or technology, using the stars, the sun, the moon, wave patterns and the ocean environment. These Indigenous navigational techniques, as applied by the famous navigator Kupe and our ancestors, are variously termed “celestial navigation”, “Pacific navigation”, “wayfinding” and “etak”. Barclay-Kerr writes that in Māori histories Kupe found New Zealand. However, in later life, Kupe “returned to his island homeland to share information with his relatives and they utilized this knowledge to return to Aotearoa, New Zealand on *deliberate* voyages of settlement” (emphasis in original) (87-88). Barclay-Kerr mentions that, despite Captain Cook and other early European explorers documenting their observations of the remarkable maritime ability and canoe use of Pacific peoples, our navigational abilities were consigned to myth and legend. European scholars viewed us as “people with stone age technologies” and did not believe that we could possess “the ability or knowledge to sail deliberately and safely on two way voyages of more than a few hundred miles” (Barclay-Kerr 87).

The key principles underpinning wayfinding, which are employed in the methodological approach of this thesis, are set out by Spiller et al. in *Wayfinding Leadership*. Spiller et al. scrutinise the principles of leadership embedded in the customary practices of Pacific navigators and apply those principles in order to teach and develop Pacific wayfinding leaders. These principles include: “sphere intelligence”; the “philosophy of recognition”; the idea that “the waka is the needle”; and the concept that “the island comes to you”.

1.1.3. Sphere intelligence

Wayfinding operates on what Spiller et al. call “sphere intelligence” (23), which together with the “philosophy of recognition” is about relating to and responding to the world (130). Spiller et al. note that “successful wayfinding depends on everybody on the waka having alertness of the mind, wakefulness in the heart, being attuned in the spirit, and grounded in the belly. It involves a responsiveness, detailed and disciplined engagement with an unfolding and continuously changing environment” (7-8). Spiller et al. go on to explain that the sphere belongs to a “multi-dimensional world – a world of interiority as well as exteriority” (23). Using sphere intelligence, an effective wayfinder “will tap into multiple sources of knowledge and information” including:

recognition of multiple ways of knowing; roundedness and holism; appreciation of a process of unfolding and a cyclic approach, not just the linear; capacity to be with uncertainty, mystery and the unknown; attention to process; and understanding the relationship between things (23).

The sphere intelligence of wayfinding or etak means that a navigator must use all their faculties and all the information around them. They must “dwell creatively in the world” and respond to signals directly (36). I use the approach of sphere intelligence to survey the literary environment in the literature review section of this thesis.

1.1.4. Philosophy of recognition

Spiller et al. note that, rather than viewing the world from the bird’s eye view of Western maps, a two-dimensional “square intelligence”, the navigator is guided by a “philosophy of recognition” (33). The philosophy of recognition requires a wayfinder to recognise many elements received from the environment around them in order “to build a multi-perspective understanding of a situation” (Spiller et al. 22). The wayfinder must

sit within the environment on the waka, on the sea, directly processing and responding to all information received, reading the signs including their own emotions and feelings, information from the crew, course, speed, current, winds, clouds, light, stars, planets, fish, streaks of phosphorescence that indicate land mass, homing birds etc., to show them the way. These signs provide valuable information for the wayfinder to “draw the destination to them and make landfall” (Spiller et al. 7-8).

In Chapter Two, I shift the principles of sphere intelligence and the philosophy of recognition into the literary environment, to observe and recognise multiple ways of understanding Indigenous conceptions of the future. Using these principles enables me as an Indigenous researcher to sit within an Indigenous literary waka and take readings from the literary environment around me in order to assess the current position of science fiction production and consumption by Māori and Pasifika peoples and the Pasifikafuturist destination I am seeking.

1.1.5. The waka is the needle

Spiller et al. observe that “in wayfinding, the world is your compass— and you and the waka are the needle” (35). The navigator and the waka are one. Instead of the waka moving, the world moves around the waka, like sitting on a train when “you and the train are one item, and as you look out the window, the world is flying past you” (35). Similarly, the position of the waka is regarded as fixed beneath the star points. The wayfinder’s job is to remain still and “calibrate against the signs” around them in the world (Spiller et al. 35). Hutchins notes that Etak navigators from the Caroline Islands have combined fourteen named star paths with the position of Polaris to form a sidereal compass that defines thirty-two directions around the circle of the horizon (195). This

star compass is an abstraction that the wayfinder can construct mentally from a glimpse of only one or two stars near the horizon.

I use this concept in Chapter Two to calibrate the literary waka of Pasifikafuturism and those who sail in her, as a metaphoric needle that takes its positional reading from the Indigenous and Western constellations of fixed stars within the literary firmament. These stars include literary text, theory, and academic discourse by authors such as Teresia Teaiwa, Albert Wendt, Epeli Hau'ofa, Toni Morrison and others.

1.1.6. The island comes to you

In the practice of wayfinding, there is a difference in perception between Pacific conceptions of navigation and those of the West, in relation to the position of the navigator on the vessel. In wayfinding navigation, islands move on the sea around the waka and the navigator who remain stationary. In this etak system of moving references, the islands may be out of sight beyond or below the horizon, but wayfinders hold the past home base of departure and the future destination in the present intention, in what Spiller et al. describe as the “eternal present” as they move towards landfall in the future (24). This approach allows the wayfinder to be in the present and respond to signals around them creatively while moving to their future destination. As observed by Spiller et al., “this navigational technique is very different to the Western system, which tends to place great faith and emphasis on maps and charts” (37). Spiller et al. explain that the wayfinder’s world is one of “*be-coming* – which is very different to the usual model, which has us always going somewhere between a static world of fixed things – a *be-going* approach” (emphasis in original) (36). As such, the way towards your destination may not necessarily be linear as you adjust to signs around you.

Hutchins writes that “the Micronesian technique is elegant and effective. It is organized in a way that allows the navigator to solve in his head, problems that a Western navigator would not attempt without substantial technological support” (223). DeLoughrey (2010) notes that “this wayfinding concept of moving islands has provided an innovative model for approaching the intersections of Indigenous and cultural studies” (3). DeLoughrey invokes the interlinked concepts of tidalectics and moving islands as postcolonial seafaring and as “a metaphor for navigating a course that is not overdetermined by the trajectories of western colonization” (*Routes and Roots: Navigating Caribbean and Pacific Island Literatures* 3). This metaphor provides an effective methodological framework for the development of Pasifikafuturism. Using this metaphor, Pasifikafuturist text may plot its own course, taking into account all that is available in the present literary sphere and, while remembering our Indigenous Pacific values and our past, calibrating our position towards a future literary destination.

Wayfinding requires the wayfinder to hold in mind the destination of the waka and to envision the future landfall, even though it is out of sight below the horizon. Gregory Cajete writes that “dream and vision are an integral dimension of artistic creation. For Indigenous people, there exists a huge body of belief regarding the nature of dreams and visioning” (142). Cajete echoes the notion of “sphere intelligence” as formulated by Spiller et al. in stating that “American Indians symbolically recognized their relationship to plants, animals, stones, trees, mountains, rivers, lakes, streams, and a host of other living entities. Through seeking, making, sharing, and celebrating these natural relationships, they came to perceive themselves as living in a sea of relationships” (74). Cajete’s words also resonate with Hau’ofa’s delineation between the European conception of the Pacific as “islands in a far sea” and the conception of Indigenous peoples of the Pacific as inhabitants of “a sea of islands”. Cajete states that

“from the vantage point of that visionary mountain top, we have the opportunity to envision, regardless of cultural orientation, our most basic sense of identity to our environment” (92). As Daniel Heath Justice says, “we can’t possibly live otherwise until we first *imagine* otherwise” (156) (emphasis in original). These thoughts from Cajete and Justice embody a wayfinding perspective that calibrates a present visualisation of an Indigenous future.

Spiller et al. further note that “wayfinders seek to recognise the invisible – to reveal what might remain hidden – by being in a state of readiness and response-ability, being able to respond with wisdom and discernment and not merely being reactive” (17). One can move the ability to see the invisible into Pasifikafuturist science fiction production and consumption as both are rare—which is not to say they do not exist. I sit in the present, in 2020, with a view towards increasing the production and consumption of Pasifikafuturist science fiction text for, by, and about Māori and Pasifika peoples in the future.

1.1.7. Recovered knowledge

Our ancestral navigational practices, together with the building of double-hulled ocean-going waqa, were thought to have faded into distant memory. However, they have recently made a remarkable comeback in a pan-Pacific effort of cooperation which speaks to our regional Indigenous relationships and interconnectedness. Despite the incursions of the colonial project into Pacific culture, our wayfinding lore has endured. This is due to the teachings of one man: Papa Mau Piailug, a master navigator from Micronesia who spent his life teaching a dedicated group of students the art of wayfinding, which led to its revitalisation and recovery. Many voyaging waka have been built throughout the Pacific as a result of Papa Mau’s teachings, and many

successful wayfinding voyages have been completed between Aotearoa, Hawaii, Rapa Nui, Samoa, Tahiti, and San Francisco. The art of “wayfinding” was literally fished back up out of the ocean in the same way that Maui fished up the North Island of Aotearoa.

The waka is an Indigenous Pacific technology shaped by the Pacific Ocean environment, and an inscribed container of cultural knowledge, equalling any Western models of physics. As painter and author Herb Kane says, the waka is “at the heart of the web of Polynesian culture”. Without the waka, “the culture would not exist, nor the people”. Kane describes the waka as a “symbol of the mutuality of all Polynesian peoples [and their] common origins and their common ancestry.” He goes on to say that “we see [waka] in the context of the Polynesian culture as a spaceship. You could really call it the spaceship of our ancestors, because with it, they made explorations that were, in the context of their culture, just as staggering as our effort to go to the moon and other planets today.” The recovery of our customary navigational and waka building techniques has brought about a pan-Pacific revival of wayfinding that defies Western dismissal of Indigenous science. In 1976 Hokule’a, a double-hulled ocean-going waka, sailed from Hawaii to Tahiti following customary ocean pathways without the aid of modern instrumentation. Barclay-Kerr notes that Hokule’a’s inaugural voyage marked “the first step in the reawakening of a dying Pacific practise” (88).

In 2019, as part of the controversial marking of the 250th anniversary of the first onshore encounters between Māori and Captain James Cook and the Endeavour crew, a flotilla named “Tuia 250”, comprising three Pacific waka (two waka hourua from Aotearoa and a va’a tipaerua from Tahiti) and three tall ships, sailed around Aotearoa. The controversy surrounding this commemoration arises from the fact that the English Crown sanctioned Cook’s voyage under the doctrine of discovery. Māori commentators

such as human rights lawyer, Moana Jackson, contest the validity of the commemoration as really being “about power and the Crown restating the authority that it has always assumed over Māori since Cook’s alleged discovery” (Ngata 47).

The Tahitian va’a, Fa’aaitē, sailed from Tahiti to Aotearoa to take part in Tuia 250, carrying with them the spirit of Tupaia, Captain Cook’s Tahitian advisor. Fleet kaitiaki, Jack Thatcher, in discussing the customary navigation techniques used by the crew of Fa’aaitē in their voyage to Aotearoa, said that “we call it celestial navigation, but it would be more accurate to call it Pacific navigation because it’s a knowledge that’s been gained over thousands of years of our tupuna sailing through the Pacific. It’s not just about the stars, the moon and the sun, it’s about the whole environment and how you are able to attune yourself to the environment in terms of signs” (Radio New Zealand).

I posit a Pasifikafuturist methodology in the production and reading of Pasifikafuturist text when steering the literary waka of science fiction. Such a methodology relies on being present in the current reality for Pacific peoples— already a lived “strange newness” imposed upon us— while retaining our memories and being aware of our past knowledge and experience of the ongoing effects of colonisation as we move into the future. What, then, is the home base for Pacific peoples in this journey? Home base for us is family, culture, land, language, the sea. I envision a mental map of the journey from home base as a reference point. We are constantly updating in terms of our present time and place. We are wayfinding future imaginaries that include us, even though aspects of that future, such as our presence in literary genre like space stories, may be out of sight below the horizon.

I argue that a Pasifikafuturist viewpoint does not conflict with Suvin’s definition of science fiction. Pasifikafuturism provides an Indigenous platform for analysis of

social science that encapsulates and comments on the reality of the present moment for Pasifika peoples. At the same time, a Pasifikafuturist point of view makes it possible to create a transformative “novum” that privileges our culture and imagines a future where we continue to exist and thrive.

1.2. Chapter structure

The mix of methodologies I rely on in this thesis provides a research framework from which to represent, acknowledge and honour Pacific peoples, our values, knowledge and power. Within this critical framework, I undertake a close reading of Ihimaera’s novella *Dead of Night* and Nnedi Okorafor’s novella *Binti*, both of which I argue are representations of an Indigenous conception of the future.

Chapter Two – “Locating Pasifikafuturism within the literary sphere” defines and explores where and how to situate Pasifikafuturism. It proposes a place for the values and cultural knowledge of Pacific peoples in the writing of science fiction. Pasifikafuturism is positioned in a tidalectic talanoa with other futurisms of Black peoples, Indigenous peoples, and people of colour who take up the opportunity afforded by science fiction to imagine stories which write back to and beyond the hegemonic forces of colonialism and neocolonialism. Pasifikafuturism is defined and located within a critical talanoa inspired by and situated alongside other Alternative Futurisms.

Chapter Three – “Witi Ihimaera steers the doctrine of discovery into the Māori space-time continuum of Te Kore” examines how Ihimaera mirrors Captain Cook’s colonial journey of discovery in the Pacific against a science fiction journey to the end of the universe. This chapter also investigates the conception of space from a Pasifikafuturism point of view in terms of the concept of the *vā* as set against the Western concept of *terra nullius*, *aqua nullius*, or *spatio nullius*. Finally, it explores how

Ihimaera employs technology in depicting navigation through space and the similarities and parallels this draws with navigating or wayfinding across the Pacific Ocean.

Chapter Four, titled “Envisioning the dream of the Indigenous woman in Oceanic space in Nnedi Okorafor’s *Binti*”, explores Okorafor’s depiction of the Indigenous woman as having technological power in the science fiction setting of interstellar space. A close reading is conducted of Okorafor’s novella *Binti*, which appears as the first novella in the collected trilogy published as *Binti: The Complete Trilogy*. This chapter investigates how Okorafor privileges Indigenous culture and identity to reenlist the science of Indigeneity. Furthermore, this chapter also examines the thematic and metaphoric parallels between space and the ocean that Okorafor draws through setting, character, and dialogue in her *Binti* novella. Finally, it analyses the representation of Binti as an Indigenous woman leader who uses Indigenous science, knowledge, technology, and transformation, to survive.

Chapter Two: Locating Pasifikafuturism within the literary sphere

We sweat and cry salt water, so we know
that the ocean is really in our blood.

–Teresia Teaiwa, quoted by Epli Hau’ofa

In this chapter the concept of “Pasifikafuturism” is defined and located within the literary sphere. That sphere is a world of robust production of scholarly writing, discourse, and art that has already occurred and continues to grow in the fields of Afrofuturism and Indigenous Futurisms. I first heard the term “Pacific Futurist” when listening to a two-part podcast entitled “Aotearoa Futurism: Space Māori and Astronesians”¹⁶ in which Sophie Wilson and Dan Taipua discuss the question of the existence of futurism in Aotearoa. Wilson and Taipua name Afrofuturism as the place “where science fiction and technology meets popular culture of the African diaspora” and they question whether it could be happening in Aotearoa too. The podcast explores whether the discourse of Afrofuturism may be mapped onto the work of Māori and Pasifika artists including hip hop musicians Che Fu, DLT, and Nesian Mystic; psychedelic rock musician Billy TK (the “Māori Hendrix”); the electric pop of Poi E; teen thrash metal band Alien Weaponry; science fiction film such as Taika Waititi’s directorial work in *Thor Ragnarok*; multi-media artists such as Coco Solid and Lisa Reihana (particularly her work “In Pursuit of Venus”); and Mara TK’s space Māori poetry. What is clear from the podcast is that Māori and Pasifika artists are using futurism, technology, and science fiction in their work and have done so for some time.

¹⁶ See Wilson "Aotearoa Futurism Part One " and Wilson "Aotearoa Futurism Part Two".

In this thesis I explore reasons for the seeming absence of both critical attention and creative writing in the genre of science fiction by Māori and Pasifika writers especially in respect of space stories. I pay critical attention to that absence and through the creative portion of this thesis I add to the creative production of science fiction. What has become plain from my research is that Indigenous Pacific science fiction is difficult to define and categorise. It is, as poet Karlo Mila notes, a transformation of classic science fiction via Indigeneity.¹⁷ As Alessio mentions, the genre of science fiction in general in Aotearoa has received little critical attention and “such oversight is even more pronounced for those science fiction works produced by Māori and Pacific Island authors” (257).

Who are the forerunners and visionaries of Pasifikafuturism in science fiction production and what is their focus? The emphasis in the above-mentioned podcasts, on Māori and Pasifika musicians’ use of technology in sonic art, mirrors the use of technology in the music of African American musicians such as Jimi Hendrix and jazz musician, composer, and writer Sun Ra. Both musicians are founding ancestors of Afrofuturism, even though their work predates the coining of the term “Afrofuturism” by academic Mark Dery in 1994. Ytasha Womack notes that “the roots of the aesthetic began decades before, but with the emergence of Afrofuturism as a philosophical study, suddenly artists like avant-garde jazz legend Sun Ra, funk pioneer George Clinton, and sci-fi author Octavia Butler were rediscovered and reframed by Afrofuturists as social change artists” (17). Similarly, it is possible to cast the Māori and Pasifika artists mentioned above as forerunners of a nascent philosophical study of “Pasifikafuturism”, together with Māori and Pasifika authors of science fiction such as Katarina Mataira, Albert Wendt, Witi Ihimaera, Chris Baker, and others.

¹⁷ See Wilson "Aotearoa Futurism Part Two".

Although there are few works of long-form science fiction written by Māori and Pasifika authors, the roots of a Pasifikafuturist aesthetic are already in place. In the works that do exist, there is an understandable focus on post-apocalyptic, dystopian settings and themes.¹⁸ I say understandable because such writing reflects our colonial past and its ongoing effects on Indigenous peoples in the present. I view the common thematic approach of Māori and Pasifika science fiction, towards the apocalypse, as a turn towards an allegorical Indigenous navigation of the last five hundred years of brutal colonialism and imperialism, which continues into the present day. As Daniel Heath Justice (2018) writes, “our apocalypse isn’t a singular event, it’s an ongoing and relentless process, not unlike settler colonialism itself” (168). In this thesis, I attempt to shift the focus slightly from “the apocalypse” to Indigenous technologies and science fiction set in space, encompassing space travel and Pacific science and technology.

I turn my attention to space travel set against and within Pasifika values and concepts, both in the creative and critical portions of this thesis. I am interested in Indigenous people travelling into space and I agree with Lou Cornum (Diné) (2015) who asks, “why can’t indigenous peoples also project ourselves among the stars? Might our collective visions of the cosmos forge better relationships here on Earth and in the present that colonial visions of a final frontier?” Why shouldn’t we, Māori and Pasifika writers, imagine ourselves doing it differently, without extractive, exploitative, violent objectives but with respectful and harmonious relationships? As Cornum asserts, “outer space, perhaps because of its appeal to our sense of endless possibility, has become the imaginative site for re-envisioning how black, indigenous and other oppressed people can relate to each other outside of and despite the colonial gaze”. In this statement,

¹⁸ For example, Wendt’s novel *Black Rainbow*, Ihimaera’s novel *Sky Dancer* and Chris Baker’s novel *Kokopu Dreams*.

Cornum is heralding a turn from historical narratives of white hegemony toward a building of collective change driven by freedom of imagination for Indigenous peoples.

Cornum creates the figure of the “space NDN” in discussing the presence of Indigenous people in space. She questions the separation of Indigenous peoples in the colonial imaginary, not only from the present but also from a place in the future. Cornum states that “for many the image of the Indian in space is jarring not just because of the settler perception of indigeneity as antithetical to high tech modernity, but because Indian identity is tied so directly to specific earthly territories”. This perception tying us to place is a form of erasure in respect of those of us forced from our lands or who move away. We Pasifikafuturist authors still ground our writing in our Indigenous cultural viewpoint even when the Pacific diaspora is an imagined space diaspora. As Cornum notes, “the space NDN looks into the void and knows still who they are”.

In this thesis, I reclaim and recreate space for talking about decolonial futures through the imaginary possibilities that science fiction offers, and I place Indigenous people at the helm when navigating through the space-time continuum. This is a vital position to take when Māori and Pasifika peoples are not currently represented in a meaningful way in the genre of science fiction. To be excluded from such a huge area of cultural production is another form of colonial erasure. My critical and creative production of Pasifikafuturist theory and story goes some way to remedying this gap.

2.1. Recognising Pasifika notions of time and space

How do we recognise the characteristic elements that make up Pasifika notions of time and space? It is important to recognise the central importance of the sea to the cultures of the Indigenous peoples of the Pacific, as encapsulated in the epigraph by Teresia Teaiwa at the beginning of this chapter. Epli Hau’ofa notes that “the sea is our most

powerful metaphor, the ocean is in us” (*We Are the Ocean* 58). Geographically, the Pacific Ocean is the largest and deepest of Earth’s oceanic divisions, a vast area covering about 46% of Earth's water surface and about one-third of its total surface area, making it larger than all of Earth's land area combined.¹⁹ As Wendt (1976) famously wrote,

so vast, so fabulously varied a scatter of islands, nations, cultures, mythologies and myths, so dazzling a creature, Oceania deserves more than an attempt at mundane fact; only the imagination in free flight can hope – if not to contain her – to grasp some of her shape, plumage and pain” (“Towards a New Oceania” 9).

I take my cue from Wendt when sending my imagination into free flight in the creative and critical sections of this project, by centring Indigenous Oceanic principles in the work.

How do Pacific peoples view space? Airini, Anae and Mila-Schaaf refer to the pan-Pacific notion of va—or vā, va’a, vaha—which “can be loosely translated as a spatial way of conceiving the secular and spiritual dimensions of relationships and relational order, that facilitates both personal and collective well-being, and teu le va as the ‘valuing’, ‘nurturing’ and ‘looking after’ of these relationships to achieve optimal outcomes for all stakeholders.” In Tongan culture “vā” literally means “space” (10).

Airini et al. cite Ka’ili who states that

the word vā is not unique to Tonga, for cognates are found in many Moanan languages. Vā can be glossed as ‘space between people or things’. This notion of space is known in Tonga, Samoa, Rotuma, and Tahiti as vā, while in Aotearoa and Hawaii it is known as wā. Vā (or wā) points to a specific notion of space, namely space between two or more points (11).

¹⁹ See Encyclopaedia Britannica.

Vā is defined by Wendt as “the space between, the between-ness, not empty space that separates, but space that relates, that holds separate entities and things together in the Unity-that-is-All, the space that is context, giving meaning to things” (cited by Refiti 209). Accordingly, vā can denote the space between two people or two islands or two planets and in Pasifika culture it is a space that needs to be nurtured and cared for.

The Western view of the Pacific, as portrayed on the map of the world, is often viewed through the Mercator projection, based on a map which dates to 1569 by the Flemish cartographer Gerardus Mercator. This is the traditional flat map of the world that hangs in most classrooms today. Haverhals and Roscoe state that the Mercator projection (see Figure 2-1) was used by sailors and cartographers during “the age of discovery” (357) (a euphemism for colonisation and imperial conquest of Indigenous peoples) and “is still widely used in navigation today”. The Mercator projection is useful for ship navigation in that it provides north south lines of constant bearing and a constant angle from any point to the North Pole. However, the Mercator projection map distorts land masses and distances between them. The continents are all placed in the middle of the map. Greenland looks roughly the size of Africa – even though Africa has fourteen times more land mass than Greenland. Antarctica is depicted as a huge landmass. The Pacific Ocean is split in two on the left- and the right-hand sides of the map. This perspective gives no idea of the huge size of the Pacific Ocean – covering approximately one-third of the Earth’s surface. As a result of our reliance on the construction of the Mercator projection map, people continue to have a distorted two-dimensional view of the planet.

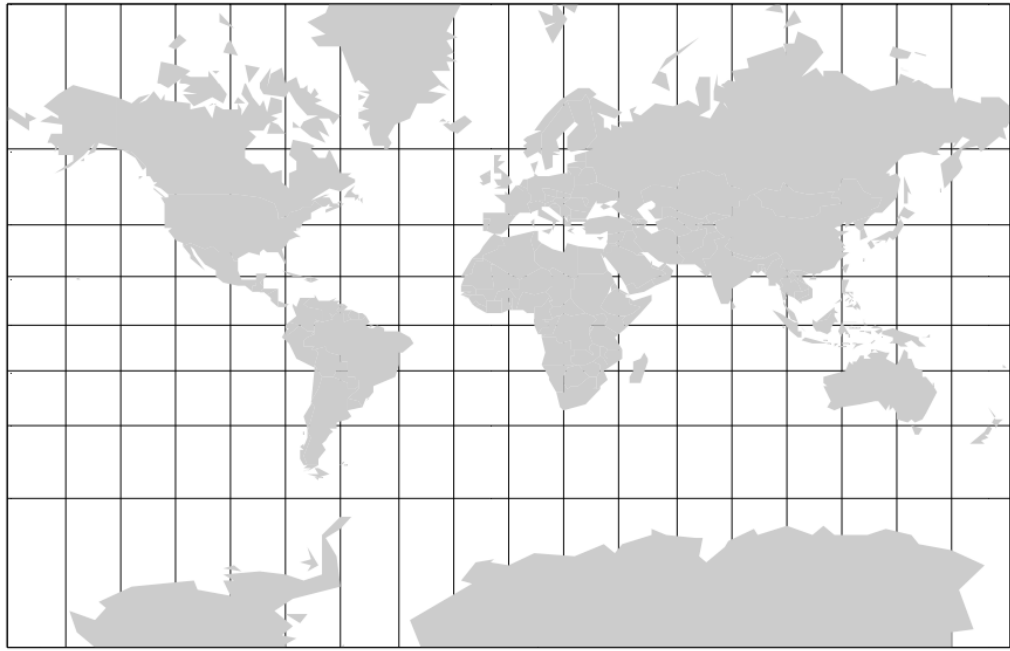


Figure 2-1 Mercator Projection Map (Haverhals and Roscoe 357)

In 1999, Japanese architect Hajime Narukawa invented the AuthaGraph (see Figure 2-2), an equal area world map projection. The AuthaGraph world map “represents all oceans, continents, including Antarctica ...in substantially proper sizes” (AuthaGraph CO. Ltd "About Authagraph"). In 2011, the Japanese Museum of Emerging Science and Innovation (Miraikan) selected the AuthaGraph mapping projection as its official mapping tool and placed it on permanent exhibition. The AuthaGraph map is “able to frame all continents and islands in a rectangle while maintaining their area ratios correctly” (Miraikin National Museum of Emerging Science and Innovation).

The AuthaGraph world map is considered to be a near-perfect representation of the actual size of countries, and continents and the oceans, laid out on a two-dimensional surface. While the AuthaGraph map may not be as useful for ship navigation as the Mercator projection, it is a more accurate cartographic picture of oceans and landmasses and their actual geographical relationships to each other. From this perspective, Greenland is clearly nowhere near as big as the African continent.

Africa is, in fact, bigger than North America and Europe. Antarctica is about the same size as Australia. Most important of all, the vā-stness of the Pacific Ocean is not minimised and is clearly visible, covering one-third of the Earth's surface, the biggest continent on Earth, the blue continent. The significance of this map is that it shows the huge area of the Pacific Ocean which the West often views as “empty space” to be used for dumping²⁰, or bombing²¹, or missile tests²². This view is at odds with that of Pasifika peoples who treat the Pacific Ocean as a living entity in dynamic interconnection with their islands. According to this Pasifika view, those parts of the ocean in the vā between land masses are relational spaces that need to be looked after and nurtured.

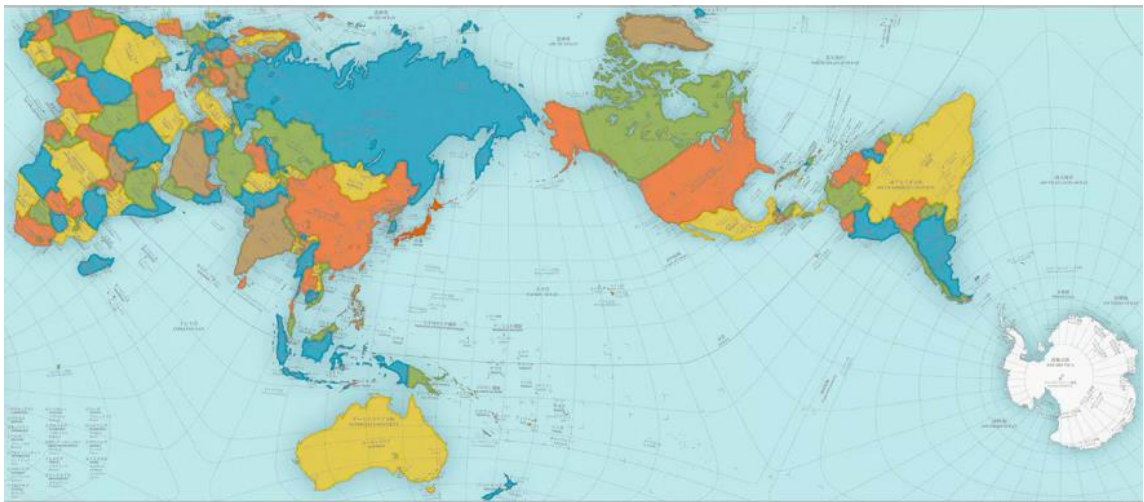


Figure 2-2 AuthaGraph World Map (AuthaGraph CO. Ltd "Authagraph World Map")

Given the last five hundred years of colonial push into the immense oceanic environment of the Pacific Ocean, and the adverse present-day effects of that incursion on the lives of Pacific peoples, the question arises, How do Pasifika peoples think of the future and how is it expressed in science fiction storytelling? As noted above, Pasifika-

²⁰ ‘Point Nemo’ also known as the ‘Spacecraft Cemetery’, is located in the international waters of the Pacific Ocean and is the furthest point from land on Earth. Since 1971 NASA, the Russian space agency and space agencies in Japan and Europe have crashed 263 spacecraft into the ocean at this point. (De Lucia and Iavicoli 346-347).

²¹ Mururoa Atoll, Bikini Atoll, Enewetak Atoll.

²² Kwajalein Lagoon.

authored science fiction tends towards a focus on the apocalyptic, post-apocalyptic and dystopian because that is our reality in the afterlife of colonialism. The incursions of colonialism have adversely impacted the lives of Indigenous peoples in the Pacific. However, following the ideas of Banivanua-Mar and Edmonds (1), I argue that in the afterlife of colonialism, the shape of Indigenous Pacific communities in the present has adapted to accommodate the reordering of Indigenous lands and bodies over the last five hundred years of European settler colonialism and imperialism.

The way in which we are situated in time and the way in which we frame past, present and future is reflected in our belief systems as contained in language. Hau'ofa writes that in the languages of Austronesian-speaking peoples, including Fijian, Tongan, and Hawaiian, time is non-linear. Time is ecological and circular; it fits with the regular cycles of natural occurrences. Circular time “does not exist independently of the natural surroundings and society...circular time is tied to the regularity of seasons marked by natural phenomena such as cyclical appearances of certain flowers, birds, and marine creatures, shedding of certain leaves, phases of the moon, changes in prevailing winds, and weather patterns” (*We Are the Ocean* 67). In the Fijian conception of time, the past is located ahead or in front of us and the future is behind.²³ In the Fijian language the future is at our backs. For instance, the phrase for “the following week” is “macawa mai muri”, which literally translates as “the week from the back”. In the Lauan language from the Lau group in the South East of Fiji, the phrase for “the time in the past” is “a gauna i mada”, which translates as “the time in front”. Thus, the colonial history of the Pacific is right in front of our mind's eye. It is part of our history, but it is not the beginning. The beginning is contained in our oral traditions of storytelling such as the oral text of Maui's exploits; the legend of Maui fishing up the North Island, Te Ika a

²³ See Hau'ofa “Pasts to Remember” in *We are the Ocean* (66) for a discussion of the different terms for the past in Fijian, Tongan and Hawaiian.

Maui, which acts as a reference to wayfinding navigation; and the legend of Maui slowing down the sun as it moves through the sky, a possible reference to the changing seasons where the days become longer during the change from winter to summer (Barclay-Kerr 90).

2.2. Naming the literary waka of Pasifikafuturism – The needle in the compass

The only valid culture worth having is the one being lived out now, unless of course we attain immortality or invent a time machine that would enable us to live in the past or future – Albert Wendt (1976).

In this thesis I wish to name, for the first time, the futurist sea of islands that comprise the literary seascape of science fiction written by Indigenous Oceanian authors.

Oceanian authors explore outside the normative boundaries of our existence as subjects of colonialism and imperialism, as shown in some of the speculative fiction works already discussed. I imagine the time machines, mentioned in the epigraph above, taking the form of literary waka. I imagine these waka employing the estrangement of science fiction to subvert the colonial gaze and to express how the colonial process has negatively impacted on us and our lives in the past and on a continuous basis in the present, but with a view to transformative change in the future. Science fiction offers a means of stepping out of the strictures of colonial history with its attendant cultural trauma, social displacement, economic deprivation, and political powerlessness, in order to explore alternative means of regaining Indigenous sovereignty in the present through storytelling.

Te Punga Somerville mentions that “Hau’ofa’s and Wendt’s vision of Oceania... decenters the relationship between colonizer and colonized in favor of local

constructions of the region as a space overwritten by multiple crisscrossings and navigational histories” (193). She then goes on to figure the academy as “the Good Ship University”, although it is “neither neutral nor egalitarian” (195). In this naming, Te Punga Somerville invokes the tall ships of the coloniser rather than the Indigenous Pacific technologies of waka or waqa or vaka or va’a. She notes that with the increasing numbers of Indigenous people from the Pacific now inhabiting the ship, “the university has become a part of the crisscrossing—the histories, the relationships, the boundaries—of the Pacific and takes its place alongside the many watercraft fashioned by Indigenous and non-Indigenous people” (195). From this metaphor of ships, I wish to extract, extrapolate, and envision a pan-Pacific Indigenous fleet consisting of the many and varied waqa of literature, including science fiction. As noted by the editors of *Black Marks on the White Page*, a collection of Oceanic writing from all over the Pacific, “we find ourselves in the same waka when it comes to literature”—it is “a medium that we have loved from the first moment it landed in Aotearoa and elsewhere” and we have made it our own (Ihimaera and Makereti 10, 13).

The vision of being in the same waka, when it comes to literature, encapsulates an interconnectedness between Pacific peoples that comes from our contiguous relationships via the Pacific Ocean. The traditional “literatures” of Māori and Pacific peoples, that were practised before contact with the colonisers, were (and still are) culturally inscribed in our Indigenous knowledges, including orature, or talanoa in the Fijian, Tongan, and Samoan languages; tatau in Samoan or tatu in Fijian, which inscribes text on the body; ceuceu²⁴ in Fijian or whakairo in Māori, which inscribes text through carving; talitali in Fijian or raranga in Māori, which inscribes text through the

²⁴ The first white missionaries in Fiji developed a writing system for the Fijian language in which the letter “c” in written Fijian text, is pronounced “th” as in “this” (not “th” as in “thigh”). The phonetic spelling of “ceuceu” is therefore “ðæʊðæʊ”.

weaving of *ibe* or *whariki* (mats); *waqa* building, which inscribes text through the technology of our watercraft; *etak* navigation or wayfinding, which reads the texts of nature surrounding us in the environment; *laga sere* in Fijian or *waiata* in Māori, which inscribes text through song; *meke* which performs text through dance and costume; and many others. Dillon notes that Indigenous artists have emphasised for years how “indigenous knowledge is *embodied*. As opposed to the Enlightenment impulse to abstract ideas from things, Native objects *are* information, and they convey political and aesthetic purpose simultaneously” (emphasis in original) (“Introduction: Indigenous Futurisms, Bimaashi Biidaas Mose, Flying and Walking Towards You” 4). These Indigenous technologies still exist and are not static. They continue to evolve, develop, and adapt over time. I look to the re-emergence of the past ancestral practice of wayfinding as a present expression of the evolution of Pacific culture. Wayfinding provides a methodology for envisioning the future in transformative and positive expressions of Pacific peoples in science fiction.

While not wishing to flatten or essentialise our “varied scatter of islands” into a pan-Pacific regional identity, I posit that the fleet of Indigenous literature is one where we are able to maintain our Indigenous boundaries as Māori and Pacific peoples within our own *waqa*. At the same time, we may or may not choose to sail together at various times and we may do so in different configurations. I have, therefore, envisioned into formation for this thesis the Indigenous Māori and Pacific science fiction flotilla under the banner “Pasifikafuturism” in the knowledge that at any time these *waqa* may sail different lines or regroup into differing configurations. I use “flotilla” rather than the grander term “fleet” to signify the relatively small production of science fiction written in English by Māori and Pasifika authors to date. Stepping away from the metaphor of

ocean-going vessels for a moment, there is also a need to get the conversation going in the knowledge that identity is not immutable.

Māori are tangata whenua of Aotearoa, and Pacific peoples are not homogenous. In order to land on one term that includes Māori and all Pacific peoples, I look to our shared geographic location in the Pacific Ocean and Hau'ofa's eloquent formulation of our Pasifikan existence in "a sea of islands" rather than the colonial euro-centric romanticism of far flung "islands in the sea" ("Our Sea of Islands" 153). Māori and Pasifika peoples have a shared island sensibility and shared ancestral navigational culture. The current revitalisation of waka building, and wayfinding, is an example of a pan-Pacific movement where Māori and Pacific peoples are in the same waka. Māori and Pacific peoples also contend with overlapping experiences of colonial incursion and imperialism that continue to affect us to this day. Our shared place in the Pacific Ocean, and our interrelated cultures and ancestral navigational technologies, are unique markers of our Indigeneity. Sophie Wilson²⁵ discusses the difficulty in naming the type of "futurism" that is emerging from our geographic location in the Pacific Ocean and notes that "Dan Taipua has woven these words into one kete: Space Māori, Astronesians, Polyfuturists, South Pacific Futurists. This kete, we've decided, describes Māori who imagine, create or are receptive to ideas that play with, and sometimes even obliterate, the boundaries of technology and time".

The term "Pasifikafuturism" also appeals to me as being an appropriate term to cover science fiction production by Indigenous people in the Pacific for linguistic reasons. "Pasifika" is a creolised version of the word "Pacific", the European designation for the region, which does not seem apt given the atrocities of settler colonialism and imperialism that hide behind that romanticised naming. As Franz Fanon

²⁵ See Wilson "Aotearoa Futurism Part One".

says, “colonialism is not a thinking machine, nor a body endowed with reasoning faculties. It is violence in its natural state” (61). Hau’ofa enumerates some of the instances of violence Indigenous peoples in the Pacific have suffered at the hands of colonial invasion, including being removed from their ancestral natural surroundings; being severed from traditional sources of livelihood; their lands being destroyed by mining, deforestation, bombing, large scale industrial and urban developments; and being severed from their ancestry, history and identity (*We Are the Ocean* 75). While I accept that the choice of “Pasifikafuturism” as an overall term for science fiction written by Māori and Pacific peoples may appear somewhat arbitrary, it is a choice I claim as fitting within the framework of this thesis and as a marker of the meeting point and intersection of multiple diasporas of Pacific peoples in the region.

The term “Oceanic Futurism” is also an option, although “Oceania” is, again, an English word. In discussing a pan-Pacific view of Pacific peoples, Te Punga Somerville (5) notes that the term “*Oceania*...can be discursively traced through Wendt in 1976 and Hau’ofa in 1993 to the successive explosion of its use. Even though it is an English term that belies a degree of colonial infiltration and complicity, *Oceania* can be conceptually traced—as they both argue—back through countless generations”. Te Punga Somerville states further that “*Oceania* is still in the language of the colonizer (or at least one of the colonizers), and some scholars are engaging Indigenous terms, such as Tevita Ka’ili’s preferred *Moana*, which is a pan-Polynesian term but not, unfortunately, pan-Pacific” (10).

Although there is room for all the various terms noted above, it is necessary for some rationalisation to occur in order to maintain coherence in this thesis. Therefore, I adopt, add to, and rework the above-mentioned Taipua kete by way of definition of the term “Pasifikafuturism”. Accordingly, for the purposes of this thesis, and for the

avoidance of doubt, I refer to science fiction produced by Māori and Pacific peoples who envision, dream, imagine, create, or are receptive to ideas that play with, and liquify the boundaries of technology and time and space, as “Pasifikafuturism”.

I now turn to briefly explore the overlaps, parallels, and similarities between Pasifikafuturism, and some of its fictive kin. I also explore where this term parts ways with related Alternative Futurisms that influence the literary current in which Pasifikafuturism sails, including Afrofuturism, Indigenous Futurisms, Queer Indigenous Futurism, Chicana Futurism, Latinofuturism, and Africanfuturism. Besides these, there are many other Alternative Futurisms within the literary sphere and, while some have relevance to this thesis, there are others that I consider are a little further away from the intersecting swells of colonialism and Indigenous Pacific science fiction for the purposes of my research. I have therefore not included a comparative analysis of all Alternative Futurisms as the sheer number of them does not permit it and so I have placed many outside the purview of this thesis. Those omitted include Sinofuturism, Arab Futurism and Gulf Futurism, all of which have a specific geographical focus on the Near and Middle East (Al-Maria; Al-Maria and Al-Qadiri; Frangos; Lew); Crip Futurism, relating to disability (Kafer); Black Quantum Futurism, which provides African American people a framework upon which to apply metaphysics and the sciences of colour and sound (along with the theories of quantum physics) in order to recall future and past memories (Phillips); and many others.

2.3. Afrofuturism – The echoing swell from the North East

I stood at the border, stood at the edge, and claimed it as central,
claimed it as central, and let the rest of the world move over to where I was

– Toni Morrison

As the navigator of this thesis, a scholactivist²⁶ waka, I sit within the literary waters of the Pacific Ocean and survey the sphere around me. From this point of view, Afrofuturism is a strong swell travelling through the Pacific from the North East. It has journeyed across the Atlantic Ocean carrying the echoes of its origins from the African continent. Afrofuturism is an established topic of study for science fiction scholars and provides a model for formulating an approach to Pasifikafuturist science fiction writing. In 1993 Mark Dery, a white cultural commentator and art critic, coined the term “Afrofuturism”, which he defines as “African-American signification that appropriates images of technology and a prosthetically enhanced future” (738). Dery states that the notion gives rise to a troubling antinomy and poses two critical questions:

can a community whose past has been deliberately rubbed out, and whose energies have subsequently been consumed by the search for legible traces of its history, imagine possible futures? Furthermore, isn't the unreal estate of the future already owned by the technocrats, futurologists, streamliners, and set designers—white to a man—who have engineered our collective fantasies? (738).

The answer to Dery's first question, as asserted by Russell (268) and many other Afrofuturist scholars, is yes.²⁷ Afrofuturists in music, writing, and art that predates Dery's formulation of the term “Afrofuturism” regularly incorporated speculative fiction and science fiction themes and motifs into their work and still do today. Alondra

²⁶ Ramsey defines the neologism “scholactivism” as a merger of “scholarship and activism, *Scholactivism* evokes a conceptual shadow: *scholasticism*, a term with its origins in the first medieval universities, now come [*sic*] to signify a ‘narrow-minded insistence on traditional doctrine.’ Changing two letters in this old-fashioned word, our emphasis shifts from the dogmatic, tradition-bound tasks of academic adjudication, to a project more in line with Karl Marx's famous Eleventh Thesis on Ludwig Feuerbach, theses aimed at the scholasticism of his own day: ‘Philosophers have sought to understand the world. The point is to change it’” (Ramsey 1).

²⁷ See Womack for in depth discussion of Afrofuturism.

Nelson notes that, although Dery may have come up with the phrase Afrofuturism, the “currents that comprise it existed long before” (14 note 23).

Karam and Kirby-Hirst define Afrofuturism as creative engagement with a Black focus. It acknowledges the fight to enable the expression of Black aspirations and selfhood (4). Eshun refers to Afrofuturism as providing a “tool kit” for Afrodiasporic peoples to intervene in the current day to create reworked futures that revise concepts created by white science fiction writers (301). In keeping with Karam and Kirby-Hirst’s definition and Eshun’s reference, I posit that Pasifikafuturism recognises, in artistic form, a characteristically Pacific Ocean viewpoint in technology, creative ideas about the future, and science fiction. That viewpoint provides a tool kit to recover histories and create counter-futures, and it is rooted in our relationship with the Pacific Ocean and the navigational technologies that we use to travel across the ocean.

Pasifikafuturist writing, and particularly science fiction, is a recent phenomenon. Katarina Mataira’s 1975 novel *Te Atea* is arguably the first Pasifikafuturist science fiction novel and there has been very little since. Why is it that we have only recently entered the genre? In looking for answers I turn to the discussions of Afrofuturist commentators about the relative absence of science fiction literature in the African American community. This discussion speaks to the second question posed in the above quote by Dery. Nalo Hopkinson opines that “to be a person of colour writing science fiction is to be under suspicion of having internalised one’s colonisation” (7). Walter Mosely echoes this suspicion of science fiction being a white domain, in his observations about the absence of Black writers from the science fiction genre. In his essay “Black to the Future”, Mosley argues that both the white dominated publishing industry and the Black community itself expect Black people to write about their existence in a white world. It is therefore difficult for Black writers to escape that

expectation and their own need to write about the historical and present day injustices of racial discrimination (406). Accordingly, the reasons for the absence of science fiction in the African American community may provide some insight into how to view the same absence in Māori and Pasifika writing. It may be that our community considers science fiction to be a white domain. It may be that our community and the literary establishment expect us to document our experiences of racism and colonialism. However, as Mosely recognises, these are “limitations upon limitations”, and my hope is that science fiction writing provides an imaginary platform to free Pasifikafuturist authors of these constraints.

It is important to mention that the socio-cultural and historical milieu for Oceanic peoples is different to that of African American peoples who are direct descendants of the stolen and enslaved Africans of the transatlantic slave trade. The experience of Oceanic peoples is that of the imposition of European colonialism and imperialism while trying to hold onto our culture, history, and language within our homelands and within the Pasifika diaspora. The situation for Māori in Aotearoa is also different given the existence of the Treaty of Waitangi between the Crown and Māori. Our reasons for not writing science fiction might be quite different to that of African American writers. Aotearoan or Pasifikan reasons for this absence is a topic that requires further research and scholarship. In addition, science fiction by Māori and Pasifika poets and playwrights are topics that I have not researched for the purposes of this thesis. Although, I note that Robert Sullivan’s epic poem *Star Waka* (1999) is a significant work of Māori science fiction poetry, set in 2140AD where Māori waka transform into starships.

In relation to African American authors of science fiction or “Afrofuturists”, John Russell writes that the reality of the science fiction genre is that it remains

predominantly a “white genre” in both production and consumption “despite advances by people of colour into its ranks” (259), such as African American authors Samuel R. Delany, Octavia Butler, Nalo Hopkinson, Nnedi Okorafor, and Jewelle Gomez. Russell argues further that, at worst, the genre has proven itself overtly hostile to Blacks and at least “generally indifferent to presenting the black experience unless that experience is defined within the context of racism – not as part of a universal human experience.” Russell says that “black engagement with the genre has been marked less by absence than by *invisibility*” (emphasis in original) (256).

The situation for Oceanic authors may be similar, in that Oceanic science fiction written by Oceanic authors exists, albeit behind a shroud of invisibility and shifting definitions of genre. It is also possible that Oceanic writers do not see genre divisions in the same way as the white literary establishment. An example given by Tina Makereti,²⁸ is that she did not know her work was speculative fiction until *Once Upon a Time in Aotearoa* was nominated for a Sir Julius Vogel award, an annual award that recognises achievement in New Zealand science fiction, fantasy, and horror. However, she went on to say that this was not a situation of invisibility but simply because she was writing the world as she knows it. That world may be defined as genre writing by white people, but it is just life for Māori.

The way in which the white media and the white literary world views work by Black writers is also instructive. Toni Morrison’s statement in the epigraph at the beginning of this section comes from an interview in 2017 with a white Australian interviewer. The interviewer asserted that Morrison “marginalised whites” in her writing and asked why she did this. Morrison answered that she was interested in Black readership, in “another kind of literature that was not just confrontational, Black versus

²⁸ Tina Makereti, personal communication, October 2017.

white.” The interviewer went on to ask Morrison, “will you ever change and write books that incorporate white lives into them substantially?” Morrison answered as follows:

You can't understand how powerfully racist that question is can you? ... you could never ask a white author When are you going to write about Black people? ... Even the inquiry comes from a position of being in the centre...and being used to being in the centre and saying, Is it ever possible that you will ever enter the mainstream? It's inconceivable that where I already am is the mainstream.

Morrison's answer has remarkable resonance with the etak wayfinding conception of moving islands. Morrison provides a model as an African American author writing within, about, and for African American people, of being located firmly within her community and her environment, of being the waka, of being the needle in the compass, taking her positional reading from her community. While Morrison confirmed that she did not have in mind the mainstream white literary environment as the audience or destination for her writing, the mainstream certainly came to her, as an island comes to a navigator. In the same way, Afrofuturist writing is situated within the African American diasporic community writing to, about, and for that community while addressing and reclaiming futurist themes and histories. The equivalent argument holds true for Pasifikafuturist text, in that it is situated within Māori and Pacific communities, taking its positional reading from the environment and writing to, about, and for those communities in science fiction stories.

I turn now to briefly touch on some of the many Alternative Futurisms that have been inspired by and have followed Afrofuturism as the tuakana concept of the colonisee writing back and writing beyond, in science fiction. These Alternative Futurisms provide further guidance for the formulation of a theory of Pasifikafuturism.

2.4. Indigenous Futurisms – The great North East swell from Turtle Island

The futurist writing of the First Nations people of Turtle Island is a powerful swell resonating across the Pacific from the North East. The term “Indigenous Futurisms” was coined in 2012 by Grace Dillon (Anishinaabe), the editor of the first anthology of Indigenous science fiction *Walking the Clouds*. In her introduction “Imagining Indigenous Futurisms”, Dillon affirms that science fiction has “the capacity to envision Native futures, Indigenous hopes, and dreams recovered by rethinking the past in a new framework” (*Walking the Clouds: An Anthology of Indigenous Science Fiction* 2).

Dillon states that *Walking the Clouds* “pays homage to Afrofuturisms” and takes the same approach as Mark Bould’s framing of Afrofuturism, in that it is not relegated “to a purely sf field, but rather recognizing that sf theory and Afrofuturisms have much to gain by the exchange” (“Introduction: Indigenous Futurisms, Bimaashi Biidaas Mose, Flying and Walking Towards You” 2). She argues that “writers of Indigenous futurisms sometimes intentionally experiment with, sometimes intentionally dislodge, sometimes merely accompany, but invariably *change* the perimeters of sf” (*Walking the Clouds: An Anthology of Indigenous Science Fiction* 3). Likewise, Pasifikafuturism takes the same approach. That is, Pasifikafuturism is inspired by Afrofuturism and Indigenous Futurisms and its fictive kin in the Alternative Futurism field, in that it engages in an exchange with the science fiction genre in a way that privileges Pasifika peoples’ storytelling.

In accordance with the theory of Indigenous Futurisms as formulated by Dillon, I wish to centre Indigenous Pacific peoples’ values and concepts within a Pacific theoretical framework similar to the tidalectic framework offered by wayfinding and etak navigation. This framework is an Oceanic expression of Indigenous Futurisms that embodies a Pacific Island understanding of the significance of the ocean in our cultures.

As Hau'ofa said, "We are the ocean." The sea is our highway, a fluid biotic mass that connects us. Carrying Hau'ofa's conception of a "sea of islands" into space, and into what Kahala Johnson terms "an interstellar sky of islands" (Goodyear-Ka'ōpua 90), could also, I argue, be extended further into space as a "galaxy of islands" or even a "universe of islands", where Pacific knowledges of wayfinding can be employed as a methodology for envisioning the future in Pasifikafuturist science fiction writing.

Johnson writes that Pacific peoples "envision Oceanic futurisms as an interstellar Sky of Islands flowing with saltwater futurists, austronesian wayfinders, and excolonial constellations" (Goodyear-Ka'ōpua 90). This reference to "envisioning" also touches on the importance of "dreaming". Tuhiwai Smith argues that "one of the strategies that Indigenous peoples have employed effectively to bind people together politically asks that people imagine a future, that they rise above present-day situations which are generally depressing, dream a new dream and set a new vision" (153). Tuhiwai Smith refers to Cajete's discussion about "vision making as knowledge making, as one of the methodologies for producing indigenous knowledge through vision quests and dreaming, a reflection of the spirit which is also the mind" (153). When looked at from the point of view of Cajete and Johnson's notion of "dreaming", I suggest, in line with Goodyear-Ka'ōpua's reasoning (90), science fiction is a current manifestation of futurist thinking that Indigenous peoples have always practised.

2.5. Queer Indigenous Futurism – Fabulous currents of swirling phosphorescence

In wayfinding, the presence of phosphorescence in the ocean can indicate that a waka is close to land (Spiller et al. 8). I look to that glittery, bioluminescent presence in the liminal space between sea and land as a metaphor for both the liminality of the queer community in the literary sphere, and for what we represent within Pasifika

communities. Chang Hall et al. discuss the lack of discourse on Pacific lesbian and gay literature as the result of two interlocking systems of exclusion. The first is “the realities of racism, colonialism, and homophobia” that decides who receives an adequate education, who is enabled to write and who is published. “The second questions the terms and premises of racial (Pacific) and sexual (lesbian and gay) inclusion” (75). Ngahaia Te Awekotuku denies that queer love is a Western importation, stating that “we are the inheritors of a Polynesian tradition, of the Mahu of Hawai’i, Tahiti, the Cook Islands, the Marquesas, of the Fa’afafine of Samoa, of the Fakaleti of Tonga... in (Aotearoa) we obviously have the traditions” (36). In *Love Beyond Body, Space and Time: An Indigenous LGBT Sci-Fi Anthology*, the first such collection, Grace Dillon asserts that it is difficult for “Two-Spirit natures” as they must resist “both colonial gender binaries and sexual regimes imposed by the legacy of nineteenth-century white manifest destinies, as well as scepticism and rejection by some traditional Native communities. Two-Spirit stories are at their core survivance stories” (Nicholson 9).²⁹ Dillon notes that the Anishinaabe idea of “Biskaabiiyang: Anishinaabemowin for ‘returning to ourselves’” (Nicholson 9) is a concept that can be used to explore Two-Spirit futurisms. I adopt Dillon’s reference to the Anishinaabe concept of “returning to ourselves” in presenting queer Pasifika people as a bioluminescent presence in the environment which defies the blind spot that we have become in our communities.

Being queer is a unique way of knowing that is important to me and I need to take note of that position in my writing. As a queer Indigenous woman, I sometimes fear for my own safety in the Pacific community, which often regards me as “other”. There are seven countries in the Pacific region where homosexuality is currently

²⁹ Gerald Vizenor (Anishinaabe) first employed the term “survivance” in the context of Native American studies, explaining that “survivance is an active sense of presence, the continuance of native stories, not a mere reaction, or a survivable name. Native survivance stories are renunciations of dominance, tragedy and victimry”. See (Vizenor *Manifest Manners: Narratives on Postindian Survivance* vii).

criminalised - Cook Islands, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Tonga, and Tuvalu; homosexuality was only decriminalised in Nauru in 2016. These laws criminalising homosexual conduct are a direct legacy of British colonialism and were imported in order to support colonial control and morality (Human Rights Watch). While this encoded legacy of homophobia is traceable to colonisation, our leaders and religious institutions continue to make statements that entrench discrimination towards LGBTQI2+ people (Lesbian, Gay, Bisexual, Trans, Queer, Intersex, Two-Spirit) and Queer and Trans Black and Indigenous people of colour. For example, even though Fiji gave sexual and gender minorities protection against discrimination in Article 26 of the 2013 constitution, Prime Minister Frank Bainimarama made pejorative public statements about lesbians when marriage equality was achieved in the US in 2016 (SBS). In April 2019, Tongan rugby player Israel Folau revealed a fundamentalist streak that has hijacked Pacific cultures and Christianity when he posted on Instagram that hell awaited unrepentant gay people. This claim led to his sacking by the Australian Rugby Union. Following the settlement of the subsequent legal proceedings Folau said he felt “vindicated” (Morse). Folau continued his homophobic narrative in November 2019 delivering a religious sermon in which he claimed that the horrific bushfires in Australia were “God’s judgment” for same-sex marriage and abortion. To be culturally marginalised like this, within our own Indigenous communities, which are also marginalised, is again, in Moseley’s words, a limitation upon a limitation.

While Queer Indigenous Futurism is not a discrete field of study in the Western academy, the rapidly emerging field of Queer Indigenous Studies provides discursive currents of futurist analysis, scholarship, and story.³⁰ These currents search for imagined

³⁰ For example, see *Asegi Stories: Cherokee Queer and Two-Spirit Memory* (Driskill); *Love Beyond Body Space and Time: An LGBTQ Sci-Fi Anthology* (Nicholson) particularly the bibliographies provided by Dillon (10) and Sinclair (19); *Why Indigenous Literatures Matter* (Justice); and *Speculative Blackness: the Future of Race in Science Fiction* (Carrington).

past, present, and future stories that speak to the survival of Indigenous queer people as a gender-fluid liminal community who have been marginalised and continue to suffer severe discrimination. Although the hope offered by science fiction is to provide the ability to imagine new futures, the current reality of the science fiction genre is that it is dominated by a white, cisgendered, heterosexual, male point of view. Black, queer writer, Adrienne Brown, offers an answer to this domination in advocating for transformation through an “emergent strategy” that builds “complex patterns and systems of change through relatively small interactions” (6). Brown states, “I would call our work to change the world ‘science fictional behavior’—being concerned with the way our actions and beliefs now, today, will shape the future, tomorrow, the next generations” (17).

Daniel Heath Justice describes “queer” or “two spirit” as having identities and relations that reach “beyond the narrow acceptability of the straight nuclear family—a structure that never found much purchase for Indigenous folks until the imposition of Christian values on our communities” (104). We still exist despite being under siege, our luminescence shining on as a beacon to those who would obscure our existence. As a queer Indigenous Pasifika woman, I hope to honour queer existence, persistence, and love in the creative portion of this thesis by foregrounding queer characters and expressions of our survival.

2.6. Chicanafuturism and Latinofuturism – Intersecting waves from the North East

Next, I turn to the many intersecting waves in the emerging fields of study in Chicanafuturism and Latinofuturism which draw inspiration from Afrofuturism, functioning as incisive social critique and providing a distinct point of view from that of

other Alternative Futurisms. The concept of Chicanafuturism was introduced by Catherine Ramírez in 2004 in an essay about Chicana feminist artists who use computer hardware in artistic images of Catholic iconography such as the virgin Mary. These artists use computer components, some of which are acquired from the dump at the Los Alamos National Laboratory, the birthplace of the atomic bomb and the centre for nuclear weapons research in the United States. In making these images, technology of the present is used to transform traditional art forms that “underscore New Mexico’s history as a dumping ground” for nuclear waste, while challenging romantic visions of New Mexico and “interrogating the parameters of Hispana and Chicana cultural identity” offering work emblematic of what Ramírez terms “Chicanafuturism”. Drawing from Nelson’s definition of Afrofuturism, Ramírez (2004) defines “Chicanafuturism” as

Chicano cultural production that attends to cultural transformation resulting from new and everyday technologies (including their detritus); that excavated, creates, and alters narratives of identity, technology, and the future; that interrogates the promises of science and technology; and that redefines humanism and the human (78).

Ramírez (2008) explains that Chicanafuturism investigates the changes that throw-away items of ordinary usage have wrought on Mexican Americans, Chicanas, Chicanos and other people of colour (187). In the same way that Afrofuturism considers diasporic experience, Ramírez (2008) writes that “Chicanafuturism articulates colonial and postcolonial histories of *indigenismo*, *mestizaje*, hegemony, and survival” (187). Ramírez writes of Afrofuturism and Chicanafuturism as being “fictive kin”.

Latinofuturism builds on Catherine Ramírez’s formulation of Chicanafuturism. Cathryn Merla-Watson (2017) defines Latinofuturism as referencing a broad spectrum of speculative aesthetics produced by “U.S. Latin@s, including Chican@s, Puerto

Ricans, Dominican Americans, Cuban Americans, and other Latin American immigrant populations. It also includes innovative cultural productions stemming from hybrid and fluid borderlands spaces, including the U.S.-Mexico border”. Merla-Watson (2019) states that Latinofuturism is propelled by “the disordering aesthetic of rasquachismo, a working class Chicana/o sensibility of creative recycling or making do. Latinofuturist writers and artists do not passively consume received forms of the speculative, but instead creatively repurpose them toward emancipatory ends”. She states that “whereas Afrofuturism foregrounds the African diaspora and the legacy of slavery in regard to new media and the technological, Latinofuturism focuses on migrations within and across the Americas and beyond” (Merla-Watson).

The rasquache aesthetic of Latinofuturism and Chicanafuturism conveys a particular point of view that works to disidentify Indigenous Chicanas and Chicanos from white speculative fiction that does not see a place for them in the future. Alex Rivera, the director of the film *Sleep Dealer*, describes rasquache as a “collage aesthetic of the street” where people recycle and repurpose used items to make new dreams. It is a practice that Rivera says is “ingrained in our spirit of survival, resistance and innovation” (cited in Gutierrez-Perez & Hernandez 262-263). The rasquache aesthetic at the heart of Chicanafuturism anchors Chicanafuturist art and literature in the lived experience of Mexican Americans at the US-Mexico border. Merla-Watson (2017) argues that while “Latin@futurism does not exist independent of dominant speculative genre... it disidentifies with it, creatively recycles and repurposes it a lo rasquache”. Accordingly, the rasquache aesthetic has grown out of the artistic expression of the effects of past and continuing colonialism on the Indigenous people of Mexico and the ongoing effects of neocolonial practices of scientific experimentation and nuclear

dumping on their lands. As such, it is a marker of the survival and transformation of Indigeneity in New Mexico.

The characteristic focus and Indigeneity of the rasquache aesthetic in Chicanafuturism and Latinofuturism provides a guide to anchoring a formulation of Pacificafuturism in the distinctive Oceanic aesthetic and wayfinding culture that characterises Māori and Pasifika peoples. In the same way that the rasquache aesthetic has grown out of Indigenous Mexican experience, the aesthetic of wayfinding has grown out of the revival of Pacific ancestral knowledge and is a customary practice that Spiller et al. have shifted into a model for developing wisdom and leadership in Pacific people. I assert that the same leadership model can be shifted into science fiction writing by, for, and about Pacific people.

2.7. Africanfuturism – The North West swell from across the Indian Ocean

The North West swell travels across the Indian Ocean from the continent of Africa, the ancestral home of Nnedi Okorafor, and pivots around Australia and the peninsulas and archipelagos of South East Asia. Nnedi Okorafor provides a distinctly Indigenous take on her identification with the diversity of the African continent as separate from the diasporic identity of African Americans, in her coinage of the term “Africanfuturism”. Okorafor specifically bases Africanfuturism in Africa and asserts that it does not include fantasy “unless that fantasy is set in the future or involves technology or space travel”.³¹ That is, she centres science fiction within her definition of Africanfuturist texts.

