



CENTER FOR PACIFIC ISLANDS STUDIES  
TEACHING OCEANIA SERIES  
VOLUME 8

# VOYAGING IN THE PACIFIC



UNIVERSITY  
of HAWAII  
MĀNOA





CENTER FOR PACIFIC ISLANDS STUDIES  
TEACHING OCEANIA SERIES  
VOLUME 8

# VOYAGING IN THE PACIFIC



UNIVERSITY  
of HAWAII  
MĀNOA



---

# Credits

## Cover:

Digital adaptation from “Outrigger sailing canoe of Yap, Mathaumeram” (Photograph by Karen Tu, 2013. Courtesy of Waa'gey) and “Archipel des Carolines; Proa de Satawal” (Circa 1819. Source: UHM Library Digital Image Collections).

© 2023 Center for Pacific Islands Studies.

Book layout design by Teoratuuaarii Morris.

## How to cite this book:

Genz, Joseph H., Celia Bardwell-Jones, Makena Coffman, Darienne Dey, Axel Defngin, Richard Feinberg, Celeste Hao, Hetereki Huke, Tomainne Joab, Tarcisius Kabutaulaka, Alson Kelen, Patrick V. Kirch, Monica LaBriola, Setareki Ledua, Ian Masterson, Alexander Mawyer, Teoratuuaarii Morris, Jerolynn Myazoe, Peter Nuttall, Foley Pfalzgraf, H. Larry Raigetel, and Shania Tamagyongfal.

2023 *Voyaging in the Pacific*. Volume 8 of Teaching Oceania Series, edited by Joseph Genz. Honolulu: Center for Pacific Islands Studies, University of Hawai'i-Mānoa.

---

# Acknowledgement of Genealogies of Voyaging Ancestors

Thousands of years prior to the voyages of exploration that left European shores, voyagers of the vast sea that would later be called the Pacific Ocean began carving dugout canoes that would not only become their primary means of transportation across the ocean but also the central object of their culture and identity. These Pacific seafarers studied carefully the surrounding elements including the depths of the ocean and the skies above. With close observations and carefully calculated analysis, they aligned their navigational stars, loaded supplies and tools, and then set sail for the unknown. The intent of these voyages was to discover terra incognita, the unknown and unexplored wider Pacific, and make it their new home. This was an unmatched

achievement in the history of humanity. The knowledge developed by these pioneering ancestors, passed down over centuries, has allowed contemporary navigators to look ahead, always knowing their location. The bravery and wisdom of the ancestral seafarers who passed on their knowledge made it possible for the current generation of navigation practitioners to proudly identify as descendants of the greatest of the world's voyagers. With humility, we—the navigation practitioners contributing as co-authors in this volume—acknowledge our role as custodians charged to protect and pass on the ancestral knowledge, paying homage to the generations before us.



---

# Preface

Galvanized by the easing of COVID-19 pandemic travel restrictions in the spring of 2022, a diverse team of academic scholars, cultural practitioners, and students with a shared interest in voyaging met for a workshop at the Center for Pacific Islands Studies at the University of Hawai'i at Mānoa. In co-producing this volume on voyaging in Oceania, we developed an approach that embraced multiple perspectives and ways of knowing, created a space for diverse ways of sharing and representing that knowledge, and acknowledged, incorporated, and honored a Hawaiian place of learning.

Approaching the topic of voyaging from multiple perspectives meant capturing a variety of disciplinary fields and experiential knowledge, while simultaneously attempting at least a partial representation of the diversity of seafaring traditions across Oceania, in regional variations and cultural specificities, and changes through time from contemporary revitalization through origin stories. The assembled team included academics whose research has focused on and contributed to the growth of

knowledge about voyaging, including the fields of Pacific Islands Studies, anthropology, history, geography, and philosophy. This includes long-term community-based collaborations and Indigenous scholarship from within communities. The team also included practitioners of voyaging, ranging from titled navigators and master canoe builders with decades of experience at sea to apprentices acknowledging their continued learning, whose commitment and passion serve as inspiration for the next generation of seafarers. The team also included graduate and undergraduate students who facilitated the sharing of stories beyond the written text.

Embracing the idea that some forms of knowledge in the Pacific are more easily expressed in spoken form rather than committed to written text, the navigation practitioners were invited to share their lived experiences, childhood memories, genealogical connections, and ancestral knowledge passed on to them, with the aim of incorporating their storytelling within the iBook. The students video-recorded the





individual interviews with the practitioners. While the students provided a few prompted questions, the narrators shared their own stories with the explicit intent to include video segments within this iBook. The interviews also served as the foundation for follow-up interviews as part of a larger oral history project for the graduate students' MA theses. (When published the MA theses will be included in a revised

Recommended Readings in this volume).

The gathering centered on recording the narratives of navigation practitioners from Yap, the Marshall Islands, Fiji, and Hawai'i. The Hawaiian delegation grounded the group in a Hawaiian place of learning by visiting the site of Kūkaniloko. Kūkaniloko is centrally located on O'ahu, and in addition to being recognized as a royal birth site (the Kūkaniloko



Birthstones State Monument), the rock formations indicate astronomical alignments such as the summer and winter solstices, and remain a site for the teaching of astronomy for navigation through a Hawaiian lens. The stewards of Kūkaniloko led our group on a “listening journey” by sharing with us the cultural and historical significance of the site, and this afforded a connection to the navigation practitioners visiting Hawai‘i. This shared experience helped forge and strengthen our relationships during the workshop. The co-writing process for this volume is imagined to be the first step in future collaborations. We extend our appreciation to Aunty Jo-Lin Lenchanko Kalimapau and Uncle Tom Lenchanko of the Hawaiian Civic Club of Wahiawā for sharing their stories and perspectives.

From this variety of experiences and forms of knowledge sharing, we have amassed our collective understanding of voyaging in Oceania. We recognize this is a partial representation of seafaring across the region. With different

contributors and a different workshop location, this volume may have been written differently with attention to other issues and other voices. The Recommended Resources afford more in-depth and broader regional coverage of the topics introduced in this volume, and are organized by general references, films, and specific themes pertinent to each section. Our collective hope is that this volume will be used in institutions of higher learning and incorporated into the curricula developed by seafaring organizations. We have developed a series of classroom activities at the end of each section to engage students in the topics of voyaging and allow for students to reflect on their own experiences as they metaphorically navigate their way on their educational voyage.

Joseph Genz  
Teaching Oceania Series Volume Editor  
Center for Pacific Islands Studies



---

# About the Teaching Oceania Series

Teaching Oceania is a publication series created with the collaboration of scholars from around the Pacific region to address the need for appropriate literature for undergraduate Pacific Islands Studies students throughout Oceania. The series is designed to take advantage of digital technology to enhance texts with embedded multimedia content, thought-provoking images, and interactive graphs.

The Teaching Oceania series is defined by:

- A regional perspective
- A collaborative process. The current texts have been written by teams of 4 or more scholars with regional representation to appeal to a broad audience through diverse examples
- A theme or topic that is not yet accessible to undergraduate students through current literature
- A Pacific Islands Studies approach that is interdisciplinary, creative, comparative, and grounded
- Attractive, relevant images, video, audio, and interactive features
- Accessibility in multiple formats, interactively as iBooks, EPUBs, and broadly as PDF files
- Free access to the texts at permanent links on the University of Hawai'i Scholar Space [Center for Pacific Islands Studies Community](#)

The Center for Pacific Islands Studies invites collaborative proposals for additional volumes in this series. For inquiries and more information contact, please feel free to contact us at [cpis@hawaii.edu](mailto:cpis@hawaii.edu).

Other Volumes:

1. Militarism and Nuclear Testing in the Pacific
2. Gender in the Pacific
3. Health and Environment in the Pacific
4. Oceanic Arts: Continuity and Innovation
5. Islands of French Speaking Oceania
6. Introduction to Pacific Studies
7. Pacific Studies: A Transformational Movement





# THE PACIFIC ISLANDS

© 2011. Center for Pacific Islands Studies, University of Hawai'i at Mānoa.  
All Rights Reserved. Reproduced with permission.  
Cartography by Manoa Mapworks, Inc.





# Authors and Contributors



**Joseph H. Genz**

Dr. Joseph H. Genz is an associate professor in the Department of Anthropology at the University of Hawai'i at Hilo. He teaches courses on social change in Oceania, cultural anthropology, history of anthropological theory, and oral history research. Joseph serves as the Book and Media Reviews Editor for *The Contemporary Pacific: An Interdisciplinary Journal* and is the Director of the Islands of Opportunity Alliance (IOA)-LSAMP program, which supports Pacific Islander students in the STEM fields in a regional network spanning 11 campuses. His book, *Breaking the Shell*, shares the journey of how nuclear refugees from Rongelap and Bikini in the Marshall Islands are revitalizing their maritime heritage.



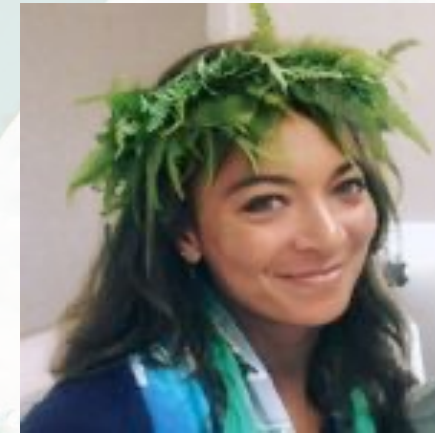
**Celia Bardwell-Jones**

Dr. Celia T. Bardwell-Jones is a Professor of Philosophy, affiliate professor of Gender and Women's Studies and currently Humanities Division Chair at the University of Hawai'i at Hilo. Her teaching and research interests include Feminist Philosophy, American Philosophy, immigration, philosophy of race and cultural diversity, ethics and social political thought, and philosophy of nature. She is currently working as a co-editor for a Special issue in *Amerasia Journal* entitled "Ocean Feminism."



**Makena Coffman**

Dr. Makena Coffman is a Professor of Urban and Regional Planning and the Director of the Institute for Sustainability and Resilience at the University of Hawai'i at Mānoa. She specializes in regional economy-environment modeling, with an emphasis on topics related to climate change. She teaches classes in environmental planning, urban economics, and climate change mitigation and adaptation.



**Darienne Dey**

Darienne has worked both as an archaeologist and an educator, teaching math, science, and wayfinding/seamanship at Hawaiian culturally-focused charter schools. Most recently, Darienne worked as a researcher, supporting education systems in Hawai'i as well as American Samoa, CNMI, FSM, Guam, Palau, and RMI as part of the federally funded REL Pacific program. She is a Polynesian Voyaging Society crew member, serving in various capacities (including apprentice navigator) during deep sea voyages aboard *Hōkūle'a* and other *wa'a kaulua* and is conducting her doctoral research on traditional Hawaiian wayfinding education, drawing primarily from Hawaiian-language historical documents. She also studies hula and oli as part of Ka Pā Hula o Ka Lei Lehua.



**Axel Defngin**

Axel Defngin was born and raised in Hilo, Hawai'i, and is from the islands of Yap in the Federated States of Micronesia. Apart from his studies, Axel is an active contributor to various organizations serving Pacific Islander communities. He has served as Team Leader and Project Manager at Pacific Students Media, and he currently serves on the Kaulunani Advisory Council, CAPAL Board of Directors, APIA Scholars Advisory Committee. Axel's goal is to support students in his home island of Yap, as well as Pacific Islanders more broadly who are on their journeys of completing higher education. Axel currently serves as Project Manager for the Islands of Opportunity Alliance (IOA)-Louis Stokes Alliances for Minority Participation (LSAMP).





### Richard Feinberg

Dr. Richard (Rick) Feinberg grew up in New York City, attended the University of California, Berkeley, for undergraduate study, and completed his doctorate at the University of Chicago in 1974. In 2018, he retired from Kent State University after almost 45 years as a member of Kent's anthropology faculty. His Pacific research has been on Anuta and Taumako islands in the Solomon Islands, Nukumanu Atoll in Papua New Guinea, and Atafu Atoll in Tokelau. He has published books and articles addressing topics that range from kinship, language, healing, and religion to navigation, voyaging, and spatial cognition.



### Celeste Hao

Celeste Manuia Hao, an 'ōiwi of Hilo, Hawai'i is an ancestral title holder as the taupou of her family and village of Faleapuna on 'Ūpolu, Sāmoa and was trained in the art of wayfinding and navigation by the late master navigator, Chad Kālepa Baybayan. Alongside him during her time as an Education Associate and Outreach Coordinator at the 'Imiloa Astronomy Center of Hawai'i, she co-designed specialized curriculum, PreK-12 outreach programs, and cutting-edge STEAM education tools for local and global audiences via the art of wayfinding. In 2014 she co-navigated *Hōkūle'a* in a historic homecoming to her ancestral homelands of Sāmoa and American Sāmoa during the Mālama Honua Worldwide Voyage. A graduate of UH Hilo, she is a wife, mother of eight children, and currently serves as a Senior Learning & Innovation Consultant at Kamehameha Schools Hawai'i.



### Hetereki Huke

Hetereki Huke Ainsa is a Rapa Nui architect and territorial planner with significant experience in surveying pre-European settlements in Rapa Nui, identifying territorial uses and patterns, and managing natural resources. Huke has led archeological surveys and collected baselines in the sites of Akahanga, Vaihu, Ahu Tepeu, Maunga Puharua and Roiho caves, all located within Rapa Nui National Park. He served as member of the Indigenous Affairs Office appointed by the President of Chile, a lead for the Rapa Nui Climate Action Plan, Secretary of Te Mau Hatu - Council of Elders, Board member of SASIPA and Honga'a Re'o, and currently is the Director of TEPUKU, a research center focused on archeology, territory, and environment in Rapa Nui and other Pacific Islands.



### Tomainne Joab

Tomainne Joab is a graduating senior in Environmental Studies at the University of Hawai'i at Hilo, with plans to enroll in the MA program of heritage management at UH Hilo. She is from the village of Awak, U on Pohnpei. She enjoys learning about her culture and other cultures, spending quality time with family and friends, and taking naps.



### Tarcisius Kabutaulaka

Dr. Tarcisius Kabutaulaka is from Tasimauri, Guadalcanal, in Solomon Islands. He is an associate professor at the University of Hawai'i-Mānoa's Center for Pacific Islands Studies and editor of the center's Pacific Islands Monograph Series. His research focuses on governance, natural resources development, conflicts, post-conflict development, international intervention, Australian foreign policies, and political developments in Oceania, especially Solomon Islands. He has written and published on these issues and has worked as a consultant for governments and international and regional organizations.





### Alson Kelen

Alson Kelen has been involved in the traditional canoeing culture of the Marshall Islands for a number of decades. For four years, Alson assisted the Waan Aelōñ Kein (Canoes of These Islands) project to document the step-by-step construction of Marshallese canoes. In the late 1990s, he co-founded the Waan Aelōñ in Majel (Canoes of the Marshall Islands) program, a registered non-profit that focuses on empowering youth to use traditional Marshallese knowledge as a medium to transfer needed life skills and capacity building. Alson has served as the former Mayor of Bikini Atoll and a former Councilman for Bikini Atoll, and currently serves as the President of the Marshall Islands Council of NGO's. He is also an outspoken advocate on addressing the impacts and legacies of nuclear testing and the current effects of climate change in the Marshall Islands.



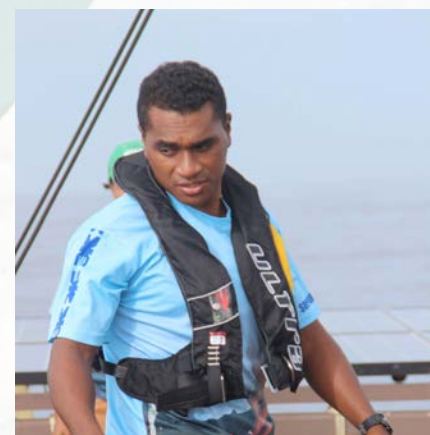
### Patrick V. Kirch

Dr. Patrick V. Kirch is Professor of Anthropology at the University of Hawai'i, Mānoa, and also Professor Emeritus of Anthropology and Integrative Biology at the University of California, Berkeley. Born and raised in Hawai'i, Kirch received his B.A. from the University of Pennsylvania and Ph.D. from Yale University. Kirch's research interests include the evolution of complex societies, preindustrial agricultural systems and agricultural intensification, and the dynamic interactions between human populations and their ecosystems. Kirch has carried out archaeological fieldwork in the Mussau Islands, Solomon Islands, Tonga, Samoa, Futuna, the Cook Islands, Society Islands, Mangareva Islands, and Hawaiian Islands. Kirch has published some 25 books and monographs, and more than 300 articles and chapters on the results of his research.