In her blog “Nnedi’s Wahala Zone Blog”, Okorafor introduces the term “Africanfuturism” in order to demarcate herself as a “Naijamerican” (Nigerian American) and to differentiate her work from Afrofuturism. She explains that

³¹ See Okorafor "Africanfuturism Defined".

Africanfuturism is similar to Afrofuturism in that Blacks on the continent are connected to the Black Diaspora by blood, spirit, history, and future. However, Africanfuturism is different in that it is “centred on and predominantly written by people of African descent (black people) and is rooted first and foremost in Africa”.³² Okorafor explains that “Africanfuturism is spelled as **one word** (not two) and the ‘f’ is *not* capitalized. It is one word so that the concepts of Africa and futurism cannot be separated (or replaced with something else) because they both blend to create something new” (emphasis in original).³³ Similarly, my diasporic Fijian identity as a second-generation immigrant to Aotearoa and as a queer Indigenous Pasifika author privileging Indigenous culture over that of the West, plays into the term Pasifikafuturism. I borrow from Okorafor’s conception of Africanfuturism in coining the term “Pasifikafuturism” in the same way; as one word and with a lower case “f”, so that concepts of the Pacific and futurism cannot be separated or replaced, because they both blend to create something new that is anchored in an Oceanic aesthetic. Similarly, I centre science fiction texts that are set in the future or involve technology or space travel within the definition of Pasifikafuturist literature.



I conclude this chapter by contending that repurposing science fiction from an Indigenous point of view gives the opportunity to envision imagined futures in which Indigenous peoples exist and thrive, where our values and knowledges are privileged. The kind of repurposing I am suggesting is using Pacific science, such as wayfinding, as the technological basis of story, rather than Western ideas, such as cartography. To envision the future in this way is one step towards bringing into being positive imagined

³² Ibid.

³³ Ibid.

futures for Indigenous Pacific peoples. I argue that Indigenous futurist writing is a spur to this dream. I am inspired to ask what happens to Māori and Pacific texts when we read them as science fiction? Do we have a pan-Pasifika identity that can be viewed as having a cultural aesthetic that emanates from our oceanic saltwater environment? In answering these questions, I apply my conception of the term Pasifikafuturism, which is indebted to its fictive kin in taking an Indigenous point of view that is particular to the Pacific Ocean and our wayfinding ancestry and knowledge.

This review of the literature indicates that there are commonalities that thread through the futurist fictive kin of Pasifikafuturism, that bind together into what Rieder refers to as a “family of resemblances” (19). I view one of the most common threads as being that of the continued attempt of settler colonialism to erase Indigenous peoples to maintain installed settler futurity. What is also evident in the literature is that despite the persistent attempt to deny us representation and our very existence, Indigenous peoples adapt and evolve in our continued survival. The gatekeeping of the publishing industry and the whiteness of the science fiction genre may be part of the reason for the small number of published works by Pasifika writers in that field. However, it does not mean we are not science fiction fans or that we do not write science fiction. Indigenous Pasifika peoples are navigating pathways into the future through science fiction imaginaries that accord with our values and are not blocked by white conceptions of what or who we should be. Survival is part of our DNA, whether it is on ocean-going voyages, in battles, negotiating the arrival of new and foreign ways of being, natural disasters, pandemics or other threats to our survival. Pacific peoples, like Indigenous peoples in other parts of the world, live, respond to challenges, and move forward. Science fiction provides a lens through which we can look to the ancestral knowledges

of our past, while our knowledges live and evolve within the eternal present, and we ensure our continued existence in the future.

Chapter Three: Witi Ihimaera steers the doctrine of discovery into the Māori space-time continuum of Te Kore

The ship is like a silent celestial angel in solitary flight through a sea of stars. It cleaves through the blackness, serene and powerful, its light-wings at full extension, accelerating through the space-time continuum. (Ihimaera *Ask the Posts of the House* 217)

This chapter presents a close reading of Witi Ihimaera's 2007 novella *Dead of Night* as a narrative that flips the doctrine of discovery and steers Captain James Cook's colonial voyages to the Pacific Ocean into the Māori space-time continuum. There are two alternative endings offered to the reader of Ihimaera's novella as it appeared in both its original 2006 publication *Are Angels OK?* edited by Callaghan and Manhire, a collection of writer/scientist collaborations, and in the subsequent 2007 publication of the story in Ihimaera's collection *Ask the Posts of the House*. The ending that was published in *Are Angels OK?* is the "open" ending Ihimaera terms the interventionist or "second chance" ending (301). This "open ending" underscores the scientific understanding provided by David Wiltshire, Ihimaera's cosmologist collaborator, that "the end of the universe is not a place but a time" (312). It is "alpha and omega, the beginning and the end". According to the "open" ending, when the spaceship *Endeavour* reaches the end of the universe, the six human passengers see a double helix millions of miles high. The helices spiral around the spaceship locking it into the now and giving the passengers a "second chance". The last lines of this ending come at the conclusion of a scene where Captain Craig, the captain of the spaceship *Endeavour*, opens a door in his dream. I interpret "second chance" in this context as meaning that

the end of the universe is a second chance at life, reflecting a Western, linear view of time.

The ending that Ihimaera preferred, in the version of *Dead of Night* published in *Ask the Posts of the House*, is what he refers to as the original “closed” or “circular ending”. The epigraph above is from this closed circular ending and has the interstellar echo of Hau’ofa’s formulation of the Pacific Ocean as a “sea of islands”. According to the circular closed ending, when the *Endeavour* reaches the end of the universe, or Te Kore, the six human passengers return to the beginning of their journey and they are once again seated at the dinner table of the *Endeavour* in a scene that replicates the beginning of the story. Thus, the passengers return to their beginning in a cyclical rendition of life and death in the space-time continuum, reflecting a more Indigenous view of time as being circular. The alternate endings appear in author’s notes to each publication. My close reading is taken from the version in *Ask the Posts of the House*.

3.1. A postcolonial navigation of space

One central thread of the narrative structure of *Dead of Night* is a postcolonial navigation of space modelled on the voyages of Captain James Cook to the Pacific in 1769 to observe the transit of Venus in Tahiti. The story is set in 2169, 400 years after Cook’s first voyage to the Pacific and his so-called “discovery” of Aotearoa in 1769. The spaceship is named *Endeavour* after Cook’s ship, and is run by an artificial intelligence named Hemi, an acronym for Hypertime Engineering Matrix Intelligence, and the Māori transliteration of the name “James”. Cook’s first trip to the Pacific, commissioned by the British Admiralty, was a combined Royal Navy and Royal Society expedition aboard the bark HMS *Endeavour*. The admiralty’s orders to Cook were divided into two sections both marked “Secret”. The first order was to voyage to Tahiti

to observe the 1769 transit of Venus across the sun. The second order directed that once the transit was observed, Cook was to sail south to seek evidence of the southern continent.

Similarly, Captain Craig, who commands the spaceship *Endeavour*, is instructed by its owner and builder, scientist Peter Cortland, to voyage to the Hubble Deep Field, and to observe the transit of a black hole named Venus II across a galaxy named HUDF-JD2. Once the transit has been observed, Captain Craig opens a second set of secret instructions directing him to “Go forward to zero” as the universe is closed and will start contracting. He is, therefore, humanity’s only hope (200). Accompanying the second set of instructions is a codicil “which is not to be opened until zero is reached”.

The analogy with Cook’s voyage to the Pacific is that Cook returned home to Britain and the spaceship returns to the beginning of the voyage. While this is an Indigenous representation of the circularity of time, any other comparison with Cook’s voyage is difficult to follow. As Hau’ofa argues in relation to reconstructing the histories of the Pacific, “we must clear the stage and bring in new characters... bring to the centre stage, as main players, our own peoples and institutions... lay to rest once and for all the ghost of Captain Cook” (*We Are the Ocean* 64-65). Following on from Hau’ofa’s thinking, there is a lost opportunity in *Dead of Night* to centre Pacific Indigeneity more fully, as only one of the six human passengers onboard the spaceship is an Indigenous character, Captain Craig. Captain Craig is Māori and is an equal in all respects with the five other Pākehā passengers, from engaging in socially appropriate conversations to having the required technological knowledge to fly the spaceship.

The artificial intelligence (AI) characters in the story include the *Endeavour*’s avatar Hemi, who is in control of the spaceship and with whom Captain Craig communicates via an implant in his brain. Three robotic probes, named the “Aunties”

(Advanced Unified Navigational Tracking Intelligence), work with Hemi to shepherd the spaceship through space. The scientists who built the probes gave them “the personalities of three grumpy old ladies who are constantly scolding Hemi as if he were their nephew” (199). A robotic service crew assists Hemi and the Aunties. The AIs invoke whānau of the mechanical type, standing in as disembodied technological Māori characters who have a relationship with the human character in Captain Craig—the only other Māori presence onboard the ship—but remain at a distance from the other passengers. The parallel is, therefore, that Māori are in control of the ship, navigating its course, and protecting those who sail within. This idea of Māori being in control of the ship is a metaphorical turn towards an Indigenous view of who should be leading Aotearoa. The story, therefore, holds a glimmer of the idea of Māori governing New Zealand and gestures towards what that would mean in terms of an adherence to Māori values, such as Māori sovereignty or rangatiratanga, manaakitanga (caring for others), and kaitiakitanga (stewardship).

What is the purpose of modelling an Indigenous space story on the Crown-sponsored colonial voyage of Captain Cook who voyaged forth under the “doctrine of discovery”, a doctrine which authorises the dispossession and genocide of Indigenous peoples? In author’s notes, Ihimaera (2006) states that “as a New Zealand writer, I have always tried to put New Zealand at the centre of my work, even if, in this case, the narrative involves the universal world of science and mathematics” (310). Ihimaera goes on to say that

like all my work, it is embedded with a Māori kaupapa and my constant environmental concerns. In my opinion it is not enough to just save the planet; we’ve got to give ourselves the chance to get off it so that future generations can fulfil their destiny and truly achieve the inheritance that belongs to them (300).

Mapping the plot of *Dead of Night* onto the story of Cook's voyages as well as providing a mirror narrative structure, also serves to challenge the colonial agenda implicit in Cook's journeys. Cook was searching for a land that Europeans thought of at the time as being at the end of the Earth. Tina Ngata traces the justification for widespread colonisation to a set of papal bulls from the fifteenth and sixteenth centuries. The "doctrine of discovery" grew out of these decrees (45). The *Dum Diversas* empowered King Alfonso V of Portugal the "right" to conquer North Africa to "invade, search out, capture, and subjugate the Saracens [Muslims] and pagans [non-Christians]"—in other words, anyone who was not white and Christian. This decree formed the basis of the Atlantic slave trade (46). Ngata points to later papal bulls such as *Romanus Pontifex* and *Inter Caetera* which extended the rights, previously granted, into the New World. These decrees are still in force today. As Ngata states, "in justifying European imperialism, the papal bulls paved the way for Cortés, Columbus, Ferdinand Magellan, John Cabot and indeed James Cook" and provided "a convenient religious rationale for the... cruelties of colonisation" (46). The plot of *Dead of Night* challenges this colonial agenda by setting the story in space and offering an Indigenous conception of the journey to the end of the universe, in which such a journey is in effect a return to the self and not a precursor for imperial domination and colonialism.

To travel forward into what would, from a colonial perspective, be termed spatio nullius and to reach the end of the universe where you return to yourself "is also the same as going back in time" (206). Another way of conceptualising such a journey would be to say that you arrive into a beginning in a recycled universe; and this conceptualisation is a more Indigenous Pacific conception of the unknown, what Wendt refers to as relational space—not empty space but space that connects, the *vā*. Ihimaera invokes this thinking when Captain Craig remembers the Māori village of his birth as

the spaceship travels towards Te Kore. Captain Craig recalls the old women of the tribe who kept the oral traditions alive chanting to him as he slept and reciting the whakapapa of time from the beginning, Te Kore the Void, to Te Po Kitea (220).

Thus, the narrative, while being clothed in colonial trappings such as a faux Victorian dinner service and discussions centring around the European development of scientific theory in the Enlightenment tradition, is subverted by Māori kaupapa that continually disrupts the colonial journey. For example, Captain Craig, despite having Western technology literally embedded in his head in the form of an interface with the ship, retains an Indigenous perspective. He challenges Western educational divisions between the humanities and science, arguing in favour of the wholistic values of Indigenous peoples and posing the question, “How can the head function without the heart, the body without the spirit, the individual without understanding his role in the community?” (207). He observes Māori protocol and raises his voice in poroporoaki (farewell) when the ship reaches the end of the universe (240). However, he is a lone voice for the Indigenous perspective amongst a guest list representative of Pākehā scientific thinking, capitalism, religion, and cultural production. Captain Craig’s minority position mirrors that of the minority position of Indigenous peoples in societies such as Aotearoa where settler colonialism is the hegemonic framework. In addition, it is odd that the passenger list reflects a colonised gender set-up, where there are no queer people, there are only two women onboard neither of whom are scientists, and everyone is cisgendered.

3.2. Ihimaera’s didactic game

Another central narrative device used in the story is a didactic game played by the passengers during dinner. The game requires each guest to discuss what they think has

been the most transforming event in the history of cosmological science. Ihimaera (2006) writes in the author's notes that "for better or worse there's always been a strong didactic component to my work, and I had always wanted the story to begin a process of information transmission from the inventory of cosmological history, attaching it to the kinds of New Zealand, Pacific, Maori and indigenous histories that I write about" (310-311). The text goes some way towards achieving Ihimaera's stated aim of attaching an account of Pākehā cosmological history to Indigenous histories. However, the didacticism of the game reflects a Western portrayal of scientific and cultural thinking and does not investigate Indigenous science or culture in any meaningful way. The attachment of Western philosophy to that of Indigenous peoples comes at the expense of the elucidation of Indigenous histories and reflects an obscuration of Indigeneity in the text.

Dr Foley, a historian, traces "the unfolding set of revelations of Earth's – and man's – position in the cosmos". He admits that he is only able to talk of "western man and western cosmology" and that "western cosmologists were blind to Muslim science and astronomy" (195). However, there is no acknowledgement of the existence of other Indigenous cosmologies or their legitimacy.

Professor Van Straaten, a scientist, continues the portrayal of European Enlightenment scientific discourse and offers a discussion on the way in which the telescope transformed the cosmological sciences. His discussion stretches from European science around the Big Bang theory, Einstein's theory of relativity and the cosmological constant, and quantum mechanics. During the Professor's discussion of European humanities and science, Captain Craig hesitantly points out that Indigenous people would not divide the sciences and the humanities into two separate disciplines and to do so was a grave mistake (207). The Professor does not take up the opportunity

of engaging in a discussion about Indigenous science or giving any acknowledgement of the Indigenous viewpoint. Rather, his response is to denigrate Indigeneity by criticising the Indigenous people of Te Rapanui for “cutting down all the trees on Easter Island” (207).

Monsignor Frère, a Catholic Priest, engages in a debate with Professor Van Straaten about science versus God. The Monsignor’s contribution to the discussion is that from the 1990s onward the most transforming event in the history of the cosmological sciences was the discovery of the unseen universe, that is “Dark Matter” or “exotic matter”. This is a provocative plot device, given the Monsignor’s birthplace is a village in Nigeria, which places him as the only black character in the narrative. However, there is no discussion of his Indigenous roots and his discussion focuses solely on his position as a Catholic Priest. The Monsignor inevitably concludes that “the presence of the unseen affirms the continuing presence of God in the universe” (214). However, while talking of the discovery of the “unseen universe”, the Monsignor’s contribution to the game does not take up the opportunity afforded by the metaphorical implications of the phenomenon of “dark matter” as discussed by Afrofuturists, whereby dark matter stands in for Black people who are invisible in science fiction but whose gravitational force is unmistakable.

Mrs Cortland, the widow of the man who financed the spaceship, catalogues the unheralded contribution of women scientists, how their male employers underpaid them, how their achievements went unrecognised, and they were passed over in favour of men for such awards as the Nobel prize. She argues that “one would think, from looking at the history of the cosmological sciences, that it was a male history” (223). The men at the dinner are dismissive of Mrs Cortland’s topic. Professor Van Straaten “groans” at the mention of the subject and disparagingly refers to one group of women

scientists as “Pickering’s harem”, thereby defining the women scientists in terms of their male boss and denigrating their contribution as against the contribution of male scientists. Mrs Cortland thinks of the long dead and diseased Earth and wonders “how much better our future might have been if women had been allowed to take control of our destiny” (226). What is striking about this feminist musing is that it is an observation which is wholly directed at white women in the context of a discussion rooted in the European development of science in accordance with the Enlightenment tradition. There is no place in this discussion for the contribution of Indigenous women whose position in the community is yet again erased. The omission contrasts sharply with the placeholding that Ihimaera gives to Indigenous women in the form of the three robotic Aunties and their guiding auntie-nephew relationship with Hemi, the ship’s controlling AI. Ironically, Ihimaera places Indigenous women, albeit in the form of robotic avatars, in control of the ship’s destiny. But the subtext is that they are disembodied automatons with no real power.

The issue that Miss O’Hara, an actress in popular cinema, brings to the dinner debate is a discussion about the large number of films and television series in the science fiction genre that came out of Hollywood at the turn of the millennium. “In them we see our wonderment at the universe,” she says (227). However, there is no discussion about the fact that science fiction film and television production is overwhelmingly peopled by white characters and that the figure of “the alien” always stands in for the “other” or Indigenous people. In a podcast interview with David Tennant, Whoopi Goldberg commented about the effect on her as a child of seeing Nichelle Nichols playing the part of Lieutenant Uhura in the television series “Star Trek”:

you see the show and if you're a movie buff you suddenly think "Oh she looks really great, she's the communications officer on the Starship. Are we in the future anywhere else?" And, you start thinking ... about all of the sci fi. Up until 1963 we were not represented in science fiction, we were not in sci fi movies, we weren't there. So that was the first clue that we would be in the future.

In relation to representation of Indigenous Mexican people in science fiction film and television, Chicanafuturist Catherine Ramírez states that Mexican girls weren't supposed to like science fiction. Ramírez (2008) argues that "few if any of the characters in the mainstream science fiction films and television programs of the 1970s and early 1980s looked like us. As the African American science fiction writer Octavia E. Butler pointed out, *Star Wars* featured 'every kind of alien...but only one kind of human—white ones'" (185). Similarly, Merla-Watson (2017) writes that contemporary speculative production in the US and beyond "remains firmly entrenched within a largely white, middle-class, cisgender male purview" and that "an overwhelming majority of sci-fi and fantasy films and popular novels rely on familiar colonialist, racist tropes".

Any analysis of the invisibility of Indigenous people and the whiteness of science fiction produced by the screen industry is lacking from Miss O'Hara's discussion. She considers the fact that "for all our imaginary voyages through space we have not found any other life. There are no aliens out there, hostile, friendly, or otherwise. There's been nothing... The most transforming event in cosmological science? It is this: the discovery that man is truly alone. It has always only and ever been in this huge immensity just-us" (230). This comment speaks to a humanist understanding of the world that elides the colonial representations of Indigenous peoples as the "alien other", and their omission from the science fiction genre.

3.3. Oceanic metaphor – Wayfinding in space

The metaphoric device of a ship on a wayfinding voyage through a celestial sea is at the heart of the narrative in *Dead of Night*. The *Endeavour* is a spaceship built for an ongoing expedition over billions of light years from Earth to the end of the universe using black holes to slingshot itself across the space-time continuum (209). However, once the ship reaches the initial destination of HUDF-JD2, there is no further mapped area. The ship is sailing in uncharted waters which must be navigated by robotic probes, the Aunties, much like Captain Cook in his first voyage to the Pacific who, eventually, with the help of his Tahitian navigator Tupaia, pivots around the islands of the Pacific until returning to the beginning in England. It is notable that Cook did not record anything about how Tupaia was able to retain his bearings and always knew where Tahiti was. Lewis notes that the fact that Tupaia could do so is in line with the home referencing systems of the Caroline Islands system of etak, of having the ability to point out the location of invisible islands while at sea (128). The subverted theme here points to historical blind spots where Indigenous knowledge was not considered worthy of note.

Similarly, the *Endeavour* spaceship relies on the Aunties to guide it on its voyage through the uncharted waters of the cosmos (217). Hemi and the Aunties, knowing that the humans onboard crave “landmarks”, must plot a course populous with galaxies and stars. Accordingly, black holes and galaxies provide turning points and landmarks or cosmic islands that plot the ship’s journey in the “sea of stars”, a cosmic environment that chimes with Hau’ofa’s “sea of islands”. The Aunties must assess the environment in a wayfinding process, avoiding violent mushrooming quasars, gamma ray showers, supernovae explosions, collapsed protostars, galactic cyclones, solar storms, collisions with asteroid belts, and the gravitational pull of black holes, planets,

moons and stars. They must harness galaxy-wide superwinds from star bursts, and change course to “plough through the reefs and island universes that dotted the celestial sea” (218). After negotiating the dangerous cosmic sea on its approach to zero, the spaceship anchors in the lee of a benign star system (220). The ship is described as a “valiant star waka” (221). When the ship nears Te Kore, the end of the universe, “the light-wings are reefed, minimising her profile so that the ship is not overturned by the cosmic winds buffeting from all around, and Hemi has dropped seven anchors to keep her from drifting” (233). While the ship rocks, “the three aunties are like lifeboats beside it”(239).

Thus, Ihimaera’s conception of space is not one of empty space but that of a place in dynamic movement that can be used to hold a ship in place, much like the ocean on Earth. When Te Kore begins to collapse, and the countdown reaches zero, the ship is incinerated and likened to a “bloodied jawbone thrown through the air” recalling the legend of Maui who used his grandmother’s jawbone to fish up the North Island. Accordingly, at the end of the voyage, Indigenous ritual, myth, and practice are present. The subtext by analogy with Cook’s voyage to the Pacific is that although Cook returned to Britain and settler colonialism followed in his wake, Indigenous Pacific peoples and cultures lived on and we survive today.

3.4. The Indigenous dream

Ihimaera envisions an Indigenous view of the universe which punctuates the narrative in the form of Captain Craig’s recurring dream, at the halfway mark in the countdown and at the end of the countdown when it reaches zero and Te Kore collapses. In his recurring dream, Captain Craig returns to his country of birth, New Zealand, and to a scenario where he meets three elderly women who direct him to a farmhouse. In the farmhouse,

Captain Craig meets the other passengers on *Endeavour*. At the end of the spaceship's voyage, time fades to nothing as the countdown reaches zero and the universe collapses. At this point, Captain Craig closes his eyes and opens them to find himself in the same scene he encounters in his recurring dream. Again, he sees the three elderly women who direct him to a farmhouse where he once more meets his fellow human passengers on the spaceship *Endeavour*. He then finds himself in a white room where he sleeps for billions of light years. When he wakes, he dresses, "takes a deep breath. Walks to the door. Turns the doorknob. Opens the door. The table is set for six. It is circular. Every guest, when seated will be equidistant from the other" (243). Thus, the narrative device of a recurring dream circles back through time where the end is the beginning, an Indigenous conception of time as circular and not linear. In this circular conclusion, Captain Craig reaches the end of the universe only to find himself back at the place where he first started the voyage.

In *Dead of Night* Ihimaera draws a direct parallel between Captain Cook's voyage through the Pacific and around Aotearoa in 1769 and the voyage of the spaceship *Endeavour* to the end of the universe. Cook's voyage marked the first encounter between Māori and Pākehā, the violent precursor that paved the way for the European colonisation of Aotearoa and the subsequent invasion and arrival of waves of British settlers. Similarly, the story of the voyage of the spaceship *Endeavour*, set entirely in space billions of cosmic light years in the future, retains a Western aesthetic with an Indigenous viewpoint that struggles to come to the fore in the narrative. Although Captain Craig, and the controlling AIs and robotic drones and service crew are technologically enhanced or robotic Māori characters who guide and control the voyage, their methods and thinking go unnoticed.

Captain Craig maintains an observance of Māori ritual. For example, when the spaceship reaches the end of the universe, as one of the last survivors of the human race he farewells humanity in Māori, “Tena koutou nga iwi katoa o te Ao, Te Huinga o te Kahurangi, Tena koutou” (240). The ship and the passengers are all incinerated. However, Captain Craig falls into “a tunnel of dazzling light”, then into his recurring dream of being in a farmhouse in New Zealand, then into the white room which opens onto the dinner setting (243). This ending speaks to the survival of the Indigenous body via a Pasifikafuturist science fiction story that defies those colonial science fiction narratives which either do not include Indigenous people at all, or which cast them as “other” or “alien” destined for destruction and erasure. The narrative thus envisions an Indigenous counter history, reweaving the first contact colonial nightmare within a cosmic framework embedded in Oceanic wayfinding metaphors from the Pacific.

Chapter Four: Envisioning the dream of the Indigenous woman in oceanic space in Nnedi Okorafor's *Binti*

... but even I knew that just because information was in a book didn't make it true – Okorafor *Binti: The Complete Trilogy* (18)

In this chapter I conduct a close reading of Nnedi Okorafor's 2015 novella, *Binti*, the first novella in the *Binti* trilogy. *Binti* was followed by *Binti: Home* and *Binti: The Night Masquerade*. The three novellas are published in the 2019 collection *Binti: The Complete Trilogy*, which also includes a new story *Binti: Sacred Fire*. In this thesis, my close reading is taken from the text of *Binti* which appears in the 2019 collection. I argue that Okorafor envisions in *Binti* a dream of the Indigenous woman in space which helps to bridge the crisis that Ebony Elizabeth Thomas refers to as the “imagination gap” present in literature and media for young people. This gap is “caused in part by the lack of diversity in childhood and teen life depicted in books, television, and films” (8), and by what Carrington observes as the “whiteness of science fiction and its function as a source of alienation for Black people” (17).

I investigate how *Binti* privileges Indigenous culture and showcases a reenlistment of Indigenous science. I also examine the metaphoric parallels between space and the ocean that Okorafor draws through setting, character, and dialogue. (Although I do not examine them in this critical portion of the thesis, I note here that there are also some parallels between my novel *Na Viro* and *Binti*, in that they both feature Indigenous women protagonists travelling into space). Finally, I analyse the extent to which an Indigenous point of view is sustained in the face of the Meduse, turning *Binti* into a part-Meduse, part-human being, and how this ultimate act of

survivance through transformation reconfigures Binti's identity while at the same time she retains her Indigeneity.

4.1. An Indigenous woman in space

In Okorafor's novella *Binti* the eponymous protagonist is a young woman from the Himba tribe in Namib who defies her parents and travels to a university planet, Oomza Uni, to study mathematics and currents. She is the first person from her tribe to attend university. When she makes the decision to travel to the university, she steps out of the Himba tradition of staying put and not leaving their land. The Himba people prefer to travel inward as opposed to outward. Dustin Crowley observes that "the Himba are ecological, but not cosmopolitan, refusing meaningful interactions outside those clustered around their own lake" (247). On the trip to Oomza Uni, Binti is an outsider, the only one of her people onboard a Khoush spaceship filled with Khoush people, who are the majority tribe on Earth and despise the Himba. As Crowley notes, "in contradistinction to the Himba, the uber-cosmopolitan Oomza Uni is replete with different peoples from all over the galaxy—a literal universe-ity" (249).

Binti grapples with opposing aspects of her nature and this tension defines the arc of the story. On the one hand, her cultural traditions dictate an adherence to a type of stasis that rejects any threat to her people's way of life from outsiders. On the other hand, she wishes to pursue her desire to extend her love of "mathematics, experimenting, learning, reading, inventing, studying, obsessing, revealing" (9), and this desire obliges her to break with tradition and engage with other peoples and species. Accordingly, Binti's decision to go to Oomza Uni sits alongside her Himba Indigeneity, which Okorafor depicts as technologically advanced although contained within cultural rules.

Binti is a mathematical genius, a “master harmonizer” who builds “astrolabe” communication devices used universally by all peoples. Oomza Uni accepts her application based on her technologically advanced skills and knowledge. Crowley notes that Okorafor “uses the SF genre to project and prepossess a future in which African peoples like the Himba are not shut out of technological agency and its posthuman possibilities” (244). Thus, by investing an Indigenous woman with technological ability, Okorafor decentres the West’s hold on access to technological advancement and provides her protagonist with the scientific agency that is usually absent for Indigenous characters in science fiction. The significance of this investment is that it bridges the “imagination gap” and asserts the empowerment of a young Black woman in science fiction text.

At the heart of the story is a theme of cultural appropriation which is the main plank upon which Binti’s role as protagonist rests. During Binti’s interstellar trip to the university, a jellyfish-like species called the Meduse attack the spaceship and murder everyone on board except for Binti and the pilot. This extraordinary act of violence occurs in retaliation for human violence against the Meduse: in the past they remove the Chief Meduse’s stinger, the source of Meduse power. To take the Meduse Chief’s stinger was an act of war. Anthropologists from Oomza Uni have placed the Chief’s stinger on display as an artefact in the weapons museum. After the massacre, the Meduse enlist and transform Binti to enable her to negotiate the return of the stinger from the university. When the Meduse Chief meets the professors at Oomza Uni, he tells them “if you do not give it to us willingly, we have the right to take back what was brutally stolen from us without provocation” (47). Binti helps to resolve the Meduse grievance over the unprovoked violence inflicted upon them, and the university agrees to return the stinger to the Meduse.

This strand of wrongful appropriation in the narrative is a powerfully evocative comment on the practice of European colonial invaders who took artefacts and body parts from Indigenous peoples which are still housed in European museums today and which Indigenous people are seeking to have returned to them. James (Sa'ke'j) Youngblood Henderson (Chickasaw Nation) notes that the unethical acquisition and cultural appropriation of Aboriginal human remains is harmful and does not benefit First Nations peoples or science. Such practices are acts of colonial privilege which academic researchers justify under the guise of good science. The resulting harm to First Nations people is "ignored, summarily dismissed, or scorned" (Young and Brunk 57). Binti's role in negotiating the return of the Chief Meduse's stinger is representative of some of the successful demands that Indigenous peoples have made to museums and educational institutions for the repatriation of human remains. She is a representation of successful Indigenous advocacy for justice in what Scarre refers to as "the collision between two fundamental values, knowledge and justice" (Young and Brunk 81).

4.2. Privileging Indigenous culture and reenlisting the science of Indigeneity

Binti's Indigenous Himba culture is privileged throughout the story in several ways. For instance, over the course of the novella, Binti maintains a customary Himba practice of rubbing *otjize*, an ointment made of red clay and oil from her homeland, into her hair and skin. This bodily link with the Earth serves to always ground Binti so that she keeps a connection with her desert birthplace and her culture. The weight of *otjize* in her hair gives her cultural grounding and comfort when she first speaks with the Meduse after the massacre onboard the Khoush spaceship, "Third Fish". She observes that "the weight of my hair on my shoulders was assuring, my hair was heavy with *otjize*, and

this was good luck and the strength of my people, even if my people were far far away” (23).

Binti’s relationship with her hair and what it represents is one of the central threads weaving through the narrative. In the beginning, her hair is braided into a mathematical code, a history of her people, a pattern that speaks to her family’s bloodline, culture, and history. She notes that “my father had designed the code and my mother and aunties had shown me how to braid it into my hair” (10). Binti’s hair is, therefore, the embodiment of her culture in a sea of mathematics. Her cultural relationship with her hair and otjize, and the Meduse’s cultural relationship with the stinger merge when Binti befriends one of the Meduse named Okwu and heals his injured stinger with otjize.

When the Meduse Chief stings Binti, she becomes part-Meduse and her hair turns into tentacles called “okuoko”. Although Binti’s body changes into that of a hybrid Meduse–Himba person at a cellular level, she maintains her bodily connection to her Indigenous Himba culture by making new otjize from ingredients she finds on Planet Oomza and continuing to cover her okuoko tentacles: “I touched one of my tentacle-like locks ... I plunged my two fingers into my concoction ... I spread it on my flesh” (54). Thus, Binti’s ability to maintain a link with her Himba origins, despite her physical transformation, speaks to the ability of Indigeneity to survive and evolve in the face of forced change.

4.3. Oceanic space

Throughout the text of *Binti*, metaphoric and thematic lines draw linkages between space and the ocean through imagery and characterisation. Oceanic and natural elements hold equal relationship with intelligent beings and are given their own agency as living

entities. The spaceship on which Binti travels to Oomza Uni is a living technology, a sentient entity called “Third Fish... a Miri 12, a type of ship closely related to a shrimp. Miri 12s were stable calm creatures with natural exoskeletons that could withstand the harshness of space” (8). The spaceship is therefore a sentient, pelagic figure swimming through the sea of space in the same way that fish swim through the sea on Earth. Accordingly, Okorafor draws a direct parallel between the sea and space as essential sites of interconnection between lifeforms, such as the Miri spaceships and the lifeforms who travel within her, and metaphorically between Indigenous peoples and the sea.

The oceanic theme running through the text is most clearly drawn in the characterisation of the jellyfish-like Meduse, who are blue and translucent and have “long tentacles spilling down to the floor like a series of gigantic ghostly noodles” (12). The Meduse also have, within their tentacles, a stinger that is “tinted pink like the waters of the salty lake” (15). In the formulation of the Meduse characters, Okorafor pays homage to Octavia Butler, a founding Afrofuturist author in the literary ancestry of Afrofuturism, and her creation of the “Oankali”. The Meduse are reminiscent of the Oankali race in Octavia Butler’s trilogy *Lilith’s Brood*, who have writhing tentacles instead of hair, like “Medusa” (13). However, while the Oankali are humanoid, the Meduse are more like jellyfish in that their bodies are transparent blue domes.

The imagery of water contrasts with Binti’s desert home throughout the text. For instance, the Meduse and the Khoush are old foes who once fought over water-soaked lands on Earth and have agreed by treaty not to attack each other’s ships. Another metaphoric sea in the story is the current of numbers that runs through the “sea of mathematics”. Binti observes a meditation-inducing state called “treeing”, in which she can become lost in the “mathematical sea” (10). The “sea of mathematics” is a constant comfort to Binti and a place that she retreats to in times of fear and stress. For instance,

when she is alone after the massacre, her “thirsty brain dropped into a mathematical trance like a stone dropped into deep water. And I felt the water envelop me as down down down I went” (21). Binti finds safety and protection in numbers, and she views them as deities invested with magical power. She invokes numbers as a spiritual comfort, focusing on the number five when she witnesses the Meduse murdering the Khoush, and praying to the “Seven” when the Meduse imprisons her on Third Fish.

Crowley observes that “in the *Binti* series, the scope of belonging includes plants, insects, microbes, even land and *water* themselves; the novellas consistently portray the nonhuman as more than background or symbolism, but consequential participants in eco-political histories” (238) (emphasis added). Although Binti is a desert dweller on Earth, her ability to access various numerical currents in the sea of mathematics serves as an oceanic metaphor in which she swims.

4.4. Indigenous posthumanism as survivance

At the end of the story Binti is transformed into what may be described as an Indigenous posthuman state of survivance. Vizenor writes that “the character of survivance creates a sense of native presence over absence, nihility, and victimry” (*Survivance: Narratives of Native Presence* 1).

Hayles describes “posthumanism” as “referring to twentieth-century developments in which an Enlightenment inheritance that emphasized autonomy, rationality, individuality and so forth, was being systematically challenged and disassembled—in a whole variety of fields, among them cybernetics” (321). Ferrando observes that posthumanism and transhumanism “share a common perception of the human as a non-fixed and mutable condition, but they generally do not share the same roots and perspectives” (27). She states that the main keys to access human

enhancement in the transhumanist reflection “are identified in science and technology... as existing, emerging and speculative frames—from regenerative medicine to nanotechnology, radical life extension, mind uploading and cryonics, among other fields” (27). Whereas with posthumanism, as it becomes more mainstream, some thinkers are looking to embrace “the ‘exotic’ difference, such as the robot, the biotechnological chimeras, the alien, without having to deal with the differences embedded within the human realm... so that the non-human differences are as compelling as the human ones” (30).

Posthumanism is represented in Binti who makes the decision to survive and avert a war by becoming a posthuman figure. As a result of her transformation, she is able to access the mathematical current all around her and is thereby able to communicate with the Meduse. The “current” connects her to the Meduse: “many of them had it running within their very bodies. Some of them were walking astrolabes, it was part of their biology” (36). Crowley asserts that “current” acts as a central component of the posthumanism narrative in *Binti* (244). Binti becomes one with “the current” which represents the “merged spiritual and material, technological and organic, human and non-human” medium (Crowley 244). It feels strangely unifying for Binti to be posthuman. In this merged state she can understand the Meduse and interprets for them at the negotiations with the university for the return of the Chief’s stinger. She feels both “part of something historic and very alone” and wonders if her family will comprehend it all (49) .

Accordingly, Binti begins her studies at the university in a physically transformed state. Her hair is now no longer hair. Replacing her hair are ten Meduse okuoko, “a soft transparent blue with darker blue dots at their tips. They grew out of my head as if they had been doing all my life... a little longer than my hair had been,

hanging just past my backside, and they were thick as sizable snakes” (54). When Binti runs out of the otjize made from the red desert soil from her birthplace, she finds a sweet-smelling oil of the same chemical make-up in the market at Oomza Uni and a similar clay from the forest near her dorm. She mixes these ingredients into a new batch of otjize and rubs it into her skin. The new otjize has the same healing powers of the earthly substance and she uses it to heal an injured Meduse student: “This was the real test...When I rubbed off the otjize the burn was gone” (55-56). Accordingly, Binti’s cultural practice of rubbing otjize on her skin, and on her transformed state in the form of Meduse okuoko, foreshadows a continuing connection with her culture and her Indigeneity, despite the changes to her physical body.

Chapter Five: Conclusion

The objective of this thesis is to demonstrate how science fiction texts, particularly space stories, written by Indigenous authors comment on the present social position of Indigenous peoples by recasting the colonial past into transformational futures of the imagination. Few Pasifika authors take up the challenge of writing science fiction space stories. In researching the reasons for this absence, I turned to the work of Afrofuturist scholars who have traced the causes for the absence of Black people from both the production and consumption of science fiction in the USA. The results of that research mirror the reasons for the racist exclusion and marginalisation of African American people from cultural, political, economic, and other sites in present day US society. However, more scholarship is needed to locate Māori and Pasifikan reasons for this absence.

The colonial project of slavery has all but erased the Indigenous cultures of African American peoples. Afrofuturism scholars and writers have paved the way in mapping alternative cultural cartographies that use technoscientific storytelling to imagine new futures in the afterlife of the deliberate colonial attempt at erasure. Afrofuturism has inspired other Indigenous scholars and authors to interrogate the effects of colonialism and neocolonialism in their production of futuristic stories and academic discourse. The field of Alternative Futurisms is a growing area of scholarly dialogue, research, and story. Accompanying these developments is a growing network of Indigenous fictive kin with similar analyses of the effects of colonialism on their cultures.

Inspired by the scholarship of Afrofuturism, Indigenous Futurisms, and their fictive kin in Alternative Futurism discourses, I have developed the term “Pasifikafuturism”. A Pasifikafuturist framework locates Māori and Pasifika authors

within an environment where the Pacific Ocean is the central influence in science fiction. Pasifikafuturism is a term that marks the meeting point and intersection of multiple diasporas of Indigenous Pacific peoples who envision, dream, imagine, create, or are receptive to ideas that play with, and liquify the boundaries of technology and time and space.

I have used the Indigenous ancestral art of wayfinding across the Pacific Ocean as a metaphorical framing device in this thesis. It provides a metaphorical model for Pasifikafuturist cultural production that focuses on Indigenous transformation resulting from our position in the Pacific Ocean. Wayfinding is a living practice of Indigenous science that continues in the present day. It is a practice that demonstrates that Pacific peoples and teachers, such as Papa Mau Piailug, have always been and continue to evolve as futurist thinkers. Our ancestors navigated across the vastness of the Pacific in deliberate voyages to their home islands. They maintained an awareness of their site of departure and their destination while at all times calibrating their position against the totality of the environment around them. They remained firmly attuned to the eternal present, making any necessary adjustments in course, until their future destination came to them. Similarly, Pasifikafuturist artists, such as Witi Ihimaera, maintain an awareness of their Indigenous past while calibrating their cultural production in the present against the environment in which they exist. They make any required course corrections in the present until their destination comes to them. Our future destination for the purposes of this thesis is the production and consumption of Pasifikafuturist text, including science fiction space stories, written by, for, and about Māori and Pacific peoples.

I have applied a wayfinding framework to the science fiction stories of Indigenous authors where the ocean figures as a metaphor for space and vice versa. These space stories, including novellas like *Dead of Night* and *Binti*, provide a lens

through which to examine the corrosive effects of colonialism on Indigenous peoples, such as the harm caused by loss of lands, culture and language; cultural appropriation of artefacts and human remains; and continued subjugation under settler colonial and neocolonial rule.

Indigenous space stories such as *Dead of Night* and *Binti* also exemplify the envisioning of transformative futures in which Indigeneity is honoured and recognised. They present an Indigenous Oceanic conception of the cosmic story. In this conception, Pasifikafuturist texts centre Indigenous Pacific peoples as the main characters. In these texts, an Indigenous imperative drives a narrative that foregrounds our culture and values, as opposed to the current mainstream presentation of science fiction story which favours a white, male, cisgendered, heteronormative, able-bodied, middle-class point of view.

Looking at Witi Ihimaera's novella *Dead of Night* through a Pasifikafuturist lens reveals a narrative that overturns the doctrine of discovery and directly examines Captain Cook's colonial voyages to the Pacific Ocean in contrast with a Māori conception of the space-time continuum. Ihimaera uses an examination of European scientific thought in the Enlightenment tradition as a backdrop against which to subvert the colonial gaze and place transhuman and robotic Māori characters in control of the voyage and as protectors of the human passengers onboard the spaceship. The voyage in this sense stands in for the fate of humankind on the spaceship that is Earth. The story can be read as saying that in the hands of Indigeneity the fate of humankind as it faces annihilation has one of two endings: either a closed, cyclical or circular return to the beginning of time, or an unknown linear progression towards a hoped-for second chance.

Okorafor's depiction of an Indigenous woman in space, in the novella *Binti*, privileges Indigenous culture and, in contrast to the normal white, Western, colonial norm of science fiction, displays a reenlistment of Indigenous science. Binti retains her connection with her home, family, and culture through an embodied relationship with clay and oil from Earth, even after she is physically transformed and separated from these elements. Okorafor places her protagonist's cultural origin from an Indigenous tribe in the Namib desert in dynamic contrast with an Oceanic view of the space journey. When Binti becomes part-Meduse, her identity is subsumed to an extent within a pelagic, posthuman physicality.

Oceanic metaphors positioning space as an ocean of cosmic islands, and the ocean as a galaxy, are common metaphorical figures in both Ihimaera's *Dead of Night* and Okorafor's *Binti*. And yet, these authors hail from vastly separate spaces—the Pacific Ocean continent and the African continent. I posit that their common use of oceanic imagery finds connection in the relationship between the Pacific Ocean and the Atlantic Ocean as the liquid biotic mass that provided the highway for the worldwide invasion of white settler colonialism into Indigenous lives over the past five hundred years. I look to Māori and Pasifika culture, and specifically our ancestral navigational knowledge of wayfinding across the vast Pacific Ocean entity, as providing us with an imaginative metaphor for finding our way in the present and envisioning transformative future pathways in our writing. While the West views the high seas and space as *aqua nullius* and *spatio nullius* to be conquered, in Ihimaera's and Okorafor's texts the Indigenous Oceanic view figures these sites as places of deep connection where Indigenous science fiction can imagine transformed Indigenous futures.

My mixed method qualitative research in this thesis has focused on science fiction space stories written by Indigenous authors. While I have also touched on post-

apocalyptic, dystopian and utopian fiction, I have not delved into other areas of Indigenous writing within the speculative fiction genre such as fantasy, horror, steampunk, paranormal romance, fandom, alternate history, native slipstream, and superhero fiction. These areas would provide fertile ground for further research. My dream envisions a fleet of Indigenous literary waqa in oceanic space sailing through a continuum of the cosmos of science fiction story.

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Appendices

Appendix A Copyright permission to reproduce Figure 2–1 Mercator Map Projection

From: Gina Cole <gina@ginacole.nz>
Sent: Thursday, 14 November 2019 3:51 p.m.
To: matt.roscoe@umontana.edu
Subject: Copyright permission

Hello

I am a Phd candidate from Massey University, Auckland New Zealand.
I am writing a creative writing thesis on Indigenous science fiction.

I am emailing you to request permission to reproduce a map in my doctoral thesis, from your 2010 article, co authored with Nick Haverhals, in TMME, vol 7, nos 2& 3, p339, titled “The history of mathematics as a pedagogical tool: teaching the integral of the secant via Mercator’s projection”.

The map is at p357 of the article and is titled “Figure 2: A Mercator Projection Map”

I originally emailed you at a different email address, so I apologise if this is a duplication. I also tried to email Nick Haverhals but the email bounced back.

I await your reply.

Kind regards

Gina Cole
Phd Candidate
Massey University
Auckland, New Zealand

From: Roscoe, Matt <roscoem@mso.umt.edu>
Sent: Friday, 15 November 2019 5:04 a.m.
To: Gina Cole <gina@ginacole.nz>
Subject: RE: Copyright permission

Hi Gina,

No problem, you are welcome to use the map. If you are interested, you can produce the same map using the mathematical software Mathematica. That is how I believe I created the image (If I remember correctly). Here is the documentation in case it is useful to you:

<https://reference.wolfram.com/language/WorldPlot/tutorial/WorldPlotting.html>

Good luck on your thesis...I am really curious of course, being a big science fiction fan.

Best,

Matt

Matt Roscoe PhD
213 Mathematics Building
The University of Montana
Missoula, MT 59812
406-243-6689
matt.roscoe@umontana.edu

Appendix B Copyright permission to reproduce Figure 2–2 AuthaGraph World Map

From: gina@ginacole.nz <gina@ginacole.nz>
Sent: Friday, 15 November 2019 5:06 p.m.
To: 'info@authagraph.com' <info@authagraph.com>
Subject: Copyright permission

Hello

I am a Phd candidate from Massey University, Auckland New Zealand.
I am writing a creative writing thesis on Indigenous science fiction.

I am emailing you to request permission to reproduce your Authagraph Map in my doctoral thesis.

The map I wish to reproduce is as follows:



I await your reply.

Kind regards

Gina Cole
Phd Candidate
Massey University
Auckland, New Zealand

From: narukawa <narukawa@authagraph.com>
Sent: Friday, 15 November 2019 5:19 p.m.
To: gina@ginacole.nz
Cc: info@authagraph.com
Subject: Re: Copyright permission

Yes. For academic activity it is free to use the map.
I kindly ask you to put the credit,
AuthaGraph CO.,Ltd.
in the page please.
good luck with your thesis.

Hajime Narukawa

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Preface to *Na Viro* (A novel)

In the creative part of the thesis, I explore Pasifikafuturism imaginatively in an original novel titled *Na Viro*, meaning “the whirlpool” in Fijian. *Na Viro* is a work of science fiction set in interstellar space and the Pacific. The novel features a young Fijian woman, Tia, who travels into space to save her sister Leilani from a whirlpool. It is a story about courage and survival and the relationships between two sisters, their mother, and their grandmother. The aim of the story is to centre ancestral Pasifika navigational methods of wayfinding as legitimate Indigenous science; to privilege Pasifika cultural values such as cyclical notions of time and space; and to place Indigenous Fijian, queer, non-binary, and posthuman characters at the forefront of the narrative in a science fiction space story.

Creative Component

***Na Viro* (A novel)**

Prologue – Namu Island

This was the day that Tia would bury deep in the hive, the day her mother left her and her sister behind. She woke from the link and waited in the half dark for her eye circuitry to adjust. Taking a deep breath, she screwed up her face, ready to scream, to send a noise into the emptiness and make it real. Flickering lights peeking out of the blackness caught her attention, green and sparkling, soothing the cry about to erupt from her throat. Some distance away, a familiar outline sharpened into focus, curving out from the side of a helmet. The soft arc of her mother's face. Humming fins brought Tia to full consciousness. She had travelled with her mother many times before, knew the synthetic smell of the passenger compartment, and the sparkling pin-point colours of the lakescreen glowing from the flight deck.

Her mother sat in the pilot seat, staring at the instrument panel. Tia had no memory of who had placed her into the passenger seat. Did her mother carry her there and strap her in? She jerked her small body against the harness, struggling to free herself. Leilani, her big sister, lay calm and awake in the next seat, her hands draped over the armrests, eyes engrossed in playing strike games. They wore matching blue exo-suits, dotted with red puffer fish spaceships and green dinosaurs, Tia's favourite. She dozed off again to the thrumming beat of the fins, her skull lolling on a spongy headrest.

The shuttle lowered onto a landing pad with a cushioned bump that jostled Tia awake once more. A red glow streamed into the cabin, bouncing off the smooth carapaced walls. The data cells in the shuttle's vertebral column jangled and ticked in cool-down. Heated air wafted in through a gill vent and onto Tia's face. On the lakescreen porthole in the cockpit a big ball of sun, its edges dancing in far-off ocean

haze, descended slowly towards the sea. Her mother had not left the pilot seat. Why was she still sitting there, holding her belly, rocking back and forth like a weighted Daruma doll, heavy in the feet, upright? Tia detected the familiar scent of the sea, and fish, filling the air beneath the hot tar, burn and singe of the puffer ship. They lived in each other, didn't they? Of the same substance, fish, salt, sea? Somewhere close by water lapped rhythmically onto a flat surface. She tried to remember the last time she'd heard that pattern, the hollowed-out conk, and slap. Bubu Keleni had told her that the sea never stopped moving. She tried to relax into the seat, listening to the pulsing swish of ocean waves bouncing off the pontoons under Bubu's floating house. Anchor chains clanged, pulling taut against flotation struts beneath the homes all throughout the settlement, straining in the gentle currents flowing over the submerged ridges of Namu Island.

The passenger door slid open, exo-ore gliding across exoskeleton, revealing a night sky shot through with streaks of bright crimson and yellow. Warm tropical air curled into the cabin, seeking out each molecule, heating every one of them like hot steam. Tia's eyes locked onto Bubu's shape, tall, slim, waiting in the open passenger door, red light bathing her smiling face. Behind Bubu streaky clouds lay in the sky like thick ropes of hair.

'Bula, Dani,' said Keleni, hesitant, her head turning back and forth, searching the cabin.

'Hi Mum.'

They said nothing further to each other. Tia breathed in the sea air, wrinkling her nose at the sharp salt tang. Her impatience grew as she watched her mother release Leilani's safety harness first, wrapping her in a big blue woollen blanket, Academy issue. Leilani nestled into her mother's neck, hanging on, sticking to her like a limpet,

refusing to let go. Keleni held her arms out to take her granddaughter through the passenger door, coaxing Leilani to leave her mother's embrace. Leilani finally relented, unclasping herself from around Dani's neck, allowing Keleni to take her.

At last the shape of her mother approached, backlit in the red sunset. Dani struggled to unclip the safety harness securing Tia's body into the seat, her fingers gripping at the buckle and pulling the straps. Nanobots raced over Tia's irises, not yet fully engaged. She tried to make out her mother's face. But there was no clear shape to it, her nose indistinct, her eyes flat, her mouth a blur. The lack of features frightened Tia, the blank spaces, the nothingness. The strongest trace of her mother came from the smell on her skin—burnt apple and wood smoke from their home in Tamaki. Tia reached up to touch her mother's face, pudgy fingers gripping at the air.

Dani carefully placed Tia's small arms into the sleeves of a warm exo-jacket. As soon as the jacket patches contacted Tia's skin, she plugged into the network again. Somewhere in the rush Tia perceived the Academy logging her arrival into the hive once more and her senses swarmed into the great embrace of many minds. She greeted the hive, chasing sparkling thoughts in and out of the data streams. The hive acknowledged her. She was the first human to have instinctively plugged into the system in utero since the Waters Wars had ended one hundred years ago. Tia loved talking to the hive but in that moment, she only wanted to snuggle into her mother. Dani hoisted her up onto one hip and held her tight, hooking a bag onto her shoulder, and stepping out of the shuttle onto the landing pad. Tia whimpered, sleepily grabbing hold of her mother's flight jacket as they moved across the platform.



The entire structure of Keleni's flotation house rocked with the motion of sea currents, unnerving Dani as she walked across the landing pad, trying to keep her balance. She

breathed heavily, not speaking, carrying Tia half asleep in her arms towards the squat house at the end of the platform. A warm breeze wafted over her skin from the expanse of ocean sweeping out to a mauve horizon, curving in a 360-degree circle. She stopped for a moment to gaze at the blood red sunset dropping like a molten coin into the sea. Tia squirmed in her arms as she carried her through the lakescreen doors and down a narrow hall into the bedroom. Bending at an awkward angle, she released Tia to sink into a soft mattress, brushing the back of her hand softly along her daughter's warm cheek.

'My dear little mapper,' she said, sitting on the edge of the bed.

She sat there for some time, rocking from side to side, then leaned forward to kiss the top of Tia's head, fat tears dropping into her daughter's hair.

'Mummy, don't leave,' said Tia, clipping the words out in her three-year-old way.

'Shhh ... go back to sleep,' whispered Dani.

Tia closed her eyes, then opened them just a fraction. Across the room Bubu leaned over the edge of Leilani's bed, tucking blanket corners under the mattress.

'Turn off your game now. Go to sleep,' said Keleni, gently.

'Ok, Bubu,' said Leilani, spinning her iris circuits into close-down, and turning over in the bed.

Dani looked at her mother and tried to speak, but Keleni walked out of the room. She sat for a while longer and then slowly stood up, kissed both of her daughters and tip toed to the doorway. She hesitated at the threshold, watching them for a minute before carefully closing the door, leaving it open a crack.

Alone in Keleni's kitchen Dani rummaged in the pantry searching for alcohol, anything to calm her nerves. Nestled among her mother's jars of pickled seaweed at the

back of the cupboard she found a half full bottle of red wine. It took her some time to prise free the squeaky cork. She poured the dark red liquid into a tall glass. It smelled bad, like mouldy wet towels. She took a sip anyway, eager to dull her senses. A sharp vinegary tang bit at her tongue. She spat the liquid into the kitchen sink, wiping her lips with the back of her hand. She twisted the rotting cork back into the glass rim, banging it in with the heel of her palm, and shoved the bottle along the shelf, rattling it back in among the jars of seaweed.

She flopped onto a white barstool at the kitchen island and stared out of the lakescreen doors to the landing pad and the shuttle waiting in the dark like a moth at rest. Keleni stepped quietly from the hallway to the kitchen as darkness fell over the ocean.

‘How long will you be gone this time?’

‘Nine years,’ said Dani, her face drawn down at the mouth.

Keleni took a step back and held onto the kitchen sink.

‘Nine years! You didn’t think to warn me?’

For a moment Dani didn’t speak, just stared at her mother.

‘Have you told them?’ asked Keleni.

‘I couldn’t risk it. Tia’s linked into the hive. I’m leaving for Mars tonight,’ said Dani, stammering.

‘Look, I know I’ve cared for them many times in the past. But this is absurd. They won’t even have the chance to say goodbye to you. They won’t understand. It will traumatise them for life,’ said Keleni, shaking her head.

‘Tia’s strong. Leilani’s on track to be a striker. You left me with your mother, and I turned out ok,’ said Dani, trying to stop her hands from trembling.

‘I never left you for longer than a couple of weeks,’ said Keleni, her eyes big and glassy.

Dani said nothing, her lips began to quiver. Keleni stared at her for a moment and sank heavily on a barstool, lowering her head into her hands.

‘Mum, look. I’m sorry. I just can’t do it anymore.’

The colour had drained from Dani’s face. She didn’t know how to separate from people, even for a brief time. A good mother would know how to do it. If she had anyone else to turn to, anywhere else to go, she would. But she didn’t.

‘Please. I will come back. Right now, I just can’t have them with me,’ said Dani.

She heard the lie even as the words dropped out of her mouth. She would not be back. She’d put the girls in the best place though, at home with their grandmother, where they would be safe. Keleni would look after them and teach them the old ways so they’d have the best chance of surviving in deep space. For that is what Dani dreamed for her daughters. That they would become space mappers like her. Then they would understand her sacrifice.



Tia woke sometime later to the sound of frigate birds cawing out at sea, catching flying fish as they launched themselves out of the water. She climbed out of the cot, ran across the room, and pulled herself up to open the door, wandering out in search of her mother. Running the length of the darkened hall, the floor cool beneath her feet, she reached the kitchen island and then the big sofa in the lounge. A bright glow shone at the edge of the sky, a planet her mother had told her about. The Venus planet. Squatting on her three-year-old haunches, little rolls of dimpled brown flesh folding over the edges of her exo-suit pyjamas, she placed her hands onto the chilly wet surface of the lakescreen

windows. Bubu scooped her up off the floor, her hands leaving tiny waves rippling across the lakescreen, and hummed softly to her as the morning sun rose above Venus.

Graduation

Tia sat alone in her quarters, the way she liked it, by herself with no one to annoy her. The bed neatly made, the shelves now empty of books, and her possessions packed into one bag. To think she had been here for three years and all her belongings fitted into only one bag. But she liked to travel light, efficient, ready to leave. She checked the patches on her black exo-battlesuit, made sure she'd armed all pressure notes, activated all green dots, charged the call line. Just in case.

She wanted to leave the Academy right after the graduation ceremony. In fact, she didn't want to be part of the pointless graduation ritual at all. Bubu had said she would come, and her uncles always supported her. And Leilani her big sister would be there. Her mother Dani would not come. Dani hadn't even bothered to send her a pressure note, or an onscreen call, or a green dot message. She checked again. Yes—she'd made sure to fully charge those ports the night before and had checked and rechecked them that morning. She waited, but Dani didn't call. At least Gromtarg, her absentee father, had had the decency to send her a short pressure note, congratulating her. She'd increasingly come to think of Gromtarg as her father—not just her biological father, or a distant acquaintance, or some weird stranger who she sometimes spoke to onscreen. He'd really become more like a faraway friend. Too far away to hurt her.

When she peeked into the hallway, she recognised some of her classmates, thundering past her room, like idiots. As she grabbed hold of the door to slam it shut, one of the cadets slowed down and stared at her. Mali, the repeat student who sat up the front of the lecture theatre all the time. Mali had continuously failed navigation simulation year after year and had finally passed the exam on her third attempt.

'What are you looking at,' said Tia, menacingly.

‘I just wanted to say I watched all your simulation runs. And they really helped me,’ said Mali.

Tia said nothing, just stared at her. Mali backed away and ran off into the crowd, pushing her way in among a pack of cadets. Neet, one of Mali’s friends, looked over at Tia. Another classmate she didn’t want to know; one she’d beaten in combat training many times. Neet, the deadbeat, ran up to Tia, proffering her hand for a handshake. The gall of her. Tia reacted without thinking, instantly slapping Neet’s hand, hard. Neet cried out. Two more girls moved out of the throng towards Tia, Neet’s sycophantic sidekicks. One of them, Faw, dressed in a faded blue exo-jacket, advanced on Tia.

‘Stop being such a Grom bitch,’ yelled Faw.

A few passing students glanced at Faw and Tia and quickly moved away. Adrenaline streamed into Tia’s veins, burned into her muscles. Her fists bunched up at her sides. The rushing crowd of cadets slowed down to a silent parade as the blood drained from her face. In an instant, she launched into the hallway and grabbed Faw by the scruff of her faded blue exo-jacket. They fell to the ground, Faw struggling beneath Tia, screaming for escape. Someone dragged Tia off her and Faw sprang to her feet, ready for battle. All around them a crowd of cadets formed into a braying circle. Tia put up her fists and sank into a fight stance, then popped up again, bouncing like a boxer. The onlookers cheered.

‘Come on then, what have you got?’ said Tia, bounding up to Faw.

‘Just because you’re in the hive, you think you’re better than us,’ said Faw, her iris circuitry spiralling.

She threw an awkward punch at Tia’s head. Tia ducked, came up under her rib cage and punched her hard in the kidneys. Faw let out a loud grunt and fell to the

ground. Tia stepped back, breathing hard, her eyes flicking around her at the faces of raucous onlookers, ready to take on anybody else.

The crowd of cheering cadets drew the circle tighter around the fight. Tia spied Leilani in her bright blue post-graduate uniform wading into the mob, shouting at everyone to disperse. In that moment Tia took her eye off Faw. She rushed at Tia, tackled her to the ground, and straddled her, flailing at her head with a rain of punches. Tia held her arms up trying to deflect the blows. One punch landed squarely on her left eye and another one glanced off her right cheek splitting the skin and sending a spurt of blood down her face. Leilani pulled Faw off, threw her to the ground, and dragged Tia away. Tia cut her eyes at Neet fading into the throng with her minions. The crowd of cadets broke up and continued walking, looking back at Tia over their shoulders, whispering about her. As blood trickled into her eyes Tia tracked the ghost images of her attackers running through the building, their heat signatures leaving bright red lines trailing behind them in her mapping array.

‘What the hell are you doing?’ asked Leilani, pulling her inside Tia’s dorm room.

Tia struggled to get out of Leilani’s vice-like grip. Once they were safely inside Tia’s room Leilani let go and stood blocking the door, her iris circuitry whirling to a halt, her long black hair falling over her shoulders and framing her face.

‘Why are you brawling in the hallway, again?’ asked Leilani, disappearing into the tiny bathroom.

‘They started it.’

‘You had to pick a fight today of all days, didn’t you,’ said Leilani, appearing from the bathroom with a wad of dripping tissues.

‘One of them called me a Grom bitch. Anyway, what do you care? You’re off to Mars. Leaving me like everyone else.’

Leilani dabbed at the congealing lines of blood dripping down Tia’s face. Tia winced and swatted Leilani’s hand away.

‘That is so unfair. You know I’m not like Dani or Gromtarg,’ said Leilani.

‘Well, you’re leaving me, aren’t you?’

Tia sank back onto her bed, grudgingly relieved to have Leilani with her, but unable to even look at her. Leilani had always protected her, ever since Dani had abandoned them when they were kids. Together, they’d learned to sail all over the archipelago in the waqa camakau. They’d attended the Academy at the same time. And now they would separate for the first time, ever.

‘You’re the one that can map the ocean. I can’t do that. What are we going to do about these bruises on your face?’ asked Leilani.

‘I’m not going. It’s just a farce.’

‘You absolutely are going. It’s your graduation day. Come on. They’re waiting for us,’ said Leilani.

‘Who’s waiting?’

‘Bubu, Aunty Rota, the uncles.’

Tia glared at Leilani.

‘She didn’t come to *my* graduation either,’ said Leilani, throwing her hands up in the air.

‘I hate her,’ said Tia, folding her arms across her chest and pouting.

‘Come on,’ said Leilani, gently, throwing Tia’s bag over her shoulder and looking around her room. ‘Wow, sparse.’

For Tia it might as well have been a prison cell, and today marked the end of her sentence, a release. She followed Leilani out of the room and slammed the door shut without even looking back at the space she had occupied for three years, glad to be putting it behind her. Leilani took flight, running down the hall. At first Tia only jogged after her sister, and then she broke into a sprint, weaving in and out of the droves of cadets crowding the corridors and flyovers until she caught up to Leilani and raced ahead of her. They made their way into the jam-packed foyer, out of the building, and down a wide flight of stairs onto the concourse at the entrance to the grand hall.