### Monica LaBriola

Dr. Monica C. LaBriola is an assistant professor in the Department of History and affiliate faculty in Pacific Islands Studies at the University of Hawai'i at Mānoa. Her expertise lies in the geographic region known as Micronesia in northern Oceania, researching oral traditions, land, women and gender, mobility and migration, and historiography. She is a dedicated scholar and teacher, who was awarded a Frances Davis Award for Excellence in Undergraduate Teaching in 2017 and the Board of Regents Medal for Excellence in Teaching in 2023.



### Setareki Ledua

Setareki is the Executive of Drua Sailing Experience and a lecturer at University of Fiji, Setareki Ledua grew up in Naividamu, Fulaga in the Lau group of Fiji. He moved to Suva to continue his education. Setareki Ledua did his engineering studies in Fiji Institute of Technology, before he started sailing beyond Fijians waters. He has logged more than 80,000 nautical miles (which is twice the distance around the world) and has sailed throughout the islands of Fiji in the Fijian drua called *i Vola Sigavou* (The New Rising Star). He also did his foundation in Fabrication and Welding and he is one of the only two trained navigators in Fiji. Setareki is now looking to start a traditional navigation school in Fiji.



### Ian Masterson

Ian 'Akahi Masterson—the Surf Professor, is an educator, ocean safety specialist, archeologist, and Hawaiian cultural practitioner, leading numerous culture-based trainings for community organizations, and also serving on the Kahalu'u Neighborhood Board. Hailing from a kama'āina Portuguese family, Masterson grew up on O'ahu and received his MA in Pacific Islands Studies from the University of Hawai'i at Mānoa. He has developed and taught courses in Surf Studies, Pacific Islands Studies, Hawaiian Studies, and Ocean Safety Education within the UH System, as well as teaching Cultural Anthropology and Marine Science at Hawaii Pacific University for over a decade. Recently, Masterson published two chapters in the Gender and Surf Studies anthology, *Surfing: Sex, Genders, and Sexuality* (2018).





### Alexander Mawyer

Dr. Alexander Mawyer is Director of the Center for Pacific Islands Studies and Acting Chair of the Department of Pacific Islands Studies at the University of Hawai'i at Mānoa. Dr. Mawyer holds a BA from Amherst College, MAs from University of Chicago and UHM, and a doctorate in Anthropology from the University of Chicago. Dr. Mawyer's recent research interests include language and space in Oceanic linguistics, biocultural indicators, conservation and sovereignty, and marine resource governance in the Pacific. He served as editor for *The Contemporary Pacific: An Interdisciplinary Journal* from 2016 to 2021. He sits on the Board of the University of Hawai'i Press (UHP) and is a member of the scientific committee of the Maison des sciences de l'Homme du Pacifique, and The Rāhui Center, among other board memberships.



### Teoratuuaarii Morris

Teora Morris received both her BA and MA from the Center for Pacific Islands Studies at the University of Hawai'i at Mānoa. Since 2016, she has worked on several volumes of the Teaching Oceania series in a number of roles including, student volunteer, ebook designer, and as a co-author on its fifth volume. She is currently the operations manager of the Bishop Museum Press at the Bernice P. Bishop Museum in Honolulu.



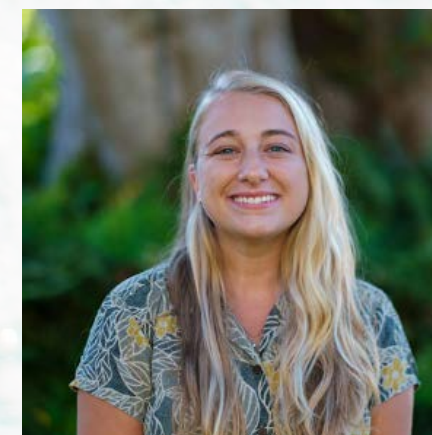
### Jerolynn Myazoe

Jerolynn Myazoe was born and raised on Majuro Atoll in the Marshall Islands. Her mother's lineage is from the village of Lorkom on Wotje islet on Wotje Atoll. Myazoe received her BA in anthropology from the University of Hawai'i at Hilo, where she is currently pursuing her MA in heritage management. Her thesis focuses on documenting oral histories of voyaging experiences in the Marshall Islands to develop a framework for community engagement in sustainable sea transportation.



### Peter Nuttall

A proud Fijian and Aotearoa citizen, Dr. Peter Nuttall is the Scientific Advisor to the Micronesian Center for Sustainable Transport and adjunct Professor at the University of Fiji. Peter has led research into shipping decarbonization at local and international scale. He has spent most of the past four decades at sea across the Pacific on various small sailing ships. He is the architect of the Pacific proposal to IMO for a universal GHG levy on international shipping. With his sons he built the replica drua *iVolasiga Vou* and set up the Drua Sailing Experience to help revitalize Fijian traditional sailing culture.



### Foley Pfalzgraf

Foley Pfalzgraf holds a BA in international studies from the American University; an MSc in nature, society, and environmental governance from the University of Oxford; and an MA in geography and environment from the University of Hawai'i at Mānoa (UHM). She is currently pursuing a certificate in Pacific Islands Studies and is a PhD candidate in UHM's Department of Geography and Environment. Her research focuses on the extent to which climate adaptation and mitigation mechanisms, such as REDD+, are meeting the needs of communities in Vanuatu.





### H. Larry Raigetal

H. Larry Raigetal is an Assistant Professor at the University of Guam, a traditional pwo navigator under the school of weiyeng in the central Carolines, and an initiated master canoe carver (senap) under the school taan gech.



### Shania Tamagyongfal

Shania Tamagyongfal is a graduate student currently pursuing a master's degree in Heritage Management at the University of Hawai'i at Hilo. She was born and raised in Hilo, Hawai'i and is from the village of Tooruw in Maap on the main island of Yap. Through her interest in connecting with her culture, her MA thesis is focused on documenting the oral histories of Yapese voyaging which will then be utilized in climate change efforts towards developing a framework with voyaging being incorporated as a form of sustainable sea transport.



### Image 2.

Co-authors in attendance at the Teaching Oceania series workshop at the University of Hawai'i at Mānoa, 2022. (Left to right) Tomainne Joab, Jerolynn Myazoe, Celeste Hao, Shania Tamagyongfal, Monica LaBriola, Ian Masterson, Darienne Dey, Richard Feinberg, Joseph H. Genz, H. Larry Raigetal, Setareki Ledua, Alexander Mawyer, Peter Nuttall, Celia Bardwell-Jones, and Tarcisius Kabutaulaka.



Volume 8 Voyaging in the Pacific  
Teaching Oceania Series

# Introduction & Overview

## Student Learning Objectives (SLOs)

1. Identify, describe, and map the voyaging traditions of Oceania.
2. Explain and discuss the regional and local histories of voyaging, the cultural meanings attached to canoes, the knowledge of canoe-building, the systems of wayfinding including specialized navigation techniques, the post-settlement voyaging networks, the practices of contemporary seafaring, and the community-based goals of various voyaging organizations.
3. Reflect on and address the current strategies of island resilience to confront climate change impacts that draw from ancestral knowledge of seafaring.



---

## Introduction and Overview

### *Fleet of Canoes*

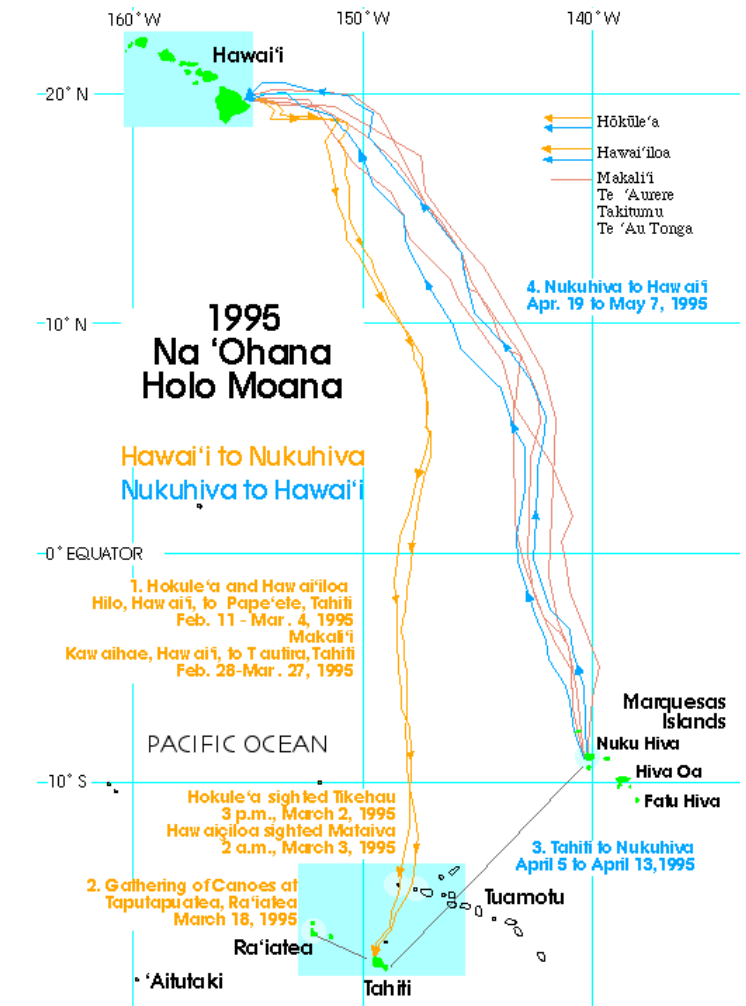
In 1995, six voyaging canoes set sail from Nukuhiva northward on a two-thousand-mile journey to Hawai'i Island. Double-hulled canoes built in Hawai'i (*Hawai'iloa, Hōkūle'a, Makali'i*), the Cook Islands (*Te Au o Tonga, Takitimu*), and Aotearoa (*Te Aurere*) commemorated the discovery and settlement of the Hawaiian archipelago by seafarers thought to have sailed from Te Henua 'Enana (the Marquesas Islands). The coming together of this fleet of canoes also celebrated two decades of efforts to revitalize voyaging, starting with the building and sailing of *Hōkūle'a* to Tahiti in 1976 guided by a navigator from Satawal, Pius "Mau" Paialug—the fleet was "sailing in the wake of the ancestors" (Finney 2003).

That initial bridging of cultures between Hawaiians and Satawalese (who may identify or be identified as Micronesians) served as the foundation for the revitalization, re-strengthening, and re-learning of voyaging that spread across the Pacific, starting in the 1970s and continuing today. The forging of cross-

cultural alliances through voyaging networks is not a new phenomenon. Such trans-Oceanic relationships are also evident historically across the region. For instance, the sawei network was a voyaging interaction sphere in the North Pacific where communities on such islands as Satawal and Lamotrek were linked to Yap via regular and periodic voyaging. This enduring support system of voyaging canoes was enacted in times of environmental uncertainty or calamity such as providing relief from the impacts of typhoons. The social relationships that underpinned the voyaging system of sawei remain intact today and serve as an example of the kinds of ancestral knowledge associated with voyaging that continue to be useful as time-honored adaptive strategies to navigate emerging climate changes.

If we can imagine the contemporary canoes of Oceania sailing as a flotilla much like the historic sawei, it would be the canoes from places like Satawal, Lamotrek, and Polowat in the central Carolinian islands, the Marshall Islands, and Taumako in





the eastern chain of the Solomon Islands that would trail at the far end—a place of honor as well as support for those ahead. These island communities' ancestral knowledge of seafaring is largely unbroken in its transmission from past generations to the present and has served as the foundation and guide for other Pacific communities in reclaiming their maritime heritage. Adept navigators preside at the helm in this fleet of Pacific canoes, using voyaging to empower communities in

innovative, visionary ways. The ancestral designs of Pacific canoes also provide guidance through the metaphors they can invoke—in addition to changing direction by tacking or “coming about,” another way to harness the wind is through a sail and hull design referred to as shunting, where the sail “changes ends” as the bow and stern are interchangeable. Confronting locally relevant issues like rising sea levels and other climate change impacts may require Pacific Islanders to “shunt” and

**Image 3.** The Voyaging Canoes in Taiohae Bay, Nukuhiva in 1995. Photo by Monte Costa. Source: Hōkūle'a Archives.

**Image 4.** Map of the 1995 voyaging expedition, Na 'Ohana Holo Moana. Source: Hōkūle'a Archives.

return to ancestral ways of knowing. Voyaging is, thus, about more than cultural pride and community renewal, it is also a practice that centers sustainability, local to regional scale social relationships, and practical environmental knowledge needed to navigate from the present into the uncertain future. All of these are embedded within the knowledge systems of seafaring.

The imagery of a fleet of canoes that represent diverse island communities, languages, worldviews, and depths of regionally specific knowledge has inspired the collaborative process of producing this volume to provide a multiplicity of perspectives, stories, and experiences. And, just as there are commonalities that underpin all systems of voyaging throughout Oceania, we have come together like a fleet of canoes to co-narrate our understanding of voyaging in the Pacific.

### *Oceania*

The Pacific Ocean is a vast realm encompassing one-third of the surface of the earth. Long disparaged by Europeans and other outsiders as a watery desert or sparsely populated region whose geography was characterized by the occasional archipelago or relatively isolated islands, Tongan anthropologist and poet Epeli Hau'ofa (1994) profoundly reimagined the Pacific, or **Oceania**, as a "Sea of Islands" vitally connected in the past and present by

shared genealogies, kinship, and cultural and social histories. Although accounting for only a tiny fraction of the global population, the region contains close to a quarter of the world's languages, is home to some of the most ancient and most recent human settlements, and is characterized by enormous ecological and cultural diversity.

This volume, the eighth contribution to the *Teaching Oceania* series, brings together practitioners and scholars of seafaring to illuminate the histories and contemporary practices of voyaging throughout Oceania. In order to accomplish its goals, this work takes a Pacific Studies stance towards teaching and learning Oceania that centers the study of the region from the inside-out, from island-home-communities-out, viewing the region not as an object of inquiry but as a site of empowerment, cultural renaissance, and assertive reclamation of cultural identity. Today many practitioners explicitly locate their research and teaching within a decolonial framework that is culturally grounded, place-based, and deeply engaged with **Indigenous epistemologies** and methods that are grounded in locally valued ways of knowing, underscore the ethical and practical importance of ongoing relationships between researchers and communities, and contest the intellectual legacies of colonial pasts and presents both within the academy and in everyday community contexts (Smith 1999; 2019).

See [Introduction to Pacific Studies](#), *Teaching Oceania* Series Volume 6 and [Pacific Studies: A Transformational Movement](#), *Teaching Oceania* Series Volume 7 for more on teaching and learning in Pacific Studies.