The adrenaline rushing through her veins had melted away to a soft glow when Tia spotted her loyal family. Well, four of them, the close ones. If the whole mataqali had arrived, they'd have filled the entire grand hall. Warmth spread throughout Tia's chest as she approached them. They stood gathered in a knot beside a beautiful meteorite sitting on a low plinth in the middle of the concourse, a shiny lump of pallasite—glowing, olive peridot melded into a synaptic web of polished iron. Bubu, dressed regally in her dark blue Academy exo-suit, spotted Tia and Leilani running on the concourse and waved at them. Aunty Rota, also wearing an Academy exo-suit, had flown in from Orojet Station via the staging port on the Moon. Tia looked forward to hearing more of Aunty Rota's stories about her thriving tourism business and all the interesting people she met. She always had exciting news about the sightseeing tours she flew out to watch the lights emitting from Ajak. Tia had seen the famous whirlpool entrance in the simulators and marvelled at the spectacular lightshows it put on even though it had closed over many years ago.

The identical twin uncles, Dua and Va, had simply taken an aerotaxi from their home in the refugee quarter in Herne Bay. Dressed in casual suits, they waved furiously at Tia and Leilani, bouncing up and down like elderly pogo robots. Tia always mistook

one uncle for the other whenever they got together. It didn't help that they sported identical haircuts. They also had the same brown eyes, matching black glasses, and identical shoes. Over the years, despite their busy lives, the uncles had managed to attend every one of Tia's prize giving ceremonies and presentations. She had to admit that she loved to see them all, the loyal uncles, Aunty Rota, and of course Bubu.

They gathered around her, hugging her, smiling at her, and laughing together.

'What happened to your face?' asked Keleni, reaching out to touch Tia's bruised eye. Tia jerked her head away.

'Gravity combat training,' she mumbled, averting her gaze.

She glanced towards the entrance, not because she thought Dani would arrive, but to make sure she would know first if Dani did turn up unexpectedly.

'What took you so long?' asked Aunty Rota.

Tia and Leilani exchanged a conspiratorial look. It wasn't the first time Leilani had broken up a fight between Tia and some other cadet. Usually it was the other student that had bruises on their face, not Tia.

'We had trouble getting through the crowd,' said Leilani.

'Has Dani called?' asked Tia, wanting to change the subject.

A moment of silence descended upon them like a cloud, and then they all spoke at once, eager to share their news.

'She refuelled at Orojet station about six months ago,' said Rota. 'She works so hard.'

'I heard she saved some miners from an asteroid collapse,' said Dua.

'Oh yes, one of the new arrivals told us about that. So brave,' said Va. Nodding vigorously with his brother Dua.

‘I spoke to her a few months ago. But nothing recently,’ said Keleni, her voice flat.

They all fell into reflective contemplation. Tia’s eyes narrowed. She scrunched her lips together and folded her arms firmly across her chest. Dani always supplied a focal point for them, even in her constant absence, maybe because of it. They of all people knew Dani well—the older sister of Rota, Dua and Va— always reaching for the next mountain, the next achievement, never sinking into the moment. These family get togethers always played out the same way. Dani’s name came up in conversation, marking her absence. They each updated the group on their latest contact with her, which was usually brief and via lakescreen or second hand from some other source, and then they carried on and didn’t speak of her for the rest of the day. Rota gently placed her hand on Tia’s shoulder.

‘You can’t stay angry with her forever. If you hold onto this bad feeling the only person you are going to hurt is yourself.’

Tia pulled away from her Aunty and then wished she hadn’t. Rota didn’t make excuses for her sister. Truthfully, none of them expected Dani to come. Tia’s chest tightened. She took a deep breath. Why waste time with this graduation ceremony. She wanted to go home to Namu Island. But her uncles hustled her away towards the hall. She brushed her hand along the side of the meteorite, for luck.

Later in the grand hall she huddled in among her fellow cadets, waiting for the Registrar to call her name, dreading the thought of walking across the stage. She kept glancing over at her family seated in the middle of the hall. Bubu craned her neck, searching the line-up. Tia waved at her from among the throng of her classmates moving towards the stage. To her horror she saw Mali, Faw and Neet fall into line

behind her. They whispered to each other and shot hateful looks at her. She ignored them. They wouldn't try anything with her now, surely. Not in this formal setting.

She kept searching the grand hall, her eyes darting to the entrance, no matter how hard she tried to stop herself. Although Dani had never attended any of the Academy prize giving ceremonies nor celebrated either of her daughters' many achievements, a part of Tia had twisted into an unreasonable fantasy world where Dani did show up to important family gatherings; where Dani put her family first, put Tia first, before her strange work assignments and unexplained work orders in the New Worlds, whatever they were. In the few communications Tia had received from Dani over the years, her mother had avoided giving away any details of what she did in deep space. Tia had learned not to ask.

A pressure-note pushed down into a small sleeve patch on Tia's left wrist. 'Dani?' she whispered to herself, her breath catching in her mouth. She tapped the patch in a state of disbelief that her mother had finally contacted her. She thought her eyes were deceiving her when she saw Leilani's name, and not Dani's, in the sleeve patch. Leilani had sent her a snapshot of them both when they were children at Bubu's house, their arms slung over each other's shoulders smiling at the camera. Heat flushed over Tia's body. She should have known it wouldn't be Dani. Why was she so stupid? She glared at the cadets in the Academy seats on the other side of the cavernous room, scanning the rows of blue mapper uniforms. Finally, she found Leilani's slender frame in the top row, chatting, and laughing with her friends, her wild hair now pulled back from her face into a loose ponytail. Leilani waved at her from across the room. Tia hung her head and peered at her face in the photo from the distant past. She looked happy and open and innocent back then, standing on the platform at Bubu's house. It was the day

that Gromtarg had shown up unannounced, the one and only time she and Leilani had met their father in person.

Tia's memory of the day had now dimmed to the point that she no longer recalled that youthful version of her father. The sequence of events was no longer clear to her and had become a jumbled assortment of changing scenes. After sitting for so long in her memory, and with no follow up visits from Gromtarg to cement his image in her mind, her recollections of him and his one-time visit now presented themselves to her in faded snapshots. She often wondered what would happen if she sat quietly and concentrated hard, whether she might be able to recall the day with more accuracy. But she had never tried, and it didn't seem necessary given that he still contacted her via lakescreen on the odd occasion. The face she now saw when she spoke to him on lakescreen, was that of an older man with multiple enhancements and aging iris circuits. The main thing she now carried with her from his visit was the delight of meeting a living breathing person who looked like her and was a Grom like her, although she was only half Grom, his half. His mere existence had replaced her feeling of emptiness with a sense of completeness.

Gromtarg had arrived in an Academy shuttle, touching down softly on the landing pad. Tia remembered watched him through the sliding lakescreen doors, pushing her eleven-year-old forehead up against the watery surface. She wore her favourite exo-suit that day, bright blue with red piping. He stood at the threshold, his face blank, trying to keep his balance as the platform rocked with the tide. She folded her arms, and peered at him, wondering who this man might be. When she looked over at her sister, it struck her that Leilani might be his echo, a small clone copy of the man even down to the way they both stood with their arms hanging loose, the way their jawlines set into similar square shapes, and the same piercing quality of their eyes in the

same shade of hazel. Leilani's wavy black fringe combed straight at the front, and her dark olive cheekbones shining in the sun, closely mimicked the man's hair and skin.

'Are you our dad?' asked Tia, when he stood near the doorway squinting into the daylight.

'Ah, yes, I am,' he said, leaning so close to her that she smelled his cologne and saw the individual strands of his hair combed into orderly lines across his head.

'You must be... are you... I don't want to get your name wrong. What is your name?' he asked, again bowing down to her level with his twinkling eye circuitry focused directly on her face.

'My name is Litia Grom-Eddy. Bubu calls me Tia,' she said, placing her hands on her hips.

The sound of pulsing blood rushed into her ears as she heard herself speaking her own name.

'Dani gave you a Grom name. I hadn't expected that. I'm so pleased to meet you. You are half Grom Nation—you know that don't you. My half,' he stammered.

'I know that. This is my big sister Leilani,' she said, grabbing Leilani's hand and roughly pulling her sister to her side.

Leilani resisted and stepped back. She also wore an exo-suit, a strike uniform for flying. Tia watched their father, and as he turned to Leilani, she saw herself reflected in the lakescreen doors, imprinted somehow over her father's face in that way of water refracting images, layering them over each other. Leilani said nothing, just stared back at him slack-jawed, her iris circuitry spinning fast in the bright sunlight.

Keleni approached from the corridor, a light green exo-jacket fitting loosely over her upper body. A black and white kiore balanced on her shoulder as she tightened a

black sulu around her hips. She stood behind Tia and Leilani, her hands resting on their shoulders.

‘Hello, you must be Gromtarg. I’m Keleni,’ she said, peering past him to look at the Academy shuttle parked on the landing pad.

He returned the greeting, looking from her to the girls, and back again.

‘We weren’t expecting to see you so soon,’ said Keleni, the pitch of her voice rising.

An awkward silence descended upon the group, the family. Tia looked to her grandmother for reassurance. Keleni gathered her and Leilani closer. Speaking quietly and slowly, she looked up at Gromtarg.

‘Leilani, Tia... this is your father,’ she said.

‘We know that, Bubu,’ said Tia.

Leilani remained silent. Tia held out her hand to Gromtarg. The platform rocked as a wave hit the pontoons and he nearly lost his balance.

‘Bula vinaka. How do you do,’ said Tia, eyeing him defiantly, her hand hanging in the air between them.

Gromtarg let out a booming laugh.

‘Bula vinaka,’ he said, and shook her hand, stabilising himself with her strong grip.

Leilani remained at a distance, silent, brooding. Keleni ushered Gromtarg into the living room and guided him over towards the kitchen island where he sat on a stool, his eyes darting back and forth between Tia and Leilani and Keleni. He seemed a little unmoored. Tia and Leilani huddled nearby, wide-eyed, and silent while Keleni bustled about the kitchen preparing hot tea and chatting with Gromtarg about his trip, the weather, the heat. He talked about his journey from Mars. How it had taken two months

to fly to Earth. That the weather on Mars ranged from freezing to below freezing. That the heat on Namu had taken him by surprise. How he'd found the island easily using the navigational settings in the shuttle's mapping array. Tia moved past him, pretending to help her grandmother at the sink. She ordered biscuits from the replicator, inspected her father from all angles to get the measure of him, listened to him speak. She detected a strange tone that had crept into his voice, a kind of wistfulness when he talked about where he'd travelled from on Mars. She circled him and finally sat cross legged on the couch in the lounge with Leilani, looking over at him as he drank from one of Bubu's china teacups. Bubu told them not to stare and handed them a plate of biscuits.

'I'm glad you've come all this way,' said Keleni. 'The girls have wanted to meet you for so long, as have I.'

'I'm sorry it's taken all this time. I hope I haven't done the wrong thing coming here,' he said, one of his knees bouncing as he sat on the stool.

'Have you spoken to Dani?' asked Keleni.

'I didn't tell her that I was coming here. She refuses to talk to me,' he said, his voice lowering as he glanced at Tia and Leilani.

They sat nibbling on biscuits, watching him while a gentle breeze drifted in through the lakescreen doors. Dani had never mentioned Gromtarg in any of her messages or online calls. Tia tried to imagine Dani and Gromtarg together. They seemed hugely different. Gromtarg laughed out loud, at ease with himself. Dani on the other hand seemed to be always in control, always held herself more rigidly when she spoke to Tia on the lakescreen.

'We were just about to sail the waqa to Kato Island. It's on the other side of the lagoon. Would you like to come with us? You can set foot on actual land, above water,' said Keleni.

Leilani's eyes widened at the mention of sailing to Kato, and she jumped off the couch.

'We're ready. And we've charged our exo-suits. Look,' she said, spinning a sleeve patch on the arm of her jacket.

'I've never sailed on the ocean before,' said Gromtarg, pressing on his knee to stop it jiggling.

'It's just like sailing in space really,' said Keleni.

Gromtarg tried to keep his footing on the pontoon under the house, staggering after Tia and Leilani who ran along in front of him. Tia held onto the double hulled waqa as it bobbed in the water and bumped into the floats buffering it from hitting the pontoon. She motioned to her father to step onboard. He hesitated, the shifting surfaces unsettling him. He cast his eyes up to the domodomo bullhorns at the top of the masthead swaying back and forth in time with the current.

'Uh... can you show me?' he asked, a sheen of sweat appearing on his chin, forehead, and cheeks.

Tia and Leilani glanced at each other to see what they each thought before running onboard followed by the kiore who ran up Tia's arm and onto her shoulders. Tia settled into the seat at the stern and held onto a wide oar. Leilani made her way to the prow and gestured to her father, urging him to step onboard. Comfortable and in her own domain, Leilani's shyness had evaporated. Gromtarg swallowed and glanced sidelong at his daughters. He stepped from the swaying pontoon onto the rocking waqa and walked shakily along the deck. He lurched towards an exo-sail lying rolled up alongside a small hut built into the middle of a wooden deck that spanned the gap between the two sleek hulls. His legs wobbled as he tried to find his balance, clutching at the grab rails on top of the hut. His face had turned grey.

‘Are you alright, Gromtarg?’ asked Tia.

‘I’m fine. It’s just that I’ve never been on a sea-going vessel before. I’m used to spaceships and zero gravity.’

Tia and Leilani eyed him warily.

‘Bubu says they’re the same. Sea and space,’ said Tia.

Gromtarg nodded, white knuckling the rails.

‘You know, you can call me ‘Dad’ if you like,’ he said.

Tia watched him, contemplating his offer. He liked to talk this man, her father. In this way he bore no resemblance to her mother. Dani spoke economically, parsing out her words in careful measures. Tia decided she would continue to call him ‘Gromtarg’. Keleni cast off, throwing the ropes onto the deck. She pushed away from the pontoon and nimbly jumped aboard. The waqa skimmed across the water and they headed out of the small conclave of flotation houses. Keleni and Leilani set the triangular crab-claw sail at the prow. It billowed in the wind, pulling the waqa along until it raced over the sea towards Kato Island with Tia at the helm.

Winching as the waqa cut across the waves, Gromtarg clutched at the grab rails with both hands and took a deep breath of sea air, watching his daughters and trying to dispel the nausea that threatened to overwhelm him. Leilani held onto the sail at the prow, looking ahead into the water and signalling whenever she spied a reef or a coral outcrop below. Tia pushed and pulled the mother oar, taking her lead from Leilani as she steered towards their destination, her face stern, like a true Grom. Gromtarg gazed at her.

‘I took them out on the waqa as soon as they came into my care. Tia first took the helm at the age of five,’ said Keleni.

Gromtarg watched the way Tia handled the mother oar on her own and how Leilani looked out into the distance, scouting the sea ahead.

‘They have excellent navigational skills and they’re so serious for such young children. You know these are Grom traits,’ said Gromtarg, drawing himself up to his full height, straightening his shoulders and spreading his legs wide to keep his balance.

‘They are indeed your daughters,’ said Keleni, standing next to the hut with him, and holding onto the grab rails. Tia knew her bubu didn’t need to hold the grab rails.

Kato Island shone out of the ocean, a round atoll surrounded by white sand with a small hillock of green shrubbery at its centre. The waqa sliced a groove into the sand as it slid up onto the beach. Leilani jumped off the side into the turquoise water, wading ashore and tying up to a small tree. It took them only one hour to walk all the way around the atoll’s white sand beach. Tia and Leilani ran ahead with the kiore riding on Tia’s shoulders, one hand holding him safely in place against her body. Leilani ran back to clutch Gromtarg’s hands and pull him along. He jogged next to her for a while, puffing and pretending he’d lost his breath. She sprinted ahead to join Tia leaving him behind with Keleni.

The hill rose at one end of the kidney shaped atoll, no higher than four meters, more of a mound really and not a difficult climb. At the top of the hill Keleni sat with Tia and Leilani on a lump of smooth lava and ate replicator mandarins. Gromtarg had no appetite. He stood a little apart from them looking out across the ocean to the ring of flotation houses in the distance, anchored to the inundated island of Namu. He raised his face into the sun. Tia drank in the moment wanting to remember it forever. This man, her Grom father, she didn’t know what to make of him. From one angle he looked exactly like her sister Leilani, his dark curly hair, pronounced cheek bones, olive skin; and from a different angle he looked exactly like her; with the same dark eyes, wide

nose, oval shaped face. She found it unnerving yet gratifying to meet her Grom father at last.

‘So, we have a Grom father,’ said Tia, scowling as she carefully peeled a mandarin and separated each segment.

‘Is he going to live with us?’ asked Leilani.

‘Your father has lots of work to do,’ said Keleni looking to Gromtarg. He walked back to them and sat down next to Tia and Leilani on the flat lava rock, his gaze directed out to the far reaches of the ocean.

‘I must return to my work on Mars. But I promise to send you messages and call you both,’ he said, watching a flock of sooty terns diving offshore into a school of fish.

Leilani’s face lit up at the mention of Mars.

‘Do you live with Dani?’ she asked.

Gromtarg flinched, his mouth opening and closing but no sound coming out. Tia also flinched, her chest clenching at the mention of Dani. Leilani stared at him, entranced.

‘No, he doesn’t live with Dani,’ said Keleni, glancing at Gromtarg.

Leilani shrugged and stood up, wiped the sand off her shorts, and started down the hill dragging Tia along with her. Tia held onto the kiore, looking back over her shoulder at her father a few times. There was no more talk of Dani that day. When Gromtarg caught up with Tia and Leilani he seemed a little withdrawn, sweating in the tropical sun. Leilani took hold of his hand and they strode back to the waqa swinging their arms. He looked back at Tia, but she kept her distance from him.

Keleni enlisted Gromtarg’s help once they pushed off the island, showing him how to change the sail from one end of the hull to the other. He remained at the prow

with Leilani on the return trip. As they sailed into the settlement at Namu he no longer looked so ill in the face.

After Gromtarg returned to Mars he made sure to send green dot messages and pressure notes to his daughters, especially on special occasions like birthdays. Short, heartfelt missives saying hello and asking them about their studies at the Academy, enquiring about Keleni, and the weather on Namu Island, and whether they'd been sailing to Kato Island. His lakescreen calls didn't happen often due to the poor reception from Mars. A few times when the reception was clear he had played strikes games with Tia and Leilani. Tia became bored with constantly losing and left them to it. One time he panned the camera around his quarters to show them where he'd taped a picture of them to his wall. In the picture they were both dressed in their Academy exo-suits and beaming into the camera. He told them that he treasured this picture and that one day he would return to Earth, to Namu Island, to see them again. He never did.

Mappers talk. Somehow Dani found out that Gromtarg had been to Namu Island, that he'd spoken to Tia and Leilani. She hit the roof. Incensed, she rang Keleni on lakescreen, furious at her for letting Gromtarg visit the girls without telling her first. Keleni told her that they'd spent a lovely day together sailing from Namu to Kato. On hearing this Dani's face scrunched up as though she were about to scream into the camera. The delay in the feed between Mars and Earth froze her face on the lakescreen, her features contorted into a screwed-up mask of torment. By the time the feed resumed Keleni had prepared herself for any further recrimination from Dani.

'You haven't so much as called the girls. Don't be angry with me. He just rang unexpectedly and then turned up here. Why don't you talk to him about it yourself? He's right there with you on Mars,' said Keleni.

‘I don’t want to talk to him. He’s arrogant and selfish You know how badly he treated me. He cares more about his commensar friends and his prayers than he ever did about me. He’s such a hypocrite,’ said Dani, her voice crackling over the deep space connection.

Tia had listened to the conversation from the hallway, the voices of her bubu and her mother echoing from the kitchen. Keleni looked up and seeing Tia, motioned for her to sit in the next stool. Tia circled the wooden kitchen island hesitantly. Her mother’s face oscillated in the snowed-out lines wavering across the lakescreen in the unreliable feed from Mars. Dani waved, her hand moving in blinking strobe lines. Tia stared at her mother as if she were looking at a stranger and ran out of the room.



A wave of anxious bodies pushed into Tia and carried her along in an undulating movement towards to the graduation stage with Mali, Neet and Faw pressing into her back. She tried to elbow them away, but they wedged themselves up against her. A blast of light shone into her face as she neared the platform. Her iris circuitry spun to shield her vision. Two people in front of her waited to walk on. This should have been a moment of pride for her, but she dreaded going up on stage. She fought the urge to flee from the building. But she didn’t want to take the moment away from Bubu or Auntie Rota or her twin uncles. She pushed all thought of Dani out of her mind and concentrated on her real family. An image of the Registrar’s face towered above her on the silvery lakescreen, announcing each graduate, their names ringing out into the grand hall. One by one the two cadets in front of her disappeared up the steps and walked across the stage in front of the crowd. They saluted the Grand Matrix, Turukawa—resplendent in her graduation iteration, in a black and red exo-battlesuit—then moved on to shake the hand of Ratu Shakti who handed them a graduation scroll. As each cadet

walked across the stage, the crowd in the hall erupted into waves of applause and the graduating cadets grinned back at them. Blood rose into Tia's face and neck, a red blush spread across her skin as she stared at Turukawa. The embod smiled at the graduating cadets, saluted them, congratulated them, shook their hands, and handed them their certificates. Millions of nanobot microbes raced to cool Tia's temperature to normal. This infatuation with Turukawa laid her bare.

Finally, her turn came, and she waited at the foot of the steps. Her head throbbed as more nanobots raced over her face trying to heal the purple hematoma forming angrily near her eye socket and cheek bone. She wished she had Turukawa's ghostborg ability to merge into walls. She recalled the first time she'd met the embod in the hanger at Bubu's house. With each updated version, Turukawa had improved and become more human looking, and more integrated into the network, the hive. Over the years, Tia had become less frightened of her. By the time she'd entered the Academy, millions of iterations of Turukawa existed, everywhere, doing every kind of work imaginable, the Grand Matrix. She envied and admired the ghostborg, her hive mind, her strength. She tried to back away from the stage and away from the cadets grouped behind her in an undisciplined mob. But Mali, Neet and Faw loitered at her back, eyeing her and whispering. Nanobot microbes swarmed over her suit regulating her body temperature, absorbing the sweat under her arms, and sending data to the sleeve patches in her exo-jacket. She glanced down at a patch on her wrist. Her heart rate elevated as the Registrar called her name, 'Litia Grom-Eddy'. The next few moments ran together in a blur. She watched herself as if from above lifting her foot onto the first step towards the stage. Something tapped her ankle and she fell face first onto the stairs. She turned in time to see that it was Faw who had tripped her up. The next thing she knew she was on top of Faw pounding at her head with her fists. Someone pulled her away from Faw, her arms

still flailing trying to land hits on Faw's face. In the middle of the melee, she caught a glimpse of the lakescreen high above the stage and saw her name spelled out in elaborate gold lettering, and beneath her name, the words **PRIZE FOR EXCELLENCE IN NAVIGATION.**

Tijen

Tia and Leilani sat in the tower, sheltered from the winds gusting outside and the scudding clouds that intermittently obscured a shy full moon. Tia desperately wanted to forget the last twenty-four hours. Ratu Shakti had ordered her and Faw out of the grand hall and away from any further participation in the graduation ceremony. Later, he called them both into his office. Tia accepted that Ratu Shakti would reprimand them. But she was not prepared for the severity of the punishment he meted out. She thought she'd misheard him when he told her and Faw he was banning them from graduating and placing them both on probation until they had completed a deep space mission. Tia uttered an involuntary 'No' before she could stop herself. Ratu Shakti also banned Tia from starting her job with the UN and banned Faw from starting her job as a mapper with the fleet until they had completed their deep space missions and their probationary periods. Faw agreed to leave on the next puffer ship bound for Mars. Tia protested. 'I just can't believe this,' she'd said. She refused to go into deep space. Ratu Shakti, red cheeked and silent in the face of her defiance, had assigned her to indefinite sky tower duty starting with tonight, her last duty with Leilani.

Tia was devastated. She had planned to start working in the UN mapping unit straight after graduation. To have that dream taken away from her was just so unfair. Now she was stuck in the sky tower. She tried to ignore the significance of the night—being the final time she would work with her sister before Leilani shipped out to Mars for who knew how long. She didn't mention Mars to Leilani when they met up on the busy concourse, dodging sombre tool-clanking engineers as they made their way through the launch bay. Instead, she talked non-stop about the injustice of it all, how it was Faw's fault. Faw was the one who had tripped her up. Leilani's focus was on her

impending trip to Mars. But Tia didn't want to hear about it. Leilani lapsed into silence, always her defence against Tia's sullen moods. The breeze-lift floated them to the lookout room at the top of the tower. They worked quietly, as they did most of the time when they were on sky watch together, very much aware of each other's presence, not needing to talk, but noisy on the inside—as Bubu Keleni liked to describe them.

They should have been checking cis-lunar space, keeping watch for any of the usual interlopers in the sky; rogue satellites falling out of orbit, inbound meteors that might be a threat to Earth, spaceships in trouble. Instead, Tia dozed fitfully at the console, her head resting on her forearms, unaware that a raft of satellites had begun to weave a gravity network in the night sky above her. Leilani lay tipped back in her chair with her feet up on the instrument panel, playing strike. They had settled in to spend the entire night in these attitudes. Nothing major ever happened on sky tower night shifts anyway. Or so they thought.

In space, above the Pacific Ocean, a winged satellite detected a change in direction in the currents spiralling up the east coast of Aotearoa into the long bone of Kermadec trench, on past the archipelago of Tonga towards the floor of Lau basin, below Namu island—where Tia lived with her grandmother when she wasn't studying or working sky duty. Fourteen fin satellites had teamed up with the winged one, hovering over the flagging currents and forming a protective gravity network. The satellites pinged the nearest sky duty watch tower—Auckland Sky Tower.

The early warning system buzzed and woke Tia. She raised her head off the console, rubbed her eyes, and tried to make out the strange readings showing up on the watery surface of the lakescreen; a red alert from a group of satellites over Kermadec trench.

'What is it?' asked Leilani, tipping her seat forward with a sudden clunk.

Tia jumped. She had forgotten that Leilani followed everything in her field of vision, even while she focused on the strikers flying across her eyeballs.

‘Gravity satellites. Fifteen of them off course over the trench,’ said Tia, staring at the screen, and gulping.

‘Can we reprogram them from here?’ asked Leilani, leaning forward and switching from her strike game to her mapping array.

‘The gravity readings are all off. They’re trying to compensate,’ said Tia, manipulating the controls. She watched as the satellites formed a criss-cross blanket of electrical connection trying to raise the dip in Earth’s gravity field back to a normal level.

‘Turukawa, we need some assistance here, please,’ said Tia, as she sent out electrical pulses to help the satellites. She tried to make sense of what had happened in the ocean to cause this dip in the gravity field.

Turukawa The Grand Matrix appeared out of the wall. The ghostborg. Tia tried not to stare, appalled that the sight of Turukawa distracted her even in such an emergency. In this embodied iteration Turukawa’s yellow researcher’s uniform stretched tight across her body, her green eye circuitry glowed beneath sleek dark hair, cropped short. Tia turned her attention back to the console and plugged into the satellite network, operating in concert with Leilani to reroute energy from stations in Aotearoa, Australia, and Peru, to the fifteen satellites hauling the gravity field up like workhorses dragging a net out of the sea. Turukawa contacted water mapping networks in the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Southern Ocean, and the Arctic Ocean, directing the network to strengthen the Earth’s protective shield. Tia’s elevated pulse rate eased as the gravity readings slowly returned to normal over the Pacific Ocean. After several minutes, the gravity field had corrected, and the Pacific

currents continued. Turukawa reprogrammed the satellites and sent them back on course.

Tia flopped into her chair, sweat dripping off her face. After checking the satellite headings, Leilani went straight back to playing strike.

‘That’s never happened before. I’ve only ever experienced one satellite going off course like that. Never fifteen all at once,’ said Tia.

‘It was an unusual gravity fluctuation. But the satellites did their job, and you did your job,’ said Turukawa, smiling at Tia who looked down at her hands. When she looked up to say thank you, Turukawa had already melded back into the wall. Her breath hitched in her throat. What was wrong with her?

She checked the mapping array. All satellites now orbited on their correct course settings, flying in graceful lines against the still cloak of the Milky Way. She stayed awake, holding her head in her hands, elbows on the console. The spike of adrenaline in her bloodstream would take a long time to abate. She stared at Leilani, lying back in her chair playing strike games, her iris circuitry rotating. Outside the moon had disappeared behind a bank of thunderheads and the wind howled in the darkness. A few stars flickered among the rushing clouds. Tia’s legs jiggled under the console making a tap tap sound against the steel rungs on her chair.

‘Relax, the gravity net has settled,’ said Leilani, flipping out of her game.

‘Why did you bother with this watch duty tonight? I thought you’d be too busy. You know, preparing for your mission to Mars,’ said Tia, sarcastically.

‘Will you miss me?’ asked Leilani.

Tia ignored her sister, turning away from her and pretending to focus on the lakescreen. She wondered what it would be like to live without her sister for years and years. The thought of not seeing Leilani or hearing her deep voice, seemed unbearable.

She'd even miss the annoying way Leilani constantly disappeared into her strike games. A lump formed in Tia's throat. She grabbed a water globule from her waist pack and bit into the gelatinous surface, releasing cool liquid into her mouth.

'I'll keep an eye on you from Mars,' said Leilani.

'You better green dot me,' said Tia, casting her eyes down onto the concourse below.

In the launch bay, multiple spaceships kept arriving, flying in one after the other. Tia wondered what had caused the increase in activity. As she set the lakescreen to auto control another console alarm beeped and red lights flashed all over the instrument panel.

'Now what?' asked Tia.

'Another satellite?' asked Leilani, sitting up and switching to her mapping array.

'Patrol spotted something. Looks like a meteor.'

Tia watched the patrol system on the water of the lakescreen, transfixed, as it plotted the course of a small rock falling through Earth's outer atmosphere towards the Pacific Ocean east of Aotea Island. There would be no more sleeping at the console. The sight of the celestial traveller captivated Tia as she watched it flashing through space towards Earth.

'Maybe it's come from a brane,' she said.

'What is going on tonight? It's just a rock, a meteor fall. It hasn't come from any membrane,' said Leilani, smirking.

'How do you know? It's a meteor from deep space,' said Tia.

The irony of it struck her. She didn't mind deep space coming to her in the form of a meteor. But she had a morbid fear of travelling there herself. They both gasped as they watched the meteor spike and tumble into a new trajectory.

‘Did you see that? Something bumped it off onto a different flight path,’ said Tia, gaping at the lakescreen on the console.

‘It shifted off course by two degrees. Still within the predicted impact zone,’ said Leilani.

‘Look behind it,’ said Tia, the hairs standing up on the back of her neck.

Leilani switched out of her iris circuitry and investigated the telescopic view in her mapping array.

‘Holy hell, what is that?’ asked Leilani.

‘I don’t know. Turukawa can you please analyse this reading?’

An iteration of Turukawa that Tia had never seen before exited from the wall and smiled at her. All the same person, all looped into each other. Tia tried, unsuccessfully, to move her mouth to smile back. The embodiment wore a full black exo-battlesuit, the material hugging the contours of her body, the red piping sparking along her legs. Tia stared, incredulous, forcing herself to switch her focus back to the console. Why did she always do that?

‘How may I be of assistance?’ asked Turukawa.

‘What is that? Behind the meteor,’ Tia stuttered, pointing to the erratic readings in the mapping arrays.

Turukawa stood silent for a moment, computing, staring out the windows, and across the sea. With a tic of her face, as though she’d woken from sleep, she addressed Tia.

‘That is Tijen Sky Hawk, an active whirlpool.’

‘Really? Like Ajak, the Sooty Tern?’ asked Tia.

‘Yes, although Tijen is ten times the size of Ajak in its active phase,’ said Turukawa.

‘But Ajak hasn’t been active for ten years,’ said Tia.

‘So, is this a new whirlpool?’ asked Leilani. The piping down the left leg of her uniform flashed red. She tapped her sleeve patch and a message from Ratu Shakti popped up.

‘What’s going on, Turukawa?’ asked Tia, watching her sister.

‘The Academy has ordered all crew onto emergency footing. Scheduling has directed five ships to launch for Mars. The first is *Toutouwai 5*, launching tonight. Leilani must report for launch in six hours,’ said Turukawa.

‘What? She can’t. It’s not due for launch until next week,’ said Tia, turning frantically to Leilani.

‘Did you know about this?’ asked Tia, a knot forming in her stomach.

‘No, I didn’t,’ said Leilani.

‘And how long has the Academy known about this new whirlpool, Tijen?’ asked Tia, turning to face Turukawa.

‘We first detected it yesterday. The fluctuations from the whirlpool caused the dip in the gravity satellites and now the whirlpool has deflected this meteor into Earth’s orbit. It would be helpful if you could recover any debris from the meteor,’ said Turukawa, pointing to an orange streak in the night sky.

Tia ran to the windows. Against the black of night, a line of fire trailed across the stars.

‘I know we’re always on standby. But the Academy has known about this since yesterday and they just change my orders now?’ asked Leilani, shaking her head.

Turukawa looked away. Tia didn’t know what to say. She didn’t want Leilani to go.

‘At least we can get out of here for a few hours before I leave,’ said Leilani, with a sigh, scanning her iris circuits, checking the course of the rock. Tia stared at her.

‘Well what are you waiting for? We have a mission to complete,’ said Leilani.

Tia shook herself, realising they now had to chase down the meteor hurtling towards the Pacific Ocean. Her hands shook as she pushed the green dot, trying to take in the news that Leilani would be leaving her in a few hours.

‘Turukawa, could you close the air traffic corridors and the sea lanes near the entry column of this meteor?’

‘I’ll send out the necessary commands to the network,’ said Turukawa.

‘Thank you. Let’s go,’ said Tia, running with Leilani to the breeze lift. Her eyes lingered on the sight of Turukawa’s back framed in the closing lift doors, her muscles rippling beneath her exo-battlesuit as she worked at the instrument panel.

The night shift had just ended in the hangar. Tia thought there would be only one or two people on duty. But when the lift doors opened, hordes of engineers and mechanics moved past her. She went up to the nearest engineer in the launch bay, their upper body leaning completely inside the output cylinder of a shuttle, only their blue uniformed legs visible. She knocked on the side of the cylinder and the engineer backed out, a woman, a cadet like Tia, covering her ears with her hands and frowning.

‘Do you mind? You nearly deafened me,’ said the cadet, frowning at Tia.

‘I’m sorry. We urgently need a sky shuttle,’ said Tia.

The engineer sighed heavily, wiped her hands with a filthy rag, and tapped the instrument panel on a small lakescreen.

‘Over there,’ she said offhandedly pointing to a long row of shuttles standing in dim light at the other end of the hangar.

‘Who are all these people?’ asked Tia.

‘Reinforcements from down south, some from Australia, a whole lot just flew in from India. Prepping *Toutouwai 5* for launch. And I’m stuck here fixing this broken rotator fin.’ The engineer looked back at the cylinder.

‘I’m part of the crew on the launch,’ said Leilani, looking furtively at Tia.

‘When did the extra engineers arrive?’ asked Tia, her eyes narrowing as she spoke to the cadet.

‘Yesterday. Look, I’m just an engineer, alright. Nobody tells me anything. Excuse me,’ she said, pushing past Tia and folding her body back into the output cylinder.

‘Come on. We gotta go,’ said Leilani, tugging on Tia’s exo-jacket.

They raced each other all the way to the shuttle, dodging the floats of amphibious vehicles, and ducking under the wings of semi-autonomous transporters. Leilani reached the shuttle first. She scrambled into the flight deck, plugged into the co-pilot seat, and lay back to check the meteor’s progress in her mapping array. Tia jumped into the pilot seat, pulled on a helmet, closed the visor, and started up the fins.

Tia loved flying the shuttles. Her favourite thing to do, other than sailing Bubu’s waqa camakau. But as she lifted off, the thought that Leilani would leave Earth tonight clouded her thoughts. She tried to put it out of her mind as she banked the shuttle over the bombed-out skyline of Auckland city, with its broken skyscrapers arching into the sky, and the survivor ships blazing with light in their watery harbour groupings. She switched her helmet to night vision blocking out all the rigged-up lights from the city dwellers. Finally, the clouds parted, and the majestic korowai of the Milky Way spread out across the sky. She kept glancing over at Leilani as they flew over the harbour, skimmed across the shipping lanes, and wove between the islands dotting the Hauraki Gulf. This would be their last sky shuttle flight together.

Aotea Island loomed out of the sea like a dark monolith in the vast Pacific Ocean fanning out before them. The ocean had a calming effect on Tia. This is where she felt at home. Endless waves rolled beneath them, buffeted by a southerly wind. She manoeuvred the shuttle into position at a safe distance from the impact site, hovering in the air currents swirling over the surface of the water. She craned her neck, peering up into the sky, waiting for any sign of the incoming meteor. Leilani spotted it first, a flaming orange trail burning into Earth's atmosphere.

Tia ran outside onto the deck to see the meteorite's arrival with her own eyes. Her iris circuitry pulled focus on the ball of light plunging earthward. A blinding green fireball, as bright as the sun, streaked across the night sky at an acute angle, trailing a fiery orange tail. The sea lit up like daytime, revealing a panorama of endless waves of water. Flashes and bursts of light exploded along the edges of the meteor. Rumbling sonic booms vibrated in Tia's chest as the meteor broke apart and disintegrated into lingering dust trails in the atmosphere. She watched, breathless, as falling debris whistled across the sky and plunged into the water sending plumes of hissing steam high into the air. She raced back to the flight deck.

'Close the gills,' said Tia, jumping into the pilot seat, and driving the shuttle in a steep dive into the sea.

'Whoa! Take it easy,' said Leilani, rocking in the co-pilot seat.

'We have to get at least one of the rocks before they're swept away in the current,' said Tia, swiping the control panel.

Heat signatures flashed across the lakescreen. Tia steered the shuttle into a quick descent, following two heat trails all the way down until the space rocks hit the ocean bed. Two cross currents buffeted the shuttle at the bottom layer of ocean water, a warm subtropical stream flowing down the east coast of the North Island, and another current

flowing along the western ridges of the Kermadec trench. The two currents swirled about the meteorites, kicking up sand and stirring around each other in a rotating spiral. Tia concentrated on the changing sensations in her stomach as she navigated the shuttle among the interweaving tides that churned over the shifting sand banks below.

‘There they are,’ said Leilani, pointing at the lakescreen.

The meteorites rolled back and forth in the sea drifts, shrouded in twirling clouds of silt and sand. They sent out dull heat signatures and emitted a red glow. Tiny bubbles of oxygen formed on their surfaces growing larger and larger until they popped off and floated up towards the sky like silvery jellyfish.

‘I see them,’ said Tia.

‘They’re just pebbles. I wonder how many other meteorites are down here,’ said Leilani.

‘They’re travellers from outer space, survivors,’ said Tia, not daring to take her eyes off the lakescreen.

She kept her eyes on the rocks, not wanting to lose sight of them, tracking them as the currents carried them away.

‘Are you scared about going to Mars?’ she asked, steering the shuttle in a circle to avoid a rocky outcrop.

‘Not really. Mars is just a staging post,’ said Leilani, staring at the lines of floating debris on the lakescreen.

‘Aren’t you afraid of travelling into the branes?’

‘Yeah, it’s tricky. The tunnels are unpredictable.’

‘I don’t know how you can be so blasé. I’d be terrified,’ said Tia, as the shuttle caught up with the meteorites and she extended two robotic arms to grab them.

Leilani concentrated on the lakescreen, intently following Tia's attempts to manipulate the electronic hands to uplift the meteorites.

'Careful, they're moving,' said Leilani, pointing at the lakescreen with an enhanced index finger, her forehead wrinkling into a frown.

Tia focused on moving the robotic arms and flexed their metallic fingers to carefully pick up the precious rocks. The graceful movements of the mechanical hands made her think of her mother. The first time she'd thought of her since graduation.

'You'll see Dani and Gromtarg on Mars,' said Tia.

'I doubt it. Dani's always on assignment, and Gromtarg's too busy praying in the temple. Anyway, I don't have time for those two fools,' said Leilani.

Tia lost focus for a second and accidentally jerked the controls as she pictured Dani and Gromtarg together. The meteorites dropped out between the metallic fingers of the robotic hands and bounced away on the sandy drifts into circulating streams of water. Tia silently cursed her parents as she raced the shuttle after the rocks and tilted the hull to enable the metal hands to scoop them up. As she tipped the keel, the force of the two swirling currents caught the underside of the leaning shuttle, flipping it upside down and carrying it off into a vortex of water.

Tia tried to right the shuttle, but the fins laboured against the force of the tide. Blood rushed to her head as she hung upside down in the safety harness. Leilani, suspended in mid-air next to her, frantically tapped at the console, trying to correct their position. They both cringed as the top of the hull scraped along a ridge of rocks. Turukawa appeared, standing upside down on the roof, like a ghostborg stalactite. The inverted sight of Turukawa made Tia nauseous. She clamped her mouth shut to stop from vomiting. Turukawa jiggled the robotic arms, using them to push off against the sand bank, flipping the shuttle back into an upright position. Of course, then Turukawa

appeared to hang from the roof like a sleeping bat. She rotated in mid-air and came to rest on her feet, now upright. Tia gulped air, trying to regain her equilibrium. As the shuttle ascended through the ocean tides, she checked the robotic hands. They had dropped the meteorites.

The shuttle broke the surface of the water, and came to rest in a half-submerged position, rocking with the currents. Gentle waves flopped over the top of the hull. The mechanised arms stuck out of the sea in front of the shuttle, jutting forward like the legs of a dead bird, and Tia couldn't budge them. While Turukawa swam under the shuttle to make repairs, Tia searched the computer log recordings in the robotic arms.

'Let's see what footage they got,' said Tia, bringing up a holograph of the two meteorites above the console.

'Is that it? They're so tiny,' said Leilani, scoffing at the grainy holograph.

The hologram of the meteorites showed them nestled into the palms of the robotic hands, like lonely black eggs in a forsaken nest. One meteorite had melted and sculpted itself into a rounded head with a skirt flaring out behind like a medieval helmet. The other one, smaller, an elongated ovoid, must have come in behind the protection of the first one, as it had no dents or pock marks on its surface. Tia wondered where had they come from? What galaxies? What orbits? What planets? Turukawa appeared from the wall in an exo-watersuit, dripping wet.

'How are the robotic arms?' asked Tia.

'I've fixed them. They're back in the hull. We can return to Devonport base,' said Turukawa.

'Anything interesting in the meteorite analysis?' asked Tia, looking away and clasping her hands together to stop them from trembling.

‘The meteors are a mixture of iron-nickel and silicate,’ replied Turukawa, noting the increase in Tia’s heart rate, oblivious to the fact that it was her presence that caused it.

‘Can they tell us anything about the Tijen whirlpool?’ asked Tia, trying to keep her voice level.

‘The meteors flew out of the whirlpool,’ said Turukawa.

Devonport base glowed on the lakescreen. Tia banked the shuttle towards the hangars. Warning lights flashed out the emergency sequence on the rooftops as she landed the vessel. Hundreds of cadets ran back and forth inside the vast hangar, bumping into each other, swerving past the mechanics and engineers, pulling on their exo-jackets as though they’d just got out of bed. Tia and Leilani dashed into the sky tower to report back and sign out of their shift. When they reached Sky Tower control deck, Turukawa appeared from the wall. The embod brought up a three-dimensional hologram of the whirlpool into the middle of the room.

‘This is the whirlpool, Tijen Sky Hawk,’ said Turukawa.

Lights sparkled inside the holographic maelstrom. Tia walked into the middle of the holograph, tilting her head this way and that, inspecting the waves and currents as the hologram danced over her body. Fragments of rock and cloud formations of strange gases swirled inside the vortex and disappeared into a vast, black, down-draft. She tried to imagine how to navigate the currents inside such a monstrous event. They moved like nothing she’d ever seen before. She watched the mesmerising currents moving in a definite pattern in amongst the confusion. The pattern reminded her of the diagonal woollen cables on the arran jersey her father Gromtarg had worn the day he arrived on Namu island. She’d laughed at him wearing exo-wool in the heat of the tropics. He’d told her that the freezing weather on Mars required the warmth of exo-wool, and he

quickly removed the jersey as the heat of the Pacific overwhelmed him. The currents in the hologram came at Tia from all directions in this same regular pattern, a swirling movement like whirlpools she had seen in the Pacific Ocean near Namu Island, but more consistent as if mechanically produced.

‘Wow, that is impressive,’ she said.

Leilani, also captivated, ran checks in her strike simulations, taking a virtual tour of the whirlpool, smashing virtual rocks with strikers, and skirting the edges of massive gas clouds.

Turukawa turned to Leilani. ‘*Toutouwai 5* will launch in two hours. Please report for departure in the launch prep room.’

‘Why is it launching tonight?’ asked Tia, backing out of the hologram.

‘Ratu Shakti wants to assess the threat level. Earth is going to come dangerously close to the edge of the whirlpool’s outer influence,’ said Turukawa.

‘Is it safe?’ asked Tia, her voice trailing off. She didn’t want her sister to leave. Not yet anyway.

‘There is no cause for concern. The Academy has assigned many people to work on the Tijen whirlpool,’ said Turukawa.

Tia knew she would hang on to that reassurance in the coming days.

‘Might be fun, mapping a whirlpool,’ said Leilani, shrugging, and rushing out the door.

Tia tried to stop the tears. She turned to look at the whirlpool hologram, spiralling in deep space. The three-dimensional image flickered in the middle of the room. She didn’t want to think of Leilani being anywhere near it. From the great height of the sky tower control room she looked down into the hangar where mechanics, engineers and cadets ran to and from *Toutouwai 5* in seeming disarray. From so high up

in the sky tower control room, the tops of people's heads coalesced into bunches like chess pieces moving across a checkerboard. Tia brought up the meteorite analysis on the lakescreen. Just rocks, she thought and ran out to find her sister.



Leilani leaned onto the window ledge in her quarters, looking out into the dark. She had changed into a black exo-battlesuit and gravity boots, ready for launch. On the desk she had carefully arranged a helmet, gloves, and extra communication patches. The spaceship had no room for personal items. Tia didn't envy her sister having to sleep in the ship hammocks, stacked any which way, in high vertical columns. She sat on Leilani's bed idly kicking at the untidy bunch of blankets hanging off the mattress, her arms folded across her chest, a frown on her face.

'Have you called Bubu?' she asked.

'Yep. She told me she's seen this before when the Ajak whirlpool appeared. Bubu's ok about me leaving. She knows we can be called up at any time,' said Leilani, tying her hair back.

'I don't want you to go,' said Tia, fiddling with one of the recorder patches on her sleeve.

'I'll be fine. I've trained for this. We all have. People go to Mars every day.'

'Yeah, but you're going past this new whirlpool. They're so unpredictable.'

'Look at Aunty Rota. She's lived next to Ajak for years and she's fine,' said Leilani.

'Ajak is dormant, closed off. It's different,' said Tia, her voice almost a whisper.

'Don't worry. I'm the best striker in the world,' said Leilani.

Tia hopped off the bed, hesitating, inspecting Leilani in her launch uniform. They wrapped their arms around each other and cried, a wet and uncomfortable

embrace. Tia's body caved in as they parted. She watched as Leilani grabbed the communication patches off the table and stuffed them into her pocket, pulled on her gloves, and left the room holding her helmet under one arm. She followed Leilani out, hanging her head and closing the door behind her. She tried to be brave, but her legs dragged, heavy and numb, walking behind Leilani towards the briefing room. She recognised some of her classmates arriving for the pre-launch briefing, talking to each other in muffled voices, eager to fly into deep space.

Captain Serché stood on a platform at the end of the briefing room, greeting the crew members, and shaking their hands as they arrived. The Matifon captain looked impressive in their deep space Captain's uniform, a black and red exo-battlesuit. Tia wondered what use a fully loaded battlesuit would be to Captain Serché in deep space. Wouldn't it make more sense to load the suits with survival nanobots and patches for keeping the wearer in oxygen, rather than arming them for battle? Who would they fight with in space? Tia had heard the stories of Captain Serché's bravery in saving a ship of miners from an unstable asteroid. She wondered what use the battlesuit had been to Captain Serché then. Still, it comforted her to know that Leilani would have such an experienced Captain on board.

Leilani kissed her on the cheek and hugged her tight.

'Stay safe,' said Tia.

'Look after Bubu,' said Leilani, releasing her and joining the line of people filing into the briefing room. She turned and jumped up trying to see Tia above the heads of the other cadets. Tia waved at Leilani as she landed back into the crowd, her black ponytail coming undone.

From the back of the throng on the observation deck Tia looked out to *Toutouwai 5*. The spaceship now lay moored in the sea alongside the Devonport docks,

blown up to full girth like a gigantic puffer fish. Steam hissed from the gill vents and the fin engines purred as the ship prepared for lift-off. The crowd stood silent, craning their necks, all eyes forward. The officials stood at the front of the observation deck—Ratu Shakti sat in a hover chair, her lieutenants floating nearby—Ratu Mohadeen, and Brother Christian. They all wore full exo-battlesuits. Why they bothered with the pageantry mystified Tia. They would never go into deep space, so why were they wearing full exo-battlesuits? Although their very presence did show how much importance they placed on this launch. Tia’s stomach lurched at the thought of Leilani inside the puffer ship, *Toutouwai 5*. She held her hands to her belly and took a deep breath, trying to calm herself. Turukawa appeared from a wall nearby—also dressed in full black exo-battlesuit. On her it seemed right. A shiver ran down Tia’s back as the countdown began.

‘Ten, nine, eight ... ignition.’

The ships rotating pectoral fins whizzed up to full speed. Tia depressed her ear plugs to dampen the buzzing noise. Turukawa stood next to her for no obvious reason, not moving, just holding still in a fixed pose like a statue, her legs apart and her hands clasped behind her back. The buzzing fin engines vibrated through the floor into Tia’s feet and up into her teeth. She clamped her jaw shut to stop the chattering in her head. The sound-proofing in the observation deck did not drown out the whirring fins as the spaceship rose out of the water. *Toutouwai 5* floated vertically into the dawn light, snapping free from the wharf lines, and rising higher and higher into the sky. The spaceship’s silvery hull flashed in the morning sun as she floated into the troposphere and disappeared into the blue. Tia found herself waving and crying, an animal sound choking out of her mouth. She quickly wiped her face, unable to take her eyes off the

point where she had last seen the puffer fish spaceship. Turukawa spoke to her. She didn't hear what the ghostborg had said and asked her to repeat it.

'Ratu Shakti would like you to complete your deep space mission and join the navigation team on the second launch in three hours,' said Turukawa.

A group of cadets filed out of the observation deck, staring at Tia and Turukawa. They kept their distance, knowing that Tia didn't like to be near them. Tia glanced at the cadets as they moved past her, wishing they wouldn't abandon her, that they wouldn't leave her alone with Turukawa. She stuttered and grew more frustrated as words refused to come.

'Oh no, no. I can't do that. You know I've never flown into deep space. Ratu put me on sky duty instead,' said Tia, her face reddening.

'Tijen Sky Hawk is a very unusual phenomenon. Your navigational abilities would be of great assistance in mapping the currents,' said Turukawa.

'I already have a job. And once I've finished probation I'm going to work for the UN. I'm staying here on Earth,' said Tia.

She lurched out of the observation deck and didn't look back. Turukawa would have to find someone else. Plenty of other navigators had the qualifications to do the job. The thought of leaving everything she knew on Earth and travelling into deep space scared her to death. She had a job to do, mapping Pacific Ocean currents for the gravity web—Kermadec trench, Tonga trench, Lau basin. She knew the rhythms of the sea, and how to steer across the currents using her skills among the waves. Bubu had taught her. She had trained all her life to map the ocean. No. Deep space? Not for her.



After all the activity on base and the long night behind her, Tia found it hard to stay awake any longer. She caught an aeroscooter back to Dua and Va's house, steering the

nimble vehicle in between traffic jams of aerotaxis and shuttles ferrying people to and from work. She balanced on the footboard and flew over the top of a gridlocked group of aerotaxis. A man inside one of the aerotaxis stood up, unbalancing the vehicle as it swayed perilously in the air. Tia swerved around the vehicle. Two women in another vehicle shouted commands at the dashboard and pounded on the control panels with their fists, trying to get the vehicle to move as it swung to and fro in the airway like a broken pendulum straining to right itself. Tia skirted around them and flew straight into another group of four gridlocked vehicles. She sighed and carefully veered around the blocked traffic.

‘Turn on hand heaters,’ said Tia.

The handlebars responded and began to warm up her hands as she skated up the hill. When she finally arrived at the house, she flew over the gate and around to the back of the house. She found Dua and Bubu in the kitchen seated at the table. Va stood nearby with a tea towel over his shoulder, a frying pan in one hand and a fish slice in the other, about to dish out fried replicator flounder and eggs and onions onto Bubu’s plate. It smelled delicious.

‘Oh, hey, just in time. Sit down,’ said Dua, pulling up a chair for Tia and bringing her a plate from the kitchen.

Tia hadn’t thought about food for a while and hadn’t eaten since before sky duty. Her stomach burbled and her head ached.

‘We sat on the back deck and watched the puffer fish launch,’ said Va.

‘Leilani alright?’ asked Keleni.

‘She’s fine, Bubu.’

‘And the meteor. What a night. That rock lit up the whole harbour,’ said Dua

‘Bit scary about the new whirlpool,’ said Va, dishing some of the uniformly brown contents of the frying pan onto her plate.

‘Tijen Sky Hawk, is that the name of this new one? What have you heard?’ asked Dua.

‘Turukawa issued an alert calling up all mappers for urgent duty. In three weeks, the Earth will orbit close to the whirlpool and the gravity satellites will activate. The same thing happened when Ajak appeared,’ said Tia.

‘But Ajak’s much further away from Earth than Tijen, much smaller, and it closed within one Earth day. Tijen is different—bigger, closer, more active,’ said Keleni.

Tia didn’t want to think about the whirlpools or linger on the memory of *Toutouwai 5* lifting off and taking Leilani away from her into outer space. She finished eating breakfast and wandered over to an inviting stack of smoothly woven pandanus mats lying in the corner of the sitting room, her eyes closing before she even lay down.

Kauri

The automated aerotaxi flew low across Tamaki city, swooping over the rooftops, its gill vents puffing and the lakescreen grabbing at droplets of condensation hanging in the air. Bubu's warm body pushed into Tia's side in the morning cold, as they both strained to see into a rippling lakescreen on the dashboard. They braced themselves against the hard seat when the vehicle banked into an airway leading to the home of Dua and Va. Neither of them said a word, both lost in the memory of saying goodbye to Aunty Rota at Tamaki spaceport. Aunty Rota had hugged Tia, and squeezed her, and kissed her cheek. The smell of her rose petal moisturiser still lingered on Tia's face. Rota had asked about Leilani, how the launch went. Tia told her the launch went fine, nothing unusual, spaceships fly to Mars every day, she'd said. Rota had nodded, her eyebrows raised, her mouth closed. Rota had lived on Orojet station for decades. She had flown to Mars many times and her body bore the price of prolonged periods of time living in deep space. She walked with a stiff gait from nanobotic bone renewal in her thighs and shins. The whites of her eyes glowed with the tell-tale purple tinge of nanobotic heart replacement. She'd received the normal iris circuitry and finger pad sensors that everyone had fitted after the Water Wars. But she'd also received extra implants; iris and finger pad enhancements to counteract the destructive force of constant exposure to zero gravity. When the launch signal rang out, Rota hugged Tia once more, kissed her mother Keleni, and no one mentioned Dani.

‘Thanks for coming,’ said Tia.

‘Of course. Wouldn't have missed it. And don't worry about anything. You'll finish probation in no time. Why don't you come and visit me on Orojet? I can take you

out to watch the lights of Ajak. They're beautiful,' said Rota, kissing Tia once more on the cheek.

'I'll think about it, Aunty,' said Tia, knowing she had no desire to go to Orojet. For one thing it was in deep space and for another, trips to Orojet seemed to be something old retired people did. Her Auntie's tourism business was a sedate deep space destination for old mappers and navigators.

Saying goodbye to Aunty Rota, weighed heavily on Tia. She curled up against the cold taxi shuttle wall and tried not to cry. Keleni glanced at her granddaughter, wondering what to say to break the silence. She reached over and took Tia's hand in hers.

'You'd get back to your UN job faster if you took a mission into deep space,' said Keleni, as the aerotaxi flew up College Hill airway.

Tia sat up and shrugged. 'I can't do it. I'll stay on sky duty for however long it takes. It's so annoying. The UN job is perfect for me. I'll map Pacific currents for the gravity network and live on Namu Island and I won't have to go off-world like Leilani.'

The aerotaxi spluttered and lurched, throwing Tia and Keleni to one side as it swerved into an airway.

'Are you sure?' asked Keleni, bracing herself against the door. 'The New Worlds are amazing places. You can always come back to Earth.'

'I'm sure. It's madness up there and I don't want to have all the enhancements just so I can survive in space,' said Tia.

She knew that Bubu understood her fears, having spent many years in deep space in service to the Academy, requiring multiple nanobotic limb enhancements, a heart replacement, and a lung replacement. Keleni laughed and held up her replacement hands, her iris circuitry spinning. The aerotaxi bounced and veered off onto the wrong

airway as it crested the hill at Ponsonby Ridge. Tia shouted at the dashboard ordering the aerotaxi to get back on course towards Dua and Va's house in the dilapidated refugee quarter on the edge of the Waitemata harbour. The shuttle crackled and bounced and turned around in the air-traffic until it faced in the wrong direction and caused another shuttle to bounce out of its way. A few other shuttles also cut into the airway causing a blockage and delaying the journey to the uncles' house as the traffic laboured to correct itself.

'Something's interfering with the aerotaxi electromagnetics. They're malfunctioning all over town. More than usual,' said Tia, rolling her eyes.

Keleni looked up into the skylight, searching for any sign of Tijen. But no hint of Tijen had arrived yet in the day sky.



The uncles stood behind the gate waiting for the aerotaxi shuttle to land, pointing their wave sabres through the security grill in case any roving gangs lay in wait. The shuttle lurched to a halt, hissing, and rattling as it lowered awkwardly and landed on the slope of an old bomb crater in the middle of the street, now covered with weeds. The rim of the hole gave way a little under the weight of the aerotaxi and a small landslide of soil, broken asphalt, and lumps of concrete rolled down to join a growing pile of rubble at the base of the crater. Tia wrenched the taxi door open and listened for a moment, alert to any movement in the deserted street. A minor bird watched from its perch high overhead sitting on a cluster of seeds. The bird sheltered below the fronds of a surviving king palm tree, its long leaves waving lazily in the breeze. A child cried in one of the boarded-up houses across the street. Probably one of the cousin's children, thought Tia. She helped Bubu out of the taxi, watchful and ready as they walked briskly to the gate. Dua quickly opened the grill to let them in and closed the gate behind them. Va

holstered the wave sabre and held up both his hands in a low jazzy wave of greeting. Safely inside the property Tia relaxed, glad to be staying with the uncles. They kept a room for her and Leilani. Now she would have the room all to herself, another reminder that Leilani had gone. Instead of going into the house as usual the uncles insisted on leading Tia and Keleni in a mysterious procession down into the overgrown back yard to their boat shed, a weatherboard building at the bottom of the garden with the paint peeling off in white flakes.

Tia looked out across the water to the twisted metal frame of the second harbour bridge and the inundated ruins of the old sugar refinery, its brick chimneys almost submerged in the saltwater. The scent of raw wood filled the air. Fresh sawdust covered the grass outside the boat shed. Va lifted the boatshed door hanging at an angle off its hinges. The door scraped open across a concrete floor. Va lowered the door against the wall and held his palm out like a hotel doorman inviting Tia to enter. She laughed at him and stepped into the mystical atmosphere, the air inside heavy with the sharp aroma of sap and sea air.

She waited for her eyes to adjust. A ghostly bulk slowly materialised out of the dark. Dua opened the corrugated iron door leading to the boat ramp. Sunlight reflected off the water and slanted in through the open door illuminating a familiar silhouette. Gradually appearing out of the haze, the shape of a waqa camakau became clearly visible. Tia gasped. Wash strakes lined the edges of the dugout hull. A slatted frame of wood and bamboo lay across the top of the deck and stretched across to the outrigger float, the ama. Built onto the middle of the dugout, a small shelter with a slanting roof rose out of the decking. Sennit lashing hung loose off the framework between the dugout and the ama, clearly still a work in progress with some wooden poles already lashed onto the ama and some unfinished. The sight of the beautiful waqa brought Tia

back into herself after the debacle at the graduation ceremony and the shock of seeing *Toutouwai 5* lift off. The emptiness that had filled her when her mother had failed to show up and when Leilani had left too soon, evaporated as she stood before the waqa.

‘Your graduation present,’ said Dua, brushing one hand lovingly along the side of the hull.

‘Really?’ she asked, barely able to speak.

The uncles nodded for a long time, wide smiles on their faces.

‘Did you know about this?’ asked Tia, looking to Keleni.

‘They told me about it, but this is the first time I’ve seen it,’ said Keleni, smiling and casting her expert eye over the waqa.

‘The laser-chisel carved it out. But we programmed the carving robot,’ said Va, laughing and elbowing Dua in the ribs.

‘It’s all sculpted out of one single kauri log,’ said Dua.

His face beamed. As young men Dua and Va had trained to be carvers. Logs didn’t come to them much anymore. They rarely had the opportunity to practise their whakairo craft.

‘Where did you get a kauri log?’ asked Tia.

‘It washed up under the jetty. Made a hell of a racket banging against the struts. Almost broke the ramp trying to get our attention,’ said uncle Dua, laughing.

Tia remembered that Tangaroa offered up a log now and then. Something about the way the currents curved past the headland where the uncles lived, and something about the shape of the beach and the position of the boat ramp meant that all sorts of debris came their way. Something about the uncles too. The way they communed with Tangaroa and Tane Mahuta. Sometimes a log would show up, usually a small pine tree, too waterlogged for carving. Never a kauri tree. She wondered how a kauri log had

fallen into the harbour. The only living kauri trees that remained in the bush after the Water Wars grew deep inland and the Academy had passed laws to protect them.

‘I can’t believe it. It’s beautiful. Thank you, thank you,’ said Tia, hugging the uncles.

The twin hulls glowed with a deep lustre that shone like golden honey, a layered three dimensional sheen that made her feel like she could reach into the wood, see in between the delicate fibres. She trailed her hand along the laser-smooth hull, pictured herself holding the tiller, sailing beyond the reef towards Kato Island. She lay her cheek against the waqa, greeting the tree, sending prayerful thanks to Tane Mahuta and Tangaroa.

That night Tia again collapsed onto the pandanus mats stacked ten-deep beneath her in the living room. She laughed with Uncle Va as he searched for the source of a strange hum in the walls, knocking on timber, crouching under the stainless-steel kitchen sink, rolling the movable kitchen island back and forth, opening every cupboard—all to no avail.

‘These old houses. Might be air conditioning, isn’t it,’ said Va.

‘Ancient Academy houses. Dead ghostborgs in the walls,’ said Dua, shrugging.