## Chronology and Catalysts of Renaissances within the Pacific

- 1950 Pacific Islands Studies Program (PIP) established at University of Hawai'i at Mānoa (UHM).
- 1967 Waigani Seminars begin at University of Papua New Guinea (UPNG), seminar sessions centered around Indigenous Melanesian theorizing of economics, politics, culture, education, history, and land tenure.
- 1969 Foulards Rouges (Red Scarves) founded by Nidoish Naisseline in New Caledonia to fight French colonialism and re-establish Kanak identity. Student food strikes organized at University of the South Pacific (Suva) by Francis Saemala.
- 1970 Niugini Black Power Group created at UPNG, inspired by the Black Power and Negritude movements.
- 1971 & 1972 Students at University of Auckland form Ngā Tamatoa (The Young Warriors) and Te Reo Māori Society march to parliament.
- 1972 Inaugural Maori Language Day on 14 September 1972.
- 1973 Polynesian Voyaging Society founded.
- 1974 Against Testing on Moruroa (ATOM) Conference.
- 1975 Te Rōpū Matakite o Aotearoa ('Those with Foresight'), led by Te Rarawa leader Whina Cooper, march to parliament and deliver a petition with 60,000 signatures protesting the continued dispossession of Māori land. Pacific Women's Conference, Nuclear Free and Independent Pacific Conference (Suva, Fiji), and Waitangi Tribunal formed to investigate grievances articulated by the Māori community. Tia Belau movement defeats the SuperPort project which aimed to refine oil in Palau. *Hōkūle'a* launched on March 8, 1975.
- 1976 Foulards Rouge becomes a pro-independence political party in New Caledonia. *Mana Review: A South Pacific Journal of Language and Literature* publishes the first issue.

In the wake of, in some parts of the region, centuries of external colonial projects, the diverse **Indigenous** peoples and local communities across Oceania have today adopted creative survival strategies in the face of rapid cultural, social, political, and economic changes. Among these are abilities to navigate multiple worlds that might include both Christian and Indigenous spiritual practices, Western and Indigenous lifestyles, and increasingly intertwined Western and customary political and economic structures, while still maintaining a commitment to family and community relations. During the cultural renaissance, a period spanning from the 1970's to the 1990's, communities from Aotearoa/New Zealand to Hawai'i, and from the island nations of the Southwest Pacific such as Papua New Guinea and Vanuatu to Palau and Guåhan (Guam) in the North Pacific, reasserted the profound value of potent Indigenous and traditional ecological knowledges. There is a growing movement now to return to ancestral knowledge for climate change resilience and adaptive strategies, including seafaring.



## Chronology and Catalysts of Renaissances (continued)

- 1976 Establishment of Protect Kaho'olawe 'Ohana (PKO). *Hōkūle'a* begins historic voyage to Tahiti. UHM establishes the first B.A. programs for Hawaiian Language and Hawaiian Studies.
- 1977 Members of Ngati Whatua occupy land at Bastion Point, Orakei for 506 days and face eviction by the police.
- 1978 Office of Hawaiian Affairs created. The Constitutional Convention amends the Hawai'i State constitution to recognize 'olelo Hawai'i as an official language along with English and the mandate that "the state will provide for Hawaiian education, consisting of language, culture and history in public schools" is included (Constitutional Convention 1978).
- 1979-1980 A set of 16 "Ondobondo" (a "Binandere word meaning festival, singing, and feasting") poster poems published by the UPNG Literature Department.
- 1985 Hawaiian Studies granted permanent status at UHM.
- 1986 Ka'ū Report submitted to UH by a committee of eighteen Kanaka Maoli scholars, including Kekuni Blaisdell, Davianna McGregor, Haunani-Kay Trask, and Lilikalā Kame'eleihiwa.
- 1987 Passing of the Maori Language Act.
- 1988 Treaty of Waitangi Policy Unit established within the Department of Justice to assist and advise on Māori land claims.
- 1994 U.S. Navy transfers deed of ownership of Kaho'olawe to the State of Hawai'i as a result of years of advocacy by PKO members and supporters.
- 1997 Oceania Centre of Arts and Culture established by Epeli Hau'ofa at USP-Suva.

(Chappell, D. 2020; Enomoto, J. et al. 2021)

*Seafaring, Voyaging, Navigation, and other Bodies of Knowledge*  
**Seafaring** involves a comprehensive system of knowledge that includes canoe building, seamanship, navigation, voyaging, astronomy, weather, land and ocean resources, spiritual connections, social relationships, gendered roles, and other integrated bodies of knowledge. The seafaring that enabled the peopling of the Pacific is one of the greatest feats of humankind. This unprecedented moment involved a series of explorations into unknown seas far out of sight of land—for the first time in our migratory human history—to discover and settle the islands of Oceania. Just as our world today is preparing for our journey into the unknown frontier of manned space exploration by reaching our neighboring planets and possibly beyond, the pioneering seafarers and their descendants who eventually inhabited all the islands of Oceania explored new worlds. Voyagers invoked Indigenous ways of knowing that considered the design of canoe hull and outrigger platforms, sail forms, construction materials and methods, observations of the cosmos and local weather for strategies and timings of voyages, social hierarchies for division of labor, protocols in learning and sharing expert knowledge, the spiritual beliefs and cultural meanings associated with canoes, and other dimensions of seafaring.





### Interview 1.

Click [here](#) to watch "A navigator's values" narrated by co-author H. Larry Raigetel. Youtube, 1:59.

### Interview 2.

Click [here](#) to watch "Sustainability as a Canoe and Organizational Skill," narrated by co-author Setareki Ledua. Youtube, 3:18.

Pioneering anthropological studies of Oceanic navigation emphasized the ways in which voyagers orient themselves in relation to the movements of the stars, prevailing winds, or wave patterns (Goodenough 1953; Gladwin 1970; Lewis 1972). Knowledge of wave patterns or the rising and setting points of particular stars is then superimposed on a mental map depicting the locations of potential destination islands in relation to the navigator's present location. However, while such accounts revolutionized our understanding of non-instrument navigation, other descriptions call attention to the importance of embodied experience (Feinberg and Genz 2012; Ingold 2000, 2011; Lauer and Aswani 2009).

Each of the ways in which people successfully navigate the sea requires diverse information from the senses—kinesthetic, auditory, visual, proprioceptive, cognitive—which navigators may hold as **embodied knowledge**. Expert skill and awareness of the sea are developed over a lifetime by

remarkable, sensitive experiences of interaction with ocean currents, winds, waves, and other indicators. The deeply rooted cultural practices of navigation include ways of perceiving, knowing, and engaging with **seascapes**. This seascape expertise is evidenced in Pacific languages (Pappas and Mawyer 2022), orienting devices during navigation out of sight of land, and remarkable marine environmental knowledge including deep knowledge of skies, seas, waves, and currents, as well as the life cycles and behaviors of diverse organisms, especially birds and migrating marine mammals. Given the remarkable character of these realms of knowledge, it is not always easy for navigators to put into words the signs and messages they are reading from the environment, the ways in which navigators 'feel their way' using a combination of diverse orienting, positioning, and visioning tools such as the roll or pitch of the vessel to discern disrupted swell patterns and to map these onto their knowledge of the stars, winds, and known



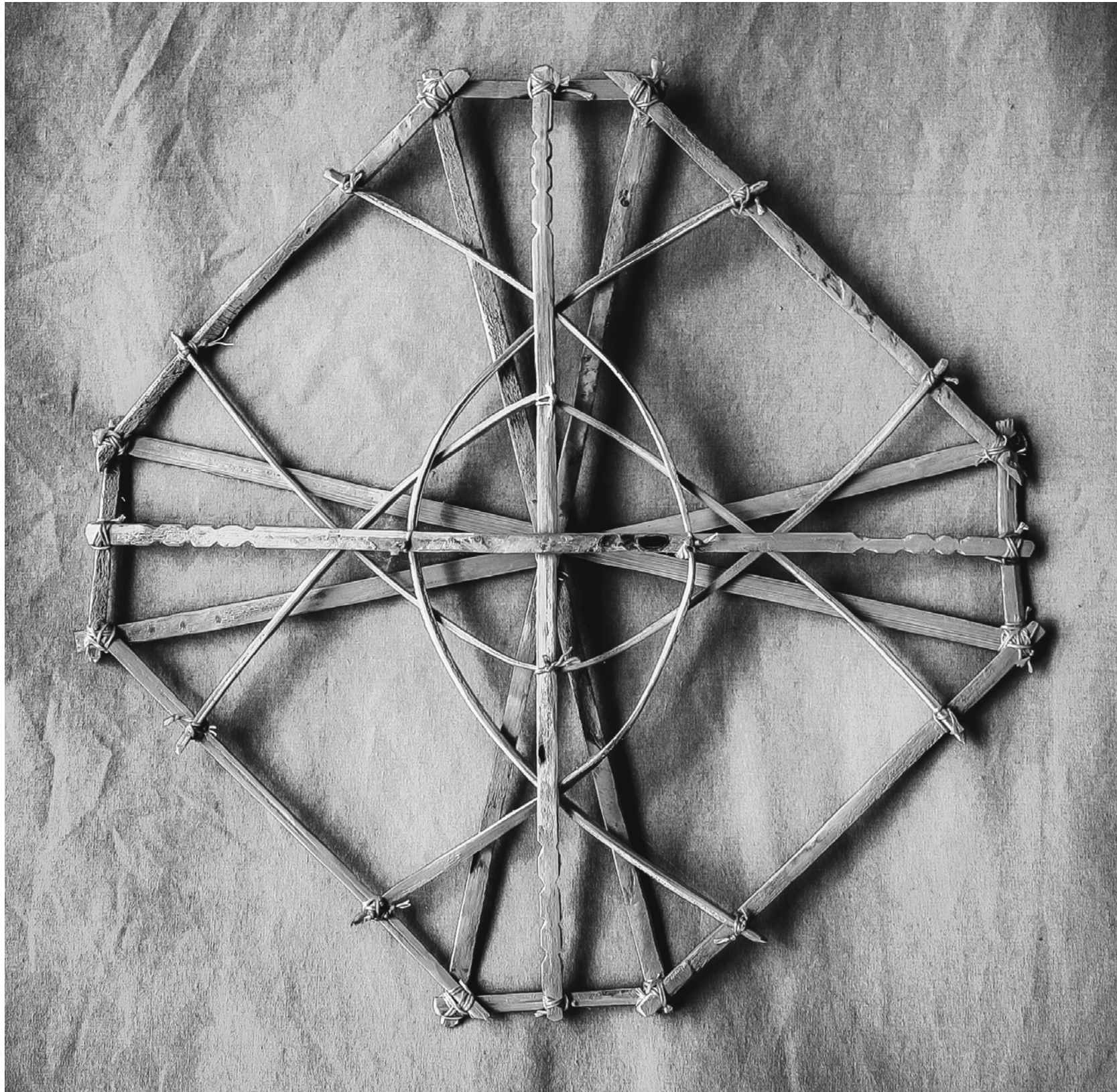
# “ Ola ka wa’a iā kākou. *The canoe lives because of us.* ”

islands to maintain a sense of orientation. Kevin Lynch’s neologism **way-finding** (also written wayfinding) offers a robust term that captures the idea of embodied knowledge, meaning “a consistent use and organization of definite sensory cues from the external environment” (Lynch 1960, 4). The navigational expertise of Pacific peoples has been used to explore, inform, and educate researchers and diverse publics about the remarkable role of **Indigenous knowledges** and cognitive resources for living in, experiencing, and navigating challenging environments such as Oceania’s seascapes.

The richness of the connections between diverse domains of knowledge is well reflected in the Hawaiian ‘ōlelo no’eau (proverb) “Ola ka wa’a iā kākou,” which roughly translates as “The canoe lives because of us.” Ola can variously mean “life, health, well-being, living, livelihood, means of

support, salvation, alive, living, curable, spared, recovered, healed, to live, to spare, save, heal, grant life, survive, thrive.” Thus, a canoe (wa’a in Hawaiian) is evidence of life, health, and prosperity. This includes healthy social relationships, a healthy forest ecosystem, a wealth of resources both in breadth and depth, well-established generational (kū’auhau) thinking and practices, and innovative and entrepreneurial mindsets and skills sets for a thriving community and culture. The proverb suggests that if you have the wood for a canoe, your forest must be healthy, and your community must have the skillsets needed to create the canoe and to voyage. Thus, the voyaging canoe is the vehicle for forging life-sustaining local and regional exchange networks.





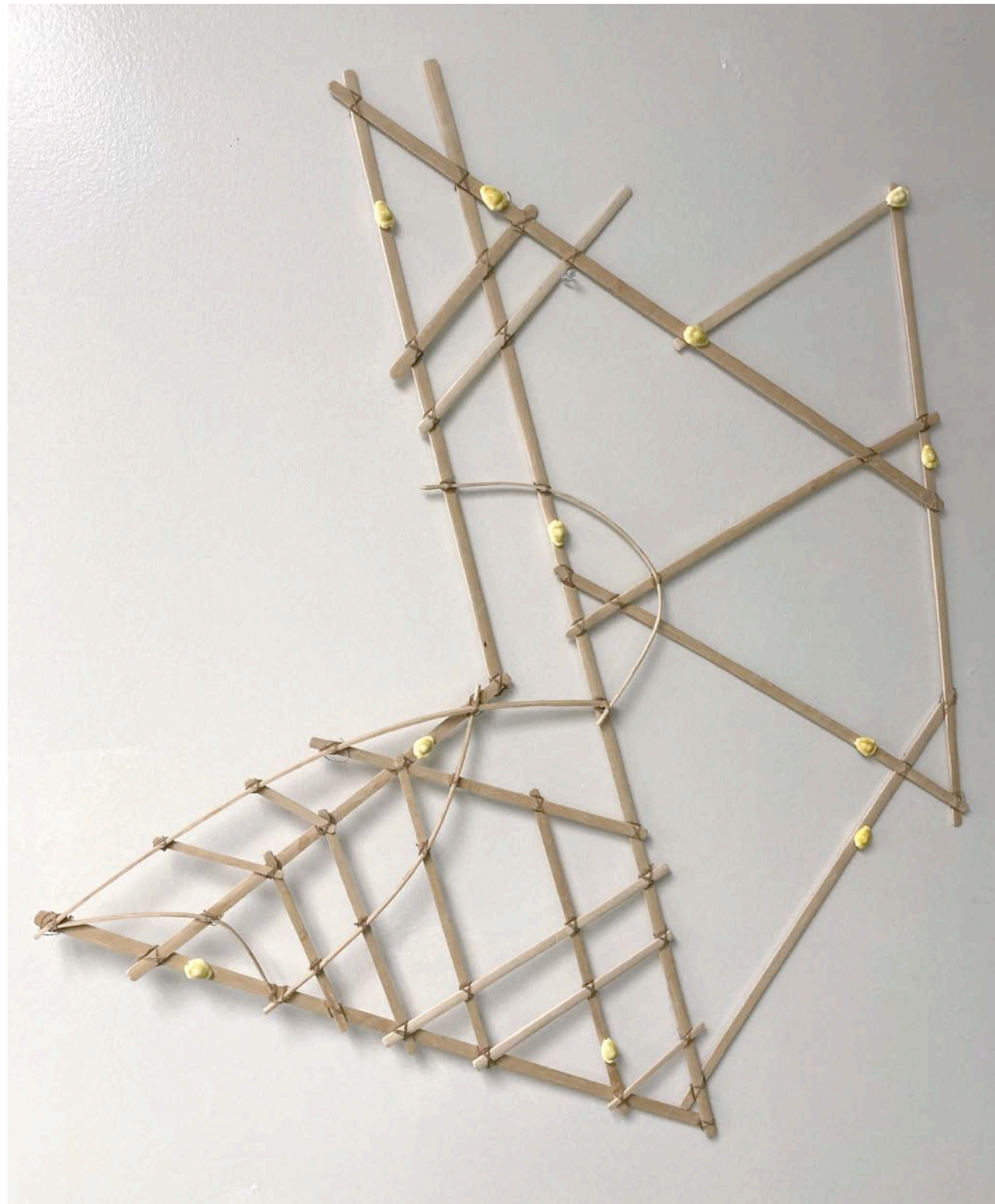
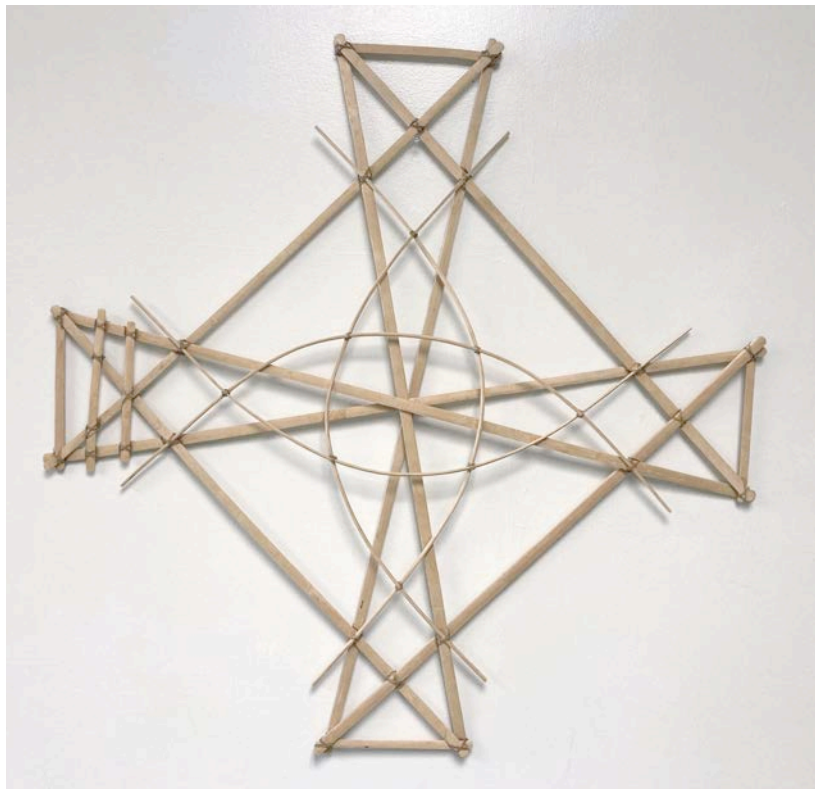
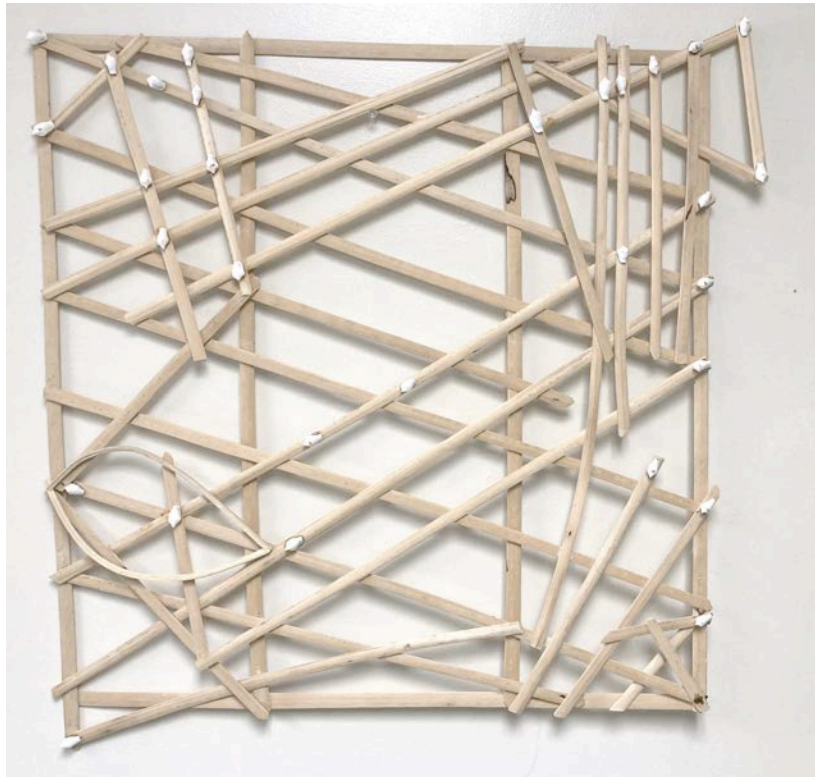
### **Ways of knowing, ways of representing knowledge**