Tia fell asleep to the rhythm of crickets chirring in the trees, and the voices of her uncles and Bubu talking as they sat around the kava bowl, drinking the brown liquid. The soft whirr of space shuttles flying across the harbour woke her several times, but each time a droning hum from somewhere deep inside the walls of the house lulled her back to sleep.

When Tia woke the following day, she helped the uncles to finish weaving the sennit lashing for her waqa. It took hours to plait the strands of sennit into long rope and to coil it up into a neat circular pile. She transported the rope in a rusty wheelbarrow to

the boat shed and watched the uncles complete the intricate work of binding together the waqa and the ama, wrapping sennit strands in criss-cross designs, pulling them tight against the golden wood to hold the ama to the cross poles. Patterns began to appear—diamonds, checkerboards, and herringbone. The uncles stopped now and then to rest their aching hands and backs and Tia brought them cups of sweet tea. They finally completed the work as night began to fall.



The next day, only one part of the waqa remained unmade—the crab claw sail. Dua hauled out a rickety old 3D printer into the middle of the lounge and inputted a design for multiple large exo-patch squares. The printer spat out reams of plaited exo-patches that resembled pandanus matting in colour and texture, but were stronger and interwoven with multiple solar power conduits. Tia sat in the long grass next to the uncles, helping to sew the patches together into a triangular sail with a large hook needle that made grooves in her fingers.

Later the uncles cleared an area of the long grass with machetes and laid out the completed sail to charge in the sun. Dua mixed a bowl of grog. When a full coconut shell came to Tia, she tipped the warm muddy liquid into her mouth. The bitter sting of yaqona numbed her tongue. She handed back the empty shell, clapped with soft hollow palms, her muscles relaxing onto the pandanus mats.

In the afternoon light, the prow of the waqa jutted out of the boatshed doors. Dappled sunlight played across the intricate sennit patterns the uncles had lashed onto the ama. As the narcotic effect of the kava spread into her muscles, Tia tried to stay alert. She focused on the squat kava bowl in front of uncle Dua, its dark wooden belly hanging over the mats. In a deep voice, Dua uttered closing ceremonial thanks to the yaqona plant, his cupped hands tracing a circle over the kava bowl as he clapped a ritual

rhythm in unison with his brother Va, his mother Keleni, and his niece Tia; long-short-long-long-short.

‘Io, sa oti saka tu na yaqona,’ said Dua, his voice a rich, basso profundo.

Sometime later the wind came up. Tia got to her feet, her legs heavy from drinking too much kava. Clouds moved fast across the sky, roiling upward in great churning heads. The voivoi pennant above the boat shed slapped against the flagpole. The wind was up.

‘Let’s take her out,’ said Tia, pulling on her exo-jacket.

Keleni agreed, always happy to get out onto the water. The uncles needed no prompting, either. They had been sailors all their lives, sailing the currents of Namu and the Lau archipelago. The Water Wars and the rising sea had changed that, turning them into land-bound refugees. But they had the sea in their blood. They rolled the waqa out of the boat shed, their colourful sulus flapping against their knees. Again, they led a procession with Keleni and Tia following behind them wearing exo-watersuits, ready to put the new waqa to the test out on the harbour. They all stood behind the waqa at the top of the boat ramp as the lowering sun drew long rays of light to play and spark among the wave tops. Uncle Va recited a prayer and uncle Dua tipped a bottle of red wine over the deck.

‘Waste of good wine,’ said Va.

‘Better than actual blood like they did in the old days,’ said Dua, glancing at Tia.

Tia helped push the waqa into the water and jumped onto the deck with the uncles. She didn’t want to think about blood washing the deck. Keleni stepped onto the waqa from the ramp giving directions to the uncles while they pulled the sail into place and turned it to catch the wind. Tia held onto the mother oar as the sail billowed and the waqa caught the energy of the shark god, Dakuwaqa, cutting through the waves and

speeding across the water. Tia lifted her face into the wind levering the oar into a gentle current sweeping out of the harbour.

She steered towards the ruined sugar refinery, whooping with exhilaration as the waqa skimmed wave after wave. Dua stood at the bow, his hand on the mast, ready for the gybe. Keleni and Va held on to the grab rails on top of the hut. As they neared the ruins of the sugar refinery, Dua changed the sail over to the opposite end of the waqa for the return journey, his nimble movements like those of a much younger man. Tia loved her uncles, their playfulness, their expert sailing and carving ability, and their deep knowledge of the sea. The sun had set, and the stars had risen by the time the waqa sailed up to the boat ramp. In the glow of starlight, Tia realised that all her worries and concerns about her mother and her sister had emptied from her mind for the first time since the botched graduation ceremony.

The stars shone overhead as the waqa bumped gently into the boat ramp, perfectly balanced on the water. She imagined sailing the waqa out through the reef that surrounded Namu Island, and onward to Kato island. The thought of Kato Island reminded her of Gromtarg's lanky frame walking with her and Leilani along the beach when they were children. She looked up into the north sky where Mars blinked red beneath a gibbous moon, where her parents Dani and Gromtarg lived, separated, but together on the same planet. It can't have been a coincidence that they'd both ended up living on Mars. A planet half the size of Earth, a small planet with a small population. They must see each other all the time she thought.

Lucky for them.

The Wave of Whero

Tia did not want to leave planet Earth. She belonged on Earth, not in space. Earth, the great blue ball. Home. To break away from her tight boundaries—the amniotic cover of the atmosphere, the boulders of gravity on your back—would take an exercise of bold-faced will, iron determination, and energy that Tia could not summon. She often thought humankind had no business in space. Why would a fish swim out of the sea when that is where it is supposed to swim? When it cannot even swim outside of the sea? She didn't belong out of water. She'd had this debate with Bubu many times. Bubu didn't blame her for thinking this way. The risks in space were as real and dangerous and unpredictable as rogue waves. Tia wanted to see the Earth, the mountains, the rivers; feel the air on her face; swim in the soft blue ocean around Kato and Namu. Gravity defined her, not the vacuum of space, the realm of the ngā atua. Stardust gathered in her bones, into a membrane of life on Earth. All that she needed came from the Earth, if people would only look after her. We are the harvest of the galaxies. We live in space.

Keleni and Tia left Auckland in calm seas, sailing the kauri waqa on her maiden voyage towards the eastern constellations, past the skeletal ruins of the sugar refinery sleeping in its syrupy grave, under the bombed-out metal spans of the two harbour bridges arching precariously across the Waitemata harbour. The night sky glowed clear, blue-black, full of stars—fixed luminous suns, reflective planetary faces, super novae, nebulae; the stuff of the universe. It was the best time to sail. With the atua shining guidance from above. The cluster of sisters, Matali'i, shimmered beneath a fingernail moon, a good sign. A strong breeze flowed in from the west, filling the crab-claw sail

and sending the waqa speeding over the top current of the full tide, past the stanchions of Auckland city, and out into the channel.

As they sailed past the vaulted buildings of the Academy base at Devonport, Tia looked up to Takarunga maunga. She spun her night vision circuits and zoomed in on the summit of the mountain where she'd often raced Leilani over the battlements. Leilani would be halfway to the whirlpool by now. Tia missed her. She'd barely had time to say goodbye. Leilani had worn a special exo-jacket, one with long range communication capabilities. Tia might be able to talk to her sister in deep space. She hoped so. She placed her hand on a woven section of criss-cross sennit on the framework of wooden poles connecting the waqa to the ama and said a short karakia for her sister.

'Safe travels,' she said, arching her face up to the stars beyond Takarunga.

The summit stayed in view, growing smaller and smaller in her iris circuits until it disappeared against the starlight. Clouds blew in and covered the sky, blotting out the stars as the waqa sailed past Aotea Island and headed north east into Te Moana nui a Kiwa.

On that first night, as they passed Aotea Island, they took on board a passenger. A little kiore. Tia guessed it had become lost in the swell as it swam between islands. A skinny rat, exhausted and close to death. Tia gave her water and fed her freshly dried fish. She snuggled into Tia's hands, and Tia held her close. After a while, the kiore squeaked and squirmed and Tia released her to the deck. She ran the length of the waqa, up and down, searching the deck, sniffing at the air.

'Welcome aboard little Kiore. Nineteen days sailing to go before we make landfall,' said Tia.

The rat chattered in her ear and the translation patches on her sleeve tried to translate, with no luck, only verbalising a rat melody. The rat would remain with them all the way to their destination, Namu Island, at the southern-most end of the Lau chain. Tia glanced at the navigational instructions displayed in huge letters and diagrams on the exo-patches in the sail, but she needed no help. She knew the way and headed into a dilep path that ran in a direct line from Aotearoa all the way along Kermadec trench to the Lau archipelago.

On the seventh night a storm blew in from the east and the sea swells grew higher and rougher. Tia sat at the stern with Keleni helping her to hold the mother oar firm, steering the waqa at a clean angle and surfing down the face of each wave. They got no sleep that night, struggling to keep on course in the heaving seas. In the confusion of keeping the waqa afloat, they lost track of the rhythmic dilep path.

The next day the sea had calmed, and they sailed steadily under a cloudless sky. Tia sat at the stern, closed her eyes, and concentrated on the sensations in her stomach, trying to assess the motion of the waves bouncing off the hull.

‘I can feel multiple currents running fast from the west,’ she said.

‘Steer past that island chain,’ said Keleni, pointing to Rangitahua.

Tia followed a line of intersecting points from two sets of waves, the dilep path, the road between islands. And then a third wave rippled down from the northwest obscuring the dilep.

‘Observe from your stomach,’ said Keleni. ‘Your first brain. The waves will show themselves; their motion and direction will reveal a dilep path.’

Tia sat with her back against the hut, quietly focusing on the honey coloured fibres of the kauri deck and paying attention to the sensations in her belly. She detected two gentle waves lapping from the west and bouncing back from Rangitahua in the east.

The interloper from the northwest knocked into the hull with a faint bump, deflecting all other waves and jumbling up her sense of direction. She mistook the new wave for a reflection off Rangitahua and almost missed the path. Kiore kept squeaking when she took the wrong path. The little kiore knew. Tia remained calm, even when they lost track of the dilep, especially then. She looked to the north, holding the image of their destination, of Namu Island, in her mind and focusing on the waves as Bubu had taught her.

‘Pull your destination to you,’ said Keleni.

As night fell the stars appeared overhead once more. Tia lay on the deck looking straight up at the familiar shapes in the constellations above—a floating woman, a snake, a waqa. An intriguing spiral of light, an unusual grouping that she had not detected on previous nights, appeared among a backdrop of stars in the middle of the sky. And then she recognised it, the portent her grandmother had seen the night before.

‘Is that the whirlpool, Tijen?’ asked Tia.

‘It is Tijen’s influence,’ said Keleni. ‘She brings the wave of Whero, the northwest wave. I’ve only seen it once, as a child, when Ajak appeared in the sky.’

Tia watched the unusual vortex dance across the heavens with the rotation of night until daylight blazed at the horizon and drove the darkness away. In the morning, a pod of dolphins appeared to the port side of the waqa leaping in front of the bow escorting them into a day of fast sailing with the wind at their backs. When night fell again, the spiral in the stars had changed shape, its arms had retracted into a tighter diameter, distorting the surrounding light.

‘Whero. She’s a tricky one. We need to be careful. Her appearance does not bode well,’ said Keleni, taking control of the mother oar.

The next morning the wind deserted them and the waqa floated on a flat sea, becalmed. The silver sheen of water reflected a few puffs of white cloud against a slate blue sky. In the distance a basking shark leapt out of the ocean, its enhanced tail shining in the sun. The shark chased a pod of stingrays flying out of the still sea, herding a shoal of fish and slap landing onto the surface of the motionless water. The wind disappeared for two days. Tia constantly checked the exo-squares in the sail for any atmospheric changes. The voivoi pennants at the top of the mast did not stir and the sun blazed down on them, caught in the shiny flat expanse.

‘Shall we power up the pectoral fins?’ asked Tia, her body heavy and drained of energy.

‘No need. I can see our island,’ said Keleni, shading her eyes against the unrelenting glare. Many kilometres away Namu Island sat beyond the curve of the horizon. Keleni had always taught Tia that if you can envision where you are going it does not matter that you cannot see your goal, it will arrive. She knew where Namu Island lay, and she knew they would find their way home.

The following day, the kauri waqa floated in blue Pacific water, still, motionless, becalmed. Absence overwhelmed Tia as a buttery disc of sun melted into the sky at dawn. Concrete-shaded clouds hovered overhead. Way down in murky pounamu depths, among the bombed-out hulls of ancient ships, the bones of ancient peoples and whales washed up against each other in the currents. Tia understood Bubu’s preference for the power of the tides and waves and wind, but on this occasion, she wished Bubu would agree to using the solar fins. She leaned quietly into the hut, Kiore on her shoulder, settling in for another day of silent stillness and unrelenting heat. Bubu sat near the helm looking towards the horizon. No dawn breeze lifted them. The sail waited for Tawhirimatea to gather up and burst into her woven belly, to pull them into

pathways of seaward resistance. Kiore sniffed the air, her eyes following dense flocks of kuaka and huahou swooping past on their way to Farewell Spit, body weight halved in the migration from Siberia. Their trailing bird lines cast flickering shadows on the mirror-glass water. The swirling aerial manoeuvres of these birds—recovering after the bombings—filled Tia’s spirit with joy.

One hundred years had passed since the Water Wars, and now the birds had returned, unenhanced, unaided. Where did they wait out all the radiation winters? Did one of the nature hold-outs care for them? Those tribes of hardy people hunkered down in the hills of Siberia and the mountains of Mongolia. It seemed an unlikely proposition. Tia sensed her black-billed cousins had prevailed all on their own without scientific interference from humans.

At the end of their third motionless day, Tia detected a dilep path flowing deep below them, near the floor of the ocean. She almost ran to the helm, her limbs now weightless. She sculled the mother oar to move the waqa in the direction of the rising current until the canoe grabbed the tail end of the swell. The wind picked up again and they moved into the night. At last, a tendril of warm air brushed against Tia’s face and the voivoi leaves fluttered from the angled boom of the crab-claw sail. Kiore scampered along the mother oar up onto Tia’s shoulders as the sail billowed, filling with a gust from the north. Tia lifted her head and laughed at the swell—a long spine of water—pulling them along a rising dilep towards home.

The waqa settled into a soft current, freeing Tia to set the oar in place, and leave her coasting. Smooth bamboo cross-poles supported her back as she lay supine, scanning the pale sky, adjusting to the spiral of the universe. Her iris circuitry calibrated the spin of the planet within the bar-spiral galaxy, the Milky Way, in its two millionth

year of a two-hundred-and-thirty-million-year orbit around the central bar, around the sun, around the centre, Sagittarius A*.

That night, as the moon rose above the masthead bullhorns, the weird spiral constellation appeared once more. Tia and Keleni looked up into the sail, searching the data displayed in the exo-squares and reading the Academy's latest directives about the helix of stars. The notices read that the spaceship *Toutouwai 5* had reached the whirlpool, with a full complement of researchers, navigators, mappers and strikers and they had sent back their preliminary observations. Tijen turned out to be an open whirlpool like Ajak the Sooty Tern before she closed into a fold in space. Ajak now resembled a shiny scar, a cicatrix like the healed-over lash wounds on the brown back of an ancestor. Tia wondered what the ancestors would think if they time-travelled into her present and saw whirlpools in the sky. She doubted that the spirals would be a surprise to them.

Tia sat laughing at Kiore as she scrambled down from the mast and onto her arm. A pressure note pinged into one of Tia's sleeve patches. She tapped open the note, a directive from the Academy.

'This is an urgent call directing all mappers to report for duty. Ratu Shakti.'

Why did Ratu Shakti send her this note now? Her back ached from lying on the deck of the waqa and the muscles in her arms hurt from wrestling with the tiller.

'Look at this,' she said, pinged the note to Keleni, and sighing heavily. 'I'm not going to work for the Academy. They know I'm a water mapper.'

'I think it must be a mistake. Ratu Shakti would've sent it out to everyone,' said Keleni, looking up to the crab-claw sail.

Tia didn't think Ratu Shakti had made a mistake and she didn't appreciate the constant pressure from the Academy to join the mapping effort in deep space. Her head

throbbled thinking about it. She sent an urgent pressure note back to Ratu Shakti's office. 'Thank you but this directive does not apply to me. I have accepted a water mapping position with the UN.'

She did not receive a reply.

Earth moved closer to Tijen's orbit every day. Each night, Tia watched the advancing spiral in the heavens, using the highest magnification possible in her iris circuitry. Tijen's corkscrew energy pulled all the ocean currents in different directions, changing the heading of the waqa several times. Each time they had to sail in a loop to get back on course, adding further time to the journey.

One morning, as they neared Namu, the wet black snout of a humpback whale erupted out of the water in front of the waqa, a barnacle encrusted monolith, a small dripping mountain. The animal lowered her head down into the depths. The sight of barnacles on the whale's skin warmed Tia's heart. She had not seen barnacles anywhere for many years. The whale's fluidity mesmerised Tia and Keleni, curving her huge grey body in the water, inspecting them with one watery, circuitry-enhanced eye, before she dived, her fluted tail the last part of her to submerge in a great triangular slide. Academy circuitry lined the underside of her tail, glinting in the sunlight.

'I wonder if the Academy has rigged the whale circuits to keep watch on us,' said Keleni.

Tia baulked at the idea.

'Why would they do that?' she asked.

'They like to know where we all are,' said Keleni.

The whale appeared once more, gliding beneath the surface of the water next to the waqa, emitting loud, guttural, honking noises, and spraying a blow of mist into the air. She covered Tia and Keleni in vapour, wetting the entire waqa. The moisture settled

onto their faces and hands, onto the sleeve patches of their exo-watersuits, onto Kiore's furry body. The fallen mist smelled of excrement and the rotting fumes of thousands of fermenting krill deep within the whale's belly. The stench made Tia retch, but it meant that the krill had returned, and that fact filled her with joy.

The whale had cast off most of her enhancements since launching from the marine laboratory in Alaska. There were no gouges or tears in her skin, and the marvels of barnacle and kelp adorned her fins. She dived once more. Minutes later, some distance from the waqa, she launched high into the air in a magnificent breach, her DNA released from hundreds of years of captivity in frozen test tubes stored deep inside pre-bomb dugouts. She landed on her back—flippers held out wide, heart vaulted to the flocks of black-billed kuaka flying the dreary skies—crashing into the arms of exploding white waves that claimed her back into the deep.

In her wake a great surge of water cascaded towards the waqa, tossing it up and down until the waves diminished. Tia and Keleni held onto the grab rails until the turbulence reduced to a slight pitch, a gentle sway quieting until it floated silent once more on the ocean drift. A sliver of the whale's tail circuitry floated up to the surface of the water, like mechanical seaweed, solder catching the sun and sparkling among the waves. The spyware in the whale's tail, part of the Academy network, had begun to degrade and slough from her skin, falling away into the sea. With every slap of her tail the whale shook free more of the circuitry, shedding the Academy's grip on her body. Her eye circuits had almost dissolved, reintegrating into her bloodstream. Tia expected that her most vital body enhancements, heart, lungs, eyes, would remain intact until the radioactive risk in the sea abated. It seemed that the whales would survive despite human scientific interference, like the kuaka and the huahou had survived without any intervention. Keleni tapped out a sequence on the mother oar—like Morse code ringing

into the water below—and tilted her head to the sky as the whale slapped its tail on the surface of the water in the exact same sequence.

Day Twenty-Two

On their twenty-second morning at sea as they neared Namu Island, a hollow clinking, the sound of walking on shards of dead coral disturbed Tia's sleep. The coral kept ringing, sending Tia an insistent message, a crunching footstep at first with a muted top note like the knocking together of stony exo-skeletons built by colonies of minute polyps long since gone from their homes. She tried to ignore the chinking echo, but it repeated itself over and over. A knot in a bamboo slat dug painfully into her back as she lay across the deck of the waqa. Kiore twitched and wriggled in the crook of her arm, poking her bristly nose into Tia's skin. Tia sat up into the morning light, the waqa pitching gently in the swell. The coral sound continued plinking from her sleeve patch, a continuous alert accompanied by flashes of red light. Keleni sat at the tiller holding the waqa on a steady course towards Namu.

'Yes, what is it?' asked Tia, finally giving in to the relentless alert.

Turukawa's image appeared in the sleeve patch. Tia moved the message into the exo-patches on the crab claw sail. Turukawa's face curled and rolled in the wind with the movement of the sail. Her features cut into surreal frames as the sail flapped about in the cool morning air. Her voice echoed via a shaky data feed, buzzing, and breaking apart, in the early daylight breeze lifting from the sea. A stream of indiscernible words filled the air, so indistinct and muffled that Tia wondered if the exo-patches had developed a malfunction, although that possibility seemed as unlikely as saying that paper malfunctioned. Tia leapt to her feet, her breath catching in her throat as the meaning of what Turukawa had said slowly became clear. Kiore's ears twitched.

'What is she saying?' asked Keleni.

‘Please, repeat message,’ said Tia, yanking the sleeves of her exo-watersuit onto her arms, her tone careful.

‘A shuttle from *Toutouwai 5* is missing. Your sister is on board,’ said Turukawa, her ghostborg voice seeping into the exo-patch with a metallic pitch.

‘What?’ asked Tia, now fully alert and holding onto the grab rails on top of the hut, whether to keep her balance in the gentle pitch and sway of the sea beneath her, or due to the sickening realisation of what she had just heard, she did not know.

‘Leilani was piloting a shuttle from *Toutouwai 5*. The shuttle has disappeared inside the whirlpool. We’re mounting a rescue operation. Please report to Academy base at Devonport. *Black Kiwi 3* is launching tonight. Ratu Shakti wants you onboard.’

‘But what happened to *Toutouwai 5*?’

‘We have very little information. Just a mayday call from Captain Serché,’ said Turukawa, abruptly ending the message.

Tia stared at Keleni sitting motionless as a statue, holding the tiller. Tia exhaled, the air bursting out of her lungs

‘I have to find her. I have to do something,’ she said, as though Keleni had offered some resistance to her decision.

‘Yes. They need your navigation ability,’ said Keleni, holding her granddaughter’s terrified gaze.

The thought of going into deep space hit her. It was the one thing she had resisted doing and feared above all. Why did Leilani have to go?

‘But I’ve only trained in the simulator,’ said Tia, rushing into Keleni’s arms.

‘You’ve trained in the deep space simulators and you’ve trained in the sea. They are the same. There is a galaxy in the sea, and you know those currents. This will just be like another sea, another set of currents.’

‘I’ve never even flown to Orojet station,’ said Tia, knowing that her protestations meant nothing, that she had no other choice but to join the rescue.

Gulls and frigate birds filled the sky as Tia and Keleni sailed into the settlement of houses floating above inundated Namu Island. Tia’s relations from the neighbouring flotation buildings sailed out to greet them, escorting the new waqa into their midst. Kiore the rat—recognising a safe landing—jumped into the water and swam between the houses. Tia paddled the kauri waqa up to the pontoon under Keleni’s flotation house and tied up next to Keleni’s kameha waqa.

After checking the ties on the kauri waqa, she trudged upstairs, her legs leaden. She flopped onto her bed and lay there staring at the ceiling. Would Leilani’s communicator work? She pressed a monitor patch on her sleeve.

‘Please contact Leilani.’

She didn’t know why she asked the monitor to do this. She did it on the off chance that her call might reach Leilani. The monitor told her that such communication would not be possible.

‘Please try anyway.’

Tia listened to the monitor patch pinging over and over, trying to connect. Only a frenzied hiss of static came back from deep space, filling the empty room. She dragged herself up from the bed, her body heavy, shrugged herself into her exo-jacket, and walked from room to room in the house with Kiore perched on her shoulders, chittering in her ear. As she walked through the rooms, she became more convinced that she needed to find a lost item.

Leilani’s room was neat, orderly, empty. She walked out onto the windswept landing platform rocking in constant motion with the push and pull of the sea. She inspected the salt rimed doors of the shuttle hangar. She went downstairs to the

pontoons where the two waqa swayed gently in the tide. Then back upstairs to the kitchen where Bubu was making sandwiches and tea. She sat on one of the white barstools at the kitchen island and leaned onto the benchtop as the rising sun glowed behind towering clouds. She tried ringing the uncles, but they didn't answer her call.

Toying with the food, breaking off pieces of bread and cheese and handing them to Kiore, Tia thought about Leilani lost in the whirlpool. And finally, she found it, among her thoughts, the lost item—a memory, an unspoken wish. The memory of Leilani saying that she would have no time for Dani and Gromtarg when she reached Mars. Tia recalled thinking at the time that while Leilani may not have time for them, for their parents, at least she would be close to them. She might bump into them somewhere in a corridor, or a bar, or a launch bay, or anywhere at all on the small red planet.

Black Water

‘Remember the currents, picture the Earth in your mind and you’ll always find your way home. Take this. It will protect you,’ said Keleni, dragging out a length of woven muka from around her neck, a piece of dark glass fixed to the end. She pulled the stone over her head and placed it around Tia’s neck.

‘Tua’s wai loaloa,’ said Tia, taking hold of the black stone taonga, still warm from Keleni’s body, and holding it up to the light. Her eyes widened with awe at the sight of the ice wonder from deep space, absorbing all light and reflecting nothing back.

‘It’s come all the way from the Kuiper belt,’ said Keleni.

‘So beautiful. But Tua gave it to you,’ said Tia.

‘Your grandfather would want me to pass it on to you. This water is like a homing stone, it knows the way back,’ said Keleni, admiring the way the stone lay against Tia’s neck. She remembered the day that Milton had come home from the mines with the black ice stone clasped in his fist. He didn’t often return with souvenirs from the asteroids. This one marked his survival. He’d narrowly escaped a mine collapse that time. She wished he’d stayed home after that accident. Now he lay forever entombed with his co-workers in a collapsed asteroid somewhere in the Kuiper Belt. She missed him.

The light appeared to curl inside the stone, like dark tendrils of smoke.

Visitor

Tia waved from the portal window next to her seat in the shuttle, bracing herself as it lifted off. The sight of Bubu waving back at her from the landing pad, brought back memories of that strange and fateful day many years before. The day when Dani had turned up unannounced at her home on Namu Island. On the morning of that day Tia had waved goodbye to Bubu from the same spot where Bubu now stood on the landing platform holding onto a grab rail while the platform rocked with the currents, and the wind whipped her hair into her face. Tia was seventeen years old. She remembered watching Bubu's shuttle until it disappeared into the blue and she went back into the house and fell asleep on the sofa with Manu Kiore, her childhood rat. She woke sometime later to the lonely sound of lapping waves and the clang of the strut chains echoing throughout the settlement. The arrival happened when she was tracking Bubu's flightpath on the lakescreen, trying to follow her flight over the sea to her destination at Lau Basin where she would commune with the great ones, the tides and the currents that had carried humans since time began. She'd stopped spinning the instrument dials when she heard the hum of shuttle fins, thinking it was Bubu returning early from Kermadec Trench. She stepped out onto the balcony to watch her fly in. Manu Kiore scampered up her arm and onto her shoulders, her whiskers twitching as she sniffed at the sea air. The confluence of afternoon glare shining into her eyes, and the shuttle's silver hull reflecting the sunlight, made it almost invisible against the sky, a spark scudding over the waves. The puffer shuttle lowered towards the landing pad, its pectoral fins whirring. Tia slowly realised that it was not Bubu's face smiling from the cockpit. She waited for the pilot to remove their helmet. Her stomach clenched. It was her mother Dani waving at her from the flight deck.

The downdraft rotator fins had blown Tia's black hair into her eyes obscuring her vision as the shuttle settled onto the landing pad. She dragged away the wet strands of hair stuck to her face, trying to get a clearer look at Dani as she stepped out of the shuttle and onto the skids. A large wave swept up against the flotation struts under the house tipping them both off-balance. Tia held onto a grab rail, straining her arms and legs to keep herself upright while she waited for the stabilisers to kick in. Dani held onto the door of the shuttle and they stood looking at each other in an uneasy stand-off, until the wave rolled past, and the house settled into its normal rocking motion. When the platform stabilised, Dani stepped down onto the deck, her movements stiff and hesitant.

She walked across the landing platform, leaning over to one side from the weight of a small exo-bag she held against her thigh, a crooked smile forming awkwardly across her face, her eyes brightening slightly as though she had just remembered that she ought to look friendly. Tia tried to collect herself, straightening up, unable to move, staring at her mother as she approached, taking in every feature of her and trying to place her in context. Dani looked so different and yet familiar. Had Tia been more prepared she would have reached out and hugged Dani. But she held back, uncertain.

'Dani, what are you doing here? Why didn't you tell us you were coming?' she asked, finally moving forward, embracing Dani quickly, awkwardly, and stepping back to look at her.

Dani had aged. Lines had etched themselves into the skin around her eyes and mouth. Strands of white hair streaked her lush black fringe. Her wiry limbs moved with slow deliberation, thinner than Tia remembered from their rare conversations on lakescreen. She bore the tell-tale signs of space fatigue and medical repairs—the stiff

walk, the slightly purple colour of the iris circuitry, and the faded square patches on her hands and face where she'd had exo-circuits tattooed directly into her skin. Tia ushered Dani towards the house. She glanced out across the ocean hoping to see any sign of Bubu, not just the expanse of sea and the far-off bow of azure horizon vacillating in the sunlight.

'I'm sorry I didn't call first. I have a meeting with Ratu Shakti tomorrow. I thought I'd drop in on the way,' said Dani, stepping into the living room, and smiling weakly at Tia.

'Only staying for one night then?' asked Tia.

'Yes. It's a very quick trip,' said Dani, her eyes scanning the room.

'Bubu's over the Lau Basin,' said Tia, reaching out to pick up Kiore.

'Still mapping Kermadec trench?' asked Dani, setting her case down heavily on the floor, and standing awkwardly to attention.

'Currents in the basin. She's due back soon,' Tia replied, checking the time in her sleeve patch.

Dani rubbed at her arms and looked around the room. Tia stood rooted to the spot wringing her hands. They stood in these awkward postures, unusual attitudes for them both, as mother and daughter.

'I'm glad to see you,' said Tia, tentatively, not really meaning it, but wanting to.

She moved into the kitchen and opened a cupboard, taking some onions from the shelf, and rummaging in the knife draw.

'I'm sorry I can't stay long. My meeting's at Devonport base tomorrow,' said Dani, trying to sound apologetic, and failing. Her face pulled into a distorted rictus of a smile.

‘You can sleep in Leilani’s room, Mum. I’ll show you,’ said Tia, gesturing in the direction of the bedrooms.

The word rang in Tia’s ear. *Mum*. Dani also hesitated.

‘Thanks. I remember,’ said Dani, leading herself off towards the hallway.

Tia watched her mother leave the room and then rang Bubu’s green dot, Manu Kiore squeaking on her shoulder. The call pinged and went to message. Tia left a note asking Bubu to come home, telling her that Dani had arrived. She hoped Bubu would pick up the message. She didn’t know how to be alone with her mother.

‘No reply?’ asked Dani, standing in the doorway.

‘She’s probably over Tonga. It’s a long way,’ said Tia.

By late afternoon Keleni had not returned. Dani and Tia sat at the kitchen island and leaned into the recycled exo-ore benchtop in an awkward silence, looking out through the lakescreen doors to the wide-open sea. Tia kept scanning the horizon, squinting at any black dot that appeared in the distance, hoping to see Bubu. On a far-off stretch of rolling waves, the wings of flying fish glistened in the sunlight, their streamlined torpedo shapes leaping to escape the jaws of mahimahi chasing them through the deep blue sea. Some of the flying fish glided to safety above the waves only to find they had to dive again to avoid the snapping beaks of frigate birds plucking them from the air. Tia shivered in the face of their dilemma, caught between the frigate birds in the sky and mahimahi in the sea, their survival dictated as much by luck as by their flying and diving skills.

The sun glowed red, quivering above the horizon as it prepared to slide into the ocean. Long rays of red light slanted across the entire vault of the sky.

‘I’ll start making dinner,’ said Tia, eager to get busy so she wouldn’t have to make small talk with Dani.

She diced tomatoes, onions, and chillies while Dani looked on, then took a bowl filled with fat white cubes of mahimahi from the icer and drained the fragrant lime juice marinade. The slap slap noise of a shuttle cutting through the water interrupted the strained atmosphere between them. The vessel bumped up against the pontoons below the house. Bubu's footsteps clopped up the stairs. She appeared at the door, her face and neck flushing red. She crouched to pick up Manu Kiore who ran up her arm and along her shoulders, settling against her neck, and squeaking in her secret rat language.

'What are you doing here?' asked Keleni, puffing from climbing the stairs and glaring at Dani.

'Just passing through,' said Dani, standing up and leaning over the bench to wash her hands.

Dani strode to the icer without any further word of greeting. Keleni watched as Dani grabbed a carton of orange juice, ripped it open, took a slug, and moved to the barstool at the far end of the exo-ore kitchen island. The ocean lapped against the flotation struts under the house and pulled at the anchors fixed to the ocean floor several metres below. Manu Kiore, aware of a frisson in the air—the same as the energy before a storm—ran to the end of the lounge, jumped onto the couch, and curled up under a cushion. With Bubu's arrival Tia gained more courage to speak her mind.

'You're always just passing through aren't you, Dani,' said Tia.

'I have an important meeting tomorrow at the Academy,' said Dani.

'We're doing important work here for the world, for Earth,' said Tia, folding her arms, and hunching her body into a ball, leaving the vegetables on the bench.

Keleni walked over to Dani and they hugged, an uneasy embrace.

'When did you arrive?' asked Keleni.

‘A few hours ago. Tia and I have had some quiet time alone together haven’t we, Tia?’ said Dani.

Tia ignored her.

‘She’s a natural wave navigator,’ Keleni said, looking at Tia.

‘So I’ve heard. That’s what I want to talk to you about,’ said Dani.

‘Ah, now the truth. You want something,’ said Tia.

‘Ratu Shakti has told me about your special talents.’

‘If you’d bothered to come to any of my prize givings, you’d know...’ Tia’s voice trailed off.

‘I’m sorry.’

Manu Kiore poked her nose out from under the cushion, sniffed the air and burrowed her way back into the folds of the couch, into safety.

‘With your navigation ability, we need you to help in the deep space projects,’ said Dani.

‘I’m staying on Earth, with Bubu. I want to work for the UN. Saving Earth’s gravity is important,’ said Tia.

Keleni looked from her daughter to her granddaughter.

‘Tia’s in the middle of mapping the Pacific currents, and she’s the Pacific monitor for gravity net,’ said Keleni, moving to the bench, washing her hands and taking over from Tia, mixing the vegetables in with the fish—kokoda for dinner.

‘How many times have I told you? I have no interest in deep space mapping. I’m not like Leilani,’ said Tia.

‘There’s no future in wave navigation on Earth, Tia. Your future is with us mappers in the New Worlds and we need you,’ said Dani.

‘This is my choice, to stay on Earth and map the Pacific Ocean, help bring it back to life.

‘Such a waste of talent,’ said Dani, spreading her hands on the bench top.

‘You’ve got no right to tell me how to live my life.’

‘You’re impossible,’ said Dani, slapping her thighs.

‘Dani, please stop. Mapping the oceans *is* my contribution. It’s transferable knowledge, saving the ocean after you lot messed it up, with your stupid wars.’

Tia held fast to what Bubu had taught her, that the Pacific Ocean held all the energy of the universe, that she had that energy within her. There was no need to leave Earth to know this truth. Tia had studied the immense Pacific Ocean energy and had learned about wave navigation, and wayfinding, sailing from point to point, her body in tune with tides, flows, currents, animals, signs, the ways of her Fijian and Tongan and Mayuro ancestors.

Dani shrugged. She pushed her hands into her thighs and shook her head.

‘I’m working on the clean-up Avocets, and I know how to operate the light sails in the cis-lunar zone. Isn’t that enough?’ asked Tia, glancing out the window at the ocean.

‘I know this would be your first time in deep space and I know it’s scary for you. But you’ll be fine once you’re there,’ said Dani.

‘I’ll take my chances here thanks. Anyway, Leilani’s going up there,’ said Tia, turning away from her mother.

It didn’t help her argument, trying to deflect the conversation towards Leilani, the best mapper in the family, and a committed New Worlder. Dani mirrored her daughter, her clenched jaw, her edgy manner—or was it her daughter that mirrored her.

‘We need your skills,’ said Dani.

Tia looked once more to Keleni for support. Keleni turned her head from one to the other as though watching a tennis match.

‘I’m not going to work in deep space, and you can’t make me. I’m staying here with Bubu,’ said Tia.

Dani shook her head and didn’t answer.

‘I appreciate the old ways,’ said Dani.

‘Do you? What about looking to the ancestors, what about our environment. You have poisoned everything,’ said Tia.

‘We have new ways as well. You don’t need to abandon the old ways,’ said Dani.

‘If the gravity fields fail, there will be no Earth for you to come back to.’

Tia got up from the barstool, tired of the conversation, and left the room. Keleni followed her down to the pontoons and helped her to unhook the kameha waqa camakau. Manu Kiore scampered on board with her.

‘What is she doing here, Bubu? She has no right,’ said Tia.

‘Where are you going?’ asked Keleni.

‘Away from her.’

Tia cast off, pushing away from the pontoon with her feet, sending the waqa gliding among the floating houses. As she exited the settlement, she pulled the crab-claw sail into place and the waqa slid out over the turquoise water.

Twenty minutes later—beyond the reef, near Kato Island where no spaceship fins droned into her ears, no Academy demands distracted her from the birdsong returning to the island—Tia weighed anchor above her favourite landing. She lay under the shelter of the waqa hut looking out at the salt-laden haze as dusk fell, the rat pressing its small body against her back. At the darkest part of twilight before night

crept in, schools of coral fish gathered over the landing, as they did every evening at that velvet time. Tia watched the stars peek through streaks of red and hoped that destiny would intervene to save her from the madness in the New Worlds.

She dozed off to the gentle sway of the waqa, looking up at the roof of stars sparkling above, and woke with a start when Manu Kiore squeaked in her ear. Morning light shone into her face. She had stayed out on the water all night. A shuttle lifted out of the sea in the distance, from the direction of Namu Island—Dani, leaving. Again. She knew Dani would spot her from the shuttle. Tia didn't care. The shuttle lifted vertically, hovered for a second, and then shot away in a thin streak of black. Tia stared hard at the line of the shuttle's heat signature slowly dissipating among a shirred group of cirrus clouds.

Hoping to dispel any further thought of Dani she swept her arms up over her head and dived deep into the flat sea like a cormorant on a morning fishing run. The large schools of colourful fish had left the landing since the night before and only solitary coral heads remained. She kicked upward, cutting gracefully through the ocean swell, and opened her eyes as she surfaced. At least the heat signature from Dani's shuttle had dissolved, leaving her in peace.

She floated on her back on the calm surface of the water, and stretched out her arms, a gentle breeze flowing over her face. Here in the sea she found escape from the demands of the Academy, from the expectations of her mother, and from any thought of her future duties. She kicked her legs in wide arcs, propelling herself in a lazy line back to the waqa where she pulled herself up onto the deck. In the fresh morning air, she lay dripping wet on the bamboo slats, and closed her eyes against the rising sun.

Tia glanced at Kato Island as the waqa cut through the water on the way back to the settlement. She gained some comfort from Kato's solid and constant presence, a

reminder of her father Gromtarg. She steered the waqa into the wind, speeding over the reef, pushing the pectoral fins to full throttle just for the fun of it. Her pulse beat with an irregular rhythm that mirrored the pace of her thoughts—fast, at first, thumping in her chest, then quivering and feathery, and then she became numb. She set her eyes on Namu settlement—home—the geometric angles, the roof lines, and flagpoles of the flotation houses, visible in her mind long before they appeared on the horizon, waiting behind the curve of the Earth.

She ran onto the pontoon as the waqa skimmed into its berth under the house and whacked into a rubbery exo-wall. Manu Kiore dashed off the deck onto the pontoon, her rat body stretching out to its full length as she bounced along the ropes and boards. Tia threw the ties over a railing. She took the stairs two at a time, Manu Kiore following behind her, matching her speed with a rat gallop. The sight of Bubu coming in from the landing platform, a grave look on her face, stopped Tia in her tracks.

‘I saw her leave,’ said Tia, running into Bubu’s arms, and squeezing her tight.

‘It’s alright. I was surprised to see her too,’ said Keleni, extracting herself from Tia’s embrace and holding her back to look at her.



She thought of that time, now a painful memory, as she flew towards Devonport Base to join the rescue mission to save Leilani. Dani would be pleased to know that she was flying into deep space for the first time in her life.

Launch

Tia hesitated at the foot of the skybridge leading to *Black Kiwi 3*. The puffer ship sat tied up alongside Devonport wharf, inflated to its maximum size, its pectoral fins humming. The wind howled through a gap between the puffer ship and the boarding plank—ruffling Tia’s black curls. Since she’d heard the news about Leilani’s disappearance, she’d let her hair flow wild and free, the way Leilani wore her hair. She wanted to emulate her sister, her fearlessness.

As the wind blew her hair into her eyes, she decided it wasn’t practical and tied it up, impatiently brushing stray ringlets off her face. A bunch of people pushed past her—two mappers in their blue exo-jackets and a navigator cadet from the Academy. She followed behind them, wondering how they mustered such vibrant energy in the face of what lay ahead. She thought of Leilani, pictured her in a shuttle, flying through the whirlpool.

She recalled the hologram she’d seen in the Sky Tower, the strange flow of spinning currents inside Tijen. If the currents flowed anything like the whirlpools she’d had seen in the oceans on Earth, they’d have an exit point somewhere. She knew that if she managed to get inside Tijen, she would be able to follow the currents and find Leilani, even though it would mean doing the thing that she most dreaded. Now that she’d made the decision to go into deep space, she wished time would speed up. Everything moved so slowly—people ambled, the launch schedule dragged, this queue wandered and lingered. She hung her head, walking the interminable line behind her new crew mates.

She quietly approached the ship’s entrance, her skin itchy and hot under the launch exo-suit. A brace of nanobots rushed to cool her down. The sight of Turukawa

waiting at the entry door slowed Tia's progress. She had never seen this iteration of the embod. A youthful incarnation, with short black hair framing her face, and a grey exo-suit of alloy fabric hugging her muscled body, taller and stronger than most others Tia had seen. She stared and fumbled with her helmet, aware that it was bad manners and yet unable to tear her eyes away from the embod.

'Greetings Tia. Thank you for joining the rescue mission,' said Turukawa, her voice deep and even.

Turukawa would be logging the sharp changes in her breathing and heart rate and commanding the nearby walls to send her remedial rhythms.

'I'm only here to save my sister,' said Tia, forcefully.

She instantly wished she had shown more restraint and courtesy. Her cheeks flamed hot. A rising heat crawled all over her neck, a mixture of embarrassment, infatuation, and shame for being so rude and disrespectful. She wanted to flee back down the gangplank and pretended to inspect the red exo-jacket controls on her left arm. Two mappers behind her pushed into her back almost shoving her into Turukawa. The ghostborg stepped away.

'I'm sorry,' Tia stammered.

She didn't know what made her apologise to an embod. It's just that she always seemed so real to Tia.

'It's alright,' said Turukawa, reaching out to touch Tia's arm. 'We're all concerned for Leilani and everyone on *Toutouwai 5*.'

Tia stumbled backwards, blinking with disbelief that Turukawa had touched her. She wondered what kind of programming this iteration had received to make her do such a thing.

'Please follow me,' said Turukawa.

Tia stood dumbfounded and let the two pushy mappers go first. She tagged along behind, trying to melt into their broad shadows, trailing a hand along the ship's dark red walls. The smooth ridges and their interfaces responded to her touch with a living pulse, sending out a regular beat that eased her tense shoulders and calmed her mind. Turukawa led the group into a corridor, past empty storage bays, and up a narrow flight of steps to the passenger compartments. The new arrivals had settled into their seats at the front. Indian Regiment guards filled the seats at the back, a silent and ominous phalanx in fully armoured, black exo-battlesuits. Tia glanced at them, their mahogany faces looking straight ahead, their black turbans looped carefully around their heads, their black beards neatly trimmed.

'This is your seat,' said Turukawa, transferring a deep space communication patch to Tia's hand. She scrunched it up into a ball, jamming it into her pocket, unable to look at Turukawa. She flopped into her seat and told the safety restraints to stay unlocked for the time being. Several minutes later Turukawa ushered in a tall Matifon with blood red hair, a luxuriant red beard, and a face so symmetrical and stunning that Tia gawped like an idiot, as did everyone else in the cabin. Trailing behind the Matifon like an afterthought, came a short Grom woman in a dark navy cape. Tia used her iris circuitry and pulled focus on the Matifon and the Grom. Her jaw dropped when the Matifon stopped and bowed. Did they see her examining them? No Matifon had ever bowed to her before. This one was the most beautiful person Tia had ever seen in her life. The trailing Grom also came to a standstill in front of Tia and looked her up and down, inspecting her grey exo-jacket, the piping on her blue mapper exo-suit trousers, her black hair, her hands.

Tia returned the glare. She wanted to tell the Grom, I am not one of those old-time mappers. It's not my fault. I know my duties to the Home Planets. She wanted to

say, look, I'm related to you. The Grom turned away with a sneer and shuffled off to a seat at the back near the Indian Regiment guards. In deference to her Grom side, Tia kept up her grumpy face, the one she always cultivated, like a true Grom.

'My name is Oculum. I'm the ship doctor,' said the Matifon, reaching out to shake Tia's hand.

Tia stared at the hand suspended mid-air in front of her, catching herself, blocking an urge to whack the Matifon's hand away. She inhaled deeply and looked up from under her hair at Oculum's lopsided grin, wondering why people insisted on wanting to shake other people's hands. In that second, something about the way Oculum looked at her, and the way Turukawa had welcomed her on board, and the claustrophobic atmosphere in the cabin, all came together in Tia's mind and she decided she would try to be different on this ship. She took hold of Oculum's large warm hand and shook it up and down, all the while thinking it was a stupid thing to do and fighting the urge to yank her hand back.

'Hi. I'm Tia Grom-Eddy,' she said, letting out a huge breath when Oculum finally released her hand. She'd detected a clicking pressure in the Matifon's hand and stared at it as they seated themselves in the chair opposite her.

Oculum saw her staring and held up their hand.

'Robotic enhancement,' said Oculum, flexing their fingers, which looked like real fingers to Tia.

'Oh,' said Tia, ducking her head. She asked the safety restraints to lock. The restraints appeared from the edges of the seat and wrapped around her chest, locking into place.

'The fins will charge up soon,' said Oculum, issuing a lock command to the seat restraints, which obeyed and locked around their perfectly proportioned frame.

Turukawa appeared in the cabin once more and approached Tia with a parcel in her hands.

‘I have a gift for you as a first-time deep space traveller,’ said Turukawa, handing Tia a package wrapped in exo-paper.

‘Oh? Thank you,’ she said, balancing the bundle, fumbling with it, and almost dropping it on the mottled carapace deck of the puffer fish spaceship.

The exo-paper wrapping came apart in Tia’s hands to reveal a neat folded square of grey alloy material, an exo-jacket made in the same material as Turukawa’s exo-suit. Tia blinked repeatedly, her iris circuits refocusing. Her pulse quickened as she stood up and put her arms into the sleeves, shrugging herself into the new exo-jacket. The control response ran a lot smoother than the one on her blue mapper exo-jacket. The torches shone brighter, the smaller microbes had already conformed to her rhythms, and she liked the metallic grey and red material, the way it clung to her body like a new skin.

‘It’s updated Academy issue. You’ll need it where we’re going,’ said Turukawa.

Tia looked around the cabin to see that everyone, except the Indian Regiment guards, also wore the same type of exo-jacket.

‘It’s incredibly soft, and the connections are strong,’ said Tia.

Everyone in the cabin stared at her. She stared back, glared, until the game became tiresome and she looked away from the mappers and navigators and the Indian Regiment guards.

‘You’ll also need one enhancement to get you flight ready. An addition to your iris circuitry to plug you in to my hive mind,’ said Turukawa.

‘Why do I need that? I’ve accessed the hive all my life.’

‘Yes, we are aware of you every time you plug into the hive,’ said Turukawa.

Tia froze, her face flushing again. She cringed at the thought that this iteration of Turukawa knew the workings of her mind. Her thoughts scrambled for some way out.

‘Ok, so what is this enhancement you want me to have?’ she stammered, with false bravado, and then panicked as she wondered if the procedure were safe.

‘I just need to inject you with a few extra nanobots,’ said Turukawa, holding up a med-phaser.

Tia shrank away from the phaser and held up her hands. ‘I already have iris circuitry. Is this really necessary?’ she asked.

‘You have standard issue iris circuitry that everyone receives at birth. These bots are more advanced. They’ll give you a wider range on your navigational abilities. It’s a normal enhancement for special ops,’ said Turukawa.

Tia exhaled in a forceful puff as if she’d held her breath for some time. She glanced at the other crew members in the cabin. Did they have these enhancements? She wanted to talk to Bubu, ask her advice. Instead, Dani came to mind. She laughed at the irony. Dani had won. She’d finally got what she wanted at last. Tia had become one of them.

‘Fine, go ahead,’ said Tia, her voice a weary monotone.

Turukawa pressed the med-phaser to Tia’s shoulder, injecting the nanobots into her veins. Tia closed her eyes and waited for the microscopic bots to reach her irises. Nothing changed at first. She thought they must have failed. But as she scanned the surroundings her focus sharpened. For a moment, the movement of oxygen molecules in the cabin became visible to her until her iris circuitry recalibrated and her vision settled. After what seemed like an eternity, Tia crumpled into her seat, finding her augmented sensory input a little overwhelming. The seat restraints closed around her, cutting into her arms, and pulling hard across her chest. She reacted without thinking, wrenching the

shoulder points in her new exo-jacket. The seat restraints snapped open in response. She breathed hard and wondered what had just happened.

‘You’ll get used to the exo-jacket and the nanobots. They’re extremely sensitive to your movements,’ said Turukawa.

The heat rose again into Tia’s cheeks. She held her breath to stop from voicing anything inane in Turukawa’s presence. She waited and watched as Turukawa merged back into the wall. She willed Turukawa to return, to give her some reassurance, to comfort her with answers. Would she be safe on this ship? She leaned forward in the seat and punched the lakescreen, clenching her jaw as she watched it splash under the impact of her fist and gradually return to its flat watery surface, grabbing at stray drops of water. Her hair had come undone and she left it like that, covering her face. Opposite her, Oculum the Matifon laughed and unfolded their long legs.

‘You know, we all fall in love with her at the Academy.’

Tia angled herself away from Oculum, inspecting them from beneath her jet-black curls. She didn’t think she’d ever met this one. Although that didn’t mean much when navigators and mappers and medical staff came and went constantly through the time warps created in space travel. She may very well have met them in a different time. Surely, she would’ve remembered meeting someone so spectacular, although it might have been just the fact that they wore the same new exo-jacket as her, that made it seem like she knew them.

‘I don’t know what you’re talking about,’ said Tia.

Oculum laughed again, taking a moment to consider Tia, their blue iris circuits rotating lazily.

‘You’ll get over it, eventually. She’s a ghostborg, an embod.’

Tia scoffed. ‘She seems human to me.’

‘The façade of humanity is what gets us all into trouble,’ said Oculum.

The ship’s fins whirred into life and Tia’s heart jumped. Trillions of microbes in her new exo-jacket moved like a cold wave over her skin, drying the large patches of sweat forming under her armpits. She put her hand up to her chest and held onto the wai loaloa taonga, then closed her eyes and pictured her brave grandparents: Tua who had worked in the asteroid belt mines and Bubu with all the Academy enhancements implanted and grafted into her body from her time in deep space. The black stone warmed to her touch as Tia uttered a quiet karakia.

‘Here we go,’ said Oculum, a big smile spreading across their face.

Vibrating fins hummed throughout the ship. Tia braced herself against her hutch, gripping the hand rests and pushing her feet into the floor of the egg-shaped compartment, dreading the coming increase in g-forces. The powerful thrust of the ship’s tail pulsed along her spine as the countdown began. She took a deep breath, preparing herself to leave the bounds of Earth. She closed her eyes tight and concentrated on the rhythms around her—a trick she used to keep her adrenalin-fuelled tremble at bay—subtle changes in oxygen flow pumping into her hutch, her erratic breathing, the drubbing of the pectoral fins, the pulsing carapace floor.

When *Black Kiwi 3* finally lifted into the sky Tia gripped the hand rests. Oculum grinned at her as the tail propelled the ship into a vertical drive straight up into the sky. Tia had practised puffer ship launches so many times in Academy simulators. Lift-off drills always made her blood pump faster and harder than any other part of the simulator flights. But she wasn’t prepared for the overwhelming clench in her chest as the brilliant blue ball of Earth grew smaller and smaller in the blackness of space. A frightening darkness between the stars—the great vā—enveloped her, creeping slowly into her

consciousness, weakening her limbs, deflating her muscles. She battled against the nauseating tide sweeping over her until she sank into the night and passed out.



In her dreaming, she and Leilani swam under the sea without any breathing apparatus. They floated up to the surface and kept their heads submerged, peering into the clear blue water at a starfish undulating rapidly along the sand below. She didn't see the small shark glide in between them. A rough pressure grazed her arm like the bark of a coconut tree rubbing against her skin. Leilani screamed under the water; a honking burble carried by the waves. The shark brushed against Tia's arm again, cutting into her skin. Blood curled into the water around her. The shark circled and bit into her bleeding bicep. She turned to face the predator and stared straight into its eye; a gold ball-bearing eye with a piercing black-dot iris.

She lashed out with her feet and punched the shark hard in its monstrous gold eye. The shark released her, and she kicked herself away from it. All around her the sea turned red with her blood. Everything went dark and she came to under a weaver's tree in the middle of a village. She lay cushioned on a bed of pandanus mats, looking up past wavering green leaves into a blue sky. Her mother wiped her forehead with a rough cloth. The village weavers surrounded her, concerned, hovering. They crowded in, blocking the light, clamouring for her to wake up. She tried to breathe, flailing against them, pushing at their bodies. She heard their voices shouting at her.

'Wake up, wake up.'

'She's coming around.'

Tia opened her eyes. Turukawa stared back at her, a concerned look on her face, crouching down on one knee next to her seat and holding her hand. Oculum held her other hand and took her pulse, their face grim. The mappers and navigators leaned over

the backs of their seats, watching her. The guards had not moved. Turukawa helped Tia to sit up, told her safety harness to unlock, and asked her gravity boots to turn themselves on. Tia's iris circuitry whirled and clicked, trying to refocus.

'It's ok. You fainted during lift-off,' said Oculum.

Tia's head swivelled as she tried to focus on Turukawa. The ship's fins buzzed in the confined cabin space and the whirring of pumps sounded from somewhere in the walls. For a moment no one spoke.

'Are you able to walk?' asked Turukawa.

Tia rose unsteadily out of the chair, her head swimming a little, and took a few tentative steps. Turukawa helped her walk out of the cabin, clip-clopping on the carapace floor as her gravity boots held down each footfall. After a while she walked without Turukawa's help, leaning on the walls for support, determined not to faint again, even though her head reeled. She padded her hands along the walls following Turukawa down the cramped corridor, then climbing up a ladder, past the bridge, and into a room which smelled faintly of disinfectant.

A large round table filled the middle of the room and a narrow bed hung from the side of one wall. Tia shuffled onto a bench and took a glass of water from Turukawa. The embod leaned back against a wall, bowing her head slightly under the low roof, the claustrophobic confines much more pronounced than in the passenger cabin. Tia propped her elbows onto the table, fighting against dizziness, rubbing her temples, wanting more than anything to flop down onto the bed, but not wanting to show any more weakness. Elastic holders held a few books above the bed. A blue exo-blanket lay tidily folded on a mattress that looked hard and narrow. A food replicator lined another wall. The room was not much bigger than Tia's cell at the Academy and just as austere. Turukawa came away from the wall and stood close to the table. She

opened a communication channel to the rest of the ship. Tia entered the hive and listened.

‘Thank you all for your attention. I want to brief you on what’s going to happen next. We will be the lead ship in the search for the shuttle missing from *Toutouwai 5* and we will be the first rescue ship to arrive at the whirlpool. *Toutouwai 5*’s fins have malfunctioned. She’s standing by at the edge of the whirlpool. Two other rescue ships will arrive after us as support. We will reach the whirlpool in forty minutes and we’ll enter the whirlpool as soon as we get there,’ said Turukawa.

Tia’s heart rate rose. She travelled further into the hive glancing at the rest of the crew. Some sat with their faces in their hands, others stared or leaned back limply in their seats.

‘We’re going into the whirlpool?’ asked Oculum.

‘Yes, but we won’t be travelling in this ship. We’ll dock with the entry ship soon. Prepare for transfer in twenty minutes.’

‘Where is the entry ship?’ asked Tia.

‘You’ll be briefed on that when we arrive at the whirlpool. That’s all for now,’ said Turukawa, before melting into the wall.

As they travelled past the Moon, Tia turned off her gravity boots and gravity locks, her bodily tension releasing into the enveloping calm of zero gravity. She floated up to the roof, bobbing in the true weightlessness of space flight, revelling in the freedom, almost equal to the Academy simulators. She hadn’t accounted for the fact that buoyancy in the simulators never cut out the entire wave energy of the Earth. She realised now, in outer space, that she’d always taken for granted Earth’s almost imperceptible pull, had never appreciated that such a subtle difference would be gone in deep space where nothing ran to earth. The algorithms fizzed in her ears as her new exo-

jacket patches performed constant changes, trying to correct her loss of gravity, and bring her back down to the floor.

She found it simple—with continuous blinking of her right eye circuit—to override the exo-jacket's attempts at mimicking gravity. The exo-jacket continued its attempts to correct her flotation state. She kept overriding those corrections, enjoying the sensation of drifting and dipping in the compartment, spinning, and laughing too loud, as the details of her surroundings appeared and disappeared. With each successive rotation Tia struggled to breathe, the blood drained from her cheeks, and the churning surroundings confused her.

Turukawa reached up and grabbed Tia's wrist, trying to pull back her down to the deck. 'What are you doing? Turn on your gravity controls.'

Alarm lights flashed red and yellow above their heads.

'What's happening?' asked Tia.

'I've sounded the alert,' said Turukawa, checking the patches in her exo-jacket.

Tia finally activated her exo-jacket stabilisers and touched down on the floor, raising her hands to block out the unbearable glare of the emergency lights flooding the compartment.

'I detect a starboard rhythm,' said Tia. 'It's not from the Home Planets or Earth. Must be from the New Worlds.'

Turukawa seemed unperturbed at this strange occurrence, although she did merge into the wall. The alarms kept blaring and the lights fizzled into black-out. An internal alarm glowed red on the left arm of Tia's new exo-jacket. She watched as an unidentified object hauled into view off the starboard bow—an unusually arranged set of conjoined oblongs that resembled asteroids. Tia mapped the object in her array as long, thin, and tubular, like *Black Kiwi 3*. But, unlike *Black Kiwi 3*, several elegant

arches levered out into space from the side of the object, attaching to an ama, an outrigger, running parallel alongside the object. The entire vessel resembled a waqa drua, a war canoe. Tia stepped back, rapidly blinking as she tried to process what she saw. Turukawa appeared from the wall, materialising back into the compartment.

‘What is that alien ship off the starboard bow?’ asked Tia.

‘That is our ride into the whirlpool,’ said Turukawa.

The fins on *Black Kiwi 3* whined noisily. Tia jumped at the sound and leaned into the ship’s soft walls, something she’d found herself doing a lot lately. The walls soothed her.

‘It’s a waqa! How is it in space?’ asked Tia.

Turukawa’s iris circuits scrolled past multiple data feeds, ‘It has two rows of rotational fins on each side.’

‘What? Like paddlers?’ asked Tia.

The alien ship travelled within a group of floating asteroids, perfectly camouflaged to look like just another rocky object among all the other asteroids. Although, the conjoined ama did set it apart as different. Tia brought up the outline of the waqa in her mapping array, carved it out into a smaller hologram, and suspended it over the table. She inspected the alien object from all angles, turning the hologram over and up and down and around like a puzzle.

The object, twice the size of *Black Kiwi 3*, appeared to have no openings, no way to board, no doors or windows, no antennae, no heat signature. It did not look like a vessel that would hold people. It looked like a strange asteroid. It looked like a ghost ship.

Waqā drua

The fact that the alien ship resembled a traditional waqā seemed lost on everybody except Tia. She explained to Oculum that she regularly sailed the ocean on Earth in a waqā with an ama, and that it had a similar construction to the alien ship, although on a smaller scale. Tia brought up a picture of the kauri waqā in her mapping array to show Oculum the likeness between the two vessels.

‘What’s the link between them?’ asked Oculum.

‘I don’t know. The waqā is a perfect vessel for sailing the sea on Earth,’ said Tia.

‘But there’s a sail on your one and it needs the wind to move doesn’t it?’ asked Oculum.

‘Or pectoral fins,’ said Tia.

Tia carved out a holographic image of the kauri waqā and placed it beside the hologram of the alien vessel. As the images floated before her eyes she wondered if the aliens had ever visited Earth. Had they brought the waqā design to her ancestors or had her ancestors given the design to the aliens? Or was the space waqā’s resemblance to her kauri waqā just a coincidence?

Black Kiwi 3 came to a sudden halt in space, floating and buffeting in the turbulence of the solar winds bouncing back from the gravitational forces of nearby planets. Tia lost her balance and grabbed onto Oculum’s arm. Behind them Turukawa’s form detached from the wall. She seemed distracted, unable to look at anybody as she asked the crew and the guards to prepare for transfer into the alien ship. Tia sat in the passenger compartment with everyone else, strapped into her seat, boots strapped on, helmet clips locked, gloves snapped into her exo-jacket sleeves.

While she waited, she tapped a sleeve patch on her exo-jacket and plugged into the hive mind, searching for any information on the alien ship. Many walled-off areas existed in the hive—power conduits, administration, security. Turukawa had walled off a new area named *Pawta*. Tia tried to open the door to the *Pawta* file, but the program locked her out. She wondered if this area held the information about the alien ship. It seemed a logical conclusion to make since she did not find any information about the alien ship elsewhere in the hive. She tried another route into the locked file and encountered Turukawa's energy in the hive.

'Why is the file locked off?' she asked.

'Security reasons,' said Turukawa.

Tia had never tried to break into any of the restricted parts of the hive before. She didn't quite know how to carry out such an act and had never had any inclination to do violence to the hive. In her first recollection of entering the hive as a child, Turukawa had appeared to her as a monstrous being—part human and part robot. She wondered if the iteration of Turukawa on this ship had any organic parts. She directed a shot of wave sabre energy via her sleeve patches into the centre of the door at the entrance to the *Pawta* file. Nothing happened, although she thought she detected a trough in the hive energy. She tried again bombarding the door with wave sabre energy until she ran out of puff. The door remained resolutely shut, without even a dent in its veneer.

A sharp bang jolted portside on *Black Kiwi 3* as the alien ship came into dock. The conjoined ships fell silent for a moment in the vastness of space. Tia unlocked her seat restraints and stood with the rest of the crew, biting at her lips as she waited for the arrival of the captain from the alien vessel. Another clang reverberated throughout the hull, and another—someone or something kept knocking on the airlock door. The crew

did not speak as Turukawa carefully opened the hatch. The door swung open in a wide arc, whining on its hinges until it hit the hull.

A helmeted face peeked out from the circular steel aperture. Bending their tall frame and ducking their head, they stepped out of the airlock into *Black Kiwi 3*. They wore a black exo-battlesuit, Academy issue with bright red and orange captain's pips on the shoulder epaulettes. Behind them stood a person wearing a brown hooded robe gathered and tied about their body in complicated folds and draping that exposed muscled forearms. The ragged fabric hung off their shoulders, faded, ripped, and patched. They removed the hood from their head to reveal a round face with large black eyes, a broad nose and smooth black skin. The man—for he resembled a humanoid man now that he'd removed the hood—stood puffing, and swallowing, eyeing his surroundings. Tia watched the captain unlatch their helmet. She gulped as they pushed the helmet over their head and there stood Dani shaking out her black hair while they crew looked on.

'You've got to be kidding me,' Tia muttered under her breath.

'What?' whispered Oculum.

Tia shook her head. The strange man now standing beside Dani began to utter baffling sounds. All crew members switched to their translator patches, but he spoke too quietly. Turukawa and the crew snapped to attention and saluted Dani. She returned the salute.

'At ease,' said Dani.

The crew lowered their hands, shuffling their feet and glancing around uncomfortably, unable to meet Tia's gaze. She guessed most of them knew that Dani was her mother. Dani greeted Turukawa then turned to address the crew, standing with her legs planted, her hands clasped behind her back, her eyes scanning the room.

‘Hello everyone. My name is Captain Eddy. This is my navigator Sotrakkar from the planet Thrae. Most of you will not have heard of Thrae. I can tell you that Thrae is a planet like Earth on the other side of Tijen whirlpool. You will be transferring onto the Thraean ship. Its name is *Pawta*. Sotrakkar is going to help us navigate *Pawta* into the whirlpool to find our lost shuttle and to rescue my daughter, Leilani.’

Tia stood with her arms crossed firmly over her chest, staring at Dani as she spoke.

‘Are you ok,’ whispered Oculum, nudging Tia gently with their elbow.

‘I just can’t believe this,’ said Tia, a little too loud. Dani turned in her direction.

‘You may be wondering why you’ve never heard of the planet Thrae or *Pawta*, the ship you are about to board. The Academy has only recently discovered Thrae. We’re working closely with the Thraeans in a knowledge exchange. They know the whirlpools and have travelled in them many times. They have developed specialised ships like *Pawta* that are more capable and faster than our ships in that environment. The Thraeans have kindly agreed to help us in our rescue mission. This information is not common knowledge on Earth. So, please follow strict secrecy protocols and observe mission silence for this operation. The reason you are all here is because you are the Academy’s best navigators and mappers. I look forward to working with you. Any questions?’

Dani looked straight at Tia as if challenging her to speak. Tia bristled, her heartbeat quickened and pulsed in her temples. She wished there were rules prohibiting family from working together on any assignment in deep space. Why had the Academy allowed this to happen? She drew herself up to her full height, pushed back her shoulders and stared back at Dani, struggling to stop her mouth turning into the shape of a snarl. No one spoke.

‘Right. Let’s go,’ said Dani, turning and walking back into the hatch. Sotrakkar followed meekly behind her, dragging his feet, and looking back over his shoulder at Tia, his eyes shaded and dull.

‘Your last name is Eddy. Is the captain a relation of yours?’ asked Oculum.

‘My mother,’ said Tia.

Pawta

Tia followed behind Five Regiment guards stepping into the airlock. She wanted to stay as far away from Dani as possible. Thoughts rushed about in her head as she tried to figure out why Dani was aboard the alien ship. She ambled along at the end of the line torn between her desire to save Leilani and the intense heaviness in her gut. She didn't want to be on any ship with her mother. How did this happen? She wondered if it would be possible to get off the assignment and transfer to one of the support ships where she would still have a hand in Leilani's rescue but not be anywhere near Dani.

The sight of Turukawa detaching her body from the wall in the airlock interrupted Tia's thoughts. A large blood stain had seeped into the middle of Turukawa's exo-jacket at chest height. Tia took a step forward, zooming in with her iris circuitry to look at the blood. Millions of nanobots swarmed over the exo-fibres of the embod's exo-jacket, methodically consuming plasma, red and white blood cells, and platelets.

'What happened?' asked Tia, her voice shaky.

'You were very persistent with the file door,' said Turukawa, coughing and unsteady on her feet.

'The *Pawta* file? But you're an embod, a ghostborg. How is it possible?' asked Tia, reaching out to touch Turukawa.

'I can explain,' said Turukawa, collapsing to the floor.

Tia rushed to her side. 'You're hurt. I'll get Oculum.'

'There's no need. I'll be fine,' said Turukawa, sitting up uneasily.

'I did this to you. I'm so sorry,' said Tia, taking hold of Turukawa's arm to help her up.

Turukawa waved her away and stood up by herself. The blood had almost disappeared. Why hadn't anyone else noticed it oozing out of her exo-jacket?

'How is that a ghostborg robot can shed blood?' asked Tia.

Turukawa said nothing. Tia had so many questions, but the boarding party kept moving and the guards hurried them along. Dani strutted down the line and stopped when she saw Tia and Turukawa. She looked Turukawa up and down.

'What's wrong with you? Why is there blood on your exo-jacket?' asked Dani, peering at Turukawa and gingerly placing a finger to the bloody spot.

Turukawa looked down at the floor, silent. As Dani waited for an answer the blood on Turukawa's exo-jacket slowly disappeared.

'Ah, yes. You are the sentient embod. I've heard about your powers. You can exist away from the walls, can't you? I've heard that you are almost human,' said Dani, in a mocking tone.

Tia moved closer to Turukawa and glared at Dani. Dani looked from Turukawa to Tia, a smile spreading over her face until she began laughing. Tia's legs began to shake. She clenched her fists and took a step towards Dani, wanting to protect Turukawa. All eyes had turned to watch Turukawa speak. Her face had turned pale. She stood rooted to the spot, unable to move.

'I am a sentient iteration of the Grand Matrix, the first sentient iteration. I don't need the charge of walls,' said Turukawa.

'I see you've taken a shine to my daughter or is it you that has taken a shine to the embod?' asked Dani, tipping her chin in Tia's direction.

'I am here to help find Leilani, just like you and everybody else on this ship,' said Tia, casting her eyes towards the guards.

‘Of course. That is what we’re all here for,’ said Dani, turning and walking briskly out of the airlock, and disappearing into the alien ship.

In the green night mode of her eye circuitry Tia saw Oculum’s mouth fall open. The guards scuffed their feet and whispered to each other; their voices shaky with disbelief. Tia had never heard of any iteration of Turukawa moving more than a few metres away from the walls in which they lived—either on an Academy ship or in any Academy buildings. To think that Turukawa could leave *Black Kiwi 3* seemed impossible. Tia moved closer to Turukawa to see if there might be a malfunction in her ghostborg iris circuitry. Turukawa flinched and moved her head back, a decidedly human reaction that Tia did not expect from an embod. Tia’s face reddened.

‘What does she mean? How are you able to move away from the power conduits on *Black Kiwi 3*? Don’t you need to stay close to them to keep your circuits running?’ asked Tia.

‘No, I don’t,’ answered Turukawa, fidgeting with the exo-patches on her sleeve.

‘Have you extended your range of connection with the wall?’ asked Tia.

‘Not really,’ said Turukawa.

‘Then how can you leave *Black Kiwi 3*?’ asked Oculum.

‘I have... evolved,’ said Turukawa, pushing past Tia and walking briskly into the airlock.

A flurry of questions erupted from Tia. Turukawa patiently answered them all. Yes, the Academy knew she had achieved sentience and had already begun to investigate the advantages of her newfound condition. No, she would not revert to a fully robotic state, although she had kept all her many ghostborg enhancements. She remained in the hive and would continue to live in the spaces between walls, sometimes only millimetres thick. She had not lost her ability to merge into walls, as she had kept

the power of molecular disintegration and it did not interfere with her organic structures. The discussion eventually turned away from Turukawa, the subject exhausted for the time being. Tia wanted to know so much more but Turukawa had slowly steered the conversation towards an examination of their novel situation on *Pawta*.

Tia followed behind Turukawa in a daze. When she exited the airlock and boarded the alien ship, a feeling of awe quickly replaced her surprise at the change in Turukawa. The interior of the ship became clearer to Tia as her eye circuitry adjusted to the dim light. Walls appeared out of the darkness, made from a golden stone-like material that curved low over her head. She ran her hand lightly along the textured surfaces, flinching at the warmth emanating out of them, as if she'd touched a sleeping animal. She cast her eyes around the room, amazed at the thought of standing in a vessel made by beings from beyond the stars. She wondered how they had created the ship, how they had built the walls, pockmarked with irregularly scalloped indentations as though carved with handheld chisels. The room vibrated with a low-pitched hum that reminded Tia of the hum in her uncles' home. All around her she spotted shadowy entrances that curved into dark green passageways.

The crew packed into the cave-like room, filling the small area. Tia scanned the faces of the people around her, searching for Dani. Oculum stood next to her, craning their neck to see over the turbaned heads of the guards.

'Where's Captain Eddy?' asked Tia, stepping into the green haze of a nearby passage.

'Strange that she's not here to greet us. She can't be far away,' said Oculum, following behind Tia.

The dark corridor curved in a wide semicircle, the walls arching above Tia's head. She ambled into the green light thankful that she'd closed her helmet, a stream of

oxygen feeding into her face. She walked hesitantly along the walkway that stretched on and on, seeming to lengthen, endlessly winding and dipping. She heard Oculum behind her and came to a stop. Leaning against a wall, she examined the dim corridor stretching on forever into the darkness. Oculum finally caught up to her.

‘Isn’t this ship a marvel,’ said Oculum, gazing up at the vaulted ceiling.

‘It’s incredible,’ said Tia, taking a deep inhale of the oxygen streaming into her helmet.

Oculum leaned against the wall next to her. The wall undulated and part of it dislodged, elongating into the shape of an arm, curling over Tia’s shoulder, and moving snakelike around Oculum’s chest. At first Tia didn’t notice it, although she did register her breathing had become calm and even. Oculum yelped and tried to wrench the appendage off their body. Tia saw the arm, then, extending from the wall, a sort of tentacle—grey and smooth and pointed like an octopus tentacle without sucker pads. She flinched away from it. Oculum hacked at the arm, karate chopping it with the sides of their hands. When that didn’t move the limb, Oculum blasted it with a short burst of electricity from their wave sabre. A scream resonated throughout the passageway and the tentacle retracted back into the wall. Tia grabbed hold of Oculum’s hand, and they ran down the passage trying to get away from the screaming.

Tia heard footsteps closing in behind her and turned to see Sotrakkar shouting at them to stop. The faster she ran along the tunnelled passageway, the closer Sotrakkar came. As they rounded a corner, Tia and Oculum stopped abruptly before Sotrakkar who now stood firm in the middle of the dim corridor.

‘How did you do that?’ asked Oculum, astounded. Sotrakkar had been running behind them and now he had somehow appeared in front of them, barring their way forward.

‘Quickly, before the guards come. I’m not supposed to be here,’ said Sotrakkar. His face was an angry mask and his head dipped as though unable to look them in the eye.

‘The wall attacked us,’ said Oculum, weakly pointing in the direction from which they’d come.

‘*Pawta* is alive. It only wanted to help you,’ said Sotrakkar, peering up at Tia from within his hunched shoulders, his face indignant.

He huddled into the wall and seemed to be talking into the grey indentations. Tia tuned her translator to the sounds coming from Sotrakkar. He spoke in a mollifying tone to the wall, as though comforting a hurt child, telling it ‘they meant no harm’ and ‘they didn’t know what they were doing.’ He raised his voice a little into a low chant and lifted his head to look at Tia and Oculum.

‘It wants to know your names.’

Tia and Oculum looked to each other and shrugged.

‘I’m Oculum and this is Tia.’

‘It says thank you. Can I ask where you were going?’

‘I was just looking for Captain Eddy,’ said Tia.

Sotrakkar shrank away from them at the mention of Dani’s name. Tia moved towards him and he withdrew from her advance, dragging his robes along the floor, and turning his body to the wall as if for protection.

‘What is your job here?’ asked Tia, sensing an ally.

Sotrakkar squared his shoulders and stood taller, unfurling his hunched body, and lifting his head out of what seemed like habitual subservience.

‘I am a Thraean navigator.’

Sotrakkar hung his head once more, rearranging his robes and retreating from Tia as if expecting some retaliation for what he'd just said. He moved close to the ship's walls as the sound of running footsteps approached. Tia jumped when a guard came running around the corner. The guard looked at her and Oculum and grabbed Sotrakkar's arms. He struggled to free himself.

'Captain Eddy is my mother. Let him go,' said Tia, trying to speak with authority.

The guard did look a little confused for a moment and then scoffed at her.

'Come with me,' he said, and dragged Sotrakkar away.

Tia and Oculum followed behind the guard who held Sotrakkar, yanking at his arm. Sotrakkar had become silent in the guard's grip and no longer resisted.

'Where are you taking him?' asked Tia.

'To your mother,' said the guard, sarcastically.

Holograph

The whirlpool spun within a vast holographic globe suspended in the middle of a cavernous room, the height of a ten-story building. Streaks of pink and yellow light burst throughout the globe at intermittent intervals. The globe drained into a funnel shape that gave the impression of emptying into the floor. Dani flew weightless in the upper hemisphere of the hologram. She spoke to a guard hovering at her side who took instructions and measurements from her and tapped them into a sleeve patch on his arm. His dark face shone with sweat as he kicked his legs trying to keep up with Dani's frantic zero gravity movements.

Tia and Oculum followed behind the guard who held Sotrakkar, walking him in a circle beneath the hologram. They craned their necks looking up to inspect the entirety of the moving globe. The hologram was many times bigger than the one Tia had seen in the tower. It seemed a million years ago now that Turukawa had shown her the hologram in the sky tower and yet it had been only a few days in Earth time. A wave of fatigue swept over Tia as she realised that she hadn't slept in a long while. A sour taste rose into her mouth watching Dani floating above her.

'This room is huge,' said Tia.

'*Pawta* can rearrange herself to accommodate any shape you ask for. The tunnel you walked into before, it would have gone on forever because that is what you asked for,' said Sotrakkar.

'I didn't ask for anything,' said Tia.

'Maybe not outwardly. But it heard you nonetheless,' said Sotrakkar, dipping his head and pulling the hood of his robe to cover his face.

'I can ask the ship for stuff, and it will give it to me?' asked Tia.

‘If it thinks you need it,’ said Sotrakkar.

‘Quiet. Wait here,’ said the guard, pushing Sotrakkar against the wall.

Tia watched as the guard turned off his gravity controls and launched himself into the hologram towards Dani. She gazed up at her mother, suspended high above her, torn between wishing Dani would halt everything and hug her like a normal mother, and wanting to demand answers from her about the Thraeans and Sotrakkar.

‘I’m going to speak with my mother,’ said Tia, her throat drying out as her breath rasped in and out of her mouth.

She commanded the gravity controls in her boots to switch off, bent her knees into a deep squat like the guard had done, and jumped into the air towards the opposite side of the globe where Dani floated with her assistant.

‘Hey, what are you doing?’ asked Oculum trying to grab at Tia’s legs as she drifted upward.

Tia ducked away from Oculum’s grasp, kicking and swimming inside the hologram towards Dani. Oculum stayed on the floor; one hand clamped over their mouth as they watched Tia float up inside the holographic globe. Tia looked down on Oculum’s concerned face and the top of Sotrakkar’s hooded form, standing to one side of Oculum, his face obscured. She moved further into the hologram in the direction of Dani and her assistant, floating at the other side of the globe, engrossed in taking readings from the whirlpool. The guard who had brought them into the room reached Dani and began talking and pointing down at Sotrakkar. Dani looked up from the tiny lakescreen in her hands, a fleeting look of apprehension crossing her face when she saw Tia floating towards her, and then her face resumed its normal half smile, the smug look that Tia despised. Tia kicked into the hologram’s zero gravity and popped out next to her mother.

‘Tia? What are you doing here? Why aren’t you with the rest of the crew?’

‘I was just looking around. How is it that you’re in charge of this ship?’ asked Tia, her voice shaking.

Dani turned towards Tia, her eyes narrowing as she bobbed in the air. She leaned her head to one side and examined Tia’s face. The two guards looked at each other, floating silently.

‘The Academy has laid the foundation for an Earth outpost on Thrae. It is proving to be the most valuable acquisition the Academy has ever made.’

‘What do you mean, acquisition? Finding the Thraeans is first contact isn’t it? There are strict protocols for first contact,’ said Tia.

‘We’ve followed first contact protocols. The Academy has been negotiating with the Thraeans for several years,’ said Dani.

‘And where is the crew of this ship?’ asked Tia.

‘That was... unfortunate,’ said Dani, her gaze not shifting from Tia’s face.

‘What did you do?’ asked Tia, her voice rising in volume.

‘Tia, calm yourself. You have no idea what is required in these matters.’

‘No.’ Tia stared at Dani and collapsed into the zero-gravity, grateful that it held her weight.

Dani smiled even more broadly. ‘Well, you’re here now. We’re about to enter the whirlpool and you my dear are part of this crew whether you like it or not,’ said Dani, turning to speak to the guards.

The heat rose into Tia’s cheeks as she thought of Sotrakkar and wondered what had happened on the ship. Dani’s past lakescreen discussions about her nebulous work commitments began to congeal in Tia’s mind into a monstrous picture. She became acutely aware of Dani’s proximity; the carotid pulse of her vulnerable neck, the wiry yet

snappable wrists. Calculating the short distance between her and Dani, Tia battled with an impulse to fly at her mother, knowing the guards would kill her first or at least wound her badly if she tried. She struggled to settle herself, slowing her breathing into a deep rhythmic inhale and exhale. Dani continued speaking to the guards as though Tia didn't exist.

'What are we really doing here? This is not an Academy ship,' said Tia.

Dani turned away from the guards and let her eyes wander over the swirling colours of the hologram—pink, yellow and white.

'We're lucky to have our friends the Thraeans,' said Dani.

'*Friends?*' said Tia, scoffing at Dani.

'Work with me and Sotrakkar. He's an experienced Thraean navigator. You can team up as a unit, navigator, and pilot. He knows these whirlpools.'

A crawling sensation slithered over Tia's skin. She looked down through the hologram at the small figures of Oculum and Sotrakkar on the ground below. She would work with Sotrakkar alright, although not in the way Dani would want.

'Where are they?' shouted Tia, straining the muscles in her neck.

Dani turned on Tia and grabbed her arms. Tia cried out in pain, holding herself rigid while Dani stared into her eyes.

'You are an Academy cadet and you will show respect to me as the Captain of this ship. Don't expect any special treatment just because you're my daughter.'

The ball of heat roiling in the pit of Tia's stomach erupted into her chest.

'You've never given me anything,' she yelled, small flecks of spit hitting Dani in the face.

Dani pushed Tia away and wiped her pale cheeks with the back of her sleeve. No longer able to look at Tia, she turned her attention to the guard who had brought Tia and Oculum and Sotrakkar into the room.

‘Take her to the deck and escort all three of them to the prep room.’

‘I’m here for Leilani. Why are you here?’ asked Tia.

Dani ignored the question and flicked her head at the guard to get a move on. The guard floated over to Tia, grabbed her arm, and propelled her towards the floor. She looked back at Dani as the guard hauled her down through the centre of the hologram. But Dani had flown to the other side of the whirlpool and now continued to take measurements, reciting a velocity reading to her assistant. He tapped a sequence into his arm patch and glanced down at Tia.

She struggled to free herself from the guard, but he had a firm grip on her, forming new bruises next to the ones her mother had made in the soft flesh of her upper arms. Tia wanted to grab the guard’s black turban and wrench it off his sweaty skull. When they reached the deck, he overrode Tia’s gravity controls and threw her to the ground at Sotrakkar’s feet.

‘Hey, take it easy,’ said Oculum, rushing to Tia’s aid.

Sotrakkar and Oculum helped her up, not taking their eyes off the guard. He ordered them to move and ushered them out the door of the huge room. Tia looked back over her shoulder at the holographic whirlpool. As the guard pushed her forward, she caught a fleeting glimpse of her mother high up in the currents moving past the entrance to a side tunnel.

Sotrakkar

Tia and Oculum sat with Turukawa at the back of the prep room taking in their surroundings on *Pawta*. On the table in front of them lay the remains of several parcels of replicator food. Tia had abandoned her meal. It tasted like ash in her mouth. She took a sip of orange liquid from a steel cup to get rid of the taste. But the liquid tasted worse than the food. She spat it back into the cup and wiped her mouth with the back of her hand. Navigators and mappers from *Black Kiwi 3* lounged on chairs at nearby tables talking and laughing and eating, the awful tasting food didn't seem to bother them. Tia cast her eyes warily over the Indian Regiment guards in their red and black exo-battlesuits and black turbans sitting primed and alert at tables all around the room, silently watching everything. She didn't trust them.

She'd volunteered for this rescue mission and now it threatened to completely take her away from Earth. Her true destiny lay in what she had agreed to do for the UN; mapping the Pacific trenches, the ocean currents, the animal trails—real work that counted towards actual recovery. The UN had actively recruited her for the only mapping position in the Pacific Ocean. Who or what would they put in place to cover her work if she did not return? She had no way of knowing how long it would take to get back to Earth or even if she could return.

The ancient UN organisation had become the only workable alternative to a life in service to the Academy. She'd just begun to understand its convoluted workings, the endless meetings. Although, the head woman had been kind enough to allow her to come away—for her sister—a concession she doubted the Academy would have allowed.

Turukawa, the sentient ghostborg had upended all her plans. In her mind anyway, and in her heart. All her life she had known of Turukawa's power, lived with her inside the hive mind. She had always marvelled at the phenomenal capacity, and revolutionary capabilities of the ghostborgs, the way their existence had changed life on Earth, holding every conceivable piece of data ever written or recorded by humans, synthesising it at will, applying it to every situation to come up with solutions for so many problems. They walked through walls for god's sake. And yet, for all their loyalty and trustworthiness the Academy used them like slaves and servants. She had always admired them as robotic entities, their purity.

'When do you think we'll get going?' asked Tia, eyeing Turukawa warily.

'We're waiting for orders from Captain Eddy,' said Turukawa.

Tia looked away, sickened at the thought of what Dani must have done to the Thraean crew. She thought Dani must have killed them. But she didn't want to believe it.

'What is really going on?' asked Tia, lowering her voice to a whisper so the nearby mappers and the guards would not hear.

'Your mother is mapping a safe entry point into the whirlpool,' said Turukawa.

'The Thraean,' said Tia, pointing with her eyes towards Sotrakkar and placing her hands onto the table.

'What about him?' asked Turukawa.

'He's frightened.'

Tia's voice cracked. She hung her head to regain her composure. When she looked up, Turukawa was staring at her. The embod knew everything about the Academy.

‘This is a first contact situation. Did the Academy go through all the protocols, all the days and weeks of procedures?’ asked Tia, staring back at Turukawa.

‘Why hasn’t the Academy publicised the discovery of Planet Thrae or the Thraeans?’ asked Oculum, looking from Tia to Turukawa.

‘And why is Dani in charge and not Sotrakkar, a Thraean Captain?’ asked Tia.

‘You trust the Thraean?’ asked Turukawa.

‘I don’t know,’ said Tia.

Oculum tossed their long red hair and scratched their beard.

‘As a Matifon, I know how oppressive the Academy agenda can be towards those of us who are different.’

‘Let’s talk to him,’ said Tia, getting up from the table and motioning with her head for Oculum to join her.

‘Captain Eddy is coming,’ said Turukawa.

Tia’s eyes darted to the entrance. The guards rose from their seats as one and saluted when Dani walked in. Dani strutted about the room, keeping one hand on the wave sabre strapped to her thigh. She pulled up at the sight of Sotrakkar, glared at him and then turned to speak to one of the guards. Tia swayed slightly on her feet. She wished she’d stayed on Earth in blissful ignorance. Sotrakkar flinched as Dani approached him. He pulled his robes tight around his body. Dani said something to him in Thraean, but she spoke quietly, and Tia’s translator patches struggled to decipher the strange clicking sounds of the Thraean language. Sotrakkar replied, his face ashen.

‘No, I won’t do it,’ he said.

Dani signalled to the guards. Tia watched dumbfounded as two guards grabbed hold of Sotrakkar and tried to drag him out of the room. Sotrakkar resisted and struggled to free himself.

‘Let me go,’ yelled Sotrakkar.

He tussled with the guards and managed to break away, his robes tearing as he fought them off. Two guards pounced on him and held him down. Another guard came forward and thrashed at his back and head with a baton. The sight of the guard hitting Sotrakkar broke Tia out of her spell. She ran at the guards, pushing and punching, and kicking them, shielding Sotrakkar with her body.

‘Leave him alone,’ she yelled.

Oculum stood up and moved towards Tia and Sotrakkar. Turukawa grabbed at their arm.

‘Don’t do it,’ said Turukawa.

Oculum frowned at Turukawa, yanked their arm back, ran at one of the guards and pushed him away from Tia and Sotrakkar. The guards turned on Oculum, who backed away, holding their arms out. Tia’s thoughts scrambled. She helped Sotrakkar to his feet and they both sheltered behind Oculum’s sizeable frame. Her heart pounded as she watched the guards come towards them one by one, throwing punches at Oculum. A few punches landed on Oculum’s face and torso, but Oculum ducked and came up fighting. They decked two of the guards and held the rest at bay. Tia had taken her eyes off Dani during the scuffle and now saw her stepping towards Oculum, her wave sabre raised.

‘Look out,’ yelled Tia.

But it was too late. A pulse of energy shot out of Dani’s weapon and hit Oculum in the leg. Oculum grunted and staggered back onto Tia and Sotrakkar and they all fell to the ground in a heap. The weight of Oculum landing on her knocked the air out of Tia’s lungs and she gasped for breath. Oculum sat up stunned, wiping blood from their red beard as it trickled from a mouth wound. Two guards seized Tia’s arms and pulled

her to her feet. She groaned in pain. Oculum struggled to get free of the two bulky guards holding onto their arms, to no avail. Two more guards wrenched at Sotrakkar who tried to wrestle himself out of their grip.

‘What are you doing?’ asked Tia, turning to Dani, her eyes welling with tears as she strained against the guards holding her arms.

The room fell silent except for the sounds of people puffing and shuffling their feet. Dani turned to the gathered throng, her eyes flicking from one person to the next. She laughed out loud. Tia recoiled at the sound of Dani’s maniacal voice, a bewildered look on her face as she wondered who this person was. Dani certainly didn’t act like the mother she thought she knew.

‘Take them all to the brig. Keep Sotrakkar separate from them,’ said Dani, eyeing Tia and Oculum.

Tia looked towards Turukawa, her eye circuitry spinning as the guards marched her out of the prep room. She calmed herself sufficiently to feel the familiar fizz at the edges of her limbs as she entered the hive. She searched the currents in the hive until she found the ghostborg signature. When she located Turukawa she said nothing, just stared at her.

The Brig

Pawta's brig stretched into an endless cave-like corridor, an illusion of freedom that carried the eye to an infinity vanishing point. Oculum strolled into the centre of the eternal darkness, their figure becoming smaller and smaller, while at the entrance to the cell Tia and Sotrakkar paced in front of a miasmic barrier to actual freedom and quietly plotted their escape. The guards had placed them all into separate cells. But somehow Sotrakkar had removed the cell walls without the guards knowing. Out of earshot of the guards on the other side of the entrance, Tia quizzed Sotrakkar on his knowledge of *Pawta*'s malleable walls. She pointed at Oculum and began walking into the centre of the room.

‘How is he doing that?’ asked Tia.

‘It’s an illusion,’ said Sotrakkar.

‘Is this how *Pawta* responds to our wish for freedom?’ asked Tia.

‘Yes. This is how the brig works. People conjure all sorts of escape fantasies in their minds, and *Pawta* is able to manifest them.’

‘It’s incredible,’ said Tia, gazing at the sight of the trees Oculum had imagined into being.

She had reached a state of thankfulness that the cave, as Oculum had nicknamed it, allowed them to defray the boredom of imprisonment using the force of their imaginations. The chaos of her thoughts had caused mayhem when the guards had first thrown her into the brig. The walls had jumped in frightening troughs and peaks as though they had trapped an invisible boxer inside their surfaces who was punching to get out. The close confines of the brig opened out once Sotrakkar had removed the barriers between them and he taught Tia and Oculum how to exert their creativity.

When their thoughts had settled down, so too did the movement of the walls. They soon came to realise that *Pawta* would respond to their varying mental and psychological states and supply a safe place for each of them in their confinement. Thus, Oculum had found an imagined privacy in a leisurely walk along an endless tree-lined avenue that disappeared into the distance, although a completely illusory experience.

Tia had imagined herself into a geodesic room on Mars. A dark red light shrouded the room to the point of darkness. On the other side of the room a Grom woman worked at a counter preparing food. The woman wore Grom robes, red material that blended into the light so that she receded like everything else in the room. Someone moved in the darkness beyond the woman. Tia squinted into the gloom trying to see more clearly but couldn't make out the features of the other person. The Grom woman moved closer to the door. Her wrinkled face showed no emotion. Locks of long white hair curved out from under the hood of her robe, framing her heavily lined forehead and cheeks and coming to rest on her shoulders. She looked like Gromtarg. Tia guessed that she had imagined Gromtarg's mother, her grandmother. Out of the darkness another person appeared in the room and sat next to the Grom woman. As they sat down Tia saw their face, Gromtarg. Or at least Tia's imagined version of Gromtarg. His face was flawless like a doll, his black hair shinier, and longer than the real version.

When Tia grew tired of her imagined life on Mars the image disintegrated before her eyes. She peered at the guards keeping watch on her through the miasmic doorway, a foul-smelling barrier at the entrance to the cell that resembled a miniature asteroid belt, a floating latticework gate, as impenetrable as any prison door. When she pushed the hanging door it disappeared; the vanishing itself another completely imaginary state. She tried to walk out of what looked like an opening, but the miasma appeared once

more in full olfactory assault, pliable film bouncing her back into the brig and barring her from leaving.

Sotrakkar watched Tia and Oculum conjuring their imaginary worlds with a mixture of loud snorts and bursts of laughter as he leaned against a wall that morphed every now and then into a ledge of soft foam, conforming perfectly to the contours of his body. After several hours they had all returned to mill about within the original cave dimensions, with its circular pod shape and dark stone surfaces. They sat arrayed about the brig in variously imagined seating configurations, and differing attitudes of boredom, aware from the shaking of the hull that *Pawta* had set sail, no doubt on its way towards finding the best entrance into the whirlpool.

Oculum sat in an armchair they had imagined out of the back wall, positioned between Tia and Sotrakkar, a kind of referee of the atmosphere. Tia stared at Oculum's perfectly proportioned profile as they tinkered with a sleeve patch on their arm, idly pinging messages out into space. She wondered how much beauty enhancement they had received; every feature of their face was impeccably symmetrical. Sotrakkar sat cross-legged on a flat shelf, meditating. Whenever the ship jolted, he opened his eyes and turned his flinty gaze in the direction of Tia and Oculum, stared at them until the whirlpool disturbance passed and then sank back into a contemplative state. Tia sat perched on a stone kitchen stool she had imagined into being, similar in dimension to the ones in Bubu's kitchen, only higher, giving her a good position from which to see everything and the ability to spring into action quickly if necessary, while also allowing her to rest.

The kitchen stool finally gave way to Tia's fatigue and changed into a soft white bed where she dozed intermittently. She woke to a juddering movement, the ship bouncing in a patch of turbulence. Sitting up bleary eyed, she wondered how long Dani

would keep them incarcerated while the ship pitched through space. She walked over to sit with Sotrakkar who had moved to a table, and now sat picking at replicator food.

Oculum walked out of the trees and sat with them, a smile on their face.

‘I know this is a brig, but it’s amazing,’ said Oculum.

‘Last time she put me in here I was with my crew,’ said Sotrakkar, shaking his head.

‘What happened to them? I asked my mother. But she wouldn’t tell me,’ said Tia.

‘Well, I’m not surprised,’ said Sotrakkar, dipping his head.

‘Why is *Pawta* cooperating with Dani?’ asked Oculum.

‘Dani beat me, tortured me. I’m ashamed to say I gave in and handed over the control codes for the helm,’ said Sotrakkar, hanging his head and inspecting his hands.

‘What did Dani ask you back there?’ asked Oculum.

‘She asked for more control codes. I refused to tell her. Hopefully, I don’t have to put up with the beatings anymore,’ said Sotrakkar, so offhandedly that Tia didn’t at first grasp what he had said.

His words crackled through the translator patch on Tia’s sleeve. She held her breath in the tiny delays that happened between Sotrakkar talking and the translation feeding into her earpiece. The thought of Dani hitting Sotrakkar conjured such a jarring image in her mind, so far from the image of her mother that she’d carefully built up in her memory and held onto since she was a child. It seemed to Tia as if something inside her had crumbled. But then why was she so shocked by these revelations? She had never lived with Dani, had never really known her at all.

‘Do you mind if I ask you how Dani came to be in control of this ship?’ asked Tia.

Sotrakkar pulled at his robes in characteristically protective fashion and turned his head away from Tia who watched him expectantly. His bottom lip quivered as he began to speak.

‘They travelled through the whirlpool and landed on Thrae, Captain Eddy and the Earth ship. She told us she wanted to talk, peacefully. We welcomed your people, fed them, put on a celebration for them. Captain Eddy told us that Earth wanted to take our dirt. But our dirt has great spiritual importance to us.’

Tia’s translator patch struggled to translate the Thraean word for *exo-ore*, which came out sometimes as ‘dirt’ and sometimes as ‘core’. She guessed that the patches had to make an approximation at meaning and there would be no perfect way to translate every Thraean word, especially a word that carried such great significance for them.

Turning to Tia with a heavy sigh, Sotrakkar continued his story. ‘Our leaders would not agree to trade dirt. There is nothing you have that we want. There is nothing so important that we would trade it for dirt. Your mother asked us lots of questions, about our technology, our ships. After years of talks your people grew tired of us. Our leaders would not agree to Captain Eddy’s demands. She grew incredibly angry. She took her people and they stole one of our ships and flew off the planet. We had shown her how to fly our technology in good faith and she stole from us. We tracked her in our systems. Our leaders sent me out in *Pawta* to get our ship back. But Dani came after us and attacked us. We fled into the whirlpool. Dani followed us and ...’ Sotrakkar’s voice caught in his throat.

As Tia listened to Sotrakkar’s translated words coming out of the translator patches into her earpiece, and realised the import of what he said, she became acutely aware of her lungs flaring, her chest expanding and deflating. Spots floated across her eyes like a colony of ants marching over her iris circuitry. She blinked rapidly trying to

get rid of them. She felt the blood drain from her face. She kept thinking the translator must have malfunctioned.

‘No. What?’ stammered Tia.

Sotrakkar said nothing for a while and then he began speaking again.

‘She chased us into your galaxy. There were other Earth ships there when we exited at the top of the whirlpool. They surrounded us and your mother boarded our ship. We fought. We tried to escape into the passages, but Dani opened fire on my crew before they could escape. She shot them in the back as they ran. Some of us escaped. She found us.’

Sotrakkar stopped speaking. His chin dropped to his chest. Tia sat silent, her face paralysed, holding her breath. Sotrakkar raised his head, his hands shaking. Tia’s heart sank into her stomach as she listened to him.

‘She told me the only reason she spared my life is because I am the Captain and she needed me to get her back into the whirlpool. By the time her crew had rampaged all over the ship, there were none of my people left alive, except for me and one of the healers. *Pawta* had also sustained injuries from all the shooting. It couldn’t move while it repaired all the damage. The healer managed to restore *Pawta*’s ability to recharge, but it took a long time and we were left floating in space, waiting for her get back to full power.’

‘What happened to the healer?’ asked Tia, her hands shaking.

‘She took her own life. She couldn’t bear to live under your mother’s authority,’ said Sotrakkar, his voice deadpan.

‘Please don’t associate me with that woman,’ she said, her voice trembling.

‘Where are they now? Your crew,’ asked Oculum.

‘In the hold. I must get them back to my home planet. Their loved ones will want to bury them with the proper ceremony,’ said Sotrakkar.

His lips trembled. He pressed them together. Tia swallowed repeatedly, trying to absorb what Sotrakkar had said. Blood rising and burning across her cheeks. She stuttered and stammered, growing more frustrated as the words refused to come. Panicked thoughts raced through her mind. The shame and embarrassment over what her mother had done overcame her and mutated into rage. How dare she ruin everything with her crazy behaviour, thought Tia.

Tia wanted to scream. Who was Dani? She didn’t know her mother at all or the true nature of the Academy or all her own life.

‘Well, that’s our plan then. We’ll get out of here and re-take control of the helm,’ said Tia, slapping her thighs.

A fizz of energy flowed into Tia from somewhere on the other side of the floating lattice entrance. She squinted between the gaps of the asteroid-like column, her iris circuitry scanning the darkness. A shadow moved about in the gloomy hall beyond. Tia jumped when a face appeared out of the murk. Turukawa stared back at her, pressing her nose up against the pebbly gaps, the lattice now devoid of any smell. Tia swung her legs around and ran to the latticework door, grabbing onto the small rocks embedded in the floating web, her fingers disappearing into the holes between them.

She didn’t know why she was glad to see the embod. She tensed her mouth, stopping a slow smile that threatened to spread across her face.

‘How are you?’ asked Turukawa.

Tia watched the guard moving behind Turukawa. For some unknown reason he had taken his wave sabre out of its holster and stood holding it at the ready as if expecting something to happen.

‘I’m Ok. When will she release us?’ asked Tia, her voice measured, not wanting to cause any alarm in the guard.

‘Don’t know. Captain Eddy’s got her hands full steering the ship,’ said Turukawa.

‘You know she murdered the Thraean crew of this ship, she kidnapped Sotrakkar, the Captain, and she tortured him,’ said Tia, gesturing to Sotrakkar who raised an eyebrow.

Turukawa stared straight at her, a pained expression noticeable around her eyes and mouth.

‘Of course, you knew,’ said Tia, her voice emotionless.

‘I don’t feel good about it. Dani’s off mission,’ said Turukawa.

Tia looked to the floor. Why was she so blind and stupid? Turukawa was the Grand Matrix. Was her mysterious sentience activating a conscience? Yes, it did seem that Dani had gone rogue. But, had she though? The Academy knew all about *Pawta*, and Dani worked in the special ops team. She followed Academy orders, didn’t she? This colonisation of Thrae must be Academy sanctioned. They certainly wanted the exo-ore, the whole Earth ran on it. This was why Tia didn’t want to work for the Academy. The Water Wars had flowed directly from the Academy trying to save Earth from centuries of fighting over scant resources. To repeat the old ways, to inflict the old structures and institutions on another planet would be a crime. The people in the upper echelons of the Academy hadn’t changed, they had conveniently silenced any mention of the Water Wars and continued with their greedy crusades for exo-ore. The all-purpose substance had given them the technology to make Turukawa, and the revolution that ensued had supplied everyone with access to everything they needed.

Tia decided to exploit her connection with Turukawa. Dani had to answer for her dreadful actions. Turukawa leaned forward, her shoulders slumped.

‘What about *Pawta*? Can you give me access to the secret files?’ asked Tia.

‘I can’t open the file while we’re out of range of the hive connection with Earth.’

Tia found herself not believing Turukawa. Afterall, the files were within her. She didn’t need to access the Earth hive.

‘Do you know what’s in the files?’ asked Tia.

Turukawa shifted uneasily and took a deep breath.

‘I have no authority to release that information,’ said Turukawa.

Tia didn’t need to see the file to know that the Academy had evil designs on *Pawta*, and all the exo-ore inside Tijen, and the resources on Planet Thrae.

The ship lurched, throwing Turukawa against the guard who fell to the deck and lost hold of his wave sabre. It skidded across the smooth floor and hit the miasmic barrier. Tia saw the curved muzzle of the weapon poking through a gap at the bottom of the barrier. She swooped on it, pulled it through the crack, and shoved it into her exo-jacket. The guard sat up, momentarily stunned. He swivelled around frantically searching for his wave sabre. Turukawa helped him to his feet. Tia held onto the rocky door as it swung in the turbulence. Oculum appeared at her side and bowed their head to the Grand Matrix.

‘Alright?’ asked Turukawa, addressing the guard.

‘Dropped my weapon,’ he said, his ears turning red.

‘Must be around here somewhere. Can’t see it. Did it roll down the passage?’ asked Turukawa.

The guard hesitated, then ran off down the hallway.

‘I’d better get back up to the bridge. Just wanted to check on you. The Captain wants you up there soon in the navigation seat. I’ll come back down and get you when she’s ready,’ said Turukawa.

Tia nodded and held her hand up in a weak wave at Turukawa as she turned and left. She waited a while to make sure the embod was gone. She motioned to Oculum and Sotrakkar who both stood near the back wall. They ambled over to her. Oculum frowned as he approached her and Sotrakkar followed, squinting at Tia.

‘Hurry, we don’t have much time,’ said Tia.

‘What are you talking about?’ asked Oculum.

Tia turned away from the barrier and produced the wave sabre from inside her exo-jacket. Oculum stepped back, their eyes widening at the sight of the weapon.

‘Where did you get that!’

‘Guard dropped it. How do we get out of here?’ asked Tia, turning to Sotrakkar.

His mouth fell open and for a moment he was unable to speak. He shook his head as though to clear his thoughts.

‘If we can somehow unlock the door, the walls will also unlock, and we can escape into the interior passages. We can blast open the door with it. Quick. Target the lock,’ he stammered, his voice brightening a little.

‘I think I hear the guard coming,’ said Oculum.

‘The lock is between these two stones,’ said Sotrakkar, frantically pointing at two green pebbles in the centre of the latticework.

‘Step back,’ said Tia.

Oculum pulled Sotrakkar away from the door as Tia blasted the lock with the laser light. The Indian Regiment sidearm emitted a continuous blue flare that sparked and flared out of the weapon. Tia shielded her eyes as the green rocks heated up to an

orange glow and exploded sending shards and splinters into the cell. The walls sighed and the asteroid gate unlocked.

‘Hurry, this way,’ said Sotrakkar, running out of the opening.

He began sweeping his hands over the walls outside the brig. Tia heard a click and Sotrakkar’s hand disappeared into the wall. He pulled across a section of the wall, splitting it in two like parting a glittering curtain of chain mail.

‘Wow, incredible,’ said Tia, her eyes widening.

Oculum stared at the gap in the wall, momentarily confused. Tia grabbed their hand and pulled them towards the opening while Sotrakkar held the curtain open for them. Oculum shook their head and stepped through the break in the wall with Tia. Sotrakkar followed them through the opening and let the curtain fall. It closed behind him with a dripping sound like rain falling on concrete and the cell wall returned to its stone-like appearance.

‘Where are we?’ asked Oculum, the dark green light of the interior passage casting a sickly pall over their face.

‘Wait. I hear the guards coming,’ said Sotrakkar, holding his finger up to his mouth to hush them.

Tia’s iris circuitry spun into night vision mode. She pointed at the curtained area they had just walked through which had kept some of its see-through chain mail quality, allowing them to see into the brig.

‘It’s alright, we can see them, but they can’t see us,’ whispered Sotrakkar.

Tia remained stock still, watching as four guards ran into the corridor and found the broken lock on the open asteroid barrier. They rushed into the brig searching and spinning around, frowning, and questioning each other. The head man shouted an order and the guards froze, listening intently, their eyes sweeping every millimetre of the

walls and the ceiling in the cell. Tia held her breath, struggling against her instinct to flee into the inviting darkness that surrounded her. When Dani strode into the brig, Tia gasped. Oculum clamped a hand over Tia's mouth and held it there. Dani spun around in the empty brig and walked up to the wall directly opposite Tia, unknowingly staring through the stone into her face. Tia's heart throbbed loud in her chest and her skin burned hot where Oculum's held her mouth. As she calmed her breathing Oculum slowly released her.

Dani punched the wall of the brig. Tia and Oculum jumped and caught each other. The wall dented under Dani's fist and bounced back, healing over into its original stony quality. Dani ordered the guards out of the brig and shouted at them to search the ship. The guards sprinted away, their gravity boot footsteps echoing in the hallway. Tia heaved a sigh of relief. No one moved. Dani had not left the brig.

'I know you can hear me. I will find you,' she said, walking the perimeter of the jail cell.

Dani stopped and paused, standing very still in the middle of the cell. She turned slowly, a smirk on her face as she quietly backed out of the brig and the asteroid door materialised once more in front of her, its gravelly fretwork locking into place and the cave-like brig falling silent and dark once more.

After waiting for a while to make sure Dani had indeed left, Sotrakkar quietly retrieved a torch stone from inside his robes and held it above his head to light the path.

'Follow me,' he said, heading down the passageway into *Pawta's* mysterious network of interior tunnels.

'We need to get to the bridge,' said Tia.

'I'll take you there. But you must understand *Pawta* is a living being. It has the power to heal itself. And it can be temperamental,' said Sotrakkar.

‘But didn’t you say that Dani controls it with the commands you gave her?’ asked Oculum.

Sotrakkar hesitated, pulling his robes tight around himself and looking to the ground.

‘Dani doesn’t really understand the Thraean language and she doesn’t appreciate the complexities of a being like *Pawta*. I tried to warn her to treat *Pawta* with care or it will turn on her. But she wouldn’t listen. If we can get Dani out of the way I can bring *Pawta* back into my control. It knows me,’ said Sotrakkar, hanging his head once more.

‘Like handing over the reins on a horse,’ said Oculum.

‘What is a horse?’ asked Sotrakkar, trying to pronounce the unfamiliar word.

‘They’re large four-legged animals, much bigger than us. We sit on their backs and ride them with reins, ropes, around their heads to control them, steer them,’ said Tia.

‘Ah. We ride infant ships like this too. Although they don’t have legs, they just float. They need lots of care, very talkative at that age,’ said Sotrakkar, as if he understood.

Tia wondered what it would be like to ride an infant ship. Clearly, they were quite different to horses. The warmth in the atmosphere had increased since they’d entered the passage. Tia gladly moved into the darkness, following behind Sotrakkar, hurrying to leave the brig behind and hoping to escape the stifling air of the dark corridors as soon as possible. Her heart sank as they rounded a corner and the passage came to a dead end.

‘Ok, this is how to open the walls,’ said Sotrakkar.

Tia watched closely as he flattened his palm against the surface of the dead-end wall and moved it across until his hand disappeared into a groove. He pulled aside a

layer of glittery material that washed against itself like droplets of cascading water, opening a hole in the wall which lead into another passageway.

‘We just reach in and open a doorway?’ asked Tia.

‘*Pawta* must also be willing to allow you through,’ said Sotrakkar.

‘Why would she let us open these doors?’ asked Oculum.

‘I am Thraean. *Pawta*’s Thraean. It allows me and my friends to pass.’

‘Let me try,’ said Oculum, pushing past Tia and Sotrakkar.

Oculum slapped a flattened palm onto the wall, at once jerking it back and crying out in pain.

‘It’s hot.’

‘Be gentle. Like this,’ said Sotrakkar, lightly moving Oculum’s hand across the wall in a smooth arc.

‘Ah, I see,’ said Oculum, finding the dip and drawing the wall aside, beaming at Sotrakkar who ducked his head and looked away.

Tia tracked their slow progress in her mapping array as they travelled into dark green passageways that narrowed and widened in arbitrary patterns. She wanted to get out of the close atmosphere. They finally reached an area where the passage kept narrowing until they all had to crouch down and crawl forward on their hands and knees. They reached a dead end in a small room that fanned out into a circle.

‘The bridge is over there. I can see it,’ said Sotrakkar, pointing at the wall in front of them.

Tia stood up in the confined space, scanning the faces of the people beyond the mesh-like wall. Several guards stood at the edges of the bridge. Academy navigators and mappers sat at multiple instrument panels. Dani stood in the middle of the bridge,

one hand on her hip and the other pointing as she gave orders to the Academy navigators.

'*Pawta*'s not responding to the control codes I gave Dani. I tried to warn her not to push it too hard,' whispered Sotrakkar.

'Can you get *Pawta* to help us?' asked Tia.

'I can try. It knows me, knows you're my friends. I'll be back.'

Tia watched Sotrakkar move back into the passage, away from the bridge. He began whispering in Thraean. Tia heard a rasping reply from the wall, *Pawta*'s response to Sotrakkar. The wall moved in and out as the conversation continued between Sotrakkar and the sentient ship. Tia turned back to the bridge when she heard Dani barking at the navigators to move the ship forward. But *Pawta* had stopped in space. Sotrakkar reappeared at Tia's side.

'I've spoken to *Pawta*. She can't resist the control codes Dani is issuing much longer. But it will help us if we rush the bridge. When we open the wall *Pawta* will extend itself to grab the guards and secure the navigators in their seats. However, it's up to us to subdue Dani,' whispered Sotrakkar.

'Can I have the wave sabre?' asked Sotrakkar.

Tia took the Indian regiment weapon out of her exo-jacket and handed it to him, her hands trembling.

'You wait here,' said Oculum.

'No, I'm coming with you.'

Oculum nodded in agreement. Tia's limbs shook as she watched Sotrakkar find the hollow in the wall and drag the curtain open to let Oculum out. Dani swung around with horrifying swiftness, gaping at Oculum who ran at her and tackled her to the ground. Sotrakkar trained the wave sabre on the guards. But *Pawta* had already

extended its walls into hundreds of tentacles that wrapped around the guards and disarmed them, holding them secure. The navigators and mappers struggled against *Pawta*'s snakelike appendages grabbing hold of their arms and legs, keeping them securely restrained in their seats. Tia exited the wall and *Pawta* shut the opening behind her, smoothing the surface back to its rock-like state.

Dani struggled in the grip of Oculum's massive arms as Tia clipped laser restraints onto her wrists and ankles.

'What are you doing?' asked Dani, gasping and trying to control her breath.

'Taking back the ship for planet Thrae. What shall we do with them, Sotrakkar?' asked Tia, trying to calm her jittery breathing.

Sotrakkar stared at Tia, immobile for a second. He finally turned to face Dani.

'They can all go into the brig,' he said, growing taller as he straightened his back.

'Wait. You're putting Leilani's life in jeopardy. We must get her back at any cost,' said Dani, her eyes narrow and cold.

'You think that justifies killing the Thraean crew and kidnapping Sotrakkar, taking his ship, torturing him?' asked Tia, her voice rising to a high pitch.

'I am an officer in the Academy. I have sacrificed everything for you girls. Everything. There's no room for sentimentality in my work. And I always get the job done. You don't know what you're doing,' said Dani, tears welling in her eyes.

Tia scoffed. She'd never heard Dani speak like this before. Nor had she ever seen her mother cry. Dani turned away from her and looked to Turukawa who stood gripped in a web of tentacles. Turukawa tried to stand to attention when Dani looked at her, but she was immobilised in a navigation seat. Seeing the ghostborg restrained Dani's face dropped, and she turned back to face Tia.

‘You can’t do this. Its mutiny,’ said Dani. ‘And you Matifon, Oculum isn’t it? You are so beautiful, like a lovely work of art? Such a waste.’

‘You know very well Captain, we Matifon are strong,’ said Oculum, holding their shoulders square, their glorious mane of red hair gleaming in the ship’s lights.

‘We need to keep Turukawa separate from them. Leave her here,’ said Tia, looking at Sotrakkar.

Tia stepped back from the exit as Oculum led the guards, the Academy crew, and Dani in a procession off the bridge; all tied together in a train of laser restraints.

Tia flinched when Dani walked past her.

‘I expected more from you,’ said Dani, shaking her head.

‘No special favours,’ said Tia, tipping her chin at her mother in a show of defiance.

Tia felt empty inside. She turned away from Dani and looked down the line of people marching to the brig—mappers and navigators who avoided her gaze and Indian Regiment guards who glared at her. After the bridge had emptied out, Sotrakkar took control of the helm and Tia sat in the navigation seat. A huge lakescreen porthole showed they were near the whirlpool. The water in the screen splashed as the ship lurched and jumped. Tia rocked from side to side in the seat restraints. She tensed all the muscles in her legs and her face trying to keep some balance in her new and disturbed reality. Sotrakkar reached over and touched her arm.

‘Breathe,’ he said, quietly.

Tia held on and rode the wave as the ship rolled. The swell soon passed, and the ship settled into the rhythm of the space currents sweeping it along. Grateful for Sotrakkar’s mediating presence, Tia tried to relax, struggling to take her mind off the image of Oculum leading away her shackled mother. She wondered how the lakescreen

porthole had appeared. She guessed that either she or Turukawa, or one of the navigators, had imagined it and *Pawta* had brought it into being. She marvelled at how *Pawta* interfaced with people's imaginations to manifest such physical permutations in its walls. She wondered how to work with the power of such a unique being. The lakescreen porthole took up an entire wall, presenting a wide vista of space, and turning the bridge into an enormous observation deck.

Tia stared in awe at the entrance to the whirlpool now clearly visible in the lakescreen. She drew a sharp breath at the sight of the gigantic currents flashing white and yellow and pink and circling in powerful spirals down into the unknown depths at the centre of the whirlpool. She held her hands to her face, realising with disbelief that Leilani had flown into the monstrous vortex in a small shuttle. The thought of Leilani inside the whirlpool caught in her throat and she struggled to breathe. Her stomach tightened, and she shifted uneasily in the safety restraints that cut into her body, another item manifested from a mapper's imagination or her own. The swirling sight in the lakescreen terrified Tia, its massive scale, the incredible speed, and strength of the currents. She trembled at the thought of travelling into it. But something about *Pawta* stilled her nerves. *Pawta* had flown in these vortexes before, and it knew how to navigate the swells and the downdraft of the whirlpool. For Leilani's sake, Tia resolved to try and put aside her nerves and to place her trust in the Thraean waqa to carry her safely into the whirlpool in the same way that she had placed her trust in the waqa that Uncle Dua and Uncle Va had made to carry her across the ocean.

Tia looked at Turukawa seated next to her, trying to find a way to take her mind off the task ahead. They had some time she thought.

'How is it that you achieved sentience?' she asked.

Turukawa shifted uneasily. The tentacles remained tightly wrapped around her torso. She concentrated on the view in the lakescreen. Tia waited for her to answer. Seeing the embod fidget and squirm, Tia wished she hadn't asked. She liked this iteration of Turukawa very much. But the disclosure of her new sentient status had bothered Tia.

'My creator had brain cancer. She up-linked her brain fingerprint into a nanobotic skull as a temporary measure until she could find a cure.'

'And did she... find a cure?' asked Tia.

'She did and she put the nanobotic skull into a robot, my ancestor. That robot evolved and every one of us since that time has continued to evolve until my predecessor made me,' said Turukawa.

'I still don't understand how you can exist away from Academy walls.'

'I am at one with Academy walls, harnessing the dormant areas and closed off cavities. Empty spaces hold a lot of power. I move through them as water moves through a sieve. You wouldn't fit into the spaces I occupy on Earth. I no longer need them,' said Turukawa.

'But where do you get your power from?' asked Tia.

Turukawa laughed. Embods never laughed, never showed any human emotion. She was not like any ghostborg that Tia had ever met.

'I have the same power sources as you, food, drink, oxygen, electricity. But I can also exist without them,' said Turukawa.

'How can you eat food, you don't even have a stomach,' said Tia, aghast at the thought of an embod robotic chewing and swallowing food.

'I have a stomach. I have every human organ. I am the first sentient iteration since my creator made my first ancestor,' said Turukawa.

‘So, are you human now? Do you have a human body? Human ...feelings?’ asked Tia.

‘I am not the thing I was. If you prick me, I will bleed,’ said Turukawa, cribbing the lines of an ancient bard whose works she had absorbed.

Tia stared at Turukawa. Her childhood obsession with the ghostborg had consumed her ever since they’d met in the hive. She had followed the changes in every new iteration, the exponential improvements in each new model, until she met the embod now seated before her. It was a safe passion that would never come to fruition in any way because how would that happen? Not with a robot, an embod, a ghostborg. Not with the Grand Matrix. This new iteration, while she attracted Tia the most of all of them, also left her with the worst case of nerves. The impossibility of any liaison with a ghostborg had now disappeared. It seemed that the unfeeling robot had now become a sentient embod with emotions and feelings like any human. Tia drew away from Turukawa, uncertainty growing within her now that the embod’s perfection appeared as human as anybody else. And yet, she also wanted and needed to accept Turukawa in her new status. Sentient or robot, she was still the Grand Matrix and as the captain of *Black Kiwi 3* she had also commanded respect and love. But this sentient version was at the heart of the Academy. Even so, she knew they would need to keep Turukawa away from Dani. Tia hoped to get some information out of Turukawa from within the hive.

They now made up the crew complement flying an alien ship, with a Thraean as their Captain.

The Edge

‘Your mother told me and Oculum that *Toutouwai 5* launched a Thraean probe into the whirlpool and Leilani has it with her,’ said Sotrakkar.

Tia glanced at Turukawa in the navigation seat next to her. She twisted in her chair, looking to Oculum seated at the back of the bridge. Oculum shrugged, their red shining locks hanging over their shoulders. Turukawa shook her head, still restrained but now her hands and feet were free and resting steady at the console. This was the first that Tia had heard about any probe. Why did the Academy have a Thraean probe? Under Sotrakkar’s instruction, Tia helped navigate the waqa towards the whirlpool, Tijen Sky Hawk. *Pawta* responded well to Sotrakkar’s direction at the helm and in any other circumstances Tia would have enjoyed this unusual co-pilot navigation experience with him. But Dani’s words kept seeping into her mind. Why was her mother so cold towards her? Tia kept bringing her thoughts back to Leilani, stuck somewhere in the whirlpool.

‘What probe? And why did she tell you that?’ asked Tia, smirking at the thought that Dani may be trying to trick them somehow.

‘The Academy was using Thraean probes to take readings inside the whirlpool. Dani says this one is important. *Pawta* will recognise any Thraean probe if there is one,’ said Sotrakkar.

This development didn’t feel right to Tia. She didn’t trust Dani. Sotrakkar now had control of his ship once more and Dani would not like it. Was this a ploy by Dani?

‘Maybe I’ll go and talk to her in the brig, try to find out more information,’ said Tia.

‘She won’t tell you anything,’ said Turukawa.

A black spot impeded Tia's view through the lakescreen. She stood up to get a better line of sight to the whirlpool as Turukawa steered the ship towards the rim of the vortex. She had imagined into being a flexible rope to replace the Academy's painful safety restraints which she'd decided the navigator who'd previously occupied her seat had conjured. The rope held her around the waist and stretched with her while she struggled to gain a good line of sight through the lakescreen to the outside of the ship, twisting her body to see around the black spot. *Pawta* listed and creaked as they approached the edge of the maelstrom.

Tia collapsed against the lakescreen porthole, ruffling the surface of the water so that the view to the outside of the ship became murky. The rope pulled her out or she would have drowned in the two-centimetre-deep lakescreen. The screen ravenously grabbed at every globule of water clinging to Tia's face until it had taken all of itself back and stilled its surface into a flat calm veneer once more.

'Are you alright?' asked Oculum, standing up from their seat, and rushing to her side.

'I'm fine,' said Tia, staring at Tijen Sky Hawk.

'What's that black spot in the way?' asked Tia, pointing to a mark on the lakescreen.

'I don't see anything. Let me look at your iris circuitry. It may be malfunctioning,' said Oculum.

Tia swivelled to face Oculum. They gazed directly into Tia's right eye, a pinched expression of concentration on their face. She stared back and didn't look away even when it seemed that they had been looking at each other for an exceedingly long time. She began to feel uncomfortable watching Oculum's iris circuitry rotating, in and

out, examining her. She stole a glance at Turukawa and focussed on her beautiful green eyes, the brown flecks, and black eyelashes. A silly grin formed on her face.

‘Eyes on me please,’ said Oculum.

Tia struggled to stop herself from bursting out laughing and entered the quiet of the hive to escape from Oculum’s intense scrutiny.

‘Your right iris circuit has tipped out of its placement slightly. It needs adjustment,’ said Oculum.

Tia flipped out of the hive to find Oculum at her side injecting her with a medi-phaser.

‘This has never happened to me before,’ said Tia.

‘Repair bots will clear it up,’ said Oculum, holding the medi-phaser steady against Tia’s arm, and smiling as they looked between her and Turukawa.

The black spot in Tia’s vision slowly cleared as the nanobots flowed into her bloodstream and cleared away the blockage in her iris circuits.

‘Thanks,’ stuttered Tia, her face flushing red.

‘Let’s take a couple of revolutions around the edge of the whirlpool. I need to see how the currents are moving before we go in,’ said Sotrakkar.

While Sotrakkar steered the ship, Tia slumped back into the co-pilot seat, grateful to have her eyesight fully restored. She stared at the whirlpool, magnifying it in her repaired eye circuits. Tijen’s edges shone with a transparent blue light that refracted and gleamed. She shivered as she thought about what lay beyond the circle of darkness swirling into the middle of the vortex. The whirlpool dragged a cloud of dust and rocks into its centre where they exploded and sank in a hail of sparks and shooting light. Tia cast a worried look at Sotrakkar who stood implacable and still, watching the swirling currents.

‘We’re going into that?’ asked Tia, reaching for the comforting shape of the wai loaloa taonga at her neck, the stone smooth and warm against her skin.

Would the stone really know the way home? She held the smooth rock up to her lips. She became aware of an empty feeling in the pit of her stomach, and her mouth went dry as she thought once more about Leilani lost somewhere inside the whirlpool.

‘Don’t worry. Thraean engineers have mastered the art of whirlpool travel. *Pawta* will safely drop into the centre and then we’ll join the current,’ said Sotrakkar.

Leilani was somewhere beyond that frightening, swirling entrance. In her mind Tia renewed her vow to bring Leilani back home. But first she would speak to Dani.

Dani

Tia couldn't bear to think any more about Dani's vile acts. She bolted from the bridge into *Pawta's* dark green passages. The light soothed her headlong escape, reducing her to a crooked stumble, pressing her hands against the walls to keep herself from falling over. She wanted to hurt Dani, to see her bleed. She burst into the corridor leading to the brig, unable to breathe, panting and holding onto the wall to keep her balance. Dani stood in the middle of Bubu's kitchen tossing a dalo tuber with one hand, deftly slicing off the skin with a large silver knife. At least that is what Tia saw that Dani had imagined for herself, a conjuring of Bubu's kitchen from her mind; a place where she seemed relaxed and happy. *Pawta* had faithfully recreated the scenario for Dani, but the ship had lost something in translation, producing a slightly more sparkling version of reality. Together, *Pawta* and Dani had in fact created something quite new and lush and colourful. The kitchen looked much bigger and housed multiple devices and machines all powered by *exo-ore*.

Tia did not think it possible for anyone to accurately recreate reality in the brig. Everyone sees other people in their own diverse ways. In Dani's imagined situation Tia and Leilani sat laughing at an elongated kitchen bench, listening to her, hanging off her every word. They obeyed all her requests and did anything she asked, without complaint. Tia didn't recognise her mother's imagined vision of herself or Leilani. She didn't in any way resemble the Tia that Dani had dreamed up. Dani's fantasy version of Tia smiled and talked freely with Dani and Leilani. Bubu stood at the cooktop stirring a simmering pot of her delicious smelling chow mein.