Navigators from the Marshall Islands developed a system of wayfinding largely focused on remotely detecting how islands disrupt the flow of swell and currents. Piloting a canoe in reference to wave patterns centers on embodied ways of knowing—feeling how waves affect the motion of the canoe, which in turn afford navigational information in terms of distance and direction toward an island. Marshallese navigators developed “**stick charts**,” called *mattang* or *wapepe*, that abstractly model the conceptual framework underlying Marshallese wave navigation, including representations of Indigenous wave concepts that, to a degree, resonate with Western oceanographic understandings of wave reflection, refraction, and diffraction. They also developed planar representations to map the positions of real atolls and actual swell patterns, ranging from regional *medo* to *rebbelib* that map an island chain or the entire archipelago. The modeling and mapping of the stick charts are material representations of the navigator's embodied knowledge of the sea (Genz 2014).

#### **Image 5.**

Wapepe (also referred to as *mattang*); one class of Marshallese “stick charts.” Constructed by Isao Eknilang, 2006. Photo by Joseph Genz.





**Images 6.**  
(Top left) Rebbelib;  
one class of  
Marshallese stick  
charts. Constructed  
by Isocker Anwell,  
2016.

**Image 7.**  
(Bottom left)  
Mattang (also  
referred to as  
wapepe); one class  
of Marshallese  
stick charts.  
Constructed by  
Isocker Anwell,  
2016.

**Image 8.**  
(Right) Meddo;  
one class of  
Marshallese stick  
charts. Constructed  
by Isocker Anwell,  
2016.



In this volume, we draw from a diverse range of experiences, scholarly inquiry, and ways of knowing to explore seafaring from different perspectives. Historically, academic inquiry has largely focused on the cognitive and embodied knowledge of wayfinding that enables the practices of

### **Voyaging within and beyond “Oceania”**

One of the challenges of this work on navigation and voyaging in Oceania (or the Pacific Islands) is the way in which this topic draws into view the limitations of how the region is defined. As scholars like Tongan anthropologist Epeli Hau’ofa, and many others, have noted, the boundaries which make up the region are ultimately arbitrary. Moreover, in some sense, every Ocean navigation challenges the boundaries of land and sea and community many of us have in our heads. For instance, the common conception of the Pacific Islands or “Oceania” is challenged by the example of voyaging connections between the Philippines and Palau and other islands in the central Pacific. In deep time, voyaging connects cultures across an area referred to as Austronesia from Taiwan to Madagascar off the coast of Africa to Rapa Nui (Easter Island) in the far-eastern Pacific.

**voyaging**—sailing a canoe long distances out of sight of land across the ocean to reach a targeted island destination. Anthropologists have explored this idea through time and across space, drawing from archaeology, linguistics, physical anthropology, and cultural anthropology. An anthropological lens thus informs the general outline of this volume by moving chronologically from the remote, ancestral past with voyages of discovery through the historic era and to the present day with voyages of cultural reclamation. Other fields such as philosophy and geography

complement this understanding. In this sense, this volume mirrors and draws inspiration from the comprehensive treatise, *Vaka Moana: Voyages of the Ancestors: The Discovery and*

*Settlement of the Pacific* (Howe 2007). Layered onto this anthropological foundation are Indigenous perspectives generated by Pacific Islands Studies—exploring the significance and meaning of canoes within a decolonial framework that is culturally grounded, place-based, and engaged with Indigenous ways of knowing and research methods. Some of these Indigenous approaches come from Pacific Islander communities through the written and video-recorded contributions of practitioners; the volume features practitioner perspectives from Yap, the Marshall Islands, Fiji, and Hawai’i. The histories of voyaging challenge and expand geographical and intellectual boundaries related to place. Though Oceania understood as a regional concept has shaped the trajectory of Pacific Islands Studies, voyaging as a migratory practice within Oceania necessitates crossing boundaries, opening an abundance of knowledge, and connecting islands beyond the conventional demarcated regions.

**Section 1**, “Oceania’s Deep Time,” explores the regional and local histories of origins—cosmogonic stories and voyages of exploration, discovery, and settlement—taking into account the challenges and forms of evidence in reconstructing the past that stretches back many thousands of years. **Section 2**, “Canoe Culture,” focuses on the cultural meanings attached to canoes, canoe designs and canoe-building, and the various systems of wayfinding including specialized navigation techniques. **Section 3**, “People of the Sea,” describes some of the post-



## Spotlight

"Seiseiwei – Paddle Onward," a poem by Carol Ann Carl

“

Tuhkehn wahr tipwitipw, wahr seisei  
*canoe trees falling, canoes paddling*

”

### Video 1.

"Seiseiwei-Paddle Onward," a poem by Carole Ann Carl (2022). Click [here](#) to view online.

The literal translation of the Pohnpeian proverb *tuhkehn wahr tipwitipw, wahr seisei*—"canoe trees falling, canoes paddling"—is often invoked by elders in everyday language and provides a Pohnpeian understanding of how to metaphorically navigate social challenges as well as the emerging realities of climate change. This proverb is commonly used as a response by elders to "iairomw?" (how are you?), referring to the feeling of going through hard times but still trying to keep moving forward. The proverb also provides insights to understand oral traditions of Pohnpei that include the foundational roles of women. According to one legend, the first voyage that led to the discovery of Pohnpei was navigated by Sapwikini. Of the 15 crew members, nine were women (Lisapwkini, Lipalikini, Lieulehle, Limwetu, Lisaramenpwel, Lienkatautik, Lioaramenpwel, Litorkini, Lipwekdakalahng) who were responsible for constructing the canoe, hewing the hollow of the canoe, weaving the canoe's sail, carving the designs on the canoe, and securing the wind for the sail. These women and the entire crew persisted despite difficult conditions at sea (*tuhkehn wahr tipwitipw, wahr seisei*), leading to the discovery and settlement of Pohnpei. Carol Ann Carl (2022) draws inspiration from this proverb in her poetical expression of how Pohnpeians—at home and in the diaspora—understand and confront social issues and the complex realities of climate change impacts through the pioneering efforts of other who have come before.



in my mother tongue  
is a proverb worth channeling.  
tuhkehn wahr tipwitipw wahr seisei  
canoe trees falling, canoes paddling

the ancestral intonation  
of an existential need to be in constant  
moving  
consciousness our inner ocean  
move or be moved, rise or risk drowning

in a world where ignorance is bliss  
and profit beats human life on the priority list  
where complacency comfortable,  
and power defined by material  
canoe trees are felled  
and canoes must be paddled

tuhkehn wahr tipwitipw wahr seisei  
As canoe trees fall canoes paddle

canoe trees felled:  
climate change, environmental degradation,  
and overexploitation  
canoes paddling:  
ahi mour ahi pwukoah and prutehi litekyan

canoe trees felled:  
racism, genocide, and poorly justified  
militarized/police violence  
canoes paddling:  
black lives matter and West Papuan  
independence

canoe trees felled:  
Imperialist white supremacist  
heteropatriarchal ill will  
canoes paddling:  
ku kiai mauna and shut down Red Hill

canoes paddling because a canoe tree fell  
down  
we must move or be moved  
rise or be left to drown

canoe trees cultivated and felled  
divinely carved and meticulously helmed  
pulled across these sands of time  
into ocean tides  
crew members unified  
in principled struggle, meanwhile

industrially cut and manufactured tables  
where the seating charts promise us

the world will be able  
to hear our cries for action  
tables carved of empty promises  
seats given in reluctance  
all these conferences and still no justice

this is why  
while they carve tables  
we carve canoes  
because if we are to keep existing, we must  
move  
guided by ancestors knowing  
sitting idle would be fatal  
IT IS TIME to take up your paddle  
and help keep the canoe stable

master the ability to thread that paddle  
swiftly  
because no one is free until we all are free

and until then, every single day  
tuhkehn wahr tipwitipw, wahr seisei

~ “Seiseiwei – Paddle Onward”  
by Carol Ann Carl

## Video 1.

“Seiseiwei-Paddle Onward,” a poem by Carole Ann Carl (2022). Click [here](#) to view online.



settlement voyaging networks that challenge and transcend European-imposed demarcations of Polynesia, Melanesia, and Micronesia, and which substantiate Epeli Hau'ofa's re-visioning of Pacific Islanders as being connected to each other through movement across the ocean. **Section 4**, "Tributes to Pioneering Voyagers," features select voyagers who have come before and whose legacies continue to shape contemporary revitalization efforts. **Section 5**, "Contemporary Currents," draws largely from the contributing navigation practitioners to showcase contemporary voyaging societies and the ways in which they employ traditional canoes as symbols of sustainability, sites of resistance, and strengthening of communities as well as connections to institutions of higher learning. **Section 6**, "Resiliency of Voyaging as Climate Change Adaptation," confronts the realities and existential threats of sea level rise and other impacts of climate change, discussing the strategies of island resilience currently being planned and implemented that draw from the ancestral knowledge of seafaring.

### *Voyaging in the Classroom*

Voyaging and navigation can be used as metaphors for our own journeys of exploration and self-discovery. I-Kiribati scholar Teresia Teaiwa (2005) developed a cooperative learning approach with her undergraduate students to imagine the classroom as a metaphorical canoe. For Teaiwa, the "voyage" of

learning is more about the exploration (process) than discovery (product). Given that this iBook is designed for introductory college-level courses and Indigenous navigation training programs, we invite you to embark on a metaphorical voyage with us. At the end of each section is a segment titled "Classroom Activities." A series of questions is meant to encourage your own exploration of the topic and provide a space to reflect on your own emerging understanding or lived experiences. These prompts may be used by instructors to facilitate individual or group-based discussions. The questions are designed to provide a variety of opportunities for multiple ways of learning, including written responses, personal reflections, literature research, mapping, talk-story and conversations, visits to museums, participation in local wayfinding festivals, hypothetical scenarios, ethical debates, artistic creativity, and giving back to community.



# Classroom Activities

One critical aspect of voyaging on a canoe—and in the metaphorical canoe of the classroom—is developing a climate of good communication, and this may start with expressing one’s interest and connections.

1. Reflect on your personal interest in learning about, or your lived experiences of, seafaring in Oceania.
2. In what ways can you imagine your journey through college as a long-distance canoe voyage?
3. The film *Moana* contains awe-inspiring scenes of open-ocean canoe voyaging. If you have viewed this film, what imagery stands out to you, and why? If not, what are other ways that Pacific voyaging has been represented in popular culture that resonates with you?
4. As a class or group and in partnership with an acknowledged expert, learn in detail about an aspect of preparing for a voyage that requires constructing something. These preparations would typically take a fair amount of time and require many hands. Examples include the weaving of a sail, the making of sennit rope, the production of preserved breadfruit, and the fashioning of tools for wood carving such as shaping an adze. With guidance from your instructor, the acknowledged expert, and available resources, introduce and possibly incorporate the technical skills into the classroom learning. Consider how this technical activity could work as a metaphor to potentially guide you while “voyaging” through your college experience.



# Oceania's Deep Time

This section provides an overview of what Samoan historian Damon Salesa refers to as Indigenous **deep time**—an understanding of regional and local histories, taking into account the challenges of recovering the past that reaches back many thousands of years, and the various forms of evidence used to construct that understanding.

See Section 2 of [Introduction to Pacific Studies](#), *Teaching Oceania* Series Volume 6 for a broad overview of Oceania's Deep Time.

## Indigenous and Western Science

There are often sharp lines drawn between **Indigenous knowledge** and Western science. In this strict view Western science emphasizes external evidence, hypothesis testing and falsification, and universal laws of generalizability, whereas Indigenous knowledge is more integrated, holistic, contextualized, and applied. Yet a more broad-minded perspective espoused through the lenses of anthropology, sociology, and the philosophy of science has deconstructed this division to show that it is produced by presumptions of substantive, methodological, theoretical, and contextual differences (Agrawal 1995). David Turnbull (2000) demonstrated how Oceanic navigation and Western science are both ordered, systematic bodies of knowledge embedded in practical activities and everyday experiences that only differ in how the knowledge is assembled and transmitted beyond its site of production. Turnbull highlighted that in Oceania canoe builders develop ways to harness the power of the wind to move across the ocean, weather forecasters and astronomers observe celestial bodies to time the voyages for optimal sailing conditions, and navigators employ elaborate mental representations of space and embodied knowledge to guide their canoes toward unseen islands. Turnbull and others illuminated the ways in which Pacific Islanders construct and theorize about knowledge, and in doing so have recognized multiple types of knowledge systems with varying but equally valid ways of knowing, or **epistemologies**. These knowledge systems can be viewed as complementary rather than opposing, where, for example, Indigenous Pacific Islander knowledge can inform Western science, and Pacific Islander knowledge can incorporate new information including that from Western science.