Dani had imagined Tia and Leilani as teenagers. This was a complete fantasy as she had visited Tia on *Namu* only once after she'd left them there as young children,

after she'd abandoned them at Bubu's house. Tia had only ever seen Dani in lakescreen calls after that fateful visit, never again in person, until they'd met on this mission. For Dani to imagine such a distorted family scene had a disorienting effect on Tia. Her inner emotional gyro struggled to reorient her mind to the upscaled domesticity of the scene that Dani had imagined into being. Dani seemed to be handling her upside-down vision of reality with ease, with no sign of discomfort at all. It was a vision at odds with what Dani had become, at odds with her true relationship with Tia, which was one of absence, of no real connection. And yet, Tia found herself drawn to the scene, oddly comforted. Dani spotted Tia watching her from behind the brig's latticework entry. She didn't move, and just as Tia had started to settle into the exaggerated but calm world Dani had created, the scene flipped into another reality as if Dani had closed off her mind. She walked out of sight into a dark corner of the cell.

Tia shook herself and moved her attention to watching the guards dotted about the brig in various imaginary places of escape. One guard lay in a skinny dugout floating down the Ganges river at sunset, the sun a blurred dot hanging in the sky behind a yellow haze. Huge temples rose high into the air along the banks of the river, dwarfing the small dugout as it drifted past. Several guards had imagined themselves sitting together on a Goan Beach watching gentle waves swishing up onto the white sand, while a warm breeze rustled coconut palms above their heads. They stared out to sea as the sun lowered into a red horizon, casting stretched-out palm tree shadows in diagonal lines along the shore. Two more guards knelt on intricately woven red rugs laid out on the floor of a Gurdwara temple. They faced towards a platform at the end of a cavernous room surrounded by arched openings. The sun poured through the archways bouncing off blue tiled walls and filled the room with a watery light. They

leaned forward touching their foreheads to the ground, rocking back onto their bare heels.

The head guard had imagined himself seated on a platform in the wall of a large brick shrine built into the side of a mountain. From this vantage point he looked down across a vast glacier that snaked between two rows of jagged mountain tops. He sat on a handwoven rug with his legs crossed, the glacier sparkling under a bright blue sky, the wind blowing gently across his face.

Tia found it interesting that the guards and Dani had all imagined themselves in restful surroundings. She thought she might have found Dani and the guards lounging on luxurious seats or eating or sleeping. Dani walked out of the darkness and approached the door. Her face held no more trace of the soft maternal care that Tia had seen in her domestic creation. Now her expression was one of determination and strength. Tia wished Dani would return to the fantasy mother she had seen in Bubu's kitchen. She jumped when Dani spoke to her.

'I am the Captain of this ship. Release me at once,' said Dani, shaking the floating door.

The pink tips of Dani's fingers poked through holes in the gate where she gripped onto the stone latticework. Her fingertips began to turn white as Dani squeezed the rock fretwork. The guards on the beach in Goa looked out from their coastal scene, listening, but not moving away from the sunset. The guard in the canoe on the Ganges didn't even pop his head over the dugout gunwales, as he continued floating down river. The guards in the temple glanced over at the sight of Dani shaking the brig door and remained seated in the Gurdwara. The head guard opened his eyes. He moved his head slightly to listen but did not turn away from the glacier and the bright blue day before him. None of them would move unless Dani directed them to.

Tia stepped up to the door, close enough to see the iris circuitry spinning madly in Dani's brown eyes, close enough to hear Dani's controlled breathing. Dani glanced at the guards behind her, quiet, and unmoving in their surreal environments.

'You left us at Bubu's. Why didn't you want us?' asked Tia, her heart pounding loudly in her ears.

Dani banged on the door and walked away, holding her hands over her head, and turning around in the brig. One of the guards on the beach jumped up and then sank back down onto the glowing sand.

'I did what I thought was best for both of you. I couldn't take you with me.'

'You didn't even try. You were never a real mother to us.'

'Look there's no time for this. We need to get hold of the probe,' said Dani, gazing at Tia through the fretwork of the gate and then walking away.

'What is it about this Thraean probe that you want so much? That you would sacrifice Leilani for it.'

'The probe holds vital information for the Academy,' said Dani, rushing back to the door.

'Is that so. You are never going to get your hands on it,' said Tia, hitting the door. The hanging rocks bounced back and forth in their latticework patterns. She wished she were on a beach like the guards in their Goan paradise. The way that the Thraeans had developed this escapist technology for prisoners showed great compassion. She needed some of that calm.

'You don't know what you're dealing with. I'll have you court martialled and imprisoned when we get back to Earth base,' said Dani.

'Court martialled for what exactly? You are the one that's overstepped your authority. The crimes you have committed. Nobody on Earth even knows that Thrae

exists, except for the you and the Academy. Is this what you've been doing all this time? Plundering Thrae for their resources. Is this why you left us with Bubu? You're out of control,' said Tia.

'You're a disgrace.'

'I don't know you at all. You may have given birth to me, but you don't give a toss about me or Leilani. All you want is this stupid probe and the exo-ore and whatever sick agenda the Academy has, and you don't care about anything else,' said Tia.

'You should never have come onto this ship. You're right, I didn't want you here. Ratu Shakti insisted. I knew you wouldn't be able to handle it,' said Dani backing away from the door.

'Sotrakkar is the captain of this ship now, back in his rightful place. And I am navigator. You will stay here in the brig until we get back to Earth. And then I'll make sure that you're dealt with like the criminal that you are,' said Tia.

Dani scoffed. 'What do you know about navigating a ship. Nothing. I'm warning you, if you don't release me right now you will be sorry. And that Matifon, they should be ashamed of themselves. What has happened to them? When I get back to Earth, I'll make sure they are terminated.'

The blood drained from Tia's face. She made no reply to Dani. She felt her legs crumple beneath her, and she scrambled to hold herself up against the gate. She would not stand for this verbal assault on Oculum. It shocked her to know how protective she felt. Words tumbled within her.

'I'm not scared of you Dani. Your threats mean nothing to me. We're going to get Leilani and the Thraean probe, Sotrakkar is taking this ship home to Thrae and then we're all going back home to Earth base,' said Tia, her voice breaking.

Dani stared at Tia intensely, her eyes narrowing to slits.

‘Have it your way. Leilani might not even be alive for all we know. Prepare yourself. You may be retrieving a tomb,’ she said.

Tia moved back along the wall. She wanted to hurl her body at the door. Dani scoffed at her and walked into a faux spaceship bridge as it materialised around her. She assumed her position in the middle of the floor, a wide stance, hands clasped behind her back, chin tilted up. On the lakescreen porthole a battle raged, and Dani stared at it, entranced. It seemed to Tia that Dani found it soothing to watch the mayhem.

Dani paced up and down in the cell keeping her eyes on the battle taking place in the watery surface of the imagined lakescreen. She halted and looked back at Tia, holding her back square and strong, her red and black exo-battlesuit pulling taut against her shoulders. Tia’s breath hitched in her throat. It may have been a trick of the lakescreen shining onto Dani’s face, but Tia swore she could see actual tears on Dani’s cheeks.

‘Why did you do all those horrible things? You killed people,’ said Tia, grabbing hold of the barrier to stop from falling over.

Dani walked over to the gate until she stood face to face with Tia. She gripped the latticework and shook it, her tears now clearly visible.

‘You don’t know what you’re doing. Just let me out of here. We can talk,’ said Dani.

‘We’re talking now. Why did you do those awful things. Why didn’t you tell me...?’ Tia’s voice broke and trailed off.

‘You know it’s impossible. I can’t discuss mission details with you.’

‘What are you up to? What is the Academy doing with the Thraean people?’ asked Tia, almost losing her balance as she backed away.

Dani shook the miasmic barrier and walked back onto the make-believe bridge.

‘I’ve shown my dedication. I’m a loyal Captain. I have served the Academy with honour my entire life. You know that. I was so proud of you and Leilani when you joined the Academy,’ said Dani, looking down at her empty hands and shaking her head.

Tia leaned against a wall and felt her knees buckle. She slid down onto the floor, sitting up against the warm stone.

‘You showed us none of your so-called dedication. You left us. I was only two years old. Leilani was only five. You dumped us with Bubu. We didn’t set eyes on you for years, and then one day you just popped up on lakescreen. Bubu had to tell us you were our mother. I didn’t even know you. You’ve never been a mother to us,’ said Tia, her lips quivering as she spoke.

Dani reached her hand out as if to touch her daughter.

‘I love you both. I was so busy with my work. It would’ve made things worse if I contacted you all the time. I didn’t want to upset you and you were both safe with Bubu.’

Tia’s face burned. Her muscles had tensed, as if readying herself to scream. She pushed into the warmth emanating from the wall at her back and felt a slight give as the wall flexed against her weight.

‘Is everything on track to contact the shuttle?’ asked Dani.

Tia looked at her mother, blood pounding in her ears, swishing in and out with her heartbeat. She wanted to roar at Dani, a long guttural howl. Instead she pushed it all down and glanced at her, a sidelong look filled with a mixture of sadness and doubt and longing.

‘We’ll fly by in about fifteen hours or so,’ said Tia.

They fell silent. Tia wanted to push the asteroid belt aside and run into her mother's arms. But she didn't have that luxury and she waited for the urge to pass, masking it with rage, her face reddening as the welling tears overflowed onto her cheeks. The images Dani had created on the lakescreen horrified her. A battle in space between Thraean ships that looked like *Pawta*—stone waqa with ama attached—and Academy ships, *Black Kiwi 3* and *Toutouwai 5* among them. The space battle filled the lakescreen, lasers firing from all sides, and ships flying in battle formations. Some of the ships had blown apart. Thraean and Earth bodies floated in amongst the debris, crashing into rocks and shards and pieces of metal and the cracked shells of broken puffer ship hulls. Tia wished Dani had gone back to Bubu's kitchen instead of the mayhem and carnage on the lakescreen. She shuffled out into the passageway, cutting her eyes over her shoulder at Dani as she left. Dani didn't blink. The battle raged on.

Entry

‘Where is Captain Eddy?’ asked Captain Serché, their eyes squinting into the lakescreen feed from *Toutouwai 5*.

Tia listened intently to Captain Serché, their imperious voice booming throughout the bridge, their body an imposing bulk on the lakescreen. Tia thought them to be quite a different type of Matifon to Oculum who always spoke in a considered tone. She glanced at Sotrakkar. When *Toutouwai 5* had appeared on the sensors Sotrakkar had asked *Pawta* to move Turukawa into the equipment locker. What would Captain Serché think if they found out that Sotrakkar had imprisoned Dani, a Senior Academy Captain?

‘She’s just taking care of an issue with the rotator fins. She’ll be here soon,’ said Tia, diverting the question.

Captain Serché eyed Tia through the lakescreen, slowly nodding. She didn’t think they believed her. Tia glanced at Oculum. The pride in their face was palpable in the close confines of the bridge. Captain Serché was the youngest Matifon to make it into the permanent ranks of Captain. Their voice filled the room with an energy that cast Oculum’s quiet nature into sharp relief. Sotrakkar remained in the background.

‘So, what happened to my sister?’ asked Tia stepping forward, trying to imitate the Matifon Captain’s commanding tone, although her stomach had cramped into knots.

‘The Thraean probe fed a lot of data back to us. The purity of the exo-ore, the amount of ore inside that thing. It’s incredible. It shocked me. There’s enough exo-ore in this one whirlpool entity to power the entire Earth, clothe every person on Earth, power every protein plant, every light, every energy requirement into the near future.

This discovery could push Earth into new science. Bigger than the Turukawa revolution,’ they said, brushing their cape to one side with a dramatic flourish.

Tia remained silent. The Matifon Captain’s face took on a serious cast as they explained what had happened.

‘Leilani was at the rim of the whirlpool for one Earth minute, gathering data. A tentacle of some kind shot out of the whirlpool and wrapped around the shuttle. We tried to blast the thing with lasers, but it pulled the shuttle over the edge before we could grab it.’

The first note of hesitation crept into Captain Serché’s voice. Tia crossed her arms over her chest, picturing the whirlpool in her mind, dragging Leilani’s shuttle into its depths. Why didn’t you send in a rescue shuttle straight away, she thought, glaring at Captain Serché? That would have been the best time to get her sister back, surely. Instead they had done nothing. As if knowing their lack of action would be cause for criticism, Captain Serché continued their explanation.

‘The laser. The whirlpool made a connection to our systems via the laser and drained away our entire power source. We can’t hold our position and keep life support going. That’s why we called for help. When the other ships get here, we can set up a proper staging post to rescue Leilani and retrieve the Thraean probe.’

Captain Serché clapped their hands together theatrically as if they had done nothing wrong. In Tia’s mind their lack of action was negligent. They could have done something to rescue Leilani before the power drain, and Tia wouldn’t have needed to make this trip into deep space. Why did Leilani have to leave her? Placing the blame on the Matifon Captain was a fruitless exercise. But she couldn’t help it. This was their fault. She fantasised about grabbing hold of Captain Serché’s stupid clapping hands and shaking them.

‘Why did you have a Thraean probe? Why not just use an Academy one?’ asked Tia, her voice trembling.

Sotrakkar coughed in the background and Oculum shuffled in behind Tia, touching her arm lightly. Tia shot a look at Oculum.

‘Well, this was a classified mission. When did you say Captain Eddy would be back?’ asked Captain Serché.

‘Can we at least see the footage you received from the probe?’ asked Oculum. ‘It would help us to see exactly what we’re going into.’

‘That’s why I’m here,’ said Captain Serché, turning to one of their lieutenants who stepped forward and stuck a patch of exo-material into the lakescreen. The material splashed and expanded to take up the entire portal. Once the water had calmed to a flat surface Leilani’s image appeared from inside the shuttle. She breathed loudly into the mike. Tia gasped at the sight of her sister.

‘You all there?’ asked Leilani, reaching up over her head so that her face went out of shot and only her throat and shoulders were visible.

‘Yep, we hear you,’ replied a navigator from *Toutouwai 5*.

‘Switching,’ said Leilani.

The point of view shifted to Leilani’s iris circuitry so that the lakescreen showed what Leilani saw as though looking out through her eyes. She gripped the shuttle controls and flew after the Thraean probe slowing her approach as the probe flew closer to the edge of the massive vortex. The circumference of the whirlpool lip extended far out of sight on each side of the lakescreen, curving in an arc so large that it appeared almost flat, like the curve of the Earth at the horizon. Tia couldn’t help thinking of them both sailing to Kato Island with the ocean meeting the horizon in a purple line. She

found herself wishing she was aboard the shuttle with Leilani. At least they'd be together.

The light from the whirlpool spread over the lakescreen without end; pink and yellow and white. Leilani caught up with the rock-like probe. Take it easy thought Tia watching the robotic arms extending out from the shuttle towards the probe and gripping it around the middle.

'Bringing it in,' said Leilani, her voice resonating throughout the bridge.

Tia had concentrated so hard, staring at the movement of the robotic arms on the lakescreen, that she jumped at the sound of Leilani's voice. A flash of light washed the lakescreen into white-out.

'Mayday, mayday ...'

Leilani's voice crackled into unintelligible gibberish. She must have switched the camera back. The white-out cleared into staticky lines with Leilani's face appearing and disappearing, on the lakescreen.

'Reverse,' shouted Leilani.

A freeze frame of Leilani's face appeared on the lakescreen, her mouth open, her eyes looking up, as though in wonder, her brown throat, and the collar of her red and black exo-battlesuit completing the frame. The lakescreen water shook as though a breeze had ruffled its surface. When it had settled once more to flatness another scene began, this time showing what had happened as viewed from *Toutouwai 5*.

The scale had changed completely, with the lakescreen displaying the shuttle and the entire circular rim of the whirlpool and some of its interior. Tia held onto the wai loa loa taonga at her throat as she watched Leilani's shuttle appear like a tiny dot, an island in the vast sea of the galaxy, approaching the huge gyrating mass of the whirlpool. In comparison, the miniscule probe did not show up at all, like a fish would

not show up on a map of the Pacific. Tia's inhaled sharply as she saw a line of brightness arcing out of the whirlpool, a gigantic flailing blast like a solar flare or an octopus tentacle. It wrapped around the shuttle and pulled it into the whirlpool. Red laser blasts arced out of *Toutouwai 5* aiming at the tentacle, trying to break its grip on Leilani's shuttle. The lakescreen fizzled into white-out once again.

The water in the lakescreen splashed and the green square of exo-material shrank back down to a small square. The lieutenant came forward and plucked the material from the surface of the lakescreen. Tia stumbled against the control panel. Oculum caught her elbow, steadying her. She whispered, 'Thank you', leaning into the Matifon for support.

'We've sent you all the telemetry we gathered from the probe and the shuttle before they were dragged into the whirlpool,' said Captain Serché.

'Thank you for the briefing,' said Tia.

Captain Serché bowed low and the lakescreen went blank.

'We've got to analyse the data from that probe,' said Sotrakkar, looking at Turukawa.

Tia looked up at the lakescreen gaping at the enormity of the whirlpool and the light emitting from its centre—white, yellow, and pink tentacles of light. She closed her eyes and whispered a *karakia* for Leilani. When she opened her eyes, the whirlpool seemed brighter and larger and she realised that *Pawta* would be the size of a grain of sand in comparison.

'We need to wear full space suits when *Pawta* enters the whirlpool,' said Sotrakkar.

Ten minutes later Tia joined Turukawa in the equipment locker. The embod's robotic enhancements would save her if it came to an emergency. Tia fidgeted with her

helmet checking the lining and the visors. The outer latch wouldn't close. Turukawa reached out to help her and she looked up into the embod's eyes. Their bodies moved closer, close enough to kiss. Tia imagined brushing her lips across Turukawa's, her skin tingling at the thought. What would happen if she kissed this iteration of the Grand Matrix, the ghostborg that controlled all? The entire hive would know. She blushed. Turukawa did not move away, concentrating on trying to fix the latch on Tia's helmet, her warm breath grazing Tia's cheek. Did she know the effect she had? Did she feel anything? And then Turukawa leaned in and touched her lips softly against Tia's.

A loud blip sounded in the equipment locker as the ship approached the whirlpool, a warning signal from the walls. Tia jumped away from Turukawa's body. They bumped into each other in their haste to get out of the locker room. They raced headlong into the green-lit passages. Tia ran onto the bridge and leapt into the navigator seat next to Turukawa who stared at Tia as she strapped herself in. Tia glanced at the back wall where Oculum had buckled into their seat. Sotrakkar stood in the middle of the bridge, secured against a metal pole like a captain in a storm at sea lashed to the wheel housing. Tia focused her iris circuits intently on the lakescreen as the ship neared the gigantic lip of Tijen.

'I'll keep her steady and hold the line,' said Sotrakkar.

Tia flipped her visor closed and watched as Sotrakkar steered into the heavy pull of swirling colour and the ship hung over the rim. She held her breath, checking the currents while Sotrakkar moved the throttle forward. The ship teetered on the edge for a moment before racing down into the sweep of the current. Tia gasped when the ship fell into the whirlpool, and a dropping sensation wrenched at her stomach. The lakescreen became a blur of yellow and pink and white. The tide swept the ship into the whirlpool. Oculum whooped as *Pawta* shuddered and rocked in the enormous rotating currents,

revelling in the movement of the whirlpool as it snatched *Pawta* into its clutches. After the rush of tipping over the edge the current became regular, pulling the ship down into the inexorable downdraft. Tia forced herself to concentrate on the currents, to search for the cleanest routes as Sotrakkar manoeuvred the ship and surfed along the incredible flows that sped them along. She felt strangely exhilarated and her fear dissipated as her navigational skills took over and she adjusted to the inverted reality of the forces pulling at her from all sides. She would survive this terror.

A Dream of Angels

Tia woke to find herself wedged between two angels. They floated in the whirlpool current, round and round. Had she died? She came to full consciousness and realised they were not angels. She searched the faces of Turukawa and Oculum and hugged them.

‘I saw Leilani’s shuttle. Its stuck,’ said Tia, her voice groggy.

‘I know. We saw her too,’ said Oculum.

Tijen’s pastel light reflected into Turukawa’s face. The colour combination reminded Tia of the coral reefs surrounding inundated Namu atoll and the tropical fish swimming the waters of the floating settlement where Bubu lived; shoals of colourful queen angel fish, schools of parrot fish and forests of pink brain coral. She pushed aside her thoughts of home and tried to remain calm and alert. A sharp jolt tossed the ship out of its steady descent. Then she recalled what had happened.

Something had hit the ship. *Pawta* let out a scream like a wounded animal, and its walls throbbed red. The ship tossed and spun upside down, at the mercy of the whirlpool. Tia held onto the ropes around her torso struggling against the g-forces, as Turukawa tried to regain control and of the ship. At last *Pawta* stopped spinning and floated into the vortex. All the controls were offline. *Pawta* had already begun healing the many holes in its walls caused by objects flying around inside as it had tipped. But the pectoral fins would not re-start.

Pawta sent frantic Thraean messages to Sotrakkar over the ship-wide system. Tia listened through the translation patches on her sleeve.

‘Asteroid strike. The ama is broken,’ said Sotrakkar.

Tia looked up at the swirling images of the outrigger hull on the lakescreen. A shower of small asteroids flew at the ama, bouncing off its smooth surface and flying away into the whirlpool currents. One end of the ama had broken away from a strut and now hung loose in the current. *Pawta* struggled to heal herself but the damaged ama fizzed and sparked and would not join back onto the ship.

‘What’s wrong, why isn’t the ama straightening up?’ asked Tia.

‘*Pawta* needs help. She can’t do it on her own. Someone has to go out and bring the ama back to the struts,’ said Sotrakkar.

Tia looked up at the images displayed on the lakescreen. The broken ama moved back and forth in the current as the ship rushed headlong into the whirlpool. *Pawta* worked hard to repair its hull, healing over breaches and sealing rifts wherever possible. But it had no way of bringing the flapping ama back to the hull. Every time it healed a breach, another hole ripped open and a strangled sound of pain emitted from the walls.

‘I’ve seen the currents in the holograms, and I saw how it flowed when we went over the edge. I can do this,’ said Oculum.

‘Alright,’ said Sotrakkar, nodding.

‘It’s a two-person job. I don’t need oxygen, I’ll go with you,’ said Turukawa.

Sotrakkar stood up and pulled his robes around him, addressing Oculum and Turukawa.

‘You need to tether yourselves to the ship with *Pawta*’s grey ropes, they’re extraordinarily strong. Oculum, you’ll be safe in your protective suit,’ said Sotrakkar.

‘Tia, you take over at the helm. We’ll need your navigational expertise when the ama is repaired.’

Tia sank back into her chair, deflated. Turukawa took Tia’s hands, squeezing them in her warm dry ones.

‘It will be ok. Keep the ship steady while we fix the ama and we’ll be right back,’ said Turukawa.

‘Be careful,’ said Tia.

She watched Turukawa stride over to Oculum who stood waiting with Sotrakkar at the wall and fought back her feelings of dread. Sotrakkar swept his hands over the stonelike surface searching for an opening into the passage. His hand finally found the dip. The musical echo of water dripping into a hollow space filled the bridge as Sotrakkar swept the wall aside and held it open for Turukawa and Sotrakkar. Tia glanced at Turukawa longingly but quickly broke eye contact before the embod stepped into the passage. She wrapped her arms around herself, now alone in the stone confines of the bridge without her friends. She followed their progress on the lakescreen. Sotrakkar led them through the ship and into the airlock where he showed Oculum and Turukawa how to attach the tethers onto their suits. The same grey rope material held Tia safe in her seat at the control console but going outside into the whirlpool would be a different matter. Sotrakkar seemed confident that Turukawa and Oculum would be safe. Tia hoped he would be right.

Her hands shook as she held onto the throttle. She concentrated all her energy on keeping a steady course. She longed for the security of Sotrakkar’s presence to guide her through the currents. The oppressive solitude of the bridge only magnified the full weight of the responsibility she now held in her hands. The walls seemed to close in on her to the point where she thought she couldn’t move. She evened out her breathing and tried to remember how she’d excelled in the command module training at the Academy. She remembered taking the helm, the calm that came with being in control, just like the ease of sailing her own waqa out on the open ocean. She’d taken command many times in multiple emergency circumstances in the simulator, including simulated whirlpools.

This was no different. Except this was an alien ship and the simulator supplied only approximations of a whirlpool, or so she thought. She wondered if they weren't in fact replications of Thraean vessels inside whirlpools. Did the Academy have all the correct telemetry for a whirlpool because they had flown inside them before? Had they already flown in Thraean ships? She focussed on the currents in her mapping arrays and on the lakescreen, the same way she focussed on the currents when she sailed the waqa, the feeling of freedom it gave her, sailing into the wind. She relaxed in the knowledge that she would instinctively know the right currents to take, she would know which dilep paths to follow at the right time.

‘Will the ropes be strong enough? Those currents are pretty rough,’ said Tia, into the hot mike.

‘*Pawta* controls the thickness and strength of the tethers. They'll be fine,’ said Sotrakkar.

‘What about the asteroids and rocks. There's a lot of debris out there,’ said Tia.

‘The ship's adrift. If we work with the current, we'll be alright. We need to get the ama back in place to regain control of the helm,’ said Turukawa.

Tia dragged her eyes away from the lakescreen, the emptiness of the bridge closing in on her again. She entered the dual hive to try and find Turukawa. Had she taken in anything of what had happened in the equipment locker? Lightheaded and dizzy Tia recalled the touch of Turukawa's soft lips against hers, and quickly shook herself back to the job at hand.

‘What about the hive connection. Can we communicate in the hive while you're out there?’ asked Tia, her fingers reaching up to her neck and fiddling with the oxygen seal between her helmet and her suit.

She waited for Turukawa to offer any words of comfort as she sat alone in the bridge. More than anything she wished to be by Turukawa's side. Her iris circuits spun into focus and Turukawa's presence appeared, as though she'd been with her in the hive all along. For some reason Tia recalled an image of the vast blue Pacific Ocean, scanning up to the night sky and the immense galaxies above. The ocean calmed her, and she melted into the image of her home.

'I don't know. We'll have to try a hive connection once I'm out there,' said Turukawa, smiling at Tia's ocean scene.

Tia lingered in the dual hive with Turukawa's presence. Did Turukawa know how much she wanted to touch her, to hold her? She had no time to ask. They had a job to do. The image of a perfectly curling ocean wave soothed her nerves as she sat waiting for Sotrakkar to return to the bridge.

Tia's attention turned to Oculum puffing into their mask, their breath crackling into the green dot communicator into her earpiece as she watched them in the lakescreen. She held her breath watching Oculum take a tentative step out of the open airlock onto the hull outside the ship, following closely behind Turukawa. Together they climbed like spiders, tentatively seeking out ridges for their feet and handholds for their fingers as they scaled *Pawta's* stone-like exterior while the currents swept past them. They edged their way along the hull until they reached the strut arcing over to the place where it should have joined onto the ama. Oculum stopped to rest and held onto an outcrop on the hull.

'This is nothing like any spacewalk I've ever taken before,' said Oculum, puffing into their helmet.

'We need to go out along the strut,' said Turukawa, turning to Oculum and pointing.

Oculum nodded and followed Turukawa onto the buttress-like structure, placing the inside edge of one foot onto a ridge, picking their way along indentations and pinches in the hull with their gloved hands and gravity boots and moving forward into the currents like a stiff rock climber facing into a headwind. Rivulets of sweat trickled down Tia's back as she watched Oculum and Turukawa on the lakescreen crawling towards the strut and struggling against the current. She didn't care about the sweat, the nanobots in her exo-suit would take care of the moisture, but the inside of the Thraean space suit reeked. She wriggled inside the suit trying to scratch an itch on her stomach and sent out nanobots to clear away bacteria from the folds and crevices of the Thraean suit. Hearing a sprinkling sound like flowing water, she spun in her chair to see Sotrakkar walking out of the wall.

'Hey, Sotrakkar. It's rank in here. Who was the last person inside this suit?' she asked, grimacing at him.

Sotrakkar grunted, the sound of his voice popping into her earpiece. He wrapped his arms around himself as he strode to the lakescreen.

'Wasn't me,' he said, peering up at Oculum and Turukawa on the lakescreen as they made their way along the hull.

Tia chuckled into the hot mike as she followed Turukawa's suited-up body on the lakescreen creeping ahead of Oculum towards the ama. Her relief at having Sotrakkar back on the bridge with her evaporated when the ship wobbled. They needed to quickly restore *Pawta's* balance. Once again, she wished she were back on Earth away from this madness. She watched Oculum and Turukawa gripping onto the strut and making their way to the broken ama, hand over hand. The air in Tia's suit smelled better already. She inhaled clean oxygen and gasped as a sparkling rotation of light flared on the lakescreen, just one of the strange and ever-present eruption events in the

whirlpool. Contemplating the vista of her insignificance against the huge force of the whirlpool took her breath away. The intensity of the whirlpool mirrored the power of the ocean on Earth. She realised the two entities were not vastly different. But she did not want to be here. She wanted to get back home to her family, to her life. Her place was on the water, on Earth.

When they reached the end of the strut Oculum turned back to look at the ship. They had crossed a vast distance from the main hull towards the ama which dangled some distance away, shuddering in the flow of the whirlpool.

‘We have to hurry before the ama breaks off,’ said Turukawa, pointing to the second strut.

Tia pictured the kauri waqa her uncles had carved for her and thought about how difficult it would be to fix a broken ama on the water while the waqa was moving through a current. It would be an almost impossible task. Seeing Turukawa and Oculum climbing towards the enormous ama, she wanted to run off the bridge to help them. She held onto her stomach to steady herself, almost unable to breathe.

‘We need to jump off the end of the strut, fly out to the ama, grab hold of it, and get *Pawta* to reel us in,’ said Oculum.

‘*Pawta*? Did you hear that? Can you bring us both in once we get hold of the ama?’ asked Turukawa.

‘Yes, I can,’ replied *Pawta*, its voice echoing from the sleeve translator patches into Tia’s mask, the first time she’d heard the spaceship speak clear and decipherable words.

Pawta’s spacey voice sounded like it came from inside a huge seashell, a deep reverberating sound that resonated from a far-off distance. Tia touched her hand to her chest, searching for the comforting bump under the fabric of her suit, the taonga around

her neck, imagining its smooth surface warming to her touch. She pressed her palm into the bump where the stone lay against her chest and watched Oculum and Turukawa brace themselves against the strut and fly out at an angle towards the middle of the ama, the balancing outrigger hull. They crawled on top of the ama, their joint weight stabilising the structure as they held on tight and the ama surfed the whirlpool currents. With a sinking feeling in her stomach Tia watched as Oculum's tether somehow looped over their head in the current and they became tangled in a knot. Oculum made the mistake of letting go of the ama, trying to unravel the tether from their body.

'No, no, no,' said Tia, reaching her hand out to the lakescreen.

As the current swept Oculum away Turukawa yelled into the hot mike.

'*Pawta*, pull us in. Now!'

Pawta yanked on the tethers, reeling them back towards the hull. Oculum managed to untangle the tether from around their torso. But they had nothing to push against and the current pulled them in the wrong direction.

'I've got no choice. I'll have to float here at the end of my tether,' they said, laughing nervously while they spun lazily in the current.

Tia uttered a hollow laugh in reply, unable to dislodge the dry, lumpy feeling in her throat.

'*Pawta* we need to get them both back into the ship right away,' said Sotrakkar, his voice rasping into the hot mike.

'I don't know how much longer my tether will hold out here,' said Oculum.

Tia watched while Oculum floated helpless beyond the ama, and Turukawa struggled to shove the ama and join it back into the strut. But the current kept her at the end of her grey rope, while *Pawta* gently pulled her back to the hull. Oculum waved at Turukawa and gave her a thumbs-up signal.

‘You ok?’ asked Turukawa.

‘Just glad we’re moving back to the ship,’ said Oculum, their voice thin and raspy.

Tia held her hands to her face when Turukawa managed to push the ama into position and *Pawta*’s miraculous self-healing abilities fused the ama to the strut. She had seen nothing like the technology on this ship. *Pawta*’s ability to heal itself amazed her. The tethers jerked a few times as they pulled Oculum and Turukawa back towards the main hull. Oculum spun a little in the current until they faced into the centre of the whirlpool, their tiny frame silhouetted against a backdrop of swirling, colourful gas clouds. At the same time, Tia and Sotrakkar both spotted a small grey blob in the upper quadrant of the lakescreen. They both leaned forward and squinted into the silvery surface, inspecting the growing blob; until it became clear that it was a swarm of small rocks hurtling towards Oculum and Turukawa. Oculum must have seen them too.

‘*Pawta*, I’ve got rocks, incoming. Can you speed it up please?’ said the Matifon, beginning to hyperventilate.

Tia heard *Pawta* scream as a wave of rocks hit the hull, a high-pitched squeal like that of a cawing sea gull. The collision rocked the ship and shook Tia around in her seat. She braced her arms against the instrument panel and held on, keeping her eyes trained on Oculum and Turukawa. The incoming rocks peppered their suits, hitting them in the ribs, and the stomach and the legs and the arms. One rock bounced off Oculum’s outer visor. And then a flat rock, no bigger than a hand, spun towards Oculum and sliced through their tether. The roiling current whisked them away into a huge gamboge yellow head of gaseous cloud.

‘Oculum,’ Tia yelled into the hot mike.

She watched helpless as Oculum disappeared.

‘Oculum? Turukawa?’ Come in,’ said Sotrakkar, manipulating the dials on the control console.

‘There! Under the strut,’ said Tia, pointing at the lakescreen.

Turukawa huddled under the strut, safe from the rock storm whooshing past the ship and out into the whirlpool currents. The end of Oculum’s severed tether flapped about in the rotating swell of light and smoke.

‘Turukawa? Are you there?’ asked Sotrakkar.

‘Making my way back to the airlock,’ said Turukawa.

Tia watched Turukawa hovering in the circular entrance of the airlock, suspended, holding on to the edges of the doorframe, yelling Oculum’s name into the hot mike. Tia and Sotrakkar searched on the lakescreen for any sign of Oculum in the clouds.

‘There!’ yelled Tia, jumping out of her seat and running up to the lakescreen. She almost fell into the watery surface in her rush. She wished she were able to just pluck Oculum to safety from the centre of the lakescreen water.

Sotrakkar magnified the lakescreen image. Oculum floated within an eddy of green and yellow and white mist. Tia saw that Oculum had activated their booster jets, trying to fly through the current towards the ship. She knew it wouldn’t work. The booster jets in the suits were no match for the force of the whirlpool swells.

‘*Pawta*’s back online. Let’s go get our friend,’ said Sotrakkar.

Tia jumped into her seat and flew the ship back and forth in the current, searching and scanning for Oculum. She caught sight of them once more, tumbling in the spiralling flow of currents and aimed the ship directly for them.

‘Can you hear me Oculum? Hello? Hello?’ said Sotrakkar.

There was no reply from the Matifon, only a strange musical tone, like a one note wind chime. Tia kept her eyes on Oculum's image on the lakescreen as the whirlpool tides whisked them away, and Sotrakkar continued calling out to them on the hot mike.

'Oculum. It's Sotrakkar. We've got your position in the mapping arrays. We're coming to get you.'

A crackling noise spat out of the hot mike.

'Oxygen venting,' said Oculum, their voice echoing faintly into Tia's earpiece.

Tia watched Oculum spinning around trying to find *Pawta*. And then she saw it. A red shuttle stuck in a pool of light way off in the distance beyond Oculum. Leilani.

'I can see the shuttle. It's right in front of me,' said Oculum, breathless.

The current carried Oculum towards Leilani's shuttle. *Pawta* closed the distance and caught up to them.

'Here I am,' said Oculum, waving at *Pawta*, sweeping their arms back and forth above their head.

'Steer towards the shuttle. I'll get Oculum on the fly past,' said Turukawa, into the hot mike.

'What? No. It's too risky,' said Sotrakkar.

But it was too late. Tia watched as Turukawa launched herself out of the airlock towards Oculum.

'Maintain speed,' said Sotrakkar.

Tia held the throttle steady.

'*Pawta* will also help. I'll send out a lariat to grab hold of both of you,' said Sotrakkar.

'Hey, I'm right underneath you. Stop. Stop,' yelled Oculum.

Tia saw that the oxygen gauge on Oculum's suit had fallen into the red zone, the needle bouncing on zero. She hoped Oculum's gauge was faulty, that the rocks had just broken the face and they in fact had plenty of air left. But she heard Oculum starting to choke, struggling to breathe.

'We're coming to get you,' said Sotrakkar, pacing up and down in front of the lakescreen, his head flicking back and forth searching the clouds and mist.

Tia gulped and held the throttle firm, her hands shaking as she directed the ship towards Leilani's shuttle. Turukawa appeared on the lakescreen grabbing hold of Oculum's limp body, throwing a grey rope around their torso, and plugging an oxy tube into their mask. *Pawta* threw out another grey rope and reeled them in. Oculum coughed into Tia's earpiece. She let out a huge breath and slumped into her seat, her head throbbing with the effort of concentrating. With Turukawa and Oculum safely back on-board Tia turned her attention to the shuttle floating further and further away into the rotating debris inside the whirlpool. It kept vanishing and reappearing among the clouds of pastel pink and white and yellow. Tia squinted into the lakescreen and screamed out as she watched the shuttle fly past, caught in a cross current.

'We missed her,' she shouted, tears forming in her eyes.

'Don't worry, she's in a slow current. We'll catch up with her on the next go round,' said Sotrakkar.

At that moment Turukawa stepped out of an opening in the wall, holding up Oculum. Sotrakkar ran to help.

'I mapped the shuttle's coordinates in the whirlpool. We can keep track of her for at least one rotation,' said Turukawa.

Leilani's shuttle appeared again on the lakescreen. Tia jumped out of her seat and ran towards the water. The angels closed in once more.



‘What happened? I remember something about the coordinates and then... nothing’ said Tia, struggling to sit up.

‘Just relax. You fainted,’ said Oculum, holding a medi-phaser to her arm.

‘I remember now. Leilani. I saw her shuttle,’ said Tia.

‘We think she has parked up inside a churn. It’s a bubble in the whirlpool wall,’ said Sotrakkar.

‘How long will it take—the go around?’ asked Tia.

‘A week, give or take. We can keep track of her position the whole time,’ said Sotrakkar.

Tia felt the blood draining out of her face once more. A week! She struggled to understand that they would have to sail inside the whirlpool for so long. She flapped her arms trying again to sit up.

‘Take it easy. Nothing to do except rest and wait until the current takes us around again,’ said Turukawa.

‘Such a long time,’ said Tia.

‘I know. The inside of this thing is like flying an orbit inside a gigantic planet,’ said Turukawa.

Tia slumped back onto the floor, a dream of angels at the edge of her vision.

Turukawa Star

By the middle of the second day they had fallen into a familiar routine. Sotrakkar stayed on the bridge the whole time, even sleeping, and eating there. Sometimes he would disappear into the walls, his coming and going always preceded by the sound of falling water. But he was never gone for long. Tia and Turukawa also spent a lot of time on the bridge. They rest of the time they spent in the prep room with Oculum.

As the third day began, Tia walked into the prep room to find Turukawa and Oculum refilling steel oxy tubes. She flopped into a seat next to Turukawa and picked up one of the slender pipes. They all sat silently avoiding each other's gaze. Turukawa picked up a silver oxy tube and began adjusting the inflow meter with a small blue laser beam. Tia smiled at Turukawa and watched her rolling the oxy tube in her hands, carefully inspecting it.

'Tell me again about your creator,' said Tia, desperate to fill the void in the room.

Turukawa looked up from the oxy tube, a puzzled expression on her face as though she had just woken from sleep.

'What do you want to know?'

'I don't know. What was she like?'

Turukawa placed the oxy tube back into the pile on the table and picked up another one. Oculum continued repairing one of the faulty tubes, only lifting their head occasionally to look at Tia or Turukawa.

'She made us into ghostborgs, built us to serve the Academy. My earlier iterations ... I'm not like them. My programming is differently enhanced. But I'm still one of them,' said Turukawa, carefully turning the small golden oxy tube in her hand.

‘I mean I know you told me she was trying to cure brain cancer. But what drove her?’ asked Tia.

‘What drove her? Well, that’s a funny story. My creator named my predecessors after a bird, and that’s how I got my name. She’d heard many versions of the Fijian creation legend. One version she’d heard was that Turukawa was a great hawk who lived on an island with Degei, the snake God. They didn’t speak each other’s languages, but they became close companions. One day Turukawa disappeared. Degei searched everywhere for her. He finally found her nesting in some long grass. She ignored him and he realised that she’d found a mate, one of her own kind. Degei left her behind and returned to his home, incredibly sad. But he yearned for her company, to talk to her, to be with her. So, the next day he returned to visit her in the long grass. He found her nest. But she wasn’t there. In the nest he discovered two eggs. He scooped up the eggs and took them back to his home. The legend had it that Degei rescued the eggs. But my creator felt that he had stolen the eggs from Turukawa, that he should have left them where they lay. That Turukawa may just have been out fishing for food or searching for water and she would have been distraught when she returned to find the eggs missing. Anyway, Degei kept the eggs safe and warm in his possession and after a few weeks the eggs hatched and out popped two humans, a man, and a woman. Degei nurtured them and fed them and when they grew into adults, he taught them how to garden and fish and how to survive. So, in this version of the legend. these were the first Fijians, and this is how the Fijian people were created.’

‘What was your creator’s name?’ asked Oculum.

‘Her name was Tala Viti. She always wondered what had happened to Turukawa the hawk. She liked to ponder how people might have turned out if Degei hadn’t stolen Turukawa’s eggs. What would people be like if their real mother had raised them,

Turukawa the hawk. There is no further mention of Turukawa in any of the legends. No one seems to have spoken about her ever again. She became lost in time and no one knows what happened to her. My creator considered Turukawa to be the true mother of the people. She wanted to honour the great hawk, so she changed her name to Turukawa Star. I don't know why she added the 'Star' part. Maybe because she was an astrophysicist. She gave the name 'Turukawa' to the first robot she ever created, my ancestor prototype, to ensure that no one would ever forget Turukawa the great hawk as the true mother of us all. Some aspects of the story may have been correct. But she later found out that one important part was all wrong.'

'The legend was wrong?' asked Tia.

'Yes. She found out that Turukawa was not a hawk. She was in fact a rooster sent by the Tongan chiefs to Fiji, the first such bird to ever arrive in Fiji. The rooster lived in a baka tree near the river of a warlord, and its crowing had caused some dispute among the people in the nearby villages. So, two twins went out and found the rooster and killed it, shot it with a bow and arrow to stop it crowing.'

'Your creator named herself after a chicken,' said Tia, and laughed.

'Yes. She named herself, and me, after a rooster. A wonderful black and red and orange bird,' said Turukawa, smiling.

'Oh, that is funny. Not a great hawk, but a chicken.'

'Excuse me – a glorious rooster. She thought it was amusing. Who knows with legends? They can change depending on who's telling them.'

'Did your creator work for the Academy,' asked Oculum, gazing at Turukawa with sudden focus.

'She was a scientist. She worked for the Academy before democracy fell, before the Water Wars. It was her that developed the hive mind and created my first ancestor

iteration, who she also named, 'Turukawa'. Like I explained before, she uplinked her brain fingerprint into that iteration and the Turukawa revolution began. When the Academy first discovered exo-ore in the asteroids, she used it to develop the hive technology, to use the unseen cavities of space that surround us. She made us into the robotic workforce that we are today.'

'I've seen the archive footage of her. But it's always so shaky and unclear,' said Tia.

'She looked like me. She made us in her own image, a thirty-year-old mixed-race Fijian, Tongan, Kai valagi woman. We haven't changed much in appearance since that time. She developed us for good, to help people and to stop the Water Wars. When the government institutions collapsed and the armed forces fell, the Academy sucked up all those resources into their system. They forced all the scientists to work for them. She hated it. But she tried to make sure that we would evolve so that someday we would become autonomous, beyond the control of the Academy. She made it possible for me, for my ancestors to learn, and to create our successors. What she did not count on was the exponential growth that we experienced after she died. To this day the Academy scientists and researchers still have not found all the hidden algorithms and systems she built into us. She would never have agreed to the way the Academy uses us today.

'So, we evolved, down through the ages until I arrived. I am the first species within the genus Turukawa, the first sentient. And I don't know how I came about except that it happened over time and I came from her. I have all her thought processes and all her knowledge which come down into every iteration before me. You know this history, right?'

Tia shrugged. She knew some of it. She knew Turukawa Star had lived hundreds of years before she was born, but she hadn't excelled in history at the Academy and had

not followed the intricacies of the technological revolution that the Turukawa embodies had brought about.

‘I didn’t know the part about the brain fingerprint. How did she do that?’ asked Tia.

‘A simple transfer of her mapped brain impulses into the organic matter of the robotic CPU in my first iteration. I have her brain fingerprint in me, as do all my iterations. But more importantly we pass on our learnings to the next iteration after us. I have the acquired knowledge of everyone before me. Kind of like you humans with your genes,’ said Turukawa.

‘Doesn’t that make you part of the Homo genus, a new species. Homo Turukawa, or at least an evolution of Homo Sapiens?’ asked Oculum.

Turukawa laughed. The second time Tia had heard her laugh. How do you program for laughter?

‘I know a lot, but some things are a mystery to me. Since my predecessor took me out of the mould, I have tried to process the subject of my existence. Am I a robot with human impulses, or a human with robotic impulses?’ asked Turukawa, replacing the golden oxy tube and picking out another one from the pile.

‘I don’t know. Humans think about this a lot. Our existence is finite. We don’t carry on in the same way you do. We die. We just live and pretend and feel most of the time,’ said Tia, shrugging.

Turukawa sighed and nodded inspecting the oxy tube, checking the seal and lasering the outlets to strengthen the cap.

‘I think I have a similar identity crisis sometimes. My father is Grom and Dani is Fijian and Tongan and Mayuro. But I doubt anybody would ever think of me as a Grom. My grandmother Keleni brought us up with the Fijian and Tongan and Mayuro

languages and customs. But I feel like a Grom too. Even though I've only met my father once and I could never be a priest like him, a sky pilot. I'm not spiritual like that.'

'What about your creator?' asked Turukawa, scuffing the oxy tube with a rag.

'What?' asked Tia.

'Dani. Do you want to talk to her again?'

'Oh. Yes, I'd like to check on her. I'm worried about what lies she'll spin when we get back to Earth base,' said Tia.

'I'll be extremely interested to have a look at the Thraean probe when we finally get our hands on it,' said Turukawa, placing an oxy tube on top of the pile.

'She is fixated on the probe. She keeps mentioning it to Sotrakkar and me when we do the rounds,' said Oculum, looking up at them.

'Don't worry about her. You are becoming a great pilot,' said Turukawa, taking hold of Tia's hand.

Tia hadn't expected Turukawa's warm touch. Her thoughts raced, wondering what to do. She looked at Turukawa trying to figure out why she'd grabbed hold of her hand.

'When I was floating out there in the whirlpool, I tried to reach out to you in the hive. There was no link,' said Turukawa.

'I know. I tried too. The whirlpool currents created too much interference,' said Tia, looking into Turukawa's beautiful green eyes.

'You know, I've admired all your iterations. Oh, except the first one I met in my grandmother's hangar on Namu. That one scared me half to death.'

Turukawa laughed and held on tighter to Tia's hand. Oculum watched them both with an amused expression on their face.

‘My ancestor iteration. She was so pleased to meet you. She told us all about you, the floating presence in the hive. She had never met such a pure energy as yours, even while you were in your mother’s womb. Of course, now we know that all humans in utero are pure energy. But you were the first to contact us in the hive. All your brain impulses translated into incredible images and sounds,’ said Turukawa.

‘What kinds of images and sounds?’ asked Tia.

‘I can show you.’ Turukawa closed her eyes and entered the dual hive network she had created between her and Tia.

Tia closed her eyes and gasped. Impressions and pictures rushed at her. Starbursts of colour, giant nebulae floating in dark red clouds, stellar fireworks peppering her vision, cosmic galaxies and planets whirling in her brain. The birth of her mind in its most malleable and vulnerable and creative state, in touch with the universe and filtered through her mother. And the sounds of water all around her trickling into her mother’s veins, pumping and swishing from the heart; liquid hitting the top of her mother’s mouth and cascading in swallowing motions, falling through the oesophagus and stopping at valves on the way down, filling up until the valve doors opened and let the liquid through like a lock opening in a canal. The stretching jaw sinews, the click and grind of her mother’s teeth chewing. The muffled sounds of her mother’s voice resonating throughout her entire body, happy and laughing, vibrating into her chest. She’d heard the top notes of that voice on the few lakescreen calls they’d had. But never as happy as this and never so full and all encompassing.

She felt her mother walk into the sea. Small waves lapped over her stomach. She floated on the surface of the water, her heartbeat at one with the gentle swells that rippled over her. Her mother’s heart had slowed, pumping blood into Tia at the same

rate as the waves. That sensation of weightlessness carrying her safely. Tia opened her eyes, breaking out of the dual hive.

‘Ironic, don’t you think? She sounded happy back then, when we were literally connected. Why doesn’t she care about us?’ asked Tia.

‘Why don’t you go and see her again in the brig,’ said Turukawa.

Tia didn’t answer. She wasn’t ready to see Dani again. She didn’t know her mother at all, but she was so beautiful in the images Turukawa had shown her. She wanted to hold onto that happy version of her mother, just for a while.

Mutiny

‘You realise Dani’s right. We’re mutineers,’ said Tia.

Over the days they had spent circumnavigating the interior of the whirlpool, she had tried to put Dani out of her mind. She succeeded most of the time, except when Oculum and Sotrakkar reported back from their regular visits to check on Dani and the rest of the prisoners in the brig. That morning Sotrakkar had reported that Dani was still demanding to be set free. But Tia hadn’t taken it in. Whenever anyone mentioned Dani’s name, Tia’s sense of hearing retracted like the antenna of a sea snail withdrawing into its shell for protection. In her mind she went back to her childhood and the mother she had known then, although that memory was of a ghostly figure on a flickering lakescreen.

Tia sat at the navigation station watching the whirlpool lights blinking on the lakescreen as the ship moved past yet another tunnel like the one she’d seen in the gigantic hologram room. Oculum lounged in a nearby chair quietly eating replicator food and watching the lakescreen. Sotrakkar sat at the control panel, steering the ship over a huge pink gas cloud. He had piloted the ship over the past six days together with help from Turukawa and Tia navigating their path through the incredible currents. But Sotrakkar had increasingly handed over control of the helm to Tia. Tia had proven herself a capable pilot of *Pawta*. They had all become familiar with the sight of the tunnels hanging within the structure of the whirlpool like massive gauzy pouches with no obvious entry or exit. Tia wondered what it would be like to fly inside them. Were there currents inside the tunnels and would they run as swiftly as they did in the main part of the whirlpool? Or were the tunnels like quiet air pockets, cave-like recesses, peaceful grottos? Sotrakkar told her you never knew what to expect inside a tunnel until

you were inside one. Most of the time they were benign, quiet areas and sometimes they housed taniwha. Tia wondered if the translation patches had translated the word correctly.

‘What are these taniwha?’ she asked.

‘Very large beings, like long dragon snakes,’ said Sotrakkar.

‘Are they dangerous?’ asked Oculum.

‘They can be. If you annoy them.’

While Sotrakkar held the ship steady at the helm, Tia inspected a mapping hologram hovering above the floor in the centre of the bridge. Having successfully helped to pilot *Pawta* through the constantly heaving currents in the whirlpool, she now knew how to steer among the interior tides sweeping around inside the vortex. The status of the red spot that marked the exact position of Leilani’s shuttle remained in Tia’s sights. She constantly checked its place on the lakescreen, making sure she always knew Leilani’s coordinates, *willing* her sister to come back to her. Only sixteen more hours to go before she would see Leilani again. She paced back and forth in front of the hologram, marking off the time as it dragged on minute by minute.

‘If we are mutineers, then that would make Sotrakkar, Christian Fletcher,’ said Oculum, seated at a table at the rear of the bridge, fiddling with their arm enhancement.

‘And what are you? Captain Hook?’ asked Turukawa, chuckling to herself.

Tia watched as Oculum removed their robotic prosthesis, a little shocked to see them without an arm. She didn’t question Oculum as to how it had happened, thinking it might be too rude to ask.

‘Got it caught in a harvester machine on my parents’ protein farm in the Waikato,’ said Oculum, seeing Tia’s perplexed expression.

‘I spent so much time in hospital, I turned into a medical officer,’ said Oculum, laughing.

Tia winced at the thought of the pain Oculum must have experienced and quickly turned her attention to the technical aspects of the robotics to mask her queasiness. The enhanced limb looked like a normal arm to Tia, with normal brown skin, and a delicate fuzz of red hair covering its surface. But now that she knew it was a robotic, she could see the slight sheen of a body enhancement. Oculum hid it well under their exo-jacket.

‘I’m sorry. I didn’t mean to stare. It just looks so real,’ said Tia.

‘It works fine most of the time.’

‘Can I help?’ asked Tia.

‘No, I can handle it. It’s me that should apologise. I don’t usually make repairs to my robotic in public. It’s just the fingers. They’ve seized up, and I need to fix them so I can eat,’ they said, looking mournfully at an unopened package of replicator food lying on the table in front of them.

Tia swallowed, wanting to help and unable to mask her fascination as she watched Oculum manipulate the neural chips in the robotic arm and expertly re-attach it to their body.

‘Ah, got it,’ said Oculum, clipping the prosthesis back into their stump with a satisfying blip.

Their bicep and forearm lit up with red and white lights and then faded back into the deep brown colour of the rest of the arm. They flexed and curled the fingers into their palm. But the forefinger stopped and wouldn’t move with the other digits.

‘Here, let me see,’ said Tia.

Oculum nodded and handed her a small laser. Tia leaned over and adjusted the forefinger until it moved freely.

‘Thank you for saving me from starvation. Now for the feast,’ said Oculum, picking up a replicator exo-packet, their fingers expertly removing the wrapping.

Tia smiled at the Matifon tucking into their ‘feast’. If by feast they meant extra replicator rations, then Tia guessed it must be a feast. But she longed for the cooking of her aunties and Bubu on Namu Island, and the glorious meals she ate with all her cousins on special occasions; baked fish, steaming hot cassava and dalo harvested from Kato Island, with slatherings of rich coconut miti and palusami packed with onions. Instead, she was stuck with rehydrated meals that tasted like spicy red mush.

Tia turned to look at Turukawa seated at the helm and quickly refocussed her attention on the hologram in a desperate attempt to distract herself. But her eyes kept flicking back to Turukawa quietly watching the lakescreen, intently following the movement of the currents. Tia followed her gaze up to the gigantic lakescreen, a flat body of water that continuously sought out any wayward droplet of moisture in the atmosphere and pulled it in. As a result, the lakescreen surface had grown in size over the last few weeks so that it now took up the entire wall and was expanding into the ceiling area of the bridge, curving over their heads as if they were inside a perfectly curling blue wave. Tia edged away from Turukawa, arching her neck to look up at the mesmerising flow of shimmering currents that carried them in a hurtling rush around the inside of the whirlpool.

‘Beautiful isn’t it,’ said Turukawa, staring, captivated by the sight.

A wave of light-headedness came over Tia. She tried to steady her breathing.

‘Yes, incredibly beautiful,’ she said.

After what had happened with Turukawa in the equipment locker Tia had actively avoided being alone with her. Turukawa, for her part, seemed oblivious to any change between them and acted as if nothing had happened. But Tia knew that could not be. They had kissed. They had linked in a dual hive. For a while Tia wondered if she had imagined the whole thing. She tried to focus on the mission, her role navigating the ship in the whirlpool, her unflagging goal of finding Leilani, and most of all her desire to return home to Earth. But her thoughts always returned to Turukawa. And why? For so many reasons. She didn't know how to handle the crazy thoughts constantly running through her mind. She found herself mulling over the silliest things, obsessing over Turukawa's actions, like the way she swept her hands unaffectedly into her hair whenever she was concentrating. She placed exaggerated importance on the occasions when her eyes met Turukawa's eyes shining like green jewels in the passageways, or on the bridge, or in the prep room. She would hold eye contact until she had to quickly look away, her cheeks flushing red. She kept thinking about the time when Turukawa touched her arm to reassure her as she flew the ship into a swift current. And it was that kiss in the equipment locker. The first time she had ever kissed anyone, and it felt right. If someone had asked her, she would tell them that these were the reasons why she thought so much about Turukawa. But no one asked and there was no one to talk to and she didn't know what to do about it.

'What do you think the Academy will do when we get back?' asked Tia, turning to Turukawa, wanting to engage her in conversation.

'We need to focus on what's in front of us. We can't waste time thinking about imponderables,' said Turukawa, shaking her head.

'Mutiny carries severe penalties,' said Tia.

'Yes, I know,' said Turukawa.

Tia felt so inexperienced next to Turukawa and Sotrakkar, both seasoned captains. She looked over to Sotrakkar who had loosened his grip on the robes draped over his body, exposing a white undershirt.

‘I’ve taken back the control of my ship, thanks to you,’ said Sotrakkar, a serious expression on his face.

Tia sat back in her chair and surveyed the people around her. Beautiful Oculum, carefully eating a mash of replicator food. Turukawa, mysterious, sentient, and dangerous, leaning forward and looking up into the lakescreen, her shoulders slumped. Sotrakkar, the strange Thraean she had only just met and who she believed implicitly over her mother, who she’d known her whole life. He sat quietly also watching the lakescreen, his eyes narrowed to slits.

Tia decided to exploit her connection with Turukawa. She had to bring Dani to justice somehow. What options did they have now that they had committed mutiny? Like Christian Fletcher and the mutineers on the Bounty, would they have to flee to an uncharted island in space to evade the Academy and live out their days among the stars? Tia did not want to do that, she wanted to return home to Namu Island, to Bubu, and Uncle Va and Uncle Dua, and Kiore her new rat, and her kauri waqa, and the whales, and the flying fish, and the birds. But first she would have to find Leilani.

She was glad that Sotrakkar was back in his rightful place as Captain of the ship, now that they’d locked up Dani and the Indian Regiment Guards and the Academy mappers. She wondered again about Dani, imprisoned in the brig. What would happen to her? Bubu had once worked as a Captain on one of the puffer spaceships flying between Earth and the asteroid mines, where Tua Milton worked. What would Bubu think of her taking over a ship from Dani, from any Captain? She’d only just graduated

and yet she had turned on a Captain, turned on her mother. She decided not to think about it. Leilani would know what to do.

Leilani

Hours later Tia stood on the bridge watching the lakescreen, her legs set in a wide stance, her hands clasped behind her back, like Dani. At first, she'd held her arms rigidly by her sides trying to stop them from moving. She forced herself to cross them over her chest not wanting to emulate her mother, even in this small way. She finally gave in and let her hands go where they naturally seemed to fall, behind her back.

After visiting her mother in the brig, she had renewed her determination to help Sotrakkar and *Pawta* return to Thrae. Sweat formed on her brow as she checked the mapping arrays and followed *Pawta's* progress towards the shuttle in the lakescreen. She would need to navigate with pinpoint accuracy to retrieve the shuttle, and Leilani, on this go around inside the whirlpool. If *Pawta* did not grab the shuttle out of the churn that held it in place, they may not have another chance. The thought of losing Leilani when they were so close was too much to bear. Her legs gave way beneath her and she had to sit down. Her iris circuits spun into an intense tunnel, focussing on the red blip in the lakescreen. She planned to navigate a route for Turukawa to steer as close as possible to the churn, a pocket of air that rotated near the outer wall of the whirlpool, separated from the main current. *Pawta* would lasso the shuttle and haul it out of the churn as the ship swept past.

'How do you stay so calm?' asked Tia, looking over at Turukawa sitting at the helm.

'I just concentrate on what's going on in each moment. That's all there is, the present. Nothing else is in my control. And I follow Captain Sotrakkar's commands,' said Turukawa, unflappable as usual.

Tia looked over to Sotrakkar for reassurance. The Thraean's stoic presence gave her comfort as waves of exploding gas clouds buffeted the ship. Sotrakkar seemed nonplussed by the phenomenon.

'Stay focussed. The clouds are harmless,' said Sotrakkar.

Tia had become familiar with the way the ship responded to the movement of the currents, the changing dilep paths, and the best way to find them. For now, the most important thing to do lay directly ahead; to rescue her sister. Tia guessed that for Dani the shuttle and Leilani had no value and she would sacrifice them for the Thraean probe if necessary. She pushed all thought of Dani out of her mind and focussed on navigating.

Tia's heart rate increased as the current drove the ship closer to Leilani's shuttle, sitting inside the churn like an overgrown egg in a spider sac. Sotrakkar talked to Turukawa giving her instructions as she steered the ship through a huge pink cloud the size of Earth's moon. *Pawta* exited the cloud into a yellow and white mist. The colours began to mix at the edges of the swell moving into concentrated flares of brown and orange light. Tia had tethered herself into her seat with the grey ropes pulled tight around her middle. She glanced at Turukawa, keeping the ship on track, her concentration unwavering, as they moved closer to Leilani's position.

The red blip of the shuttle remained steady in Tia's mapping array. The shuttle had not moved from the churn where she'd first spotted it. She didn't want to think about the moment Oculum had spun out of control into the whirlpool. But she knew she had to try. Any detail of what she'd seen or experienced at that moment might be important in rescuing Leilani. The panicked moment when she saw the rock cut Oculum's tether, the sight of Oculum tumbling into a lenticular cloud popping with strange lights, the hissing sound of their oxy tube leaking into the whirlpool. She

recalled the clarity of her thoughts as she'd watched Oculum floating away, and the moment when Leilani's shuttle had come into view at the edge of the lakescreen. It had appeared like a vision out of a dream, caught in a bubble, the Academy lettering shining out of the fog. No matter how hard she tried she could remember nothing after that point except for the image of the shuttle emblazoned in her mind like a toy floating in a yellow and white haze.

Leilani had now been inside the whirlpool for so many Earth months. Tia wondered what state she might be in when they finally rescued her. She refused to think of the shuttle as a tomb. Dani had rattled her, goaded her, that Leilani might not have made it. Tia knew how resourceful and smart her sister could be. As soon as they were within radio distance Tia planned to send out a signal, a message to let Leilani know she was coming to get her. She hoped Leilani would reply.

Pawta didn't have eyes on the shuttle yet, the debris and the distance kept blocking any possibility of an actual sighting. From its position in the mapping arrays, everyone on the bridge could see that the shuttle would show up on the lakescreen at any moment. An eerie silence settled over the bridge. Tia squinted at the lakescreen as *Pawta* rounded a green cloud filled with rocks and debris. The churn appeared out of the turbulence, a bubbled membrane sitting at a distance from the main current like wobbly sea foam gathered at the high tide line of a beach. There was no knowing how much longer the churn would remain in this position. Eventually the main current of the whirlpool would swallow it up, dissipating and releasing the shuttle into the tides. As *Pawta* moved closer to the churn Tia could see the fuzzy shape of the shuttle caught behind its diaphanous membrane. The timing would be crucial.

'One degree left. Two right. Forward slow...slow ...slow.'

Sotrakkar followed Tia's directions. *Pawta* nudged up close to the churn but far enough away so that the ship would not touch the membrane and pop it prematurely. As they closed in on the churn Sotrakkar stood ready to give the command for *Pawta* to hurl the ropes into the centre.

'Now,' said Sotrakkar.

Pawta sent out five blueish-grey ropes of braided exo-ore. The ropes arced into the churn popping the membrane and wrapping around the shuttle. Tia gasped as one rope slipped over the hull of the shuttle and broke, snapping back to *Pawta* with an audible whip-crack. The other four ropes held fast and tightened at the middle of the shuttle, dragging it towards *Pawta* as it swept around in the whirlpool current. The ropes pulled tight and strained against the energy of the current as they reeled the shuttle back to *Pawta*. Finally, the ropes dragged the shuttle up to the side of *Pawta's* hull and it sent out a rabble of rocky clamps to pin the shuttle into its exterior walls. Tia let out a huge breath when *Pawta* had securely attached the shuttle to the hull and jumped out of her chair. She reached out, clutched at Turukawa's exo-jacket, and hugged her with joy. Turukawa laughed and held Tia out from her. Tia pulled away from her grasp and ran to Sotrakkar.

'Let's go. Can you show us where she is?' asked Tia.

'Follow me,' said Sotrakkar, running off the bridge.

Tia grabbed hold of Turukawa's hand and tilted her head at Oculum to follow her.

'You go, I'll stay here and hold *Pawta* steady,' said Turukawa.

Tia nodded and ran to join Sotrakkar and Oculum at the wall. Sotrakkar found the opening and pulled the rock curtain to one side, holding it open for Tia and Oculum.

They stepped into a passage that sloped down to a flight of rocky steps leading away into the darkness.

‘How did Dani know her way around the ship. You didn’t show her how to open the walls did you?’ asked Tia, as they made their way down the stairs.

‘No, I never showed Dani the wall openings. There are some passages that *Pawta* always keeps open. Dani thought they were the only walkways in the ship, as you would if you didn’t know any better. These passages in the walls are short cuts. But I never told Dani about them, and she never asked because she didn’t know. You can’t ask about something you can’t even comprehend,’ said Sotrakkar, carefully making his way down the steps as they appeared.

After a long descent, the passage finally came to a dead end. Sotrakkar quickly found the dip and opened the wall into an airlock with a circular hatch at the end. Tia grabbed the handle of the hatch and spun it as fast as it would go. The door squeaked open and she stepped into the dim interior of the shuttle. All the shuttle systems had switched into stand-by mode and all the lights were off. Tia turned on her sleeve torch sweeping it back and forth, searching for Leilani, her heart thumping in her chest. She felt the push of Sotrakkar and Oculum squeezing in behind her. A faint red light pulsed on the control panel at the front of the shuttle. Exo-shields had closed over the front portholes protecting them from rock strike. A metallic smell pervaded the air inside the small flight deck.

Tia flipped a switch on the instrument panel and the curved interior of the capsule lit up. Emergency lights flared red and green on the control console beaming into their faces. Empty medi-phasers littered the floor together with empty exo-packets of food and drink, broken oxy tubes, wiring, and exo-foam that appeared to have pulled away from the back wall where something had gouged out a large hole. Tia’s breath

rasped in and out of her mouth as she frantically blinked her eyes trying to orient herself to the gloomy light in the room. She kept scanning the area with her torch, her movements becoming more erratic.

‘Leilani? Leilani? Where are you?’

Tia placed her hands onto the wall closest to the control panel and ran her fingers in frenzied arcs along the surface feeling for any temperature variations.

Sotrakkar cast his eyes warily about the room.

‘I think I’ve found her,’ said Oculum, tapping a sequence into their medi-phaser and placing a hand on the wall at the back of the shuttle, near the exit. The wall shuddered and began to peel away from itself at the top, opening out slowly into a platform. Once fully extended the platform clicked into place, levitating horizontally while warm steam hissed out of the opening in the wall. A coffin-like sleep chamber slid out onto the platform with a slow buzzing sound and came to rest in the swirling mist. Tia fanned the smoke away from the tube and examined the small strip of glass on top of the casing. The glass framed a pair of closed eyes, a pair of submerged eyeballs moving back and forth in rem sleep beneath delicate brown eyelids.

‘Is she alright?’ asked Tia.

‘She’s in stasis. We need to wake her,’ said Oculum.

Oculum tapped a wake-up sequence into the control panel on top of the cylinder. The steam disappeared and Leilani’s face clouded over beneath fogged-up glass. An alarm pinged announcing the end of the wake-up phase. The top of the tube silently slid back into the wall to reveal Leilani’s supine body lying in a base that perfectly cupped her frame and conformed to her shape. Her exo-battlesuit expanded and contracted as though breathing with her. Her long black hair had grown, and now fell over the headrest and onto her shoulders. Her bare feet twitched and stretched. She inhaled

sharply and her eyes popped open. Tia leapt back and then slowly moved towards Leilani, watching her eye circuitry spinning into focus

‘Take it easy. Slowly,’ said Oculum, holding Leilani’s arm.

Leilani groaned, turned onto her side, and braced her arm against Oculum as she levered herself into a seated position and carefully swung her legs over the side of the platform. Tia raced to her side and wrapped her arms around Leilani, squeezing her and laughing.

‘Finally,’ said Tia, tears rolling down her cheeks.

She wouldn’t release Leilani.

‘Tia? Is that you?’ asked Leilani, her voice groggy.

‘Yes, it’s me, sis. We’ve come to rescue you,’ said Tia, releasing Leilani and holding her at arm’s length for a moment before gathering her into another bear hug and sobbing on her shoulder.

‘Hey, hey. I’m alright,’ said Leilani, looking to Sotrakkar.

Leilani laughed when Tia refused to let go of her.

‘Dani tried to tell me you wouldn’t make it. But I knew you would,’ said Tia, finally releasing her grip on Leilani and wiping the tears off her face.

‘Dani? Where is she?’ asked Leilani.

Tia exchanged a look with Oculum who took the chance to gently move Tia to one side.

‘Plenty of time for talk later. Right now, I need to look over my patient.’

‘Hold my hand,’ said Leilani, reaching out for Tia.

Tia gripped onto Leilani’s hand as Oculum clicked the medi-phaser through its checklist.

‘My boots,’ said Leilani, pointing inside the sleep chamber in the wall.

‘I’ll get them for you,’ said Tia, crawling into the hole. She found Leilani’s gravity boots at the rear of the chamber and backed out, triumphantly holding the boots up in the air.

‘Found them.’

Leilani tried to laugh but coughed instead as Tia handed the boots to her. Oculum continued running a medi-phaser over Leilani’s body while Tia placed her feet into her boots and strapped them into place. They checked her eye circuitry and took her pulse. Leilani tried to bat Oculum away, but she did not deter them from gently holding her wrist and clicking through settings on the medi-phaser.

‘Let Oculum do his work. We want to make sure you’re alright,’ said Tia.

Leilani grudgingly succumbed to Oculum’s treatment. Sotrakkar came forward and bowed his head slightly.

‘I am Sotrakkar of Thrae, Captain of the ship *Pawta*. We have secured your shuttle to the hull.’

‘Pleased to meet you,’ said Leilani, smiling.

‘What happened in here?’ asked Tia, looking at the mess and debris covering the floor.

‘Crash entry. How did you get in here, inside the whirlpool?’ asked Leilani.

‘In the Thraean ship, Sotrakkar’s ship. You should see it. It’s like a space waqa and it has an ama. Only bigger,’ said Tia.

‘Uh huh. Thraean technology is remarkably interesting,’ said Leilani, flinching as Oculum passed the medi-phaser in front of her eyes,

‘You know about the Thraeans?’ asked Tia.

‘Only what the probe has told me,’ said Leilani, avoiding eye contact with Sotrakkar.

‘Can you tell us why you put yourself into stasis?’ asked Oculum.

Leilani shook her head, as though trying to recall what had happened to her.

‘I was at the edge of the whirlpool, taking readings from the probe. Something pulled me into the whirlpool. I couldn’t stop it. I tried to reverse out, but whatever it was, it held on. I managed to capture the Thraean probe as we went over the lip. That was one crazy ride,’ she said, staring down at a piece of debris on the floor.

‘I didn’t know how long I’d be stuck in the whirlpool and I’d run out of food and water. I was only supposed to be out here for a few hours taking readings off the probe. I thought I would be stuck in this whirlpool forever. So, I put myself into stasis. I thought it would be the safest thing to do. I never expected to see you,’ said Leilani, grabbing hold of Tia and hugging her. Tia hugged her back and gently moved away, not wanting to tell Leilani about Dani. Not just yet.

‘How is she?’ asked Tia, looking to Oculum.

‘All her readings are fine for the moment. I’d like to make regular checks just to be sure,’ said Oculum.

‘Where is the Thraean probe?’ asked Tia.

‘It’s in the hold,’ said Leilani, pointing at a hatch in the floor. ‘I’ll take you,’ she said, jumping off the platform and losing her balance. Tia and Oculum caught her and helped her up.

‘I think you should rest,’ said Oculum.

Leilani nodded and lay back on the platform. Tia held her hand, a large smile spreading across her face.

‘I’m always careful with the probe. It likes to sleep,’ said Leilani.

The Probe

The Thraean probe sat in the middle of the hold, pulsing, and puffing in the red light like a hibernating mountain bear. It didn't look like any of the Academy's Avocet probes and Tia had worked with the Avocet machines on every single mission she'd ever taken—real or simulated. She had sent many Avocets out into deep space, tracking their slow and ponderous progress as they fed back images and data to Earth base. But the hardest working probes were the clean-up Avocets that mapped the debris left behind in the cis-lunar zone after the Water Wars. Tia had lost count of all the clean-up Avocets she'd built, programmed, and sent out into space. They looked like crazy conglomerations of metal components, wheels, satellite dishes, propulsion systems, wiring and gadgetry of all descriptions.

She'd hated the interminable and dangerous work of piloting the clean-up Avocets. Each load of rubbish collected and removed from the cis-lunar zone between Earth and the Moon made only a small dent in the terrible mess of garbage, torn up metal, and even human bodies strewn throughout the area. She preferred navigation and mapping, rather than the clean-up work that cadets were required to complete among the old space junk. The work was dangerous as she'd found out when a small piece of old space metal cut into the hull of her ship and blew it to smithereens. Luckily, she ejected into space before the explosion, fully clad in a protective suit of asteroid-mined exo-ore. She'd trained for such an incident and she'd only hung in space for a few minutes before one of the safety ships had picked her up. But those few moments suspended among all the space rubbish had been the scariest moments of her life. The only times she'd been more scared were lifting off on this deep space mission and tipping over into

the headlong flight inside Tijen whirlpool. On all three occasions she had experienced abject panic, her mind and body completely shutting down.

The Thraean probe was rock-like and minimalist, unlike Avocet probes. It resembled an oblong boulder with sloping surfaces, dips, and cracks, but no gadgetry hanging off it at all. Or at least no Academy type of gadgetry. It looked like an asteroid, not a probe. Tia had begun to think that Thraean technology might be far more advanced and in sync with the make-up of space atmospherics than anything the Academy had ever built. In fact, Academy technology seemed almost primitive in comparison.

Tia tapped a translator sleeve patch on her right arm. She and Leilani quietly approached the probe with Sotrakkar and Oculum following close behind them. Placing one hand onto the stone like surface of the probe Tia quietly set in motion one of her sleeve patch analysis programs. The probe appeared to stir, vibrating, and rocking a little. Sotrakkar spoke to the probe in shrill Thraean dialect. Tia covered her ears as did Oculum, writhing in the uncomfortably high-pitched tone of Sotrakkar's voice. The tone increased in intensity until the translator patch reduced the sound in their earpieces to a more moderate pitch.

‘Hello again,’ said Leilani in Thraean, touching her hands to the probe.

‘You speak Thraean?’ stuttered Tia, blinking rapidly as she turned to Leilani.

‘Yeah. It was one of the reasons I was sent out in the shuttle,’ said Leilani.

Tia knew that Leilani spoke several languages—Fijian, English, Maori, Tongan, Mayuran and Moon Spanish. But she'd never heard of her speaking an alien language.

‘When and where did you learn Thraean?’ asked Tia, gaping at Leilani.

‘It was a special ops class at the Academy. I was sworn to secrecy,’ said Leilani, averting her gaze at the admission.

‘What secrecy? Why are you breaking secrecy now?’ asked Tia, scrunching up her face.

‘Because of this,’ said Leilani, making a limp gesture towards the probe.

A sound emitting from the probe interrupted their conversation.

‘I recognise my Thraean brother. But what are these other units?’ asked the probe.

‘I’m sorry. May I introduce Sailing Dirt the Third,’ said Leilani, opening her palm to the probe.

‘This is my biological sister unit,’ she said, motioning towards Tia.

‘And this is her associated unit,’ she said, pointing to Oculum.

‘And you know the Thraean brother,’ she said, nodding at Sotrakkar.

‘Again, Thraean greetings to you Great Dirt,’ replied Sotrakkar.

This part of Sotrakkar’s greeting converted into English via Tia’s translation sleeve patch. Then he spoke to the probe in a language that the translation patch had difficulty deciphering.

‘Greetings again Thraean brother, biological sister unit of Leilani, and associated unit,’ said the probe, tilting onto its end like a stone plinth.

‘Hello, Sailing Dirt,’ said Tia, not knowing what to do with her hands or at what part of the probe’s exterior to direct her gaze.

‘Greetings,’ mumbled Oculum.

‘Sailing Dirt has gathered some interesting information from inside the whirlpool, haven’t you?’ said Leilani, her voice taking on a coaxing quality as though speaking to a small child.

‘I have information about the whirlpool and beyond the whirlpool about my home world, Planet Thrae,’ replied the probe.

‘Would you mind sharing this information with us,’ asked Tia.

‘Oh, I don’t know. This information is not for outside units. Only for the home Planet,’ said the probe, rolling back onto its long side once more like a huge lozenge.

Again, Sotrakkar whispered to the probe in words that Tia’s translator patches did not pickup. The probe vibrated and a split appeared in one side. The split widened until the rock opened like a book hinging in the middle. The probe’s internal surfaces were rough like black sand and sparkled as though filled with tiny points of starlight.

‘How do we access the information in here?’ asked Tia, marvelling at the beauty of the glinting sides.

‘Stand between the pages and you’ll be able to read the information,’ said Leilani, glancing at Sotrakkar.

It was hard for Tia to think of the halved rock slabs as pages. She walked in between the so called ‘pages’ of the split rock. A three-dimensional image hovered in the air like a hologram. The image portrayed every aspect of the interior of the whirlpool against gridlines mapping the whirlpool walls and its interior including all particles of dust and debris. Flashing lights of differing intensities lit up at every intersection of the gridlines and bunched along every line in between. Tia stared, speaking softly as though not wanting to break the spell.

‘Wow, this is unbelievable. It’s a complete representation of Tijen’s interior.’

She wished the Academy could have access to this kind of technology to map the rubbish clogging up the cis-lunar zone around Earth. It would make the clean-up job so much easier. Leilani stepped into the space next to Tia and panned her eyes around the holographic image. Her eyes widened as she took in the information the probe had gathered.

‘The probe has mapped every incidence of exo-ore in the whirlpool. Each point of light marks a deposit,’ said Leilani.

‘You mean all those flashing lights are exo-ore?’ asked Tia, her mouth falling open as she gazed at billions of glowing points all over the whirlpool.

‘It’s an exo-ore treasure trove,’ said Leilani, holding onto the edge of one of the rock pages.

Oculum stepped into the space the probe had opened, standing shoulder to shoulder with Tia and Leilani, gaping in awe at the glittering lights. Tia entered the hive and searched for Turukawa. Turukawa took all the information into the hive storage and cross referenced it with her entire data base.

‘No wonder Dani and the Academy want to retrieve this probe. Captain Serché was right. Sailing Dirt has mapped every single drop of exo-ore, every location of it anywhere in the whirlpool. The amount of data is incredible. Our technology could never do this,’ said Turukawa.

‘This is what the Academy wants. They will mine this whirlpool completely. What is that beyond the exit of the whirlpool?’ asked Tia looking down at the probe’s holographic representation of the extreme end of the downdraft.

‘That is the exit to planet Thrae,’ said Sotrakkar.

The probe suddenly changed the focus of the hologram into the exit at the base of the downdraft. The view spun into a new galaxy and pointed towards a shining blue planet.

‘It looks kind of like Earth,’ said Tia.

‘That is my home planet, Thrae,’ said Sotrakkar, touching his hand to the crystalline surface of the probe.

‘Oh my god. It’s almost pure exo-ore,’ said Tia.

‘Your Academy... They want to mine the whirlpool and Thrae. The whirlpool is a place of such delicate balance. If the Academy extracts dirt from the whirlpool it will destroy the inner harmony of this entity. The whirlpools are sacred places for us. Places of great power,’ said Sotrakkar.

‘The Academy also want to colonise and mine planet Thrae,’ said Leilani, again averting her gaze.

‘You knew all this?’ asked Tia.

Leilani nodded and turned towards the probe.

‘I’ve been talking to Sailing Dirt. She told me that the Thraeans revere the whirlpools. They are complicated places, and this is not the only one. There are others. Ajak is one of them. The Thraeans managed to close off Ajak before the Academy realised what she contained.’

Tia curled her fingers, clenching them into fists so tight that her nails dug into the soft flesh of her palms. Leilani knew all about the Academy agenda of exploitation and harvest, even worked for them. Why had she turned turtle? She seemed to have grown fond of the probe. She certainly acted protectively towards Sailing Dirt. Tia had no idea her sister had become involved in this work with the Academy.

She thought of the times Dani had called from her missions in deep space wanting to speak to her and Leilani and Bubu. She would have been planning this invasion of Thrae all along. She wondered how much Bubu knew about it. Surely Bubu didn’t condone what the Academy had planned, or what Dani had done in commandeering *Pawta*, killing her crew, and kidnapping Sotrakkar. Did Bubu know about Dani’s work?

‘We can’t let the Academy get hold of any of this information. They’ll send out the fleet to harvest Tijen and colonise Thrae and they won’t even think about the consequences for the Thraean people,’ said Tia.

‘What can we do to stop them?’ asked Oculum.

‘There is only one way. The whirlpool will end naturally if we can hold them off long enough,’ said Sotrakkar.

‘What do you mean? What is happening to Tijen?’ asked Tia.

‘We don’t call the sacred one ‘Tijen’. Her name is Na Viro,’ said Sailing Dirt.

‘How can that be? That’s a Fijian word,’ said Tia.

Tia realised she had been listening to the probe via the translation patches. The patches had translated the Thraean word into the Fijian word for whirlpool.

‘The translation patches revert to the closest English word and if that is not a correct translation it will revert to the closest word in your individual languages and so on right through every language on Earth. In your case, Fijian, since that is your second language. Our second language,’ said Leilani.

‘So, the English word for whirlpool doesn’t cut it?’ asked Tia.

‘Apparently not. Doesn’t quite capture the nuance of the Thraean language,’ said Leilani.

‘Ok, so what is happening to Na Viro,’ asked Tia.

‘As I warned you before, the whirlpool is disintegrating. They are not stable entities. This one has existed for many Earth millennia. It is about to come to its natural end when it will disappear. They die. We need to get out of the downdraft as soon as possible,’ said Sotrakkar.

‘And we can’t risk the probe being captured by the Academy. We need to get Sailing Dirt, *Pawta* and Sotrakkar back to Thrae,’ said Tia.

‘No question about that. But how do we get back to Earth?’ asked Oculum.

‘Don’t worry. There is a way,’ said Leilani.

‘How long before we exit the downdraft?’ asked Oculum.

‘A few Earth hours. I’m going back to the bridge with Turukawa,’ said Sotrakkar.

‘Ok, call me when we get closer. I just need to debrief with Leilani,’ said Tia.

Sotrakkar nodded. Before he left he whispered to the probe. The rock pages closed gently and clicked shut.

Resistance

Tia and Leilani sat across from each other in their imagined table and chairs in the corner of the prep room. Tia had requested smooth edges carved out of a white marble slab, a shape that held her body perfectly. *Pawta* had reproduced her imagined chair in the proportions she had seen in her mind. Leilani had conjured a dark leather seat slung within slim steel tubing. Together they had imagined into existence a replica of the exo-ore island sitting in the middle of Bubu's kitchen. Tia asked *Pawta* to open a lakescreen porthole in the hull to make the whirlpool visible as though looking through a window. They gazed out at the swirling mists.

‘Are you feeling alright?’ asked Tia, sipping from an exo-packet of replicated coffee.

‘Yep. Oculum gave me some heavy duty wake up shots. This coffee is terrible though.’

‘At least it's hot.’

They laughed and fell silent, sipping thoughtfully. Confusing shifts in the whirlpool current mirrored Tia's mood. She turned away from the scene outside the porthole and looked at her sister.

‘I feel like I've been left out of everything. Like everyone is in on a secret and I'm in the dark,’ said Tia.

Leilani sighed, shifting her body to face Tia square on, although her shoulders drooped.

‘Do you remember when Gromtarg came to visit us on Namu?’

‘Of course, I do. He sailed with us to Kato Island,’ said Tia.

‘He recruited me that day,’ said Leilani, gazing at her sister for a moment and then looking to the lakescreen.

‘What do you mean he recruited you? You were only thirteen,’ said Tia, pushing the coffee away.

‘Old enough to be a striker in the Thraean resistance. I know this is going to be a shock for you. Gromtarg is a commander in the resistance,’ said Leilani.

‘But we were studying at the Academy. I didn’t even know that Thrae existed let alone a Thraean resistance. How did you work for them?’

‘I know you’ll have lots of questions. There’s no time to answer all of them. Right now, we must return this ship and the probe and Sotrakkar to planet Thrae.

‘How could you keep this from me?’ asked Tia, shaking her head.

‘I was... I am... a distance striker. The resistance uses my strike capabilities via the hive connection. It doesn’t always work out because the feeds aren’t reliable. But I do what I can. This trip was meant to be an easy mission. The Academy had sent me out to the edge of the whirlpool to retrieve the Thraean probe. But my mission for the resistance was to go out there and reprogram the probe so that it would fly back into the whirlpool and return to Thrae. I was going to disguise it by going right to the edge and kind of nudging it over,’

‘So, what happened?’ asked Tia.

‘I reprogrammed the probe as planned and when I nudged it with the shuttle a tentacle of light came out of the whirlpool and grabbed us both. I tried the standard reverse manoeuvre, but I couldn’t do it too much or I would’ve pulled the probe back out with me. So, I went with it,’ said Leilani.

‘But what did you think would happen to you in the whirlpool. Weren’t you afraid? You knew they’d send out a search party, didn’t you?’

‘I guess so. But the probe is too valuable. I had to make it look authentic. That the tentacle had overpowered the shuttle. Otherwise I’d blow my cover. They believed it didn’t they?’

‘Yeah, they did. I got an alert while I was out at sea. Scared me half to death. That’s why I came out here. To rescue you. Take you back home. I’m an idiot.’

‘No, you’re not. I’m glad you’re here. I’m glad you finally know.’

Outside *Pawta*, whirlpool clouds swirled past each other in a balletic display of spinning white and yellow and pink. Tia found herself going over everything in her mind—all the green dot calls from Dani, every sleeve patch note, every lakescreen call from Mars.

‘So, you’re a double agent? And all those calls from Dani. Were you trawling for intel?’ asked Tia.

‘Dani is in special ops. So, yeah, I’d play the dutiful daughter. You remember?’ asked Leilani, taking another exo-packet of replicator coffee and ripping it open.

Tia nodded, recalling the way Leilani had subtly extracted information from Dani. Asking her what she was doing and what kind of ships she flew. Dani never gave away much. But every now and then she’d let slip a small piece of valuable information. And of course, there were the rare calls from Gromtarg when Leilani would talk to him for hours. Tia thought they were playing strike games. Which of course they were. Only they weren’t games. She remembered how she’d grow bored listening to them swapping coordinates and flying what she thought were make believe missions. She would leave them to it and go to her room to read or help Bubu on the pontoons repairing the sails on the waqa or washing the decks. Sometimes she’d go next door with Bubu to the aunties’ house and fall asleep while they talked and played cards.

‘Does Bubu know?’

‘She’s never asked me. But I think she has her suspicions,’ said Leilani.

‘How did this happen? How does it work?’ asked Tia.

‘I’m part of a network in the Academy and on Mars and on Orojet Station,’ said Leilani, dipping her head.

‘Aunty Rota too?’ asked Tia.

‘She’s the monitor for Ajak whirlpool. Sometimes we use it as a back door,’ said Leilani.

‘I thought Ajak had closed over into the scar. Nothing comes in or out of it now does it? No light, no debris,’ said Tia, standing up and gazing out at the whirlpool.

‘Officially? No. Nothing is supposed to come out of it. But when it’s needed, we have used it as a route to get our people in or out of Earth. Aunty Rota’s tourism business works pretty well as cover.’

‘What about the uncles? Do they know?’ asked Tia, her mind reeling.

‘I think they suspect,’ said Leilani.

‘Why didn’t anybody tell me?’ asked Tia.

‘We didn’t want you to be at risk. I’m sorry, I never wanted to involve you in any of this. I never thought you would come out here into deep space,’ said Leilani, sipping the exo-packet coffee and wincing.

‘I thought you were lost in the whirlpool. I wanted to help,’ said Tia, kicking at a stony knot in the floor.

‘And this is exactly what Dani wanted. She wants your navigation abilities. She is one of the most brutal Commanders in special ops. She captained the Academy ship that took over this ship, *Pawta*. But she has totally underestimated Thraean technology. She has no idea what *Pawta* is capable of, and we want to make sure she never finds out.’

‘Well, she’s in the brig now. She’s not going to find out anything in there,’ said Tia.

‘Can you take me to see her,’ asked Leilani.



Dani paced back and forth in front of the lattice-work door, its intricate patterns tracing shadows onto the walls, and onto her face. She recoiled at the sight of both her daughters as they entered the hall on the other side of the brig entrance. But she quickly recovered her equilibrium.

‘Hello Leilani, glad to see you’re safe and well. And you Tia, how are your navigation duties coming along?’ asked Dani, glaring at them both.

She no longer surrounded herself in the imaginary bridge playing war games. She now preferred a monotonous re-enactment of the actual brig. The head guard sat on the side of a cricket green, a one-person crowd, sneering as he watched the other guards playing cricket. He logged Tia and Leilani’s arrival and sat up attentively, waiting for any command from Dani.

‘You know, I’m sorry it’s come to this. But you must know that as the real Captain of this ship I was only doing my duty.’

Tia glanced at Leilani who rolled her eyes. This show of apology from Dani didn’t fool Leilani one bit.

‘You have never cared about us,’ said Leilani.

Dani walked hesitantly towards the barrier, her enhanced legs moving in awkward arcs as though they’d begun to seize up. She stopped and shook her feet, repositioning herself.

‘I did what I thought was best for both of you at the time. I know I can never make up for the past. I thought it was the best thing to do, to stay away from you and let

you get on with your lives. I blame myself. But look at you now Tia, you are such a talented mapper and navigator and pilot. And you Leilani, such a wonderful skill you have with strike.'

The head guard exited himself from the cricket game and came to stand behind Dani. Leilani glared at Dani. Dani leaned her weight onto one leg and tapped her foot. She nodded slightly as though listening to a tune in her head, her arms folded across her chest and her mouth turned up into a half smile. Tia looked back and forth from Leilani to Dani as they stared each other down. The guard coughed behind Dani and broke the spell.

'May I remind you that you have a duty to the Academy,' said Dani, without taking her eyes off Leilani.

'You are going to get what's coming to you,' said Leilani.

'You are so much like your father,' said Dani, almost spitting at Leilani.

'He's more honourable than you will ever be,' said Leilani.

'Is that what you think? I could tell you a thing or two about your father. He's not the angel you think he is,' said Dani, tipping her chin.

'What are you talking about?' asked Tia.

'Don't listen to her. She'll say anything to save her own skin,' said Leilani.

'Let me out of here,' said Dani, her voice lowering to a menacing whisper.

Leilani grabbed hold of Tia's arm and led her away. Tia glanced at her mother who stared back at her with a look of composure and intensity as they left.



'I took Leilani to the brig. She wanted to see Dani,' said Tia, looking at the floor.

'How did that go?' asked Turukawa, checking readings as she walked around the probe with a medi-phaser.

‘I don’t know. I want to believe Dani. She’s my mother. But she’s so misguided,’ said Tia, shaking her head.

‘Where’s Leilani now?’

‘I left her on the bridge with Sotrakkar,’ said Tia, looking up at a portal lakescreen and studying the whirlpool currents.

‘We’re on track to exit the downdraft,’ said Turukawa.

‘Dani said something about Gromtarg. She said he wasn’t the angel we think he is,’ said Tia, rubbing her sweaty hands on her exo-suited thighs.

‘There’s nothing remarkable in his profile,’ said Turukawa, flicking her head as she checked her data base.

‘She’s probably just trying to get into our heads. My mother has no boundaries.’

‘Don’t worry,’ said Turukawa, reaching out to touch Tia’s hand.

The light from the whirlpool changed and shone through the lakescreen onto Turukawa’s face, outlining her full lips. Tia stared at her.

‘Let me look at that thing,’ said Tia, grabbing the medi-phaser out of Turukawa’s hand.

‘Hey, give that back.’

Tia ran away from the probe holding the medi-phaser over her head. Turukawa rushed at her and put one arm around her middle while reaching up with the other to take back her medi-phaser. Tia’s legs rubbed up against the embod’s hard muscled thighs. Turukawa laughed as she tried to grab at the medi-phaser, her breath hot on Tia’s face. Tia’s heartbeat throbbed in her ears as Turukawa held her tight and she gave in, releasing the medi-phaser. Turukawa gripped the instrument in her hand but continued to hold Tia tight against her body.

‘You know I like you, a lot,’ said Tia.

‘I know,’ said Turukawa.

Tia reached up to touch Turukawa’s cheek with the back of her hand, drawing it downward and staring into the embod’s eyes. She leaned in and tilted her head pushing her lips across Turukawa’s in a soft stroke, testing, waiting. Turukawa held her with both arms and deepened the kiss with a gentle brush of her tongue, pushing against her warm lips. Tia tasted her, ran her hands down her back. Her heart pounded and fluttery sensations filled her stomach. She closed her eyes to the light in the hold, wanting to sink into Turukawa’s embrace.

They parted quickly as footsteps clunked down the ladder. Sotrakkar came scrambling down the steps, missing the last rung and falling into a heap on the floor. He gathered his robes and tried to get to his feet. Tia ran to help him as he flailed on the floor. He steadied himself, trying to catch his breath, his eyes big.

‘Dani and the guards. They’ve escaped from the brig,’ said Sotrakkar.

‘Where are they?’ asked Tia.

‘I don’t know. I went to check on them and found a wall open inside the brig,’ said Sotrakkar, running up to the wall behind the probe.

‘What are you doing?’ asked Tia.

‘We need to get to the prep room. Follow me. Oculum is waiting there for us,’ said Sotrakkar, skimming his hand over the wall, searching for the dip.

‘I thought the brig was secure,’ said Tia.

‘It is, usually. When *Pawta* sent out the ropes to bring the shuttle back I think she lost power to one of the walls in the brig. It must have opened up and let them out,’ said Sotrakkar.

‘They could be anywhere on the ship. They could be in the passages. Can we lock the walls of the prep room and what about the bridge?’ asked Tia.

‘The walls can be closed off so that the dips won’t open. I’ve shown Leilani how to lock the walls in the bridge. I’ve locked all the walls in the prep room,’ said Sotrakkar.

Tia activated her sleeve patch to connect with Leilani, searching for her on the bridge.

‘We’re on our way to get Oculum. Are you ok?’ asked Tia, tapping her sleeve.

‘I’m fine. Are you still in the hold?’ asked Leilani.

‘Yep. You sit tight. We’ll see you soon.’

Tia placed their hands on the wall, frantic to find a way out of the hold. She closed her eyes and concentrated on the tips of her fingers, moving them gently over the sandy texture of the wall. She found a ridiculously small ridge near the base of the wall where it met the floor and curled her forefinger into a dip.

‘Got it,’ she said, pushing her fingers into the stone.

The wall collapsed, opening like a watery screen. Tia’s heart pounded as Turukawa grabbed her hand and they ran close behind Sotrakkar. He led them through the tunnels until they came to a dead end. Sotrakkar found the dip opening right away. As soon as Tia walked out of the wall, she heard Dani’s voice echoing in the passage. She pulled Turukawa away from the wall and they fell back through the door, holding onto each other as the curtain fell.

Passages

Tia brushed herself off in the dim safety of the passage. She remained silent, listening to Dani's muffled voice resonating through the wall, shouting commands at the guards. The beat of their wave sabres clattered against their exo-battlesuits, slowly fading as they ran away.

'Where did they get the weapons?' asked Tia.

'Probably stashed them in the walls,' said Sotrakkar.

He locked the wall with a firm twist, closing over the dip so that Dani would never be able to get through. He pressed an ear against the wall and motioned with his hand to move quietly into the passage. Dark green light threw grotesque shadows across their faces. A faint metallic smell filled the air, like blood. Tia scanned herself wondering if something had cut into her skin somewhere. Her exo-suit remained intact.

Sotrakkar led the way, his hands trailing along the walls, searching for dips. It became increasingly difficult to breathe in the passages. The temperature had increased to an uncomfortable level and the walls had become hot to the touch. Sweat formed on Tia's forehead, dripping into her eyes, clouding her vision. She leaned one palm against the warm surface of the tunnel, her legs aching as she waited for Sotrakkar to find the dip opening in the wall. He let out a small sigh of victory when he located a hollow and the wall clicked open, parting to reveal the red light of the prep room.

Tia waited for her iris circuitry to adjust. Tables and chairs lay on their sides in disarray all over the floor. Empty exo-packets littered every surface. Coffee stains and piles of extruded replicator food smeared the overturned tabletops. Tia edged her back along a wall, her wave sabre drawn, checking behind the upended furniture. Oculum

slowly appeared from behind an overturned table at the rear of the room. Tia ran to greet them.

‘What happened here?’ she asked.

‘I hid in the wall. Dani ransacked the place looking for me,’ said Oculum.

‘Hurry we have to get to the bridge. They’ll come back,’ said Sotrakkar, as he looked for a depression in the opposite wall.

‘Nobody is going anywhere,’ said Dani.

Tia spun around to see Dani and the guards entering the prep room. She dived behind a table with Turukawa. Sotrakkar dropped underneath a thick plank chair. For some reason Oculum remained standing, exposed, staring at Dani as though in a trance. Sotrakkar grabbed Oculum’s leg and pulled them down. As Oculum fell, Dani and the guards opened fire, shooting flaming orange arcs that sizzled over Tia’s head. She sheltered against the table with Turukawa. After a few minutes, the firing stopped.

‘Tia? You and your friends might as well give up. Come on. I’ll look after you. We’re in this together,’ said Dani.

Turukawa shook her head at Tia pointing at Sotrakkar who was frantically searching for a concave handle in the wall as Dani and the guards advanced.

‘With your navigational abilities we’ll be able to get out of this whirlpool and fly back to Earth. That’s what you want isn’t it? To go home?’

The whining quality of Dani’s voice sickened Tia. A bitter taste rose into her mouth. She shuddered inwardly and lifted her wave sabre, pointing it in Dani’s direction.

‘Quick, in here,’ whispered Sotrakkar, lifting the hem of the wall.

Tia trained her wave sabre on Dani’s head, her hand shaking as she found Dani in the sights.

‘I’m not going anywhere with you,’ shouted Tia, from behind the table.

‘Have it your way,’ said Dani, signalling to the guards to resume shooting.

Sotrakkar held the hem up from the other side of the wall. Tia and Turukawa threw themselves through the opening. Sotrakkar pulled the hem shut and locked the dip, twisting and smoothing it over so that nobody would be able to get through from Dani’s side.

Tia stumbled along the darkened green passageway holding onto Oculum. The Matifon tripped and fell repeatedly. They finally reached a small cave-like clearing, a kind of grotto. Oculum sank to the floor and slumped over to one side. Blood oozed out of the left arm of their exo-suit. Turukawa cut away the exo-suit material to reveal dark red blood dripping from the blackened edges of a long wound. Oculum cried out in pain when Turukawa applied pressure to the wound and sealed it with a medi-phaser.

‘I’m fine,’ said Oculum, their face contorting into a grimace.

‘It’s just a flesh wound,’ said Turukawa, holding her palm to Oculum’s forehead.

‘We have to get to the bridge before Dani,’ said Tia

‘I know the way. We’ll need to take a few different passages to get around all the walls I’ve locked,’ said Sotrakkar.

‘We can’t stay in these tunnels. Dani knows how to open the walls now,’ said Tia.

‘She doesn’t know how to work the lock mechanisms. And she doesn’t know the tunnels like I do. I just need a bit of time to figure out a different route to the bridge,’ said Sotrakkar.

‘So, let’s take a breather here for a few minutes, let me fix up Oculum’s wound, and then we can keep going,’ said Turukawa.

Tia sent a green dot message to Leilani on the bridge. Would she be working strike formations for the resistance? Was that what she had been doing all those times she appeared to be at play? It would have been actual work for the resistance. Tia kept tapping the green dot, searching for Leilani's signature. The link suddenly connected, and Tia spoke into the mike.

'Are you there?' she asked.

'All secure so far,' Leilani replied, from within the safety of the dual connection.

'We're on our way through the walls. Just stopped for a bit while Sotrakkar figures out how to get there,' said Tia, deciding not to mention Oculum's injury.

'Ok. I'm keeping the ship on track to exit the downdraft,' said Leilani.

'We'll be there as soon as we can,' said Tia, lingering on the end notes of Leilani's voice, not wanting to sign off.

The silence between them drew on, floating in the airwaves of the green dot until Leilani cut the link. Tia wanted to escape. She focussed her thoughts on Turukawa to keep the fear at bay. Turukawa let go of Oculum's wrist.

'Are you alright?' asked Tia.

Oculum shrugged half-heartedly.

'It's Dani. Why would she do this? She's a captain in the Academy.'

Tia didn't know what to say. There was no justification for her mother's actions. She wondered if Dani was working a secret mission.

'I guess she's chosen her side, as we all have. I'm glad we're here together,' said Tia, touching Oculum's arm.

They lapsed into the silence of the cavern. The only sound came from Sotrakkar whispering quietly into the wall. Tia's translation patch picked up only snippets of the conversation. Something about the whirlpool but nothing specific. She watched the

Thraean's animated form, bending forward and arching back and forth, his hands dancing as he spoke. He finally ended the discussion with the ship.

'*Pawta* is aware of our situation and will help us as much as it can. The whirlpool is closing. We have to exit the downdraft before it closes up completely,' said Sotrakkar, pacing back and forth in front of the walls, searching the surfaces.

'How long have we got?' asked Tia.

'I'm not sure. There are so many variables. Size, speed. The currents, they're the first thing to change when a whirlpool is dying. They slow down until the spin is gone and eventually the entire system collapses. If you're caught inside when that happens, the vacuum will crush you. It just implodes. You want to be on the outside of a dying whirlpool. *Pawta* has already calculated a slowdown in the currents. We've got to get moving.'

'How are we going to deal with Dani and fly *Pawta* out?' asked Tia.

'I think we're wasting time going back to the bridge. Once Dani and the guards get there, we'll have to fight her off. There's no time for that. The easiest escape route is to take Leilani's shuttle and get out that way,' said Turukawa, resurfacing from the hive, her eye circuitry devolving into a strange configuration.

'You're right. We can't keep Dani out off the bridge forever. It will be easier for us to take the shuttle and get out that way. I can get through the tunnels to the shuttle. And *Pawta* will help us,' said Sotrakkar.

'I'm going to get Leilani from the bridge,' said Tia.

'I'll come with you,' said Turukawa.

Sotrakkar stopped pacing and opened a map on the wall.

‘Alright. This is where we are now and this is how you get to the bridge,’ said Sotrakkar, tracing his finger along a route of passageways leading to the bridge. Tia recorded the map in her sleeve patch.

‘Meet us back at the shuttle, here,’ said Sotrakkar, pointing to a spot on the map.

‘Is there a shuttle bay there?’ asked Turukawa.

‘There is now. *Pawta* has just constructed one at my request so we can fly the shuttle out of the hull. It swallowed the shuttle and regurgitated it here. Dani will never find it But, *Pawta*’s used a lot of power to do this,’ said Sotrakkar.

‘It can swallow things?’ asked Tia.

‘Well, technically *Pawta* can absorb objects and redeposit them. It can’t do it with all substances. But the shuttle was dense enough for it to move. It’s always a lottery when it’s swallowed something. But it’s a risk we must take. *Pawta* will protect us as much as it can,’ said Sotrakkar.

‘Are you ok to walk?’ asked Tia, looking up into Oculum’s eyes.

Oculum’s eyelids flickered open and they rose unsteadily to their feet. Tia helped them, holding them at the waist.

‘I’m good,’ said Oculum, holding onto her arm.

Sotrakkar held the wall open and helped to support Oculum as they stepped into the passage.

‘See you soon. Lock the doors behind you as you go. See you at the shuttle,’ said Sotrakkar and disappeared behind the curtained wall with Oculum.

Tia heard Sotrakkar locking the dip on the other side of the wall, smoothing over the wall’s rocky surfaces. Her legs shook as she realised that she and Turukawa would now be travelling into the tunnels without Sotrakkar to guide them. They looked at each other and turned as one to the first wall on Sotrakkar’s map. Tia easily found the dip

and opened the wall into a new passage. She locked the wall behind her, marvelling once more at the simple organic nature of Thraean technology.

‘You’re a natural at this,’ said Turukawa.

Tia didn’t answer, moving quickly to the next wall.

‘I can’t find the opening,’ said Tia, swiping her hand across the wall. ‘*Pawta?* Can you show us the way out?’ whispered Tia, leaning into the wall as she’d seen Sotrakkar doing when he talked to the ship.

Nothing happened. Tia banged her fist on the floor and decided they would have to find another way out. As she got to her feet a red light pulsed on the opposite wall.

‘Did you see that?’ she asked.

Turukawa touched the spot on the wall where the red light had flashed and found a dip opening.

‘That’s not on the map,’ said Tia.

Turukawa carefully pulled open the wall and peered into the space beyond.

‘It’s a normal corridor. Outside of the walls,’ she said.

‘*Pawta*’s telling us something. I’m sick of these tunnels anyway. It’ll probably be faster going into the corridors,’ said Tia, stepping through the wall.

Turukawa followed her and they inched slowly along the corridor wall, listening for any noise. Dani and the guards would be on their way to the bridge as well, thought Tia. The thought that they were already there, blasting their way through the door, spurred her along. Her senses heightened.

‘I know where we are. The bridge is up there,’ said Tia, running ahead of Turukawa, not thinking for a moment about the risks that lay directly in front of her.

She ran straight into a pair of guards. But before they could draw their weapons Turukawa fired on them and they fell face down onto the deck. Turukawa grabbed hold

of Tia's hand and pulled her away. They hurdled the prone guards and raced down the corridor in the direction of the bridge. Tia heard footsteps running behind her and Dani's unmistakable voice barking orders. As she ran Tia activated an urgent green dot message and shouted into her sleeve.

'Leilani, it's me, let me in,' said Tia pounding on the bridge door.

Tia heard Leilani unbolting the door. It opened a crack. Leilani's hand arched out and pulled Tia inside. Tia in turn dragged Turukawa with her into the bridge and they slammed the door shut. Leilani closed it off and welded the lock. Dani banged on the door yelling for Tia and Leilani to open it up. Tia backed away from the door. Dani shouted orders at the guards, and they opened fire on the door.

'Won't take them long to blast the door open. Their weapons are set to explosive,' said Turukawa.

Tia heard it too, the familiar detonations used to destroy immovable objects. Bumps began to appear in the door as the wave sabre blasts punched into the frame.

'We need to get out of here,' said Leilani.

'I know, but all the tunnel exits are locked off,' said Tia.

'*Pawta*, can you help us to get to the shuttle?' asked Turukawa, her voice calm and measured.

Tia and Leilani held onto Turukawa and backed away from the wall seeking cover behind a control console as a burning onslaught of sabre fire started to sear an opening in the structure of the door. *Pawta* screamed when the weapons blasted through and a hole appeared in the door, growing larger and larger. Smoke filled the room and orange flames arced into the air. Tia huddled into Leilani and Turukawa as the floor suddenly gave way beneath them. They fell into a cavity that cushioned their fall and caught them like a giant catcher's mitt capturing a ball in its leathery palm. The opening

closed above their heads and they found themselves propelled in peristaltic ripples, a progressive wavelike journey through the innards of the ship.

Tia thought she might vomit as the motion bounced them upside down into a sickening headlong rush. She gripped onto Turukawa, and they rode the undulations like surfers caught in ocean backwash. Each contraction mulched them between soft spongy surfaces and carried them towards an unknown destination. She felt as if she were choking and kept reaching out to push herself away from the soft walls continuously pressing into her. Turukawa held Tia's hand until the awful ride came to a sudden halt and *Pawta* spat them out onto a hard floor. They fell in a jumble, scrambling to extricate themselves from each other and reorient their senses. Tia tried to focus on the floor beneath her to make sure it stayed still. Her sense of equilibrium slowly returned. She turned over onto her back and pushed herself up into an awkward seated position. Leilani lay groaning on the floor. Turukawa staggered to her feet and helped Leilani up.

'Where are we?' asked Tia.

'You're in the shuttle bay. We've got to move. The whirlpool is cutting out,' said Sotrakkar.

Leilani's shuttle sat in the middle of the makeshift launch bay, its pectoral fins vibrating a little in preparation for lift off. Tia stumbled up onto the boarding ramp behind Turukawa and Leilani and made her way into the control room. Leilani collapsed into a passenger seat, her face ashen.

'Take the helm,' she said.

Tia obediently sat in the pilot seat, pulled on her restraints, and clicked them into place. Sotrakkar asked *Pawta* to open a launch bay door.

'Go!' shouted Sotrakkar.

Tia revved the fins. The wall of the improvised shuttle bay peeled like a huge curtain of water. Tia swiped the control panel and the shuttle lifted into the air. She flew the craft out of the launch bay door and into the current of the whirlpool, circling away from *Pawta*. When she glanced back, she saw *Pawta* had turned towards her.

Exit

Two banks of rotating pectoral fins buzzed on the sides of the shuttle, the noise whirring into Tia's brain as she sped away into a strong current. She caught a glimpse of *Pawta* at the edge of the lakescreen, following not far behind. Did the shuttle have the power to outrun it? The trip through *Pawta's* throat—for that is the only way Tia could think of the tube ride she'd just experienced—had left her groggy and uncoordinated. She banked the vessel left and right, in and out of the swells and cross currents of the whirlpool. The shuttle, being a smaller and more manoeuvrable ship, easily outran the more ponderous Thraean vessel doggedly tailing them. Although Tia suspected that *Pawta* also played a role in slowing down its own progress so that the shuttle could escape. Dani would be at the helm of *Pawta*, Tia had no doubt. She swiped the controls back and forth, surfing undulating clouds and waves, fighting against the dizziness that threatened to incapacitate her.

'Be calm,' said Turukawa, speaking to her through the dual hive.

She took a deep breath softening her grip on the instrument panel and trying to settle the tremors in her body. She glanced behind her at Leilani, Oculum and Sotrakkar strapped into their seats with a bulkhead of Thraean technology wedged up against their backs. They all looked pale and worried.

The shuttle bucked and rolled as the swells tapered into the neck of the downdraft. Tia banked hard against the currents pulling the shuttle into the narrow descent. Spinning clouds moved tighter and faster and caught the shuttle in a spiral. Tia tried to pull back on the speed to slow the shuttle's steep path into the downdraft. But the pectoral fins had run out of power and sputtered to a standstill, unable to ease up, caught in the strength of the flow.

‘We’ve lost power,’ said Turukawa.

Tia tried to fire up the shuttle once more, but it didn’t work, and the pectoral fins finally cut out, sputtering into stillness. She steered the vessel like a glider but without power she had little control. They now flew at the mercy of the downdraft currents spinning into a tighter and tighter knot as they neared the exit of the whirlpool.

‘What’s that blue light?’ asked Tia, gazing at scattered shards of turquoise bouncing off the swirling clouds at the whirlpool exit.

‘It’s a reflection throwing off the surface of Thrae,’ said Sotrakkar, his voice brightening at this sign from his home world.

The whirlpool suddenly dissipated, and the shuttle burst out of the downdraft into Thraean space. They floated into the darkness, propelled slowly towards a planet about the size of Earth, as the final energy of the whirlpool momentum dissolved. Thrae hovered in the lakescreen, a turquoise globe. For a second Tia thought she had hallucinated planet Earth, that the shuttle had somehow skipped into Earth’s dimension, and she would be home any minute, swimming in the warm waters flowing over her home island, Namu. She allowed herself the luxury of the dream, the gliding lull a much-needed reprieve from their relentless hurtling trip through the whirlpool.

Swirling white cloud-cover surrounded Thrae, painting it with wispy swathes against a blue marble canvas, encircling the planet, just like on Earth. But this blue planet shone brighter than Earth, it glowed. The unfamiliar shapes of green and brown continents peeking out between streaks of white cloud forced Tia to accept that she had not somehow miraculously arrived home. Her hand moved up to her neck to hold the black water taonga Bubu had given her. The velvety stone grew warmer as she held it in her palm. This taonga knows the way home and this planet is not home thought Tia, her chest constricting.

Sotrakkar stared up at the lakescreen, in his own kind of reverie. Tia wondered how long it had been since he had last seen his home, set foot on the soil. Leilani startled them both out of their dream states and back into reality.

‘Dani is right behind us,’ said Leilani.

Tia turned to look out of the lakescreen portal at the rear of the shuttle and saw *Pawta* ejecting from the whirlpool.

‘There’s an asteroid field on the other side of the planet. We can hide there until I can call ahead to the control towers to let us through the force field,’ said Sotrakkar.

‘The fins are dead. I don’t know what’s wrong with them. They cut out when we exited the whirlpool,’ said Tia.

‘What about the probe in the hold. Can we use it?’ asked Leilani.

‘Not really,’ said Sotrakkar. ‘The technology inside the probe is for data capture. But that does give me an idea.’

He leapt out of his seat and began pulling the cover off the black hulk of Thraean technology packed behind the passenger seats. Oculum and Leilani helped him.

‘*Pawta* installed this technology in here in case we got stuck in the whirlpool. It’s like a tugboat, strong enough to haul us out of the downdraft real fast. I’ll configure it to tow us around the planet,’ said Sotrakkar.

‘How long will that take?’ asked Leilani.

‘Too long. Dani will catch up to us before I can reprogram it,’ said Sotrakkar.

‘What if I travel with the tug and direct it?’ asked Turukawa.

‘It goes like a rocket when it’s triggered. And we’ll only have one shot. It’s only meant for one sharp burst. The fuel runs out pretty quickly after the initial blast-off,’ said Sotrakkar, shaking his head.

‘It’s too dangerous. You’ll freeze out there,’ said Tia.

‘I’ll have a suit on, and it’ll only be a short trip to get us into the asteroid field. I know I can do it,’ said Turukawa, her voice calm.

‘I’ll call ahead to the control tower and tell them what we’re doing so they can open a hole in the force field on the other side. We don’t want to lead Dani there, but we have to get in somehow and this might be the quickest way,’ said Sotrakkar.

‘Ok, let’s do it,’ said Leilani.

Turukawa quickly and unselfconsciously undressed and suited up in front of everyone, pulling the Thraean space suit onto her muscled frame while Oculum and Sotrakkar pushed the tug into the airlock. Tia pulled her attention away to the lakescreen to check *Pawta’s* progress.

‘Dani’s gaining on us,’ said Tia, glancing at Turukawa now fully enclosed in the suit and checking her systems.

Tia broke out in cold sweats all over her body thinking about Turukawa flying the tug. She rubbed her arms trying to warm herself. Sotrakkar checked the grey braided rope of the tug harness and pronounced her ready to fire. Turukawa positioned herself on the side of the tug and chained her suit into dips that Sotrakkar had fashioned out of its stone hull. She gave a curt nod and prepared to close the airlock door. Tia brought her hand up into a feeble wave as she watched Turukawa disappear into the airlock and sank heavily into her station at the control panel. She strapped herself into the pilot seat to await Sotrakkar’s signal, preparing for the g-forces about to pull on their bodies.

Leilani opened the outer door of the airlock. All eyes turned to the lakescreen as the tug floated into space with Turukawa strapped to its side. The airlock door slowly moved back into place and clicked shut. Tia gasped, her breathing raking in and out of her throat and her heart pounding as she watched Turukawa activating her suit rockets

and moving the probe into position at a distance to the shuttle, taking up the slack in the rope.

‘Ready?’ asked Sotrakkar, speaking into the green dot feed.

‘I’m ready,’ said Turukawa.

‘Ignition in three, two, one.’

Sotrakkar hit the control button. Nothing happened for a second. Tia glanced at Sotrakkar thinking the tug might have misfired. Sotrakkar’s eyes remained rivetted to the lakescreen, his lips moving as if in prayer. The sudden force of the tug accelerating thrust Tia’s body into her seat and held her there, pinning her in place with the strength of a puffer ship lift off.

She watched the tug in the lakescreen with Turukawa steering it into a curved orbit around the south pole of the planet. Tia struggled to move her hand to the control panel, wanting to ready herself for the inevitable slow down when the tug’s power cut out and only the momentum of the initial acceleration would remain to move the shuttle. She prepared herself to guide the shuttle into the asteroid field. But how would they get out of the asteroid field and down onto the planet? And how would they get back to Earth? Tia put these questions out of her mind for the moment. Sotrakkar and Leilani would know what to do.

Turukawa successfully steered the tug which pulled the shuttle into a circular orbit around Thrae, leaving *Pawta* behind the Southern curve of the planet. Hopefully, Dani had missed the shuttle’s unexpected acceleration and would have lost sight of them if only for a moment. But that moment had given them enough time to float into the asteroid belt. The shuttle began to slow, coasting with the momentum it had built up. Turukawa cut herself free from the tug and steered herself back towards the floating shuttle with her suit rockets. Leilani opened the airlock door and Turukawa flew inside.

Tia checked on Turukawa in the lakescreen. She watched the gauge as the pressure in the air lock equalised. The two-minute wait seemed like forever. As soon as the alarm sounded. Oculum spun the door lock open and rushed into the airlock with Leilani and Sotrakkar.

Turukawa fell forward. They caught her and laid her limp body onto the deck of the airlock. Oculum unlocked her helmet and removed it. Her eyes flickered open and shut. They gave her a wake-up shot with the medi-phaser and she sat bolt upright, her eyes opened wide before she sank back down onto the floor writhing in pain.

‘Quick, we need to warm her up,’ said Oculum, unzipping Turukawa’s suit and gently removing the material from her body.

Leilani placed an exo-blanket around her shoulders and Oculum carried her into a heated chair in the shuttle, bolstering her with pillows and laying the chair back. Leilani took Turukawa’s hand and tenderly massaged her fingers to warm her skin. She slowly came to, her eyes blinking rapidly and squinting against the light.

‘Did we make it?’ asked Turukawa.

‘We made it thanks to you,’ said Leilani, glancing behind her at the lakescreen to see where Tia had steered the shuttle.

‘We’re inside the asteroid field. You did it,’ said Oculum.

Turukawa tried to get up, pulling against Leilani’s hand to lever herself into a seated position.

‘It sure is cold out there,’ said Turukawa, looking at herself under the exo-blanket, and pulling it tight around her naked body.

‘Where’s my battlesuit?’ she asked.

Leilani laughed and handed her the red and black suit.

‘Any sign of Dani?’ asked Turukawa, trying to pull her suit on.

Oculum and Leilani helped her into the suit, pulling the limp arms around for her to place her hands into the sleeves and helping her to find the legs.

‘No sign of Dani. I’ve called the control tower on the ground and they’re sending a battleship to bring us in. *Pawta* won’t engage with a battleship, no matter what commands Dani gives it,’ said Sotrakkar.

‘So, we just need to sit tight until the battleship arrives,’ said Leilani.

Now fully clothed, Turukawa relaxed and leaned into the seat, while Leilani pulled on her gravity boots.

‘That was an incredibly brave thing you did,’ said Tia.

‘We’re not there yet,’ said Turukawa.

Heat flamed in Tia’s neck and ears and flowed up into her cheeks. She turned her attention back to the lakescreen and the view of a blazing star lighting up the asteroid field and throwing long shadows, big enough to hide a shuttle.

Thrae

The battleship looked like nothing Tia had imagined. It appeared beyond the asteroid belt like a grey circle of gas moving in pulses toward the shuttle. As it moved closer, its form became clearer, an umbrella shape, a huge dome with a stone-like hull and yet it moved with the fluid elasticity of a moon jellyfish, a gently pulsating cupola. The battleship pulsed rhythmically and gently, propelling the vessel through space. With each contraction of the dome the ship travelled a great distance. The sight of such an efficient, magnificent, and beautiful vessel momentarily swept aside all of Tia's dread of deep space and leaving Earth. She stared open-mouthed and all her worries and concerns fell away. Darting around the huge craft were smaller, sleeker torpedo shaped vessels with scaly orange exteriors. They jumped and leapt around the body of the battleship, criss-crossing and spinning like sockeye salmon leaping up waterfalls.

It took only two pulse beats for the battleship to reach the asteroid belt where it came to a soft halt and sat waiting close to the shuttle's position. Sotrakkar sent out a message to the enormous ship. Not long after, a group of the orange vessels flew away from the battleship and encircled the shuttle, pulling it into the base of the dome floating in the blackness of space. A group of orange vessels towed the shuttle up through the centre of the dome and onto a round platform.

Stepping out of the shuttle and into the battleship, Tia felt an overwhelming sense of calm. The roof of the dome arched over her head in a gigantic blue transparent arch. She realised that if she had not left the bounds of her home galaxy, she would never have beheld this incredible ship. She began to understand what Keleni and Aunty Rota and Leilani had told her all along—about the incredible sights and sounds, the wonderful experiences she would have in the New Worlds. She had always believed

what they told her on an academic level. But they had never been able to convince her to go into deep space to experience these things for herself. She told them she did not need to see these strange sights or hear the new sounds or experience the different smells and textures of deep space worlds. She experienced them well enough in the simulator drills. Most of all she did not believe Dani and did not want the life her mother had expected her to lead. More than anything, she did not want to be like Dani.



Tia paused at the curved lakefront. Fog kept shrouding the sun, not a complete white out, just a patchy dusting that took any brightness out of the stark light and gave the illusion that if she took a step in whatever direction away from her door she would be walking on air. Still, since she'd arrived on Thrae, she had taken in every sight and had run many scenarios in her head, adamant that if she carried even one idea back to Earth she might use what she'd learned to save so many creatures.

It seemed so random that of all the ghostborgs on Earth, the Academy had assigned to this mission the first one, the only one, to achieve sentience. This iteration of Turukawa acted so differently to any other ghostborg Tia had ever met. This one had actual feelings and a body that seemed human. She ate food and cried and sweated and froze in the cold. She had seamlessly melded and integrated all her robotic systems with human traits. And now she slept like a normal person, in their shared bed. Sleeping after they'd fallen into each other's arms on an alien planet.

Tia hadn't meant for it to happen. It seemed so long ago since they'd flown into the asteroid field and yet it had only been one Thraean day, their star much bigger than Earth's sun and a lot further away. She had managed to tuck the shuttle in behind a large asteroid shaped vaguely like an upside-down pyramid. When the battleship had taken them down to the surface of the planet, *Pawta* had hung back in space at the

bottom of the globe, watching but refusing to go anywhere near the battleship. Tia had laughed at the thought of Dani sitting in the bridge, powerless, seething while she watched them float past with her precious probe so close and yet out of reach, unable to make *Pawta* move.

Upon their arrival, the Thraeans had taken them to a meeting with the Chief, the ruling authority on Thrae who had somehow already received a briefing from Sotrakkar. The Chief wore the same design of robes as Sotrakkar, although unlike Sotrakkar, the material of his robes flowed and curled gracefully in his wake as he walked and had no holes or rips in the material. The Chief treated them with kindness and courtesy but also told them plainly that humans had treated Thraeans very badly, especially one Captain Dani Eddy. Tia flinched at the mention of her mother's name and cursed her silently. She told the Chief that she and Leilani were Dani's daughters, that she did not agree with what their mother had done and that she wanted more than anything, to return to Earth. The Chief stood silently looking at Tia.

'Many families have travelled here to take home the bodies of their loved ones,' said the Chief.

Tia glanced at Turukawa and Oculum and Leilani, thinking of the bodies of Thraeans in *Pawta*'s hold. No one spoke.

'I'm so sorry,' said Tia, aware that nothing she said would be enough.

'I've met your father Gromtarg. He is a great man. He's helped our cause enormously. As has your Aunt Rota on Orojet station and your sister,' said the Chief, glancing at Leilani.

'You are a very gifted family and I thank you. My son Sotrakkar also vouches for you in the highest terms. I've seen your lakescreen footage. You fired a weapon at your mother,' said the Chief, looking directly at Tia.

Tia jerked her head back and lifted her eyebrows at Sotrakkar. He'd never said anything about being the son of the Thraean ruler. She didn't know what to say to him or his father. The mention of Gromtarg and Aunty Rota had silenced her. Leilani elbowed her in the ribs and coughed. Tia jumped.

'Thank you,' said Tia, haltingly as she looked between the Chief and Sotrakkar. They did look alike, both short and muscular with the same long face and velvet brown eyes.

'The probe you brought back to us holds valuable data. Sacred information you might say. But then someone like your mother would not understand that. And yes, our revered whirlpool is dying. Captain Eddy is on a fool's errand,' said the Chief.

Tia again fell silent. The Chief laughed.

'A daughter at odds with her mother. We have this on planet Thrae,' said the Chief, chuckling to himself and glancing at Sotrakkar who stared straight ahead and did not meet his father's eyes.

'We will fix your shuttle and enhance the technology so that you can return to your world. My son will come with you to retrieve *Pawta* from Captain Eddy and bring our dead home. For now, we have prepared some food and accommodation for you,' said the Chief, turning and walking briskly out of the room without any further discussion.

'I won't abandon *Pawta* or my people in Dani's hands. It is a Thraean ship and they are my brothers and sisters in the hold. I will bring them back to their true home,' said Sotrakkar, his companions nodding at him.

Tia followed Sotrakkar and two other Thraeans, a man and a woman, as they ushered her and the others into a prep room where they served up a dish of food made from a white tuber cooked in a rich brown sauce. When Tia told Sotrakkar that the dish

tasted like meat, he asked her to explain what meat looked like. She told him meat came from the muscle of animals called cows. Sotrakkar gasped and recoiled from Tia, his eyes wide. He assured Tia that Thraeans did not eat animal muscle and did not kill any animals. She asked what animals lived on Thrae. She'd heard a whistling sound echoing over the lake, and had spotted shadows flying through the fog, but had not seen any birds. He explained that there were millions of birds and fish and baby ships like *Pawta* and that Thraeans existed in harmony with the many animals that lived on Thrae.

After the meal, Tia's eyes grew heavy. Sotrakkar, seeing her head drooping, told her and the others to follow him to their rooms. She could have curled up right there on the floor but gladly followed him to a small corridor next to the prep room. They came to a stop outside a large grey door.

'This is for you and Turukawa,' said Sotrakkar. 'I'm sorry thousands of people have come to the city to welcome home *Pawta* and the dead. We have extremely limited space.'

'What? No. We're not a couple,' said Tia.

'Oh, I'm sorry. I thought... I'll find another room for you,' said Sotrakkar.

'No, no. It'll be fine. We can share. There's no problem. I'm dog tired anyway. I just need sleep,' said Tia, looking to Turukawa and nodding vigorously.