See Joseph Genz's *Breaking the Shell: Voyaging from Nuclear Refugees to People of the Sea* for a case study from the Marshall Islands for more on the incorporation of Indigenous and Western navigation systems.



### *Oral Traditions*

Tongan scholar Emil Wolfgramm describes **mythology** as poetic visions encoded with environmental and cultural information that are valuable for thriving in an island ecosystem. These kinds of oral traditions help retrace the feats of voyaging ancestors and provide meaning for today's voyaging practitioners. For example, the Kumulipo is a Hawaiian chant honoring the nobility of particular chiefly lineages. It is simultaneously a creation story that describes the evolution of the universe using metaphors relating to plants and animals, specific places, and natural phenomena. This genealogy (mo'okū'auhau) also details the movement of the sun, moon, planets, and stars used for navigation across the sea. Sketches of a few stories from this mythology highlight the ancestral observations that are so important for thriving in an oceanic world.

#### **Image 9.**

Maui fishing Aotearoa out of the ocean.  
Photolithograph of ink drawing by Wilhelm Dittmer,  
1907. Source: Alexander Turnbull Library.

See next page for discussion on "Maui/Motikitiki/  
Maui-a-tikitiki pulling islands from the sea"





### **Maui/Motikitiki/Maui-a-tikitiki pulling islands from the sea**

Tricksters play a vital role in Polynesian origin tales. Of such tricksters, the most widely recognized may be a character known by variants of the name Maui. Often characterized as a demigod, storytellers credit Maui with shaping fundamental features of our universe. Hawaiians famously attribute the livable day to his heroism. Initially, the sun traversed the sky too quickly to permit normal activities. Maui, using a spiritually-empowered lasso, forced the sun to adopt a reasonable pace. Other Polynesians as far away as Aotearoa's Māori share similar narratives.

Many Islanders embrace stories of Maui creating their islands with a charmed fishhook. According to experts on Anuta, a Polynesian community in the southeastern Solomons, Motikitiki (their version of Maui) was not born but hatched from an egg. He surreptitiously followed his father, who climbed a spiritually-vested tree to reach the heavens. There, he fought with Manu 'Bird' to usurp fire, which he bequeathed to humanity. In that fight, he fractured Manu's wing. Manu ascended to the sky and became Sirius, the brightest of all stars; in the local language, Sirius is Te Tino a Manu 'Manu's Body'. The astronomical Manu, like earthly birds, has two wings, known to Western astronomers as Canopus and Procyon. Procyon is the wing Motikitiki broke; therefore, it is closer to Manu's Body than Canopus, the unbroken longer wing. After Motikitiki descended from the heavens, he joined his brothers on a fishing expedition and pulled Anuta from the ocean floor. The three then journeyed through the sea, creating island after island. They eventually were caught up in an argument and fled to the sky, where they became Ara Toru 'Path of Three', the stars of Orion's Belt. Many Islanders embrace stories of Maui creating their islands with a charmed fishhook. According to experts on Anuta, a Polynesian community in the southeastern Solomons, Motikitiki (their version of Maui) was not born but hatched from an egg. He surreptitiously followed his father, who climbed a spiritually-vested tree to reach the heavens. There, he fought with Manu 'Bird' to usurp fire, which he bequeathed to humanity. In that fight, he fractured Manu's wing. Manu ascended to the sky and became Sirius, the brightest of all stars; in the local language, Sirius is Te Tino a Manu 'Manu's Body'. The astronomical Manu, like earthly birds, has two wings, known to Western astronomers as Canopus and Procyon. Procyon is the wing Motikitiki broke; therefore, it is closer to Manu's Body than Canopus, the unbroken longer wing. After Motikitiki descended from the heavens, he joined his brothers on a fishing expedition and pulled Anuta from the ocean floor. The three then journeyed through the sea, creating island after island. They eventually were caught up in an argument and fled to the sky, where they became Ara Toru 'Path of Three', the stars of Orion's Belt.

### **Interview 3.**

Click [here](#) to watch "Experience of feeling your way home; sighting the island of Ta'ū during the voyage of Hōkūle'a in 2014," narrated by co-author Celeste Hao. Youtube, 40:15-49:03. Courtesy of 'Imiloa Astronomy Center.



### Lata/Rata developing the voyaging canoe

Another famous trickster is Lata or Rata (also sometimes pronounced La'a or Laka). Many narrators credit Lata with inventing the first reliable, efficient voyaging canoe. People of Taumako, in the Solomon Islands' Temotu Province, say he built it from a tree belonging to Hinora (or Sinota), usually depicted as a woman with great spiritual power. At first, he lacked Hinora's permission, and each time he chopped the tree it grew back up in the same spot. She eventually consented to his use of her tree in return for a conch-shell bugle, which Lata knew was defective. Hinora discovered the deception and, while Lata was at sea in his canoe, she used her power to close the passage through the fringing reef. Lata and his crew were, thus, prevented from returning to Taumako. Instead, they sailed throughout the region, exploring islands as they went. The crew is said to have encompassed a diversity of skills and personalities, from fisherman, cook, helmsman, and navigator to a glutton and an unapologetic thief. As they journeyed and encountered a variety of challenges, Lata had his crewmen put their diverse talents to effective use.

Voyages of Mō'īkeha, La'amaikahiki, Pelehonuamea, Hi'iakaikapoliopole, and Mo'oinānea

One of the oral traditions that informed the ocean crossings of *Hōkūle'a*—a double-hulled voyaging canoe built with an ancestral Polynesian design—features cultural and linguistic connections between the sacred site of Kapukapuākea on O'ahu and the sacred site of Taputapuātea on Ra'iatea. These islands in the Hawaiian archipelago and the Society Islands of French Polynesia are separated by about 2,000 miles of ocean. According to the oral traditions, the great voyager Mō'īkeha (1100-1200 CE or common era), hailing from Waipi'o Valley on Hawai'i Island, lived for a time on Ra'iatea. He then sailed back to Hawai'i from Ra'iatea, dropping off an important kahuna

(priest) on each island and eventually settling on Kaua'i, where he became mō'ī (ruler). Kumukahi, Honuaua, Mo'okini, Makapu'u, and Makaaoa chose to stay at each island along the way, eventually being honored as named land areas and sacred sites. La'amaomao, the Hawaiian wind deity, was one of these kahuna as well, whose mana (divine power) lives on in her wind gourd and brought forth by her descendants Pāka'a and Kuapāka'a. The stories about this gourd tell the names and characteristics of the winds and rains across the island chain. Later, Mō'īkeha sent his son Kila to fetch his other son La'amaikahiki, so he came from Kahiki—a cognate of Tahiti that refers to ancestral lands—with a large retinue, retying genealogical connections to the parent lineages.

### Image 10.

North Solomon Islands.  
Photography by Douglas Oliver,  
1939. Source: UHM Library  
Digital Image Collections.



Hawai'iloa, Kapuhe'euanui, Papa, Wākea, and Maui are all voyagers mentioned in the Kumulipo chant who are credited with "pulling Hawai'i out of the sea" or "giving birth" to these islands. These stories share a common theme—the southernmost island of Hawai'i was first to be discovered or "arise out of the sea," followed by the other islands along the island chain toward Kaua'i. This chronology of "births" relates to the voyaging paths and histories of various families that came upon the Hawaiian archipelago from the south.

In contrast, Pelehonuamea, the volcano goddess, sailed to Hawai'i after having offended her older sister Nāmakaokaha'i, the wave goddess. Pele arrived first at Kaula—a small islet to the north of Ni'ihau and Kaua'i—but Nāmakaokaha'i chased her to Hawai'i, doing her best to extinguish Pele's fires as she moved across the island chain. Pele's journey through the islands, eventually settling on Hawai'i Island, shows the correct geologic formation sequence of the Hawaiian Island chain from northwest to southeast. Nāmakaokaha'i's ability to extinguish Pele's flames shows the Hawaiian understanding of island aquifers—the basal lens that lies beneath each landmass. Only Kīlauea, along with the other high volcanos of Hawai'i Island, are high enough to rise above these aquifers and escape the waters of Nāmakaokaha'i's wrath, and that is why this active volcanic crater remains Pele's home.

The chanted story of Pele's youngest sister Hi'iakaikapoliopole journeying across the island chain to Kaua'i and back to fetch Pele's lover, Lohiau, maps the main island chain. Hi'iakaikapoliopole mentions the important aspects of each place that she passes through, including named winds and rains, plants and animals, geographic features, famous landmarks, and unique environmental conditions as well as prominent families. She also describes each voyage between islands by naming the seas, identifying launching and landing points, and describing the weather phenomena experienced along the way.

The great ancestress Mo'oinānea and her retinue were said to be the first arrivals on O'ahu, landing at Pa'ala'a Kai on the North Shore. Here they built a sacred site named Kapukapuākea—perhaps honoring the marae (ceremonial platform) on Ra'iatea. In mythology, the mo'o (giant lizards) who also had human form, were guardians of fishponds and freshwater pools. Their "bodies" are generally associated with the lateral ridges that run from the main mountains down to the sea on a high volcanic island. Geologically speaking, these ridges (mo'okapu) are formed from the shield building stages of the volcano. The reason for this is that within these ridges run the fresh waters that feed the fishponds along the coast. A good example is found in the tale of the mo'o guardian of Moli'i fishpond in Hakipu'u. The mo'o had lost his tail in a battle with



Can you see the body of the mo'ō  
in Hakipu'u whose tail became  
the islet Mokoli'i?



Hi'iakaikapoliopele, so she threw it into the sea. His tail became the offshore islet Mokoli'i, named for this mo'ō. The oral tradition suggests that the watercourse here extends out across the shallow sea to this islet, as evidenced by fresh water springing up from the sandy beach and sea floor surrounding this islet off Kualoa.

These are just a few of the many oral traditions that describe initial settlement of islands by canoe migrations and cosmogonic narratives of first inhabitants. As described through these various stories, the voyaging peoples of Oceania encoded knowledge about various aspects of life at sea, on the land, and in the sky while honoring those ancestors who had mastered that knowledge. This knowledge was critical for the voyaging renaissance, transmitting specific information about the journeys planned while also instilling belief in these modern voyagers that it could be done—a knowing that sits deep within voyagers who choose to leave the land behind and follow their ancestors.



**Image 11.**

Pu'u 'Ōhulehule and Kanehoalani. Kualoa, Hawai'i. May 9, 2013. Photo by Ian Masterson.

**Image 12.**

Sun over Mokoli'i during the 2013 Spring Equinox. Photo by Ian Masterson.



## Spotlight

### The Roles of Women in Marshallese Seafaring: Stories of Liwātuonmour, Lidepdepju, and Litarmelu

Marshallese bwebwenato (stories or histories), ikid (song-stories or navigational chants), and other historical traditions reveal that women played a central role in voyaging, navigation, and canoe culture as practitioners as well as conservators and conveyors of navigational knowledge and skills that have been central elements of Marshallese culture and daily life for centuries. Several bwebwenato recount that the Marshall Islands' first settlers were two deity-sisters, Liwātuonmour and Lidepdepju, who arrived via canoe after a long voyage from Ep, the legendary western homeland of the Marshallese people. After touching at Kuwajleen Atoll in the Rālik (western) island chain, the sisters parted ways, with Liwātuonmour traveling south to Naṃo and the younger Lidepdepju going east to Aur in the Ratak (eastern) chain. After settling on Naṃo and Aur, they had children whose descendants went on to be the most powerful irooj (chiefs) of Rālik and Ratak through matrilineal succession. The sisters became ekjab (physical idols or deities) in the form of stone pillars, worshiped for generations by Marshall Islanders as founders and as the originators of the Marshall Islands' matrilineal culture and system of power and inheritance. A third sister, Lijjeleijet, who also traveled to Naṃo from the west but was driven out to sea by Liwātuonmour where she became a kōk!a! (navigation sign) for Naṃo in the form of a foggy sea mist (Tobin 2002, 330-332).

Another woman, Litarmelu, is recalled as the first Marshall Islander to study wave piloting, a navigational technique that involves remotely sensing islands based on the way they disrupt the patterning of swell and currents (Genz 2018). Litarmelu became an expert seafarer and founded a navigation school to preserve and pass the knowledge on to other members of her jowi (matriclan). . . [Scroll down to continue]

#### Interview 4.

Click [here](#) to watch "Marshallese legend of the origins of navigation," narrated by co-author Alson Kelen. Youtube, 3:00.



#### Interview 4.

Click [here](#) to watch “Marshallese legend of the origins of navigation,” narrated by co-author Alson Kelen. Video, 3:00.

### Marshallese women as kōkḷaḷ (navigation signs), waves, reefs, animals, stars, and others

Limedwetip

Kwōlej (Golden plover), sea marker of Mājeej on the ocean approximately fifty miles north of Mājeej (Jam in Tobin 2002, 244)

Lijjeleijet

Name means “woman of the sea”; early founding sister who was driven into the sea by her sister Liwātuonmour and became a sea mist along the reef in Naṃo Atoll believed to be Lijjeleijet’s spirit (Erdland 1914, 279; Lokrap in Buckingham 1949, 1)

Lijebake (also Libake)

Wōn (green sea turtle) approximately fifty miles south of Lae Atoll (Jam in Tobin, 134)

Libat, Likerelem, Lijoñ

Dekā (rocks), navigation signs of Ellep Island (134)

Liñijilok

Koñe tree (*Pemphis acidula*), navigation sign of Ujae Atoll (107)

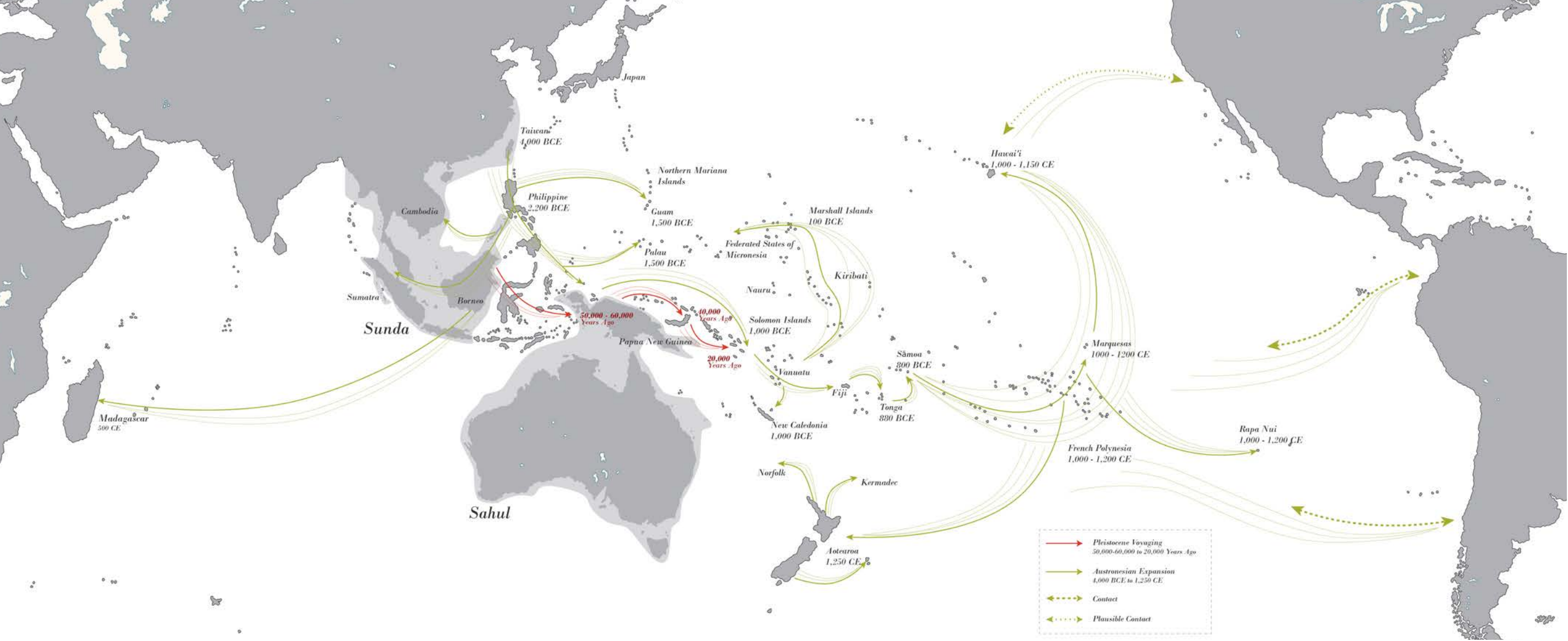
Libujon

A woman, a wind that comes from the northwest (136)

Loktañur

A star; Capella; mother of all great stars (56)





*Archaeology, Linguistics, and Biological Anthropology*

**Holistic Anthropology** is an approach that combines evidence from the four main subfields of anthropology, including archaeology, linguistics, biological anthropology, and socio-cultural anthropology. Archaeology is the study of past human cultures based on the material remains of their settlements and the artifacts that they left behind. Some of these material traces may be found on the surface (such as monuments), while others are sedimented in the ground and must be recovered through excavations. Excavated artifacts are

put into a chronological framework using several dating methods, especially radiocarbon dating of charcoal and other organic materials. In the Pacific, archaeological research over more than a century has gradually accumulated an extensive body of information that allows an “archaeological history” of human settlement of the myriad islands and archipelagoes of this vast region to be written (see Kirch 2017 for a recent synthesis of Pacific Islands archaeology). The material evidence of archaeology can be augmented and independently assessed by examining evidence from linguistics and from biological

**Map 2.** Austronesian migrations in the Pacific, 2023. Prepared by Hetereki Huke.



anthropology. Through systematic comparison of the hundreds of languages spoken by peoples across the Pacific, linguists can determine which languages are more closely related and can reconstruct a “family tree” of language history. Biological anthropologists investigate the variation in human populations across this vast region. With recent advances in genetic sequencing, biological anthropologists have made important contributions to understanding the historical relationships among Pacific peoples.

The first tentative steps by early humans to venture into the island world of the Pacific began 50-60,000 years ago, during the last “ice age” (what geologists call the late Pleistocene). At that time, New Guinea was joined to Australia due to climate-induced lowered sea levels, thus forming the supercontinent of Sahul (or Greater Australia). Crossing short water gaps from Southeast Asia, people entered Sahul, exploring a land with giant marsupial animals that no humans had previously occupied. These early explorers were foragers who subsisted on the natural resources they discovered. By around 40,000 years ago, some of these Pleistocene mariners had explored as far eastward as the large islands of the Bismarck Archipelago. Archaeologists have excavated the remains of their campsites in rock shelters on the islands of New Britain and New Ireland. That they were able to settle those islands, which are separated from New Guinea by water gaps,

implies that they had some form of watercraft such as bamboo rafts, bark boats, or dugout canoes.

By about 20,000 years ago, some of the descendants of the original Pleistocene mariners had moved even farther east



**Image 13.**

Yapese small fishing canoe.  
Photo by H. Larry Raigetel.



**Image 14.**

Excavations at the Nombe rock shelter taken in 1979 during early fieldwork led by the Australian National University.  
Photo by Barry Shaw.



into the main Solomon Islands. But this is where the first phase of human expansion into the Pacific ended. There is no evidence for human movement beyond the eastern end of the Solomon Islands until about 3,500 years ago. The forms of watercraft and navigation techniques used by these early seafarers were apparently not adequate for deep ocean voyaging and long-distance exploration.

The descendants of these initial human groups that moved into **Near Oceania** speak a diversity of languages that are loosely grouped together under the rubric of **Papuan** (or Non-Austronesian) languages. There are about 950 Papuan languages and they are for the most part concentrated on the large island of New Guinea, with a few other Papuan languages spoken in the adjacent Bismarck Archipelago. Biologically speaking, the Papuan peoples also exhibit a great deal of genetic diversity, for example in their Y-chromosomes. This high degree of both linguistic and genetic diversity correlates with the long period of time that their ancestors resided in Sahul and the adjacent islands of Near Oceania.

During the mid-Holocene, starting around 10,000 years ago, warmer temperatures melted ice that had been trapped in the polar regions, which resulted in sea levels increasing to eventually reach present-day conditions. The changing insular geographies resulted in the islands of Southeast Asia and the separation of Australia and New Guinea. It was during the Holocene with a vastly different island seascape that speakers



**Image 15.**

Lapita potsherd from Talepakemalai site with face motif vessel. Photo by Patrick Kirch.

of **Austronesian** languages began to migrate through the region of Near Oceania already inhabited by the descendants of the Pleistocene mariners and then explored the unknown seas. This dispersal of Austronesian speaking peoples—one of the great sagas of world history—is intimately linked with the development of ocean voyaging technology.

The earliest archaeological evidence for Austronesian seafarers comes from the island of Taiwan, and dates to about 4000 BCE (before common era), with the pottery-making Dabenkeng Culture. By about 2200 BCE, some Austronesian people had moved southwards into the Philippine Islands, and then beyond to Sulawesi and Halmahera. These movements are indicated by archaeological finds of pottery and related artifacts that are characteristic of Austronesian culture. This rapid movement was presumably enabled by the fact that the Austronesians had invented the outrigger sailing canoe. Although the physical remains of these early canoes have not been found, historical linguists can reconstruct many of the

### **Near Oceania and Remote Oceania**

Near Oceania is the corridor of inter-visible islands extending from island Southeast Asia to the eastern edge of the Solomon Islands, and beyond that is Remote Oceania, characterized by longer distances between archipelagoes.





**Image 16.**

Yapese canoe at sunset, 2016.  
Photo by H. Larry Raigetel.

### **Language and navigation**

Just as topographic features such as rivers, mountains, and coastlines shape navigation on land, environmental features such as the waves, currents, and winds are features of seascapes and play key roles in navigation at sea. Interestingly, languages across the region shape and support their speakers' perception, understanding, and engagement with seascapes and are treasure houses of environmental expertise. For instance, speakers who know the names of the winds and what they entail have powerful tools for their navigational toolkits (Pyrek and Feinberg 2016). Just like the winds, many aspects of navigational knowledge, practice, and values are encoded in language. For linguistic anthropologists, the existence of cognates (words in different languages which share a historical 'root') for various voyaging terms offer extraordinary evidence of past connections and shared genealogies between communities}.

early Austronesian words associated with the canoe complex. The canoes themselves were called \*wangka (from which later canoe words such as vaka and wa'a are derived); other words indicate the presence of outriggers, masts, and sails (for details on the reconstruction of ancient Austronesian canoe terms, see Pawley and Pawley 1994).

Equipped with these outrigger sailing canoes, some Austronesian explorers began to sail eastward out of their homeland islands in Southeast Asia. One group discovered the islands of Palau and the Marianas as early as 1500 BCE; their settlements are marked by a kind of pottery with stamped designs. Almost simultaneously, another group voyaged eastward along the northern coast of New Guinea, establishing multiple settlements in the Bismarck Archipelago. These people also made pottery, decorating their vessels with distinctive motifs made by "dentate-stamping" with small toothed combs. Based on the name of a site on the island of New Caledonia, archaeologists call this pottery and its associated culture **Lapita**.

Around 1000 BCE, Lapita voyagers expanded rapidly out of the Bismarck Archipelago into several island groups across the southwestern Pacific, islands that had not previously seen human settlers. Archaeologists call this vast region **Remote Oceania**. Within less than a century, Lapita people established settlements throughout present-day Vanuatu, the Loyalty Islands, New Caledonia, and Fiji. Recent genetic sequencing of



DNA from Lapita skeletal remains excavated in Vanuatu suggests that these “first Remote Oceanians” were biologically closely related to the Austronesian peoples of Taiwan.

Some Lapita people reached Tongatapu by about 880 BCE and arrived in Sāmoa shortly thereafter. Around 0 CE, another branch of the Lapita culture settled the Caroline and Marshall Islands archipelagoes. This rapid diaspora could only have been accomplished by people with sophisticated sailing canoes and seafaring knowledge.

Other kinds of archaeological evidence attest to regular voyaging contacts between island communities. One of these is the movement of obsidian, a fine-grained volcanic glass, whose sharp edges made it useful for cutting tools. Obsidian occurs only in a few limited places in the Pacific, such as at Talasea on New Britain and in the Manus (Admiralty) Islands. Obsidian flakes from these sources were being transported by Lapita canoes as far away as the Reef Santa Cruz Islands of the eastern Solomon Islands; a few obsidian flakes have even turned up in archaeological sites in Fiji. One adze from the Tuamotu archipelago in French Polynesia appears to be a good match with the Hawaiian Islands (Collerson and Weisler 2007), which demonstrates at least a limited instance of return voyaging.



**Image 17.**  
Basalt adze. Kosrae, FSM.  
Department of Public Affairs,  
UHM Library Digital Image  
Collections.

**Image 18.**  
Canoe carving with adze in Yap.  
1984. Photo by Steve Thomas.  
UHM Library Digital Image  
Collections.



For reasons that are not entirely clear, the rapid Lapita expansion across the southwestern Pacific appears to have paused once the Tonga and Samoa archipelagoes were discovered and settled. Whether there were attempts during that time period to explore farther eastward is not known. What is certain is that for the next 1,700 years or so, eastward expansion came to a halt.

During this long period, sometimes known as “the long pause” (and the impetus for the Disney movie *Moana*), voyaging continued between communities in Tonga, Sāmoa, and other nearby islands. A distinctive Polynesian culture and language emerged in this region (sometimes referred to by the Polynesian name for the ancestral homeland, Hawaiki). There is reason to infer that during this period, ancestral Polynesians developed the double-hulled canoe, enabling larger exploring parties equipped for staying at sea for weeks and months, and carrying all the supplies needed for establishing new settlements on previously uninhabited islands. Methods of wayfinding presumably were also refined during this period.

Archaeological research over the past twenty-five years has afforded a detailed understanding of the timing of the final phase of human expansion into the eastern Pacific. This began no earlier than about 950 CE (common era) and culminated in the settlement of Aotearoa (New Zealand) by about 1250 CE. Although the precise order of island settlement remains a matter of debate, the southern Cook Islands and the Society

Islands were likely to be among the first discovered. Early settlement sites across the archipelagoes of eastern Polynesia (the Marquesas Islands, Tubuai, Mangareva, Rapa Nui) have been dated to 1000-1200 CE. The Hawaiian Islands were discovered about 1000-1150 CE. There is strong evidence, from ethnobotany and recent human genetic studies, that some ancestral Polynesians made landfall on the coast of South America, returning with the sweet potato, which became an important crop in some islands including Hawai’i and Aotearoa. Linguistic evidence also suggests Polynesian interaction with the Chumash of southern California.

Regular voyaging among the islands of central eastern Polynesia is also evidenced by archaeological finds, particularly of fine-grained basalt tools such as adzes. Basalt sources on different islands have distinctive geochemical signatures that indicate where these tools were quarried and manufactured. Adzes from Eiao Island in the Marquesas, for example, have been found in archaeological sites in the Society Islands, Cook Islands, and Mangareva—direct evidence for long-distance voyaging contacts. The long history of human expansion across the island world of the Pacific is one of gradual—and sometimes quite rapid—invention, innovation, and ingenuity in seafaring. The Austronesian invention of the sailing outrigger canoe, and the later Polynesian innovation of double-hulled, deep-ocean watercraft, enabled this remarkable history.





**Image 19.**  
Canoe building on Yap, 2022.  
Photo by H. Larry Raigetel.

**Image 20.**  
Canoe building on Namo,  
Marshall Islands in 2006. Photo  
by Joseph Genz.



### *Experimental, Simulated, and Ethnographic Voyaging*

It remains unclear how the Lapita sailors of Near Oceania transitioned from near-shore **pilotage** within sight of land to deep-sea navigation and what techniques and sailing strategies were employed on the first exploratory probes that eventually led to the discovery of distant regions of Remote Oceania. The surviving knowledge of navigation, first documented by European explorers and later by anthropologists, is predicated on known island geographies, whereas the pioneering seafarers facing a horizon unpunctuated with islands would have sailed into unknown seas. However, insights from experimental and simulated voyages, oral traditions, and voyages guided by traditional navigators—combined with archaeological, linguistic and physical anthropological evidence—converge on the idea that intentional, two-way voyaging enabled the systematic exploration, discovery, and settlement of Oceania as well as post-settlement interaction and spheres of communication.

Detailed ethnographic investigations of surviving navigational traditions in diverse regions of Oceania starting in the 1960s revealed a common system of wayfinding with regional variations, and this information provides a glimpse into the ancient transition from pilotage in Near Oceania to blue water navigation in Remote Oceania. This would have taken place about 1000 BCE when the Lapita seafarers ventured

across several hundred miles of open ocean to the eastern Solomon Islands. Of note is David Lewis' (1972) survey of navigation techniques, Thomas Gladwin's (1970) ethnography of Polowatese navigation, Steven Thomas' (1987) reflective study of Satawalese navigation, and Richard Feinberg's (1988) ethnography of Anutan navigation. For ease of comprehension, these and other researchers analytically divided what is a fluid, integrated non-instrumental system of navigation into techniques for setting and maintaining a course, estimating position once out of sight of land with consideration of leeway and currents, and homing in on the target island (See [Section 2](#), Wayfinding).

The advancement of navigational techniques—perhaps similar to those described by anthropologists in the latter part of the twentieth century—coupled with strategic use of weather patterns enabled the systematic exploration and expansion into Remote Oceania. Computer simulations of thousands of voyages setting out from various home islands have demonstrated that while one-way accidental drift voyages or navigational errors certainly contributed to the inadvertent discovery and settlement of some islands, such a scenario cannot account for settlement of *all* of Oceania. These simulations have converged with historic accounts, oral traditions, and insights from experimental voyaging to largely support Geoffrey Irwin's (1992, 2007) thesis of **systematic**



**exploration strategies.** These mariners safely searched upwind against the direction of the prevailing easterly trade winds by either **tacking** back and forth against the winds, or by exploiting seasonal westerly wind shifts, and, whether they found uninhabited land or not, returned home with the resumption of the trade winds to then set out on future colonizing expeditions. This is much safer than first sailing downwind and, in the case of not finding land, tacking back and forth against the trade winds, or returning by a different route through different weather systems (Finney 1985).

The idea of waiting for the seasonal alternation from the easterly trade winds to westerly winds in order to sail and search in an upwind direction for land is also referenced in historic accounts and oral traditions, demonstrated in experimental voyages, and implied in the surviving navigational techniques. Captain James Cook learned such a strategy from a navigator in Tahiti named Tupaia in 1769 (Beaglehole 1955), and an oral tradition in Fiji describes searching upwind for uninhabited islands (Biggs and Biggs 1975). The experimental voyaging canoe *Hōkūle‘a* exploited westerly wind shifts when sailing through the Cook Islands between Aitutaki and Rarotonga in 1986 and when searching for the solitary island of Rapa Nui in 1999, a particularly difficult voyage given that Rapa Nui is not part of a larger archipelago and does not afford a screen of islands to navigate towards



**Image 21.**

Yapese canoe with traditional pandanus sail in 2022. Photo by H. Larry Raigetal.

(Finney et al. 1989). The documented navigational technique of **zenith stars and windward landfall** is suggestive of upwind sailing and searching upwind for considerable distances. With this technique, navigators guide their canoes to arrive at the windward latitude of an island based on the appearance of a particular star rising directly overhead (the zenith) and then turn downwind with the trade winds to make landfall. Making inferences from these historic-era observations about how the Lapita seafarers crossed the threshold to deep sea navigation remains problematic but is still suggestive that such an event was possible.