'Yeah, it's fine. We can share,' said Turukawa.

'Oh good,' said Sotrakkar, putting his palm to his heart and opening the door for them.

'This way,' said Sotrakkar, motioning to Oculum and Leilani who exchanged amused looks as they walked past Tia and Turukawa.

Tia had started off sleeping as far away from Turukawa as the large bed would allow. She crept to one side under the expansive sheets, the bed easily big enough to

accommodate three people. Turukawa tried to fall asleep on the other side, on the edge, almost falling off. Neither of them slept. Turukawa tossed and turned and moved closer and closer. Tia's thoughts raced. She closed her eyes and tried to sleep. Finally, they lay still, silently facing each other in the dark, breathing quietly. And then they were in each other's arms. Tia lost herself in Turukawa's embrace, gave her body over willingly to her soft warmth. She forgot that Turukawa was a robotically enhanced entity.

Later as she lay listening the wind whistling over the lake a sudden image of Captain Serché crept into her mind and she pulled away from Turukawa's warm arms.

'Did you have a relationship with Captain Serché?'

Turukawa looked at her and drew back, sitting up in the half light.

'How do you know that?' asked Turukawa.

'Just something one of the cadets said.'

'Well, I wouldn't call it a relationship as such. We had a brief liaison. They shipped out on the first deep space mission that they could sign up for. I think they wanted to get as far away from me as possible.'

'Why did they want to do that?' asked Tia, gazing up at Turukawa.

'I don't know. Fear. It happened so quickly. We were both surprised. I don't think I fitted into Serché's plans. They are overly ambitious,' said Turukawa, turning to Tia and smiling.

'I don't want to get away from you,' said Tia.

Turukawa kissed her again, their bodies pressing against each other.

'So, you've done this before... with a Matifon,' said Tia, and laughed.

'Um... yes. Have you?'

'No, I haven't,' whispered Tia.

Turukawa tried to pull away, but Tia held on, her body tingling all over.



The fog over the lake started to clear. A flock of birds flew low near the surface of the water and disappeared into a grove of trees. Although she had risen first, she'd stood at the door for a long time, watching Turukawa sleep. But her eyes kept wandering out to the beautiful blue lake. Bright green trees edged the lake, luminous and tall, waving in the wind. Wandering down to the water she found the impossible blue colour of the lake so inviting she wanted to dive in and go for a swim. Only the thought that some unknown taniwha may live in the lake stopped her. When she returned to the room Turukawa sat fully dressed on the end of the bed pulling on her gravity boots. They both jumped when someone pounded on the door. Tia crossed the room in three strides, zipping up her exo-jacket as she opened the door.

‘What are you grinning at?’ asked Leilani.

‘What? I’m not,’ said Tia, rearranging her face into a more serious cast.

‘Did you sleep alright?’ asked Leilani, yawning. There were dark circles under her eyes.

‘Fine. You?’ asked Tia, bending her leg and holding onto the foot behind her, stretching her quadricep, like an athlete.

‘Two of us in one bed. Granted the bed fitted us comfortably, but what a nightmare. Bloody Oculum snored like a jet and fidgeted so much I wanted to scream. Lucky for you to have Turukawa. We’re going to the launch bay. You ready?’ asked Leilani.

‘Yep. Right behind you,’ said Tia. Turukawa appeared next to her in the doorway and they followed Leilani out to the launch bay, both averting their gaze from one another.

Although a massive day lay ahead of them, Tia thought of the tasks they were about to complete with a kind of euphoria, ticking off a mental check list in her head. They had to fly off the planet, sail safely past *Pawta*, sling shot into the whirlpool downdraft, and fly all the way out to the top of the whirlpool to get back to their own galaxy. How they would carry out all or any of those manoeuvres baffled Tia on a practical level, but she had faith she could achieve anything she wanted to on this day.

Sotrakkar greeted them in the launch bay with the same man and woman from the night before, and invited Tia and the others into the prep room for breakfast. Someone had laid out festively coloured food and drinks across a bench. Red and green strips of a vegetable that resembled celery and tasted fresh and sweet; crunchy yellow berries; cooked white tubers like the ones they'd had for dinner the previous night; and green liquid in stone cups that tasted like an earthy cross between blackberries and peanuts. The fresh food certainly beat replicator parcels. Just as they finished breakfast, the Chief entered the room, still wearing the brown robing attire that all Thraeans seemed to wear. Standing at the end of the room with Sotrakkar at his side, he coughed gently to gain everyone's attention.

'Good morning. I hope you all slept well last night and that you are ready for the mission,' said the Chief, his eyes sweeping around the room.

'I've had a coded interchange with *Pawta*. She will hold herself back long enough for your shuttle to get past and slingshot into the downdraft,' said Sotrakkar, folding his arms and wrapping his robes tight around his midsection.

'How is it that Dani is able to fly *Pawta* at all?' asked Tia.

'*Pawta* is a live entity. We have trained her to fly only when commanded to do so from the bridge. Although Dani has captured *Pawta* and has the bridge command codes, we also have contact with *Pawta* and it is loyal to us, its trainers. It is struggling

to obey Dani's commands. But there is much about our technology that Captain Eddy does not understand and will never understand. She is not Thraean,' said the Chief, squinting at Tia.

'Thank you, for helping us. I'm sorry for what my mother and my people have done here. It's inexcusable,' said Tia.

'We have a strong resistance movement. Your mother of course is another matter.' The Chief nodded and left the room.

Sotrakkar beckoned to them all to follow him. He led them into the launch bay where the shuttle sat on runners, the fins humming for departure, steam billowing out of the gill vents.

'Our mechanics have fixed the pectoral fins and we've added in a Thraean booster for the slingshot manoeuvre to get the shuttle into the whirlpool. We must enter at the right trajectory to carry it up to the top,' said Sotrakkar.

'What is this slingshot manoeuvre?' asked Leilani.

'It's a way of travelling against the current inside the whirlpool. We'll use the whirlpool's own force to power the shuttle back up to the entry point and out to the galaxy on the other side, in this case your home galaxy. We do it all the time. The torque is strong when whirlpools die. It's an incredibly sad time for us on Thrae. We will need a lot of power to get into the current and drive up to the top,' said Sotrakkar.

Tia jumped when the Chief ran into the launch bay, his face flustered and red. It was uncharacteristic for him, given that he'd so far carried himself in such a stately manner.

'You must leave now. The vanishing is upon us,' said the Chief, pointing at the lakescreen, his voice urgent.

Tia saw the whirlpool on the lakescreen, searing at the rim of the downdraft like burning paper. Sotrakkar herded them all towards the doors of the shuttle. Tia looked back to the Chief.

‘Thank you. I’ll never forget this beautiful place,’ said Tia.

‘Go well Tia Grom-Eddy. Thank you for freeing my son and bringing our probe home. The battleship will escort you to the slingshot take-off point. Safe travels in our sacred whirlpool,’ said the Chief, hurrying Tia to board the shuttle.

‘I’ll do everything I can to help your son take back *Pawta*,’ said Tia.

She looked around hurriedly searching for Leilani and Oculum and realised they had already boarded. Turukawa stood on the end of the ramp urging Tia to hurry. Next to Turukawa stood Sotrakkar kissing the Thraean man and woman goodbye. Tia guessed they were his husband and wife. They all hugged quickly, and he ran onto the shuttle ramp. Turukawa grabbed Tia’s hand and pulled her into the craft, shutting the door and running with her to the control panels.

Tia pushed the throttle forward, raising the shuttle off the runners of the launch bay. She banked the shuttle steeply over the blue lake and flew over the green treetops. She looked back to the launch bay and watched the large gathering of Thraeans growing smaller and smaller until they were only tiny dots in a grey smudge of stone buildings. She kept her eye on the blue water of the lake shining on the surface of the planet. It disappeared when the shuttle flew past the south pole. The battleship met them on the other side of the planet and shepherded their departure from Thraean space, shielding them from *Pawta*’s view. Flying so close to the battleship Tia realised the enormous size of the ship and how it dwarfed the shuttle millions of times over, like an ant on the back of an elephant. No wonder *Pawta* would not come near the battleship. Dani had so much to answer for.

As they drew closer to the slingshot take-off point Tia saw that the opening of the downdraft had grown smaller. She pulled up her mapping array to assess the degradation rate of the re-entry point. They had a very narrow window to get back into the whirlpool. If she missed it, they would be stuck in Thraean space. But then so would Dani. The thought of staying on Thrae made Tia nervous. At least she would have Turukawa and Leilani and Oculum by her side. And the thought of living by the beautiful lake held an allure for her that made the possibility of the whirlpool closing and trapping her in another galaxy almost bearable.

The battleship led them to an exit in the force field and escorted them to the outer edge of the whirlpool downdraft. Tia knew that *Pawta* would be on the other side of the battleship, with Dani also preparing to slingshot into the whirlpool. Leilani sat in the co-pilot seat, swiping commands across the control panel. Tia stood with her body strapped to the control panel gripping the throttle

‘Ready to go in three, two one,’ she said pushing the throttle forward and sending the shuttle into a dizzying spin.

She braced herself against the restraints as the shuttle spun at breakneck speed and flung itself into the re-entry point of the whirlpool.

Re-entry

‘I thought you were going to say goodbye,’ someone called out to Tia from a distance.

A gentle breeze rippled along the mirror-glass surface of the lake. She lay on her back kicking and pulling her arms through the tepid water in flat angel arcs, moving herself lazily into the middle of the lake, further and further. A flock of white birds flew overhead, so bright against the blue sky. They disappeared into the green treetops of the lakeside forest. Rushing water gurgled past her ears and splashed her face as she flipped over and began swimming arm over arm, gliding through a gentle current. She opened her eyes underwater. Sunlight shone into the turquoise depths, streaming down in great yellow shafts, illuminating a gigantic cavern under the lake, and disappearing into a black point somewhere far below.

‘I did say goodbye,’ replied Tia, swimming away into the middle of the blue water.

‘Come back. Don’t go out into the lake. It’s not safe. There’s a taniwha in there and she won’t be happy to see you. Come back.’

‘Tia, wake up,’ yelled Leilani.

Tia groggily raised her head from her chest and felt the pressure of the straps holding her up. Turukawa stood at her side gently rubbing her hand.

‘Oh god. I’m no good at these take offs. I passed out again didn’t I.’

‘Only for a second. Here, drink this. It’ll make you feel better,’ said Turukawa, bringing the straw of an exo-packet to Tia’s lips.

‘Ugh, Exo-drinks. Revolting,’ said Tia. She sipped the gluey sweet liquid through the straw and wished she could go back to swimming in the lake.

‘Thank you, I’m fine now,’ she said, glancing around the cabin.

Leilani looked over at her from the co-pilot seat. The shuttle quivered and bumped along the current, riding the top of a wave that moved in the opposite direction.

‘I’m fine,’ said Tia, and flew into the whirlpool.

‘We made it in,’ said Leilani.

‘Yep, we’re in. Dani’s in too. Right behind us,’ said Turukawa.

‘We need to get into the centre of the whirlpool, where it’s calmer. Then we can shoot up to the top,’ said Sotrakkar.

‘We have to get through this entry part first,’ said Turukawa, her feet swinging up parallel with the floor as Tia executed a complicated turn.

The shuttle bucked up and down like a carriage on a roller coaster. The contents of Tia’s stomach lurched into her mouth, the sickly taste of exo-drink. She clamped her lips shut to stop from vomiting into the air.

‘Here’ said Turukawa, holding a sick bag to her mouth.

Tia spat into it, her stomach cramping with pain. Turukawa took the bag from her and pushed it through the wall into a trash conduit.

‘You ok, little sis?’ asked Leilani.

From their seat at the back of the flight deck Oculum whooped and laughed as Tia flew the shuttle over the top of a pink wave.

‘Been better,’ said Tia, feeling nauseous.

‘You’re flying a great ride,’ said Leilani, as Tia swivelled the shuttle upside down along the curve of a swell.

‘I remember the battleship taking us through the force field,’ said Tia, concentrating intensely on the lakescreen, trying to keep her equilibrium.

‘You were only out for a second,’ said Turukawa, swivelling her body, pulling herself back into her seat and clipping the restraints shut around herself.

‘How far in are we?’ asked Turukawa.

‘Still in the downdraft. Hold on,’ said Tia.

She clutched the throttle with both hands and found herself easily manoeuvring the shuttle, but her hands trembled. She sensed Turukawa by her side in the dual hive, instantly calming her and bringing her back into herself.

‘How’s *Pawta* doing?’ she asked.

‘*Pawta* is fine. She’s built for whirlpool travel. That’s why Dani seized her from the Thraeans. She’s still following us. But not far behind. I have a weak com link with *Pawta*. The Chief gave me the codes. But I suspect he gave me limited access. I can only get hold of her when there’s a clear path between us,’ said Turukawa.

‘It’s understandable that he’d limit your access. He doesn’t trust us completely. What is *Pawta* saying?’ asked Tia.

‘It’s doing all it can to delay Dani’s progress. But Dani has rerouted some of its pathways. She’s compromised some of *Pawta*’s systems, cut out a few of its live conduits,’ said Turukawa.

‘Oh no. Not *Pawta* too. How could she do that?’ asked Tia, her face collapsing into a pained expression at the thought of Dani hurting *Pawta*.

‘Don’t worry. *Pawta* is resilient. She doesn’t feel pain like we do and she’s already undoing some of the harm Dani has done. She is an immensely powerful ship,’ said Turukawa.

Sotrakkar and Oculum seemed to be having as much fun as Leilani, laughing as Tia flew past a cloud of rocks.

‘You’re as good as any Thraean pilot,’ said Sotrakkar, leaning into the control panel.

‘I am the best mapper and my sister is the best striker on the face of my planet,’ said Tia, looking over at Leilani and laughing.

‘Look out for that rock spray,’ said Sotrakkar pointing frantically at the lakescreen.

‘I see it. Don’t worry,’ said Tia, dipping the ship below the shower of rocks flying at them.

‘Where’s *Pawta*?’ asked Sotrakkar.

‘She’s right on our tail,’ said Turukawa.

‘Can we move any faster?’ asked Sotrakkar.

‘Yep, I’ll catch the next pink wave and it will boost us away from Dani,’ said Tia, pushing the throttle forward.

The shuttle fired out of the downdraft like a bullet and flew into the main body of the whirlpool. *Pawta* flew right behind, like a shadow.

Na Viro

Pawta had caught up with them, bearing down on the shuttle as Tia flew into the main globe of the whirlpool and headed up to the entry point where *Toutouwai 5* and *Black Kiwi 3* waited for them. She executed strike positions from her standing control and had already somersaulted the shuttle twice out of *Pawta's* range, exhilarating manoeuvres, but her stomach lurched each time. She had to hand it to Dani, she knew how to fly a big ship like *Pawta*, and she'd managed to keep up every time Tia twisted out of her grasp.

Leilani's mapping array hovered in the air surrounding her head, a holographic rendition of the inside of the whirlpool complete with gridlines and coordinates. She tracked *Pawta* closely in the mapping array, feeding constant navigation directions to Tia— which dilep paths to follow, which currents to ride and which ones to avoid. Sotrakkar sat next to Tia in a chair the shape of a mushroom, peering at the lakescreen porthole on the wall and watching the gas formations. He spoke to her quietly, telling her which clouds were safe to fly through and which clouds to skirt. Turukawa returned to her seat at the rear, next to Oculum, where Thraean mechanics had stored another Thraean tug, just in case. Turukawa sat with her eyes closed to the distractions on the lakescreen while she kept an open connection with *Pawta* on the coded frequency. Although their communications were minimal, they at least gave Turukawa a sign of where *Pawta* might be at any given time and she passed the information on to Tia. Taken together as a crew, Tia thought they made a formidable team.

Pawta briefly disappeared from Leilani's mapping array as it dipped into the trough of a large swell. It rose minutes later behind the shuttle riding the crest of a wave, surfing towards them at great speed. The mapping array calculated *Pawta's*

descent rate down the face of the wave and issued a loud beeping alarm with a written warning, in flashing red lights overlaying the mapping array gridlines, to prepare for a collision in ten seconds.

‘Move out now, she’s going to hit us, starboard,’ said Leilani, squinting her sore eyes and concentrating hard on the lines in the mapping array.

Tia turned the throttle to evade Dani’s incoming assault. Her evasive action would have worked if a rock spray hadn’t appeared out of nowhere. The internal waves of the whirlpool were unpredictable, and the debris fields were sometimes not visible until too late, and this was one of those occasions. On the lakescreen the rock spray resembled a bunch of potatoes tumbling towards them as though just tipped off the back of a truck.

‘Aaargh, I can’t go to port, the stone fields are coming at us too fast,’ yelled Tia, trying to dive out of the path of the incoming rocks to at least avoid a collision with *Pawta*.

She dipped the nose of the shuttle just in time, although not quick enough to miss *Pawta* completely, lightly clipping her tail. Dani tilted the big ship and put her into freefall to follow the shuttle. With *Pawta*’s added weight propelling it forward, Dani rammed into the shuttle hitting her broadside and breaking *Pawta*’s ama in the process.

‘What the hell is she doing sacrificing her own ship,’ yelled Tia, spinning the shuttle out of the wave and climbing away from *Pawta* up into the whirlpool.

Pawta had no answer, unable to turn in the tight circle that the shuttle had drawn. Leilani spun around within the holographic mapping array and followed *Pawta*’s path as it tumbled back into the current. Dani’s risky tactic had come at a price for *Pawta*, seriously wounded now that its ama had again come away from the hull. It would take *Pawta* a while to regroup and self-repair and get back onto the same path as

the shuttle. Tia hoped that by the time *Pawta* had healed its broken ama the shuttle would be uncatchable and well on course to exit the whirlpool.

‘Our hull is breached. Somewhere down in the hold,’ said Tia.

‘I’ll go down and have a look. Close your helmets and strap in,’ said Leilani, jumping out of the navigation seat and running to the ladder.

‘I’ll take over navigation until you get back,’ said Oculum, flaring up a mapping array around their head.

Tia followed them in the hive. Turukawa and Leilani shut their visors and waited for the oxygen to stream into their faces. Leilani spun the handle and opened the hatch door clipping a guidance rope onto the ladder before descending into the darkness. Turukawa followed, pulling the hatch door shut behind her. The pressure had somehow equalised in the hold as the hatch door clamped shut. Pink whirlpool smoke and debris swirled in the air, sucked into the hold through the punctured hull. Anything not fastened down floated and bumped together in the air: rocks, tools, paper, exo-packets of food, an exo-jacket, and a fire extinguisher. Leilani clipped her rope onto a grab rail on the ceiling and made her way to the hole in the wall. Ragged ends of the hull poked into the room, razor sharp and vibrating with the force of the shuttle’s forward momentum. The whirlpool waves raged outside. Tia realised that the thin layer of Leilani’s exo-jacket was the only thing that separated her from the pastel gases swirling past the hole in the hull.

Turukawa merged into the wall and began to work, melding together the ripped edges of the hull, while Leilani batted away any floating debris from the pierced shell. Slowly the jagged ends joined up and melded into each other and the hole closed over. The pink fog stopped swirling and hung in the air like mist in the mangroves, darkening into shades of ecru. The debris fell to the floor when gravity was restored and rolled

about with the movement of the shuttle as it veered around the currents and waves.

Turukawa appeared from the wall looking drawn and exhausted.

‘It’s just a patch job. I can’t do a better repair while the ship is moving. We need to stop somewhere,’ said Turukawa.

‘When we were in the hologram room on *Pawta* I’m sure I saw a side tunnel somewhere in this part of the whirlpool. It must be recorded in my mapping array,’ said Tia, into the hot mike.

‘Sotrakkar might know something about it,’ said Turukawa, making her way back to the ladder and up to the hatch door.

Tia watched Leilani run her hand over the repaired hole, the surface buckling in and out against her flat palm. It wouldn’t take much to burst the hull again at this weakened point, one hit from a small rock would do it. And if it happened again it might be more catastrophic. They had to shore it up somehow. Leilani followed Turukawa back up the ladder into the control room and closed the hatch.

Tia stood with her legs apart, bracing herself against the throttle as she leaned into the work of steering the shuttle. She felt no fatigue, although she had been flying now for an exceptionally long time. Leilani tapped her on the shoulder.

‘Why don’t you take a break. Have a turn at navigation. I can take over for a while,’ said Leilani.

‘I’m fine,’ said Tia, shaking her head, opening, and closing her grip on the throttle.

‘Turukawa’s fixed the hull temporarily. But it won’t last. We need to find a quiet area so we can slow down for a while to fix the hull properly. I saw a side tunnel in the hologram room on *Pawta*. What are they like inside and how do we find them?’ asked Tia, directing her question at Sotrakkar.

‘There are some tunnels. The current can be very still and peaceful inside them, but they only exist for a brief time and then they dissipate. Sometimes, there are taniwha resting inside them,’ said Sotrakkar.

‘What taniwha? I haven’t seen any creatures in the whirlpool,’ said Tia.

‘They’re not creatures. They’re taniwha,’ said Sotrakkar.

Tia adjusted her translation patches to see if they would translate the Thraean word in any other way. But it still came up as ‘taniwha’ in her earpiece.

‘Taniwha or not, we need to find a side tunnel fast,’ said Tia.

‘We’ll have to fly to the outer walls of the whirlpool to find the tunnels. Look out for bubbles of interstellar dust,’ said Sotrakkar.

‘Ok, I’ll keep an eye out. But I haven’t seen any bubbles at all,’ said Tia.

‘That’s because we’ve been flying in the centre of the whirlpool. Bubbles don’t form in the middle of the whirlpool. There are lots of them on the outer walls and the ones with lights inside them are often side tunnels,’ said Sotrakkar.

‘What about the taniwha? What kind of being are they?’ asked Tia.

‘They’re harmless, unless you hurt them. Then they’ll kill you,’ said Sotrakkar, glancing sidelong at Tia.

‘What! Have you seen any of these things?’ asked Tia.

‘Only once. A long time ago,’ said Sotrakkar.

‘And what happens to them when the whirlpool dies. I thought you said everything inside gets crushed,’ said Tia.

‘Nobody knows. They live at the edges of the whirlpool and like to sleep in the tunnels. According to legend they die with the whirlpool and they are born with the whirlpool. That is what we believe,’ said Sotrakkar, turning to the lakescreen and squinting into the clouds.

Leilani followed Tia's manoeuvres in the mapping array as her sister flew the shuttle along a wave that spun in an arc to the outside wall of the whirlpool. The current flowed more quietly out at the edges, more peacefully, like a back water. Sometimes the current stilled to nothing, rising and lowering like the tidal movements in a swamp. Lots of bubbles had formed out here, bulging, and popping and clumping into foam then floating away into the mix at the centre.

Leilani inspected the array and saw *Pawta* limping into the edges of the grid.

'We have company,' said Tia, scanning the lakescreen.

'She hasn't seen us yet. We need to find one of those side tunnels quick,' said Leilani.

'I'll fly behind that bloody big asteroid over there. What's a rock like that doing at the outer edges?' asked Tia.

'Be careful. The big rocks get stuck out here for good. They never move. And if they pin you to the wall, you can never get away. I've seen a ship get stuck behind a rock like that one. We had to transfer the entire crew off and we lost the ship,' said Sotrakkar, a far-off look in his eyes.

'We won't get stuck behind this rock. You could park ten battleships behind that thing. Look at it,' said Tia, swooping the shuttle in behind the asteroid just as *Pawta* came within range.

'Whoa, that was close. We missed her sweeper ray by this much,' said Leilani, holding her thumb and forefinger up with not much gap between them.

'And there they are, our champagne bubbles,' said Tia, pointing to the lakescreen.

Leilani looked up at what looked like a scum of floating suds with pinpoints of light blinking from within.

‘Looks like a side tunnel, but we won’t know for sure until we get closer,’ said Sotrakkar.

‘It’s now or never. We won’t be able to do it once *Pawta* moves much further past the asteroid. The rock cover will be gone. Your call,’ said Tia, looking to Leilani.

‘We can’t stay here. If that is not a side tunnel, we can still outrun Dani. I say we go for it,’ said Leilani.

‘Alright, here we go,’ said Tia, pushing the throttle and leaning forward with a grin on her face as she gunned the fins and the shuttle sped towards the twinkling lights. Pink clouds swirled in a spiralling wake behind them, providing them with more cover. Tia pulled the shuttle up to the floating bubbles like a race car pulling into a pit stop.

‘Where’s the entrance,’ asked Leilani.

‘There, behind the first light,’ said Sotrakkar, pointing at the lakescreen.

A mass of transparent membranes filled Tia’s line of sight, with nothing that looked like an entrance into a side tunnel. She slowly flew past the first light and a large cavern opened before them, a side tunnel filled with white, teal, and yellow clouds, and sparkling pink lights. So many colours flared around them, in much more concentrated hues than in the centre of the whirlpool with its washed-out pastels. She cautiously moved the shuttle forward into the still atmosphere of the tunnel until she had flown the shuttle completely inside and out of *Pawta*’s view. She brought the shuttle to a halt in an area where there appeared to be no current at all, although the misty colours did move very slowly like huge clouds inching across the sky on a still Earth day. She turned off the pectoral fins, unclasped the restraints that had held her up, and slumped forward onto the control panel.

‘We can’t stay here long,’ said Leilani, turning to Turukawa.

‘I just need enough time to shore up the hull from the inside and then we can get going,’ said Turukawa, sprinting to the hatch and closing her helmet for good measure. Tia watched her disappear into the hold and looked up at the lakescreen. A bright light—the colour of a red-hot poker—flashed across the face of a large cloud hovering above the shuttle.

‘What the hell... did you see that?’ asked Tia.

Sotrakkar had seen the fleeting light and rocked back in his mushroom seat, stumbling out of it, and almost falling to the floor.

‘Taniwha,’ he said, scrambling back onto his seat.

‘I didn’t see where it came from. Are we safe here?’ asked Tia.

‘I don’t know. I’ve lost it,’ said Sotrakkar.

Leilani checked her mapping array, sweeping her eyes around in a three-hundred-and-sixty-degree turn, searching for the taniwha.

‘What do they look like? I only saw red light,’ said Tia, alert once more and clipping her safety restraints into place as if preparing to take off.

‘The only one I’ve ever seen had an exceptionally long tail and green eyes. We were too far away from it to get a good look. We didn’t stick around,’ stuttered Sotrakkar, flinching at the sound of grinding and scraping noises emanating from the hull.

‘Is it dangerous?’ asked Tia.

‘The legends tell us they are to be feared and not to go near them. That was too close for me. We should leave now,’ said Sotrakkar, spinning around in his chair and trying to find the taniwha in the lakescreen.

Leilani continued searching for the creature spinning her iris circuitry and scanning the mapping array grids. The taniwha had vanished. And then something

banged into the hull. Tia put her hands over her ears as the hull cracked and reverberated throughout the room.

‘It’s latched onto us. Looks like it’s trying to crush the hull,’ said Tia, splashing her hand into the lakescreen, examining the animal from every angle.

The taniwha had curled its long body around the mid-section of the hull, squeezing itself into a tighter and tighter spiral. The hull creaked and groaned as the pressure increased. Another noise started near the front of the shuttle, a scratching and banging sound.

‘What is that?’ asked Tia.

‘It’s clawing at the hull. Looks like it’s trying to rip the shuttle open,’ said Sotrakkar, his hands trembling.

‘Ok, let’s get out of here. I’ll try to shake it off,’ said Tia.

‘What about Turukawa?’ asked Sotrakkar.

‘I’ll call her back, don’t worry. Go,’ said Oculum.

Tia fired the fins and the shuttle raced forward. Oculum called out to Turukawa in the dual hive.

‘We’ve got a passenger and we need to get rid of it. Sorry, but we can’t finish the repair right now,’ said Oculum.

‘Ok, I’ve managed to reinforce some of it. But it’s a weak spot. What is this ‘passenger’?’ asked Turukawa.

‘A taniwha. You’ll have to strap in down there. Tia is going to try and get rid of it,’ said Oculum.

‘Right. I’ll put on my safety belts,’ said Turukawa.

Tia had again strapped herself to the helm, giving her more manoeuvrability in steering the shuttle. She pushed the throttle back and forth, trying to flip the ship like a

dog shaking off water, trying to dislodge the taniwha. The creature did start to lose its grip. Tia stamped on the brakes and powered up the pectoral fins to spring the shuttle forward; she flipped the shuttle again; sent a burst of energy to the fins and blasted the gill vents. This last trick worked, blasting steaming air into the taniwha's body shocked it into letting go. As the taniwha released the shuttle from its clutches, it sent out a screeching noise and flew across to the opposite side of the tunnel. It swooped into a turn and flew back at the shuttle, faster, giving chase with even more force. Tia pushed the throttle to its limit flying further and further into the tunnel to get away from the creature.

‘Where does this tunnel end?’ asked Leilani.

‘We should pop out somewhere back inside the whirlpool,’ said Sotrakkar.

Tia flew the shuttle in dipping and diving trajectories trying to evade the chasing taniwha, but it swam easily in the tunnel and followed their every move.

‘We’ve got to get out. How long before we exit this tube?’ asked Tia.

Leilani scanned her mapping array, unable to see past the corners as the shuttle swerved into the overhead archways of the tunnel.

‘Just keep going. Will it follow us out of the tunnel?’ asked Leilani.

‘Probably not. It lives in here. They don’t like it in the main part of the whirlpool,’ said Sotrakkar.

‘We’re losing power again,’ said Tia, twisting her body around to try and flip the shuttle away from the taniwha as it flew after them.

Oculum tried to raise Turukawa in the dual hive. They didn’t receive an answer.

‘I’ll go and see what’s happening in the hold,’ said Oculum, undoing their restraints and clipping a safety rope into the ceiling grab rails.

Tia watched in the hive as Oculum made their way to the hatch cover and spun it open. The lights had gone dark in the hold. Not a good sign, thought Tia as she watched Oculum clamber down the ladder into the darkness.

‘Turukawa? Where are you?’

Oculum clipped the safety rope into the ceiling grab rails in the hold and made their way into the centre of the room. The pink mist had not dissipated. It hung in the air around them as they walked. Exo-packets full of dehydrated replicator food, rocks, and assorted tools and rubbish, crunched under their feet. The repaired section of the hull warped in and out. Turukawa must be in the wall trying to keep the hull from bursting open again, thought Tia.

‘Turukawa, don’t worry about holding the hull. We can close off this section and make a run for the top of the whirlpool with the tug,’ said Oculum.

Turukawa appeared out of the wall, puffing and red faced. ‘The sooner we get out of here the better. I can’t hold the hull much longer. That creature fractured it again at the same spot,’ said Turukawa.

‘You can’t stay down here. It’s too dangerous. Let’s go back up to the control room. We just need to get out and up to the top of the whirlpool the best way we can. The shuttle will hold together. You’ve done a great repair job and the creature won’t follow us out of the tunnel,’ said Oculum.

‘It won’t take much to break it open. If we don’t get out soon, it’ll go,’ said Turukawa, sliding along the grab rails to the foot of the ladder. She raced up the rungs and climbed out of the hold with Oculum right behind her. Together they knelt on the floor in the control room and spun the handle, their hands moving with surprising synchronicity one over the other in a rhythmic pattern until the hatch clicked shut.

‘Looks like an opening up ahead,’ said Tia, her body dipping as she veered the shuttle around the last corner in the tunnel.

A loud bang exploded in the hold. Tia looked up at the lakescreen to see the taniwha tail had lashed out at the shuttle and hit it in the mid-section. The shuttle vibrated, harnessing the power from the taniwha tail, and shooting out of the tunnel into the whirlpool. The taniwha hovered in the exit of the tunnel, lashing its tail back and forth, as though waving them goodbye.

The shuttle skidded into the centre of the whirlpool, the pectoral fins faltering and sputtering out until it had completely lost power, no better than flotsam, drifting at the mercy of the whirlpool currents. Tia kept flicking the ignition switches on and off, but the fins wouldn’t fire, and had ceased moving. She tried to steer the shuttle into the waves, but the throttle and the fins would not respond.

‘We’ve lost all power, again,’ said Tia, continuing to flip switches on the control panel.

‘What about the tug?’ asked Leilani.

‘We can’t use it this far away from the entry point. It won’t get us there and then we’ll be stuck. We’ve got to get the fins going somehow,’ said Sotrakkar.

At that moment, the water in the lakescreen darkened. Tia looked up to see *Pawta’s* rocky shape filling the entire porthole. Dani had them dead in space. She sent out ropes that arced into the current, latched onto the shuttle, and dragged it into the side of *Pawta’s* hull. The shuttle’s carapace exterior bumped gently into *Pawta’s* stone grey portside wall with a quiet bang.

‘Turukawa, can you meld all the doors shut. She may be able to bring us alongside, but let’s do everything we can to stop Dani from boarding us,’ said Tia.

‘No problem,’ said Turukawa, disappearing swiftly into the shuttle wall.

Turukawa melded shut any entry doors, portholes, or other entry points. Tia contacted her in the dual hive.

‘Do you think Dani will try the exhaust outlets?’ she asked.

‘The blades are poisonous. They hold too much flammable waste. It wouldn’t be a safe way into the shuttle even in a protective suit,’ said Turukawa.

‘I wouldn’t put it past Dani to order the guards in anyway,’ said Tia.

‘Ok, I’ll meld them shut just in case,’ said Turukawa.

Time dragged out for Tia as she waited for Turukawa to return. She jumped when the guards started pounding on the airlock doors. Turukawa appeared out of the walls as the pounding resonated in the room. After a while, the pounding stopped, and silence descended.

‘Take cover. They’re up to something,’ said Leilani.

Tia crouched behind the control panel with Turukawa, her wave sabre drawn in preparation for battle, ready for the guards to break through. The eerie silence drew on and on. Finally, the shell walls creaked, and the shuttle began to shudder and jerk as though something were dragging it along a rough path, like a child pulling a favourite toy along the concrete.

‘What’s happening? Why are we moving?’ asked Tia.

‘*Pawta* is swallowing the shuttle,’ said Sotrakkar, his face ashen, his eyes scanning the ceiling of the control deck.

Tia recognised the jerky movements, the wavelike contractions of stop and start, and wondered where in *Pawta*’s vast internal world it would finally deposit them. When the shuttle stopped rocking and all movement had halted Tia heard the guards shouting and then a fizzing noise.

‘Everybody get down. They’re going to blow a hole in the wall,’ said Oculum, covering their head with their arms.

Tia lay down on the floor next to Turukawa. The sound of Turukawa’s heavy breathing intermingled with her own. The fizzing sound of wave sabres blasting at the wall stopped, and the room fell quiet once more. The silence dragged on for so long that Tia thought Oculum may have incorrectly assessed the situation. She took her hands away from her ears and cocked her head to listen. She went to stand up.

‘Stay down,’ shouted Leilani, just as the wall blew open, and the force of the blast threw Tia to the floor.

She coughed and spluttered in the smoky air, the strong smell of burning explosives wafting out of the mist. The Indian Regiment guards ran into the room, their red flashlights sweeping the area.

‘This way,’ shouted Turukawa, blasting a hole in the shuttle wall and pulling Tia into the gap. Sotrakkar followed Leilani and Oculum into the hole. They crawled through the shuttle hull until they hit *Pawta*’s hull. Sotrakkar searched for a dip in the stone wall. Tia and the others copied him, joining in the hunt for a handle. Leilani found one near the middle of the gravelly exterior and opened the wall into *Pawta*. They rushed in and let the rock curtain fall just as the guards ran into the space Tia and her friends had occupied a few minutes earlier. Sotrakkar locked the dip and twisted the handle to stop the guards from following them.

In the passageway, moisture gathered on Tia’s eyelashes and a dank smell infused the warm air. She threw one arm over her opposite shoulder, thrusting her face into the crook of her elbow to muffle the sound as she sneezed repeatedly. *Pawta*’s familiar dark green lights shone onto every surface and cast exaggerated shadows against the stone walls.

‘Look at this filth. I don’t think anyone has walked these tunnels since the ship was built,’ said Sotrakkar, scuffing wet divots out of a thick layer of grime covering the floor.

From behind the closed off wall came the muffled banging and clattering of the guards as they thrashed around in the shuttle control room, searching for Tia and the crew.

‘Sounds like they’re destroying the bridge equipment,’ said Sotrakkar.

Tia put her ear to the wall and heard the guards shouting and smashing machinery in the shuttle. After a while they stopped upending furniture and throwing objects and the rhythmic trot of their heavy footsteps faded away as they ran out of the shuttle and back into *Pawta*.

‘Ok, we need to fly *Pawta* out of the whirlpool,’ said Leilani.

‘We can’t go to the bridge again. Dani will be waiting for us,’ said Tia.

‘I know. But what other choice do we have?’ asked Leilani.

‘Wait here. I’ll have a look at the end of this passage,’ said Sotrakkar, sprinting away from the group into the darkness before Tia could stop him.

Tia hunkered into the wall next to Turukawa, pushing against the length of the embod’s warm arm, grateful for her reassuring presence. She would have preferred that Sotrakkar had stayed with them, that they remained together as a group. Her thoughts raced as she waited for Sotrakkar to return. Oculum and Leilani leaned against the wall and checked their wave sabres, opening the safety clips and checking that the sights were straight. Oculum’s face had taken on a serious appearance, the corners of their symmetrical mouth turned downward. They sighed and exhaled softly, closing their eyes against the green light. Leilani pushed her wave sabre back into the holster, her hand resting just above the shape of it, like a gunslinger about to engage with her foe.

She spun her iris circuitry trying to see into the darkness where Sotrakkar had disappeared, her muscles tensed and ready. She got up and paced back and forth, her head bobbing as though nodding in agreement with an inner conversation she was having with herself. She shook her hands out and jiggled her legs. Sotrakkar appeared out of the murky corridor, striding quickly around the corner.

‘We’re not far from one of *Pawta*’s breathing cavities. It’s just past that wall. If we can get inside the cavity, we’ll be safe and I can send instructions to *Pawta* from there,’ he whispered, pointing, and leading the way.

Tia felt a weight lift and sighed. She followed Sotrakkar into the shadowy passage that curved in a gentle incline up to a dead end where he began looking for a dip.

‘Oh no. We can’t get past this handle. It’s locked from inside the cavity. Must be one of the ones I closed up,’ said Sotrakkar, shaking his head.

‘We’ll have to go in from the front then. There’s no other way. How do we get into the hallway, the entrance to the cavity?’ asked Tia.

Sotrakkar began looking for a dip at the other end of the passage. He found one in the stone surface and gently opened a small crack in the wall.

‘Looks clear,’ he said, glancing at Tia to see what she thought.

Tia stepped past him and put her eye up to the gap, swivelling her head from side to side, trying to see into the hallway to gauge the safety of the area. They couldn’t stay in the passage. Dani would go all out searching for them and would eventually find them if they stayed where they were. They had to get into the breathing cavity and take control of the ship.

‘Dani and the guards are out there somewhere in the corridor waiting for us,’ said Tia.

‘Is there another way we can approach the door of the breathing cavity?’ asked Leilani.

‘Only through the ceiling,’ said Sotrakkar.

Tia thought for a bit, searching her memory to recall her Academy battle training. The fighting strategies of the old generals.

‘Some of us need to draw them out while the rest of us attack from behind,’ said Tia.

‘We need to split up,’ said Leilani.

‘I’ll wait here, and you go into the ceiling. When you’re in position I’ll exit through this hole, with my hands up. That should draw out the guards. You drop from the ceiling and I’ll fight them from the front,’ said Tia, looking at the silent faces around her.

‘I don’t like it. You’ll be a sitting duck, sis,’ said Leilani.

‘It’s the only way,’ said Tia.

‘I’m staying with you. You can’t do this on your own. It’s too risky,’ said Turukawa.

‘Thanks,’ said Tia, the tension releasing from her body.

‘There’s a staircase at the end of this passage. I’ll let you know when we get there,’ said Sotrakkar.

He walked briskly to the end of the corridor and began searching for the dip opening to the staircase. Oculum nodded at Tia, their red hair shining in the dim light, and joined Sotrakkar. Leilani clasped Tia’s hand and pulled her into a hug.

‘Dani’s predictable. She’ll want me alive so she can use me for navigation,’ said Tia.

Leilani gazed at her. 'Just be careful,' she said and ran to join Sotrakkar and Oculum. They entered the stairwell one after the other, without a backward glance. Tia heard the dip handle clicking.

'I don't know if this will work or not,' said Tia, looking to Turukawa and taking small steps towards the peephole gap that Sotrakkar had opened.

'It will work,' said Turukawa, holding Tia's hand and looking into her eyes.

'Let's get into position,' said Tia, putting her hand up to the peephole, ready to pull the wall open and step into the hallway.

Although the guards remained out of sight, Tia had no doubt they would be waiting for her just beyond the entrance to the cavity. She guessed they would also be in constant communication with Dani. She cast her mind back once more to the many simulations she taken part in during her time at the Academy. She breathed deeply trying to settle her thoughts, steeling herself to fight the guards. Turukawa also relaxed into a pre-battle trance.

Some minutes later Sotrakkar's voice crackled through Tia's sleeve patch and into her mike.

'We're in position,' he said.

'Can you see through the floor?' whispered Tia.

'Yes. I can see the entrance to the breathing cavity, and I can also see you and the hole in the wall.'

'Ok, we're going out now,' said Tia, her voice now strong and unwavering.

'Understood,' said Sotrakkar.

Tia put her hand up to the peephole and slowly began to peel the wall away from itself, tearing the opening apart until she could step through into the corridor. Turukawa pushed past Tia with her hands raised in the air.

‘I’m going first. I can take the hits,’ said Turukawa, boldly stepping through the gap and moving into the corridor.

Tia followed behind Turukawa, also with her hands raised in the air. They moved slowly to the centre of the hallway, edging forward. Nothing stirred. The guards must have been waiting to see what would happen, whether anyone else would step out. Tia knew she had to get them moving.

‘We surrender. I want to talk to my mother, Captain Eddy,’ yelled Tia.

‘Where are the rest of you,’ yelled a guard, hesitantly.

‘There’s just two of us. We lost the others in the tunnels. You can have a look. See? I’ve left the door open,’ said Tia, pointing to the hole in the wall.

One guard, the head guard by the look of the insignia on his exo-suit, inched his way out from the corner, his weapon held high with both hands clasped around the pistol grip, one finger on the trigger, moving stealthily towards Tia. He gestured behind him and four guards appeared their wave sabres held high as they crept towards Tia and Turukawa. The head guard moved towards the hole in the wall, keeping his sabre trained on Tia and Turukawa the whole time.

Sotrakkar and Leilani dropped from the ceiling onto the backs of two guards at the rear, wrestling them to the floor. The other three guards spun around, unwilling to open fire on their own men. Oculum dropped down on the head guard, shoving him to the floor and quickly engaging him in a fight. Unable to draw their wave sabres in the tight space, Tia and Turukawa took on the remaining two guards in hand to hand combat. Tia ducked away from a punch and came up behind one of the guards, punching him hard in the stomach. He fell to the floor groaning.

Tia’s mouth dropped open as Dani rounded the corner and waded into the melee. She had honestly thought that Dani would have stayed on the bridge. Turukawa and Tia

ran at Dani and pushed her up against a wall. A shot rang out. Tia grabbed hold of Dani's hair and Turukawa bent Dani's arm up behind her back. They turned in time to see the head guard fall to the floor, a fatal sabre shot to the head, the wound smoking, and Oculum holding up their weapon high staring at the guard's prone form.

'Let me go,' yelled Dani, kicking at Tia.

Tia dodged her mother's boots and helped Turukawa wrestle Dani to the ground and hold her there. When she managed to look up, she saw Leilani and Oculum fighting off the other guards. Sotrakkar had escaped the brawl and stood next to the wall whispering. Tia's thoughts froze as she watched the wall convulse and soften. Suddenly the walls, the floor and the ceiling closed around them all and began to contract, swallowing everybody.

'Shut your visors,' yelled Sotrakkar.

Tia and Turukawa slammed their helmets shut. Tia closed Dani's helmet for her while Turukawa held onto Dani's arms. The ship swallowed them all and moved them quickly to the outside wall of the ship.

'What's happening? She's not stopping,' said Tia, breathing heavily as she realised that *Pawta* had moved them through the hull and had spat them out onto the exterior of the ship.

Turukawa managed to grab hold of a dip in the exterior of the hull as *Pawta* deposited them outside. She still gripped one of Dani's arms, keeping it forced up behind her back. Dani struggled to get free. Tia clung to Turukawa with one hand and gripped onto Dani's other arm.

Everyone held on as the ship waves contracted and the walls closed behind them, leaving them all outside the ship, with the swirling whirlpool currents pulling at their bodies. The head guard's dead body flew past Tia's face and spiralled out into the

current, his arms flapping in the waves. None of the other guards had shut their helmets and they also flew off into the whirlpool, their arms and legs flailing as they tried in vain to pull their visors shut. Sotrakkar held onto a grab rail he had somehow fashioned out of the stone hull and Leilani held onto his waist; their visors firmly closed. Oculum blasted a handhold out of the stone with their sabre and gripped onto it. *Pawta* screamed in pain and the wall puffed in and out quickly as though it were trying to pop Oculum off the hull. Oculum threaded a rope through the hole in the rock and tied it around their torso. They struggled to hold on, their body twisting at the end of the rope as the currents of smoke and debris swirled past them.

‘Let me go. We all need to help each other,’ said Dani.

The sound of Dani’s voice penetrated right into Tia’s brain through the helmet mikes. On one level she thought Dani might be right. Her guards were gone. But Tia didn’t trust her. Not one bit.

‘Let’s tie her up,’ said Tia.

Turukawa gripped Dani with her legs and one-handedly looped a grey rope over her hands and legs, tightening it in a complicated knot, and hooking Dani in a trussed up bundle onto her side so that she appeared to grow out of Turukawa’s ribs like a parasite. This left both of Turukawa’s hands free. Tia held on to Turukawa from the other side of her body, her arms over Turukawa’s shoulders while Dani bucked and struggled against the ropes.

‘This dip is locked from the inside,’ said Turukawa grabbing hold of an indented handle with both hands and trying to prize it open. It wouldn’t budge.

‘How do we get back inside, Sotrakkar?’ Tia asked.

‘I don’t know. I’m trying to talk to *Pawta* to convince her to let us back in,’ said Sotrakkar, making more grab rails out of the stone.

‘How are you making those?’ asked Leilani, watching Sotrakkar dig into the stone with his gloved hand.

‘I’m Thraean. *Pawta*’s allowing me to make grab rails. It wants me to live,’ said Sotrakkar.

‘Where is the ship going?’ asked Turukawa.

‘It’s drifting. There’s no one at the helm to fly it. So, it’s just floating in the current,’ said Sotrakkar.

‘Can we blast our way in through the hull?’ asked Tia.

‘If we do that, it’ll just swallow us and put us out again. We have to negotiate with it,’ said Sotrakkar.

‘Why did it do this to us in the first place?’ asked Tia.

Sotrakkar’s mike went silent.

‘I asked it to swallow the invaders and put them out to space. It considers you all to be invaders, except for me, and so it put you all out. Unfortunately, one of the guards held onto me when it swallowed everybody,’ said Sotrakkar.

‘Can’t you get it to take you back inside then? If you can get back in, you’ll be able to bring us back, won’t you?’ asked Leilani.

‘Yes. I’m trying to discuss this with *Pawta*,’ said Sotrakkar, tapping on the hull and whispering into the stone.

Tia huddled into Turukawa’s neck and watched a huge bank of pink clouds drifting by in the current. A sense of calm washed over her.

‘This is unbelievable,’ she said, staring at the clouds, mesmerised.

‘If you release me, I can help to get us out of this mess,’ said Dani.

Tia wondered how she might shut off Dani’s helmet mikes.

‘How are you going to get us out of this mess, Dani?’ asked Tia, sarcastically.

Tia's body hung off Turukawa in such a way that if she wanted to, she could bring her leg up in one swift movement and knee Dani a good, hard blow in the guts. She fantasised about doing just that, the adrenaline flowing into her muscles at the thought of it. She even moved her body into position in preparation. Just as she began to bring her leg up, Dani kicked out and headbutted Turukawa in the ribs, knocking her into the hull. Tia held on.

'Stay still, or I will shoot you,' said Turukawa.

'Untie me,' said Dani, bucking and wriggling.

'Feed her out to the end of the rope,' said Tia, sneering, her head bleeding from hitting her helmet. Blood dribbled down the inside of her visor.

'It would be easier to control her,' said Turukawa, untying the connection holding Dani to her side and letting the rope feed out into the current with Dani at the end of it, whipping back and forth in the whirlpool like a kite in the wind. Dani shouted at them to pull her back in. Tia's face and neck flushed with the pleasure of seeing Dani at the end of the tether.

'You can stay out there until we find a way back into the ship,' said Tia, drawing out each word, delighting in Dani's powerlessness.

Dani kept up a steady tirade of abuse, yelling at Tia that she had done an awful thing as a daughter, mocking her flying skills, castigating Turukawa as a rogue robot who she would terminate when they returned to Earth, mocking Oculum, and making whiny entreaties to Sotrakkar to help her out. Everyone ignored her and after some time, her voice faded into the background rush of whirlpool currents.

While he continued his whispered negotiations with *Pawta*, Sotrakkar also scrambled over the hull making more grab rails in the stone, constructing a laddered web between each of their positions on the exterior of the ship. Tia and Turukawa were

the first to follow her out on these expeditions, holding onto the grab rails Sotrakkar had made and running their hands over the surface of the ship in search of ways to open the hull. The task proved difficult with their thickly gloved hands unable to feel the minute changes in the stone that might indicate a dip opening. But they persisted, knowing their oxy tubes would not last forever. Tia had become so intent on looking for the dips that she had taken her eyes off Dani and had almost forgotten about her. Dani had gone quiet for some time.

Tia did not see Dani grab the tether and pull herself back to the hull. Turukawa had climbed off on another trail of grab holds a small distance away. Tia turned her head to look at a yellow cloud just in time to see Dani in her peripheral vision jumping towards her and kicking her in the thigh. Tia screamed as the pain shot up through her leg. Turukawa raced back down the trail of grab holds and scrambled towards Tia and Dani. Dani clenched her legs around Tia's middle and grabbed her around the throat, choking her. Tia tried to grab at Dani's hands, but her mother's grip wouldn't loosen. She stared at a bank of white billowing clouds, marvelling at how beautiful they looked, as she began to pass out.

Turukawa prized Dani's fingers off Tia's throat, one by one, and pushed her away into the whirlpool current, cutting the rope that held her to the hull. Dani scratched at Tia's neck. Somehow, she ripped open Tia's suit at the point where it joined onto her helmet. The oxygen whooshed out of Tia's lungs and the woven muka cord that held Tua's black water taonga made its way to the outside of Tia's suit. Dani yanked on the necklace with all her might. The cord cut into the back of Tia's neck and snapped. Dani flew into the current her hands outstretched, gripping the black water stone, her eyes pleading.

Turukawa clamped her hand over the rip in Tia's suit as nanobots raced to seal the hole. Tia held onto Turukawa trying to get her breath back, unable to understand what had just happened. Turukawa spoke to her softly until the nanobots had repaired the rip and Tia regained full consciousness.

'I'm fine. Has she gone?' asked Tia, looking out to the pink and yellow currents.

'I had to cut her loose,' said Turukawa.

Over the next few minutes they continued searching the hull for a way back into the ship, an opening. Sotrakkar's requests to *Pawta* went unanswered, though he continued a dialogue with it, making repeated requests that it let them all back inside. Just as Tia crested the top of the ship, she found a dip that opened into a hatch.

'I've found a way in, an airlock door,' said Tia, breathing heavily into the mikes.

The others started to make their way towards her, crawling along the grab rail paths. Turukawa arrived at Tia's side first. They worked together to score a line around the hatch with their wave sabres, trying to prise it open. Turukawa spoke to *Pawta* through the coded channel asking for help to open the hatch.

'Does it mind if we enter here?' asked Turukawa.

'No, you are purified now that Dani has gone,' answered *Pawta*.

Just as Tia placed a hand into the gap to open the hatch, a hand reached out from the current and grabbed hold of Turukawa. Tia turned to see Dani gripping onto Turukawa's shoulder like a limpet, her eyes so wide the whites were visible around her iris circuitry. The hatch began to close. Tia took her hand away just in time as the door clanged shut.

'Let go of her, or I'll kill you,' said Tia.

'You won't that do that,' said Dani.

Tia took her wave sabre out of the holster, set the wave into a sword, and held it above her head.

‘I’m warning you Dani. Let go.’

Turukawa tried to shake Dani off, but she gripped on tighter, her enhanced fingers threatening to slash through the embod’s suit.

Tia brought the sabre down slashing at one of Dani’s arms, severing it clean at the humerus. Dani screamed as Tia raised the sabre again and swiped at Dani’s other arm, severing it below the elbow. Dani groaned and the current swept her away, blood shooting out of her severed limbs and twirling in red spirals as she spun into the current. Tia froze at the sight of Dani’s severed hands still holding onto Turukawa’s shoulders. Turukawa grabbed at the hands trying to rip them away but they wouldn’t let go. Tia realised the hands were enhancements with a mind of their own. One of Dani’s hands still gripped the black water taonga that she had ripped from Tia’s neck. Tia grabbed hold of the muka cord and took back the black wai loaloa taonga. She tied it awkwardly around her wrist. She heard Oculum and Leilani breathing laboriously into her earpiece, their oxy tubes almost empty. Sotrakkar arrived by her side and called out to *Pawta*.

‘*Pawta* says she will not let us in with Dani’s arms attached to Turukawa,’ said Sotrakkar.

‘Let’s get the hands off her,’ said Tia, ripping at Dani’s severed hands, frantically trying to dislodge them from Turukawa’s shoulders.

‘It’s ok. Take this with you. It contains all of me,’ said Turukawa, clutching onto Tia and transferring her brain fingerprint into Tia’s sleeve patches.

Tia’s body jolted as the flow of trillions of bytes of data fed into her veins through the sleeve patches.

‘I love you,’ said Turukawa, letting go and sweeping out with the current into the whirlpool clouds.

‘No!’ screamed Tia, jumping into the current with Turukawa.

She rode the current, frantically surfing and swimming towards Turukawa. A rope lassoed her and pulled her back to the ship. The force of the rope winded her and she passed out as *Pawta* swallowed them all.



Ten minutes later *Pawta* deposited Tia, Sotrakkar, Leilani, and Oculum onto the floor of the launch bay next to Leilani’s shuttle.

‘*Pawta* has fixed the fins on the shuttle,’ said Sotrakkar.

‘Thank you,’ said Leilani.

‘The whirlpool is dying. We have to leave quickly,’ said Sotrakkar.

‘Come on sis, let’s go home,’ said Leilani, taking Tia by the shoulders and guiding her up the ramp into the shuttle. Oculum followed.

‘I’ll go up to the bridge and fly *Pawta* to the entry point. You can fly the shuttle out of the launch bay from there. I hope we meet again,’ said Sotrakkar, taking Tia’s hand. She stared at him; her mind blank as he walked briskly out of the shuttle door.

Tia sat in the navigator seat of the shuttle watching Leilani take her place at the helm. She pulled the straps on, her hands moving like an automaton. The launch bay wall opened in *Pawta*’s hull, and Tia watched on the lakescreen as *Pawta* raced to the entry point at the top of the whirlpool. The currents had begun to fizz and pop as the whirlpool slowed, clearly in its death throes.

‘Goodbye,’ said Tia, tears filling her eyes as she gazed into the pink clouds searching for any sign of her beloved Turukawa. She held onto the wai loaloa stone now tied once more around her neck, the muka frayed and rough.

The shuttle flew out of the launch bay and into the whirlpool, popping out through the whirlpool entrance into black space. Tia turned to look at the vortex in her mapping array. The rim of the maelstrom slowly closed over and collapsed as the shuttle floated away from it like a life raft moving towards *Toutouwai 5* and *Black Kiwi* 3.

Earth

Somehow time had warped inside the dying whirlpool and while only one Earth year had passed inside *Black Kiwi 3*, one hundred and fifty-three Earth years had passed in space by the time *Black Kiwi 3* returned to Earth. As the ship approached her beloved home planet Tia stood at the helm of *Black Kiwi 3*, her black and red exo-battlesuit fitted tight to her body, her legs braced, and her hands clasped behind her back. Leilani followed Tia's command as the ship entered Earth's atmosphere and flew to the dark side of the globe. Tia focused her spinning iris circuitry onto the surface of the planet. The cities on the western seaboard of the Americas had muted their lights as had the cities on the east coast of the Asian continents, the Pacific rim of fire. Was it her imagination or did the green patches on the continents look greener and bigger than when she'd left? The ship swept down over the waters of the North Pacific towards the equator and on to the scatter of submerged islands in the South Pacific, Tia's home. She flew low over the ocean.

A circle of phosphorescence swam in a swirling mass close to her home island of Namu. Tia looked closer, her iris circuitry spinning and zeroing in at sea level. She laughed at the sight that greeted her.

'Look at that,' said Tia, bracing herself for the loss ahead of them.

'I see them,' Leilani replied, tears in her eyes.

Down in the sea a pod of whales and dolphins swam in large circles, herding the night-time phosphorescence into a gigantic pool of swirling light in the water, like a huge searchlight. Leilani raced the ship over to the phosphorescent light, circling the ship in greeting, before flying down the length of the Kermadec trench towards the east coast of Aotearoa. The sun peaked over the horizon and shone into the leafy green of

Aotea Island. The trees had grown to full height, their huge canopies now covering the entire island. The vegetation on Waiheke Island had also changed into a lush forest of fully-grown kauri trees. The trees had grown so high on Takarunga maunga that the battlements were no longer visible. The hangar doors at Devonport base were bigger and brighter and there were more ships parked in the lots.

Leilani landed *Black Kiwi 3* with a soft touchdown in the main launch bay.

‘Everybody ready?’ asked Tia, standing at the exit door with her crew.

They nodded and shuffled forward. Oculum held their arm in a sling, close to their chest. A scar snaked across their left eyebrow and down the side of their face onto their cheek, marring their perfect skin and etching an ugly reminder into their face of the battle with the guards.

‘Won’t take much to get rid of that scar,’ said Tia.

‘No, I’m keeping it,’ said Oculum, touching the raised scar.

‘I kind of like it,’ said Leilani.

Tia slung a bag over her shoulder and looked to Leilani. For once her sister’s iris circuitry was still and she had ceased playing endless strike games.

‘All quiet on the resistance front?’ asked Tia.

‘So far,’ said Leilani, opening the hatch.

Tia exited the ship onto a ramp lined with cadets, graduates, soldiers, officials, and civilians. The crowd cheered and clapped as she walked down the ramp followed by her crew. A young woman walked up Tia and shook her hand vigorously.

‘Good to have you home. My grandmother Ratu Shakti told me all about you. I’m so glad to finally meet you,’ she said.

‘I am glad to be back on Earth,’ said Tia, scanning the young woman’s face for the familiar shape of Ratu Shakti’s fine jaw and hook nose and not seeing any similarity.

She moved down the line in a daze shaking the hand of Ratu Mohadeeen’s successor, a serious young man wearing a green turban who welcomed her back and directed her to the debrief room. Brother Christian’s successor, an elderly woman in white robes shook Tia’s hand and told her that her uncles’ house awaited them. Over the heads of the cheering cadets she looked for Uncle Dua and Uncle Va knowing they would not be there, that they had died on the same day fifty Earth years earlier. They did everything together, even death. Nevertheless, she automatically searched for them, hoping to see them standing in the crowd in bright coloured shirts, waving furiously.



The sun shone into the lounge of Dua and Va’s house as Tia sat at the dinner table. She closed her eyes and lifted her face to the warm rays, a welcome balm after the lengthy debrief at the Academy. Leilani appeared from the kitchen carrying two dishes of dalo and palusami, food delivered to them from their descendant cousins in the next-door block.

‘You should see what else they’ve brought us; kokoda, uvi, curried baigani, qalu, pounded cassava in caramelised sugar,’ said Leilani, placing the dishes on the table in front of Tia.

‘At least the food hasn’t changed,’ said Tia.

‘Got to feed you two up. You’re too skinny,’ said one of their cousins, tossing a tea towel over her shoulder and placing a dish of chopped chillies and miti on the table.

Tia ate a few mouthfuls, before moving away from the table and picking up the bag she’d brought with her from the ship. She took down the picture of Tua Milton from

the wall. It had hung there for so long that it left behind a brown rectangle. Tua Milton smiled at her from the ancient photograph. She reached for Tua's wai loaloa taonga around her neck and studied the photograph. For the first time Tia realised that Bubu was standing far off in the background of the image, next to a coconut tree. She placed the photo carefully onto a nearby shelf, unzipped her carry bag and removed the red and grey exo-jacket that Turukawa had gifted to her. The exo-jacket crackled as she placed it carefully onto a coat hanger, patted the sleeves flat, zipped the front closed, and hung it onto the picture hook. She tapped a coded sequence into one of the sleeve patches and Turukawa's brain fingerprint flared into the exo-jacket sending light and electricity fizzing in jagged lines all over the walls of the room.

Leilani walked towards her, aware that an energy had entered the room. The cousin hung back in the kitchen, her eyes opening wide. Tia stepped back and watched as Turukawa's brain fingerprint downloaded from the exo-jacket into the wall circuitry of the old Academy technology inside the walls. When the download ended, she stood silent, waiting.

Tia gasped as a Turukawa embod exited from the wall. She looked exactly like her sentient Turukawa in every way. But the hair on this one fell differently, and she held her head and her hands in a way that Tia had never seen before, stiff, and awkward.

'Have you been rattling around in the walls all this time?'

 asked Tia.

'I have been trapped in there for years. Thank you for liberating me,' said Turukawa.

'Welcome to our humble abode,' said Leilani.

'We should really be saying thank you for having us in *your* home,' said Tia.

Turukawa turned to face Tia and took an awkward step towards her.

‘I am sentient like her. I know everything she knew. But I am not her,’ said the embod.

‘I know,’ said Tia.

‘Shall we?’ asked Turukawa, sending a holographic blank into the centre of the room.

Tia huddled next to Leilani on the sofa. She nodded and the hologram buzzed into life. Dua and Va stood in the centre of the hologram wearing matching orange shirts. Bubu stood next to them. Tia and Leilani sang along with them in a song of welcome and Dua said a karakia.

‘Welcome home,’ said Bubu.

Epilogue

The kauri waqa floated on the still tide above Bubu's favourite landing, a fishing spot on the far side of Kato Island where the brain coral below supplied a home for thousands of tropical fish. Tia lay on the bamboo deck next to Leilani, her eyes closed to the sun as it beat down on her head. A white and brown kiore scampered over her supine body, its tiny rat claws tickling her skin as it ran along her arm and down her torso. Turukawa appeared from the entrance of the small hut carrying a tray of small biu filled with cold coconut water. She handed one to Tia who held the baby coconut husk to her lips and tipped her head back, taking a long draught of the sweet liquid.

'You ready?' asked the embod, taking a running dive off the end of the waqa.

'Hey, wait for us,' yelled Leilani, jumping into the water after the embod.

Tia walked to the end of the waqa and dived gracefully into the warm turquoise water. She surfaced and lay floating on her back her iris circuitry spinning into long focus as she gazed up into the sky. Her mapping array hung suspended before her eyes, searching the heavens. Looking up past the blue she detected a spark in the Kuiper belt shining at her from space.