Experimental voyages have also provided insights into post-settlement **interaction spheres**. Drawing from historically recorded designs, in 1975 anthropologist Ben Finney, Hawaiian sailor Tommy Holmes, and Hawaiian artist and historian Herb Kāne built a double-hulled canoe with twin crab claw sails that represented an ancient Polynesian canoe design in order to replicate a post-discovery crossing of 2,400 miles between the Hawaiian and Tahitian archipelagos. The

first inter-archipelago voyage of *Hōkūleʻa* in 1976 and subsequent crossings demonstrated that long-distance voyages guided by non-instrumental wayfinding techniques were possible, adding to the scenario of the rapid settlement of the far reaches of Oceania and subsequent interactions between ancestral and new home islands. The next section describes the systems of wayfinding as well as design features of voyaging canoes.



**Image 22.**  
Marshallese voyaging canoe,  
*Jitdam Kapeel*, in 2015. Photo  
by Joseph Genz.



# Classroom Activities

1. Similar to the oral traditions of the discovery and settlement of the Hawaiian archipelago sketched above, consult a resource of oral traditions that narrates the origins of a particular group of Pacific Islanders. Who narrated the story, and how was this oral tradition recorded? Do the recorded stories of this group of people describe their origins as cosmogonic in nature or through canoe migrations or both?
2. In trying to understand the remote past, which of the methods introduced in this section resonates with you the most, and why? What are other ways of knowing about “deep time” -in Oceania and comparatively throughout the world-from Indigenous perspectives other than narrated oral traditions such as mythology?
3. Demonstrate on a three-dimensional globe or trace on a map of the Pacific Ocean the general progression of canoe migrations, including the early Pleistocene mariners and the more recent Austronesian seafarers that ventured from Near Oceania to Remote Oceania. Include approximate dates of settlement according to archaeological evidence. What general trends do you see on your map? What questions arise?
4. Anthropologist Ben Finney (1989) has written about how the possible models of exploration into the unknown-especially the “push” or “pull” factors that may have influenced journeying into the unknown seas and islands beyond the visible horizon of Remote Oceania-can serve as guides for humanity’s exploration of the next frontier, interstellar space travel. What comparisons can you make between this moment of Pacific voyaging in the history of our shared humanity and the future possibility of interstellar space exploration? Why, for example, do you think the seafaring ancestors ventured into unknown waters when crossing from Near Oceania into Remote Oceania, and to what extent could those explanations apply to our motivations for space travel? (What “push” factors may have forced them to voyage? What “pull” factors may have enticed them to voyage”). Alternatively, can your understanding of our current motivations for space travel offer any insights as to why those pioneering mariners voyaged out of sight of land for the first time?



# Canoe Culture

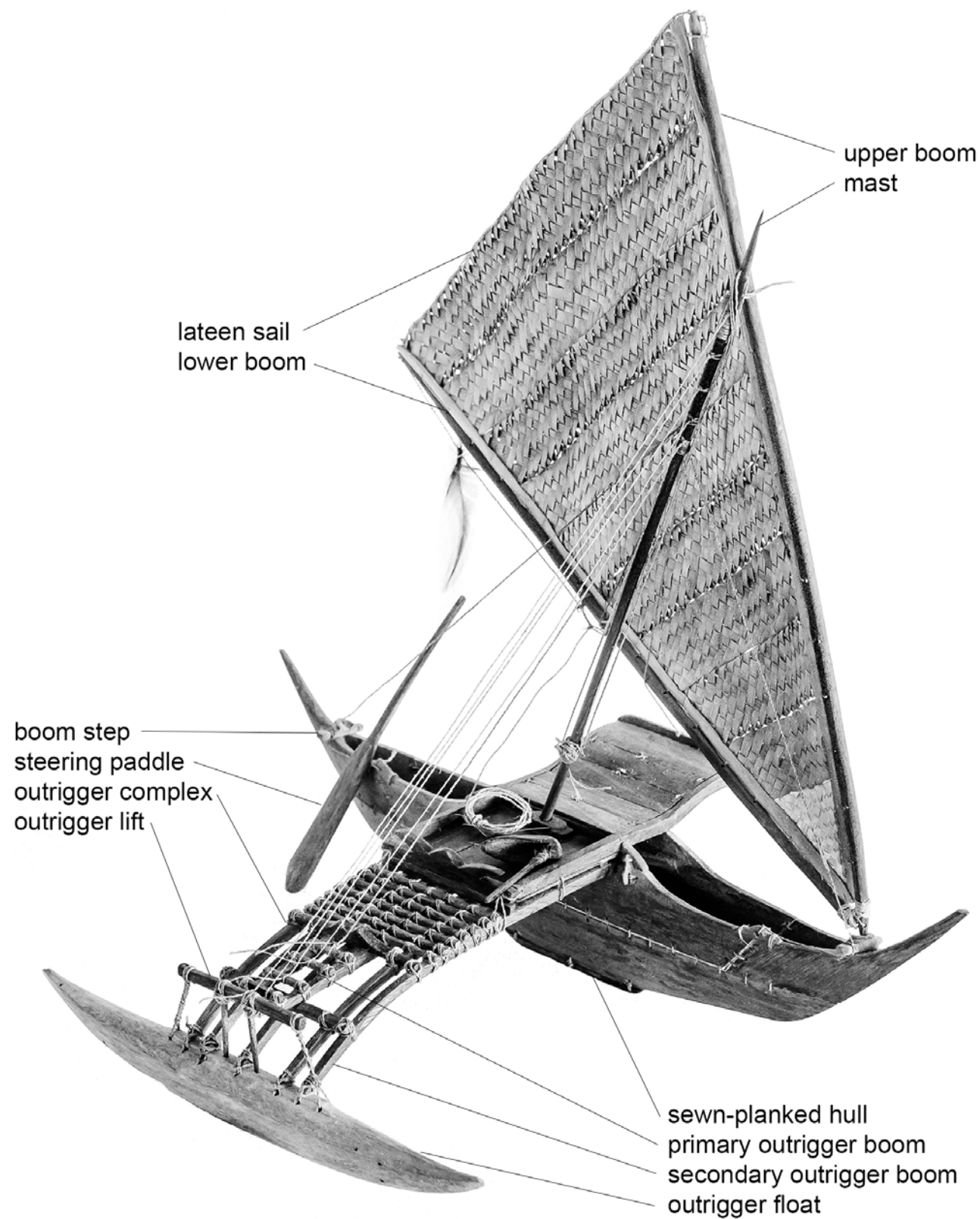
The Pacific Ocean is the world's largest ocean, covering approximately one third of the earth's surface. Scattered through that enormous territory are thousands of islands, often separated by hundreds of miles. Yet by the time of European contact, virtually every habitable island in the tropical and subtropical Pacific was home to some human population. To arrive at such diverse and often-remote locales, voyagers developed and relied on sophisticated canoe technology. Then, to survive in their new homes, people turned again to canoes for inter-island trade and communication as well as every-day activities needed to maintain life: fishing, transporting crops, and movement between islets and villages. Canoes were also used for activities ranging from recreation to warfare. This section examines two bodies of knowledge of seafaring—the canoe designs and cultural meanings attached to canoes, and systems of wayfinding with specialized navigation techniques. Detailed examples come from the central Caroline Islands and the Marshall Islands.

## *Canoe Designs*

Pacific canoes varied enormously depending on location, environmental constraints, and the purpose for which they were used. Historic observations of canoes, inferences from historical linguistics, etchings in petroglyphs, rare archaeological evidence of preserved canoe parts, oral traditions of canoes, historic-era canoes (sometimes preserved by museums), and surviving knowledge of traditional canoe-building techniques provide a possible scenario for how canoe technology changed over time during and after the initial waves of exploration and settlement.

Voyaging throughout Near Oceania—the corridor of inter-visible islands extending from island Southeast Asia to the eastern edge of the Solomon Islands—rested on the origins and development of the **outrigger sailing canoe**. In some cases, hulls were carved from a single tree, with extra planks to add freeboard and prevent taking on water when sailing on rough seas. To ensure stability, canoes were typically equipped with





**Image 23.**

Model of lateen-rigged shunting outrigger canoe, Marshall Islands. Constructed by Mental Laik, 2010. Photo by Dino Morrow.

outriggers. The outrigger float is a log aligned parallel to the main hull that is connected by lashed beams. The outrigger “complex” not only promotes stability but improves tracking; it allows the canoe to move straight forward despite winds that tend to push it to the side. European sailing craft often accomplish the same thing with a keel that extends straight down in the center of the hull. However, in an environment where one must negotiate shallow reefs, a keel is likely to run aground. An outrigger does not extend far below the surface and is less likely to run aground. These early canoes may have employed a triangular sail and changed direction by some mode of **tacking**. This would also provide a degree of upwind capability.

The Lapita seafarers eventually discovered the far reaches of Remote Oceania with the development of **double-hulled canoes**. These larger canoes were constructed with a second hull rather than an outrigger. On both types of vessel, a shelter is often constructed on a platform set up either on the beams between the two hulls or between the hull and the outrigger. In regions with limited timber, canoe hulls may be built from



planks rather than a single tree or may be built from large driftwood logs. This is often done, for example, on atolls. Voyaging canoes designed for long-distance transport were often large vessels, occasionally reaching as much as 100 feet in length.

After the initial settlement of Oceania, canoe designs developed regionally. In places such as the central Carolinian Islands, the Marshall Islands, and Taumako, canoe builders developed **lateen-rigged shunting outrigger canoes**. One of the most striking features of this new design was the development of a triangular shaped lateen sail. This triangular sail is suspended from a mid-hull mast, which is canted downward toward the bow. The lower end of the sail is temporarily attached to the hull at the extreme end. To change directions when sailing upwind, the mast is repositioned in the center of the canoe, the upper boom is unstepped and moved to the stern, which, identical in shape, now acts as the bow, and finally the mast is canted downward toward the new bow. This process of changing the position of the mast from the ends of the symmetrically-shaped long axis of the hull is called **shunting**. With this design the outrigger always stays to the windward side of the canoe. Another innovation was the asymmetrical hull. The lee (downwind) side



of the hull is slightly flattened. Water flows past the more curved windward edge faster than the straighter leeward edge, inducing a hydrodynamic pull to windward. In effect, this minimizes the leeway drift that typifies most sailing vessels.

The lateen-rigged shunting outrigger canoe technology was adapted to the larger double-hulled canoes in a few regions, where the second hull was slightly smaller than the main hull. The Fijian drua, the Tonga kalia, and the Samoan 'alia were over 100 feet long and carried crews of more than 200 sailors. They were capable of speeds of approximately fifteen knots. Another type of outrigger canoe, the te puke from the

**Image 24.**  
Model drua (sailing canoe).  
Wood carving by Alex Kennedy,  
2002. Commissioned by Te  
Papa Tongarewa (Museum of  
New Zealand).

**Interview 5.**  
Click [here](#) to watch "Canoes  
(drua) of the Lau group of Fiji,"  
narrated by co-author Setareki  
Ledua. Youtube, 4:32.

**Interview 6.**  
Click [here](#) to watch "Sail  
patterns," narrated by co-author  
Setareki Ledua. Youtube, 4:22.





**Image 25.**  
Northern Solomon Islands.  
Photo by Oliver Douglas, 1939.  
UHM Library Digital Image  
Collections.

**Image 26.**  
A refurbished *alo lili* voyaging  
canoe, *Te Nohoanga o Lata*,  
taken for a test sail on  
Taumako's fringing reef, 2007.  
Photo by Richard Feinberg.

Vaeakau-Taumako region of the Solomon Islands, is built with a sealed, round submarine hull. This design utilizes an almost entirely submerged hull when under sail that minimizes surface tension and wave action to produce faster speeds than conventional hulls. Passengers typically ride on a platform on the leeward side of the main hull.

Large voyaging canoes are typically propelled by sail. In most Pacific regions, sails were typically made from plaited leaves of the pandanus palm—a material often used for mats and, sometimes, baskets. Frequently the sails were triangular or some variant of what has been called a “crab-claw” design. In recent decades, such materials as canvas, cotton, or plastic have often been substituted for pandanus leaves, and canoe builders have experimented with a variety of sail shapes. Outrigger

canoes may be much smaller than the great voyaging craft. They sometimes are designed to accommodate just one or two sailors for purposes of fishing or local transport. These are likely to be paddled, poled, or sailed in a protected lagoon or on a reef flat with calm and shallow water. Such canoes have been found at various times through most of the Pacific.

#### Canoes of the Caroline Islands

The knowledge that makes up seafaring systems can often be traced back to some form of supernatural being. In seafaring, spiritual connections through herbal medicine, chants, and offerings play a significant role in ensuring the safety and well-being of crew members and the voyage. Practitioners in the central Caroline Islands trace the spiritual connections of their



canoes to Seolang, the deity of canoes and the art of carving. In these atolls, it is believed that while the skills and knowledge of canoe carving are essential to community survival, other equally important knowledge systems must be part of the process. Thus, seafaring and canoe culture in these islands is made up of several interrelated skills.

In the Caroline Islands it is said that to be a complete seafarer, one must prove himself by carving his canoe, hoisting

his mast and sailing toward the horizon in search of better lands, and securing resources for his community. In pursuit of becoming a voyager or a master navigator, learning begins at a very young age, taking place both at home and mostly at the canoe house. This is the beginning of becoming not just a master navigator, but also a leader in the community.

While the deity Seolang provided the knowledge of canoe carving, Palulap provided for the art of wayfinding. His canoe, in



**Image 27.**  
Engraved image of canoes  
of Satawal, 1819. UHM  
Library Digital Image  
Collections.



an analogy, is said to have the ideal crew of ten members including himself. These crew members, who are often referred to as temairong or custodians of all knowledge, represent the skills necessary for a community's survival on land and at sea. They include Tamol (chief), Tausheo (master masseuse), Tauyalus (spiritual person), Tautafey (herbal medicine expert), Senap (master carver), Taupwang (master builder), Tauyan (thinker/wise man), Tauheman (weather expert), Taubwe (diviner), and Palulap (master navigator). On land, the chief oversees the well-being of the entire community, while at sea it is the navigator who takes the full responsibility for the safety and well-being of all his crew. These ten individuals have their respective designated places on the canoe.

Carolinian canoes have three main components— epep, buunel waa, and taam. The chief, herbal medicine expert, the spiritual person, and the masseuse sit on the epep (leeward extension platform). It is the highest platform on the canoe. When the canoe is carrying women, a housing is mounted and the platform in its entirety is designated for them. Along with the chief and the four crew members, it is the women who sit on the epep. The women are the caretakers of the land and custodians of all sources of knowledge. Like the chief, women's skills are essential in ensuring peace and stability within the community. The weather expert, diviner, and master navigator sit on the buunel waa (main hull). These sets of skills are

essential in sailing the canoe toward their destination. It is these three individuals who navigate the canoe by the stars, predict the weather, and foretell what may lie ahead of the voyage. On land, they function as main supporters of those sitting on the epep; in particular, the chief. They carry out instructions on places to voyage to collect resources, and in previous times, sought out new lands to resettle. The carver, the thinker, and the builder reside on the taam (outrigger complex). While this is the lowest part of the platform, their role is quite essential. They ensure the canoe is built, the canoe house is constructed, and wisdom is transferred to the rest of the canoe or the community to maintain stability. Thus, these ten crew members and the women are the foundations upon which a community is built. These sets of skills are the requirement for one who aspires to become a productive member of the community and critical to be learned if one wants to be a navigator.

In the central Caroline Islands, waa is the name given to all types of moving (paddling, sailing, motored) crafts or vessels. The word fatul refers to paddling and terag means moving or being propelled on its own or assisted by a sailing apparatus or motor. Thus, for the Carolinian canoes, there are two general categories of canoes—waafatul (paddling) and waaterag (sailing). While these two terms place clear distinction on paddling, sailing, and sizes of canoes, the waaterag could be

#### **Interview 7.**

Click [here](#) to watch "Roles of the crew members in Carolinian voyaging," narrated by H. Larry Raiget al. Youtube, 3:48.

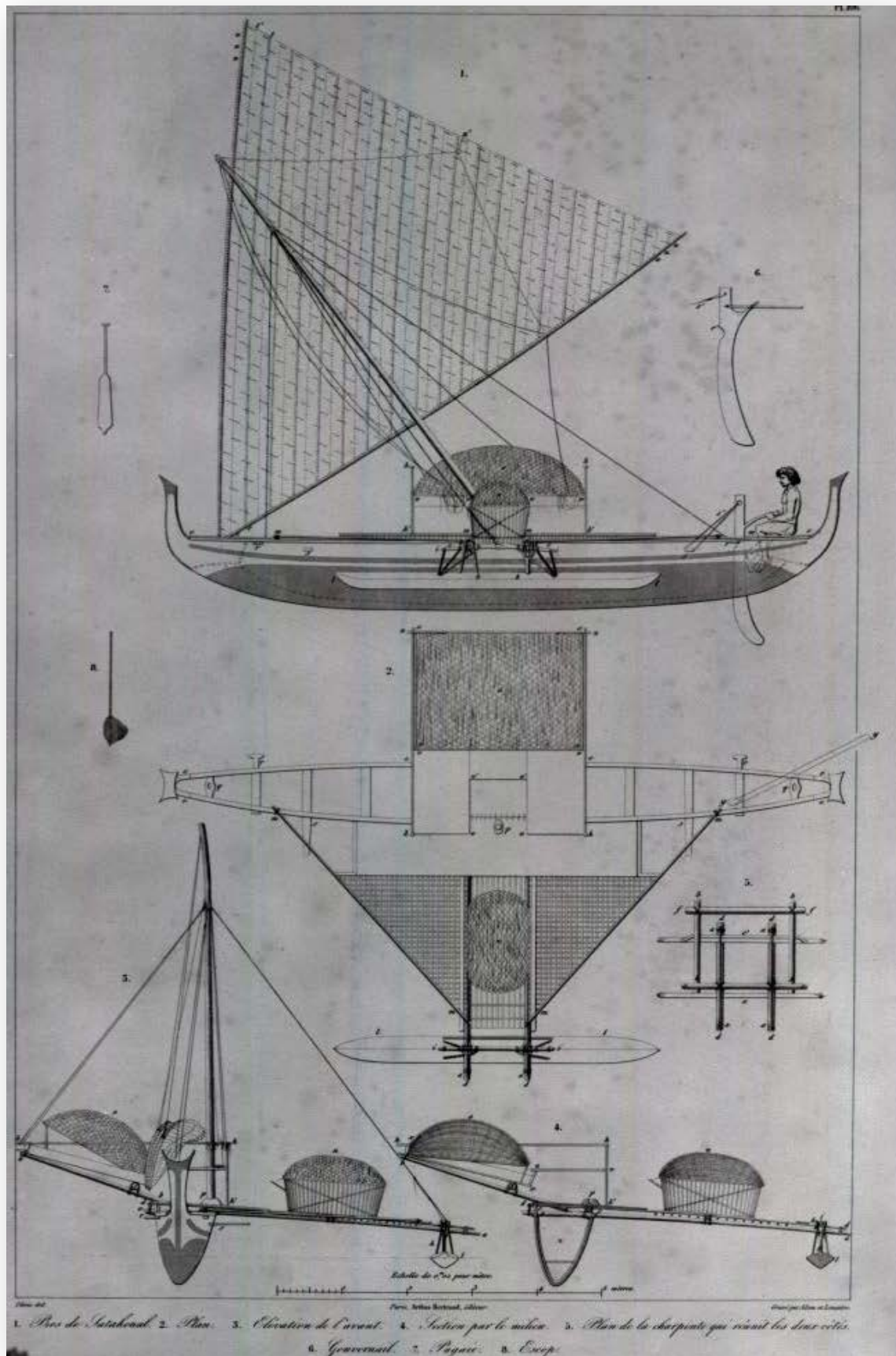
#### **Interview 8.**

Click [here](#) to watch "Roles of women in Carolinian voyaging," narrated by H. Larry Raiget al. Youtube, 4:14.

#### **Interview 9.**

Click [here](#) to watch "The ancestral spirit of Selang in Carolinian voyaging," narrated by H. Larry Raiget al. Youtube, 3:37.





**Image 28.**

Detailed drawings of the construction of a Carolinian outrigger canoe, 1835. Engraved illustration believed to be attributed to Dumont d'Urville. UHM Library Digital Image Collections.

paddled when there are no winds or when they are repositioning to hoist sails prior to sailing. However, because waaterag are large, they are typically not convenient for constant paddling.

Carolinians identify two types of waafatul (paddling canoes). The shosemal is a paddling canoe usually 12 feet or less in length and can take one or two adults. It is designed for inside reef fishing such as setting fish traps or transporting cargo between villages. This canoe can also be rigged with a sail for training youth to race such vessels. The kayap is a paddling canoe up to 10 feet in length and can take one adult. It is generally used for transporting light cargo within the reef and shallow waters.

Carolinians identify three types of waaterag (sailing canoes). The waafatul iyoyu is usually 14-18 feet in length and can take three to five adults. It is light enough to be paddled but able to sail outside the reef for deep ocean fishing. The manupwil is a midsized sailing canoe, typically 16-22 feet in length. It can take up to seven crew members and is designed for open ocean fishing at further distances. This canoe can also make short inter-island voyages and is typically the preferred canoe for daily fishing. The waaliway is a full-size voyaging canoe generally up to 30 feet in length and can take up to 12 crew members. This canoe is heavy and equipped with all long-distance voyaging apparatus. It is often



sheltered in a canoe house until a long-distance voyage is to be carried out. It is also used quite regularly for community fishing and hunting activities.

In the central Caroline Islands, the spirit for voyaging is Yaluluwey. The legends describe him as the youngest son of Palulap, the spirit of navigation. Yaluluwey, like his father, is half human and half spirit. While in the womb of his mother, he was eavesdropping on his father teaching his older brothers the skills of navigation. When he was born, he bit off his own umbilical cord, ran for a canoe, sailed off the horizon, and stayed out in the ocean until this day. The place called rongtam on the outrigger is the designated place for this spirit Yaluluwey. Before, during, and after a voyage, the master navigator of any canoe must constantly please Yaluluwey through spiritual chants and offerings to ensure favorable conditions on the voyage.

### Canoes of the Marshall Islands

The Marshallese believe that the art of canoe building and lashing was first introduced to the inhabitants of Bikini Atoll by Lewa and Lömtal, two men who came from Ep or the island of spirits. The Marshallese have a saying, “an Iroj wōt im jele,” which literally means “only the chief knows.” The meaning in association with canoes is that all people, along with their knowledge and skills, belong to the chief. Another expression,

“wa kuk wa jimor,” or “canoes bring people together,” signifies that in all canoe-building projects, all members of the village or island, including women and girls, participate in the process. In some cases, participants also include people from multiple atolls. Because of this process, most men and some women have canoe-building knowledge. However, only a select few will be acknowledged as rijōkjōk wa or master canoe builders. Navigators, on the other hand, have to be selected when they are babies, and a ribubu, or a person who can read the future, makes the selections.

Marshallese canoe builders use maan in bob (leaf of *Pandanus tectorius*) as a measuring and design tool. They use a few well-thought out, yet incredibly simple, series of steps. They use maan throughout the design and construction of the canoe for many different applications, including the profile view (looking from the side) of the canoe hull. These designs are based on the surroundings where the canoe will mostly be used. Traditionally, there are five recognized designs of the Marshallese sailing outrigger canoes. The designs differ in the main hull such as the bottom shape and depth. The five named designs are Mwijitbok (“Cutting Sand”), which features a shallow hull that can be used in shallow lagoons or in a lagoon that has many sandbars; Taburbur (“Small Parrot Fish”) with a shallow hull that can maneuver in shallow reef areas; Mālmel, a

“ “ **An Iroj wōt im jele.  
Only the chief knows.** ” ”



strong and fast hull; Tojeik ("Maneuverable"), which is a deep hull that can sail easily among the swells and currents; and Jekad ("Seagull"), a hull design with raised bows/sterns like the seagull when she floats on the ocean.

Historically, the mainstay of the traditional fishing and voyaging craft in the Marshall Islands is the outrigger canoe. The outrigger canoe represents the ultimate in design adaptation for open sea travel and intra-lagoon fishing. It combines three inventions of the utmost utility in sailing. First, the flattened lee side of the hull acts as a leeboard to reduce leeward drift and to some extent pull toward the outrigger float on the windward side. Because of the asymmetry of the main hull, as the hull moves forward lift is created horizontally, further obviating the need for a deep keel or centerboard. In addition to this horizontal lift, Marshallese outrigger canoes feature a lee platform, enabling a greater quantity of cargo to be carried. Finally, the midships pivoting of the mast, whereby the canoe is able to sail either end forward, and the shunting of the sail from one end of the hull to the other end keeps the outrigger on the weather side for any course heading.

The entire outrigger complex, that is, from the uben won (lee side of the hull) to the kubaak (outrigger float) is known as the ere. These parts include the pōtak (primary platform); the apet (secondary outrigger booms); the kein ion ere (secondary platform); the evenly spaced tarwak (crosspieces), which are lashed to the two kie to strengthen the ere; the mweieur lal

(lower crosspiece), which are lashed between the kie and apet (primary and secondary outrigger booms), the mweieur lõñ (upper crosspiece), which is also lashed across the entire ere from outer apet to outer apet; and the jojo (outrigger lift) or shock absorber lashed on the top kie directly above the kubaak.



**Image 29.**

Arno Atoll, 1950. Photo by Jack Tobin. UHM Library Digital Image Collections.

**Image 30.**

Marshallese voyaging canoe, *Jitdam Kapeel*, 2015. Photo by Joseph Genz.



1



2



3



5



4



**Images 31-35.**

The process of shunting or "changing ends" of a Marshalllese canoe: 1) the canoe sails with the outrigger float facing the direction of the wind; 2) the mast is angled vertical and the upper boom is unstepped from the "bow"; 3) the sail is moved to the "stern" which now acts as the new "bow"; 4) the mast is angled forward and the upper boom attached to the step; and 5) the canoe sails in the opposite direction but with the outrigger float still facing the direction of the wind. Photos by Joseph Genz.



## Spotlight Weather and the Sacred in Hawai'i—Kū and Hina

Weather is defined as the momentary state of the atmosphere, with climate being the long-term cycles of weather that occur over time. Meteorology is the science of studying weather, just like oceanography, which is the study of ocean conditions. The two disciplines go hand in hand, with the idea that wind makes waves and drives the surface currents upon which oceanic voyagers sailed. Thus, understanding weather was critical for voyaging across the sea. Storytelling becomes a key way of transmitting knowledge about the atmosphere from generation to generation. In Hawai'i, the study of weather is based on the concept of deities whose emotions are embodied in weather forms that express those characteristics.

In the time of Mo'oinānea, Kāne and Kanaloa lived with their sisters Paliuli, Waipuhia, Waipu'ilani, and Keanuenu at Konahuanui and Waolani before the two places rifted apart. These places are located on O'ahu, in Kailua and Nu'uano. This was a time of mixing the genealogies from different parent and chiefly lines from various island homelands by the chiefess Mo'oinānea. Kāne and Kanaloa adopted the eldest son of Kū and Hina, named Kahānaiakeakua (presumably Lono), as the backdrop for a holistic string of metaphors that play out bodily through their kinolau (body forms of weather phenomena in this case), as their human forms interact with one another in a way that poetically describes weather and genealogical ties.

The voyagers and husband and wife pair Kū and Hina are invoked for healing and carving canoes. They each have weather forms that together make up the atmosphere, reaching the tropopause. Kū has many cloud forms, some of whom are guardians for Keaomelemele. The many types of cumulus clouds are associated with warm humid air rising as seen in a maritime tropical air mass, especially as it relates to the anti-cyclonic wind flow associated with a high-pressure system. Hina also has cloud forms, and she is seen as the mother of Keaomelemele. [scroll down to continue] These are the gray of blanketing stratus and stratocumulus clouds, evidence of cold dry air sinking as seen in a maritime polar air mass, especially as it relates to the anti-cyclonic wind flow associated with a high-pressure system. High pressure systems that create trade wind weather dominate during the summer months; thus, Kū presides over ritual time from March to October.

Keaomelemele, the magical daughter born from the fontanel of Hina, was given a land in the sky to live on, built by her grandmother Mo'oinānea. It is described as being in the center of the sky with clouds encircling it at all times, an association with the center of a high pressure where no clouds exist. Thus, it is called Ke'ālohilani, "the shimmering heavens." She is joined by her half-brother, Kauma'ili'ula, the red sky that follows as maritime tropical air mass moves up from the south. Their oldest brother is Kahānaiakeakua, who is associated with storms.



An old Marshallese saying is “jinom itirum,” meaning “Your mother will always be next to you, loving you and helping you, for the rest of your life.” She is also known as the kubaak—she balances the family just as the kubaak balances the canoe. The kubaak is built after the jouj to determine the length. This is early in construction, so while one group of builders are working on the hull or other parts, another group can be working on the kubaak. The ujele (lateen sail) is a triangular sail extended by a long tapering rojak (yard and boom). The lateen sail is not integral to the mast, but to the booms, and only hoisted and held in place by the mast.

Marshallese planted trees specifically for building canoes. They cultivated and trained trees to certain shapes specifically for boat building. A good example is breadfruit trees, from which hulls and outrigger floats are built. The trees were cultivated and pruned to shape until they were old and large enough to harvest. During the 50 or more years that the tree grew, people ate the large fruits grown at the branch tips. Trees take on certain shapes when they grow. Trees grow tall and straight in groups, swaying together with the force of the wind and protecting each other from being blown over. If a tree is alone, in the open, it will grow wide, with full branches, taking up as much space as it can. When the wind blows, the tree bends away from the direction of the prevailing wind. The

canoe builders took advantage of these natural curves when selecting certain woods for the outrigger complex.

Even though they are extremely economical and well designed for inter-atoll use, the extremely large inter-atoll canoes (walap)—measuring up to 100 feet and capable of carrying as many as 50 people—are no longer constructed. The mid-sized sailing canoes (tipñöl) are capable of carrying up to ten people and built specifically for rapid transportation and fishing inside the lagoon as well as in the open sea. The smaller canoes (körkör), often rigged with a sail, are capable of carrying one or two people. The körkör, specifically designed for fishing and travel inside the protected waters of the lagoon, are still being built and used on several of the outer islands.

#### *Wayfinding or Non-Instrument Navigation*

To settle thousands of Pacific islands and then to maintain trade and communication meant that seafarers had to traverse hundreds—sometimes thousands—of miles of open sea. Occasionally they did get lost and either landed on previously-unknown islands or perished at sea. More often than not, however, Indigenous navigators had a mental model of their destinations, where they were located, and how to find them. To the uninitiated traveler, the open sea may appear to be an undifferentiated expanse. To the experienced navigator, on the other hand, natural cues exist that facilitate accurate way-

#### **Interview 10.**

Click [here](#) to watch “The grand master navigator in Carolinian voyaging,” narrated by H. Larry Raiget al. Youtube, 2:22.



“ The ocean was the highway of our forefathers. ”



finding over immense distances. Researchers of navigation describe the techniques for setting and maintaining a course, estimating position once out of sight of land with consideration of leeway and currents, and homing in on the target island.

#### *Setting and maintaining a course*

Traditional navigators throughout Remote Oceania use the progression of stars or other celestial objects across the night sky or the directions from which characteristic winds blow during various seasons to form a conceptual compass for setting and maintaining course. For many navigators, the most reliable guide is the movement of stars. Stars rise in the east, set in the west, and, if one is near the equator, they more or less proceed along a given line of latitude. If the navigator can identify a star that rises or sets directly above the target island,

the canoe is pointed toward that star and the helmsman steers the canoe on that star course. Navigators in the central Carolinian Islands used this technique to develop a **star compass** that conceptually divides the horizon into thirty-two points arranged symmetrically about a north-south axis. The rising and setting positions of stars provide the names for abstract segmentations of the horizon that can be used to indicate the direction of surrounding islands.

The navigator must keep track of many calculations. The rising of a star in the east and its corresponding setting in the west occurs four minutes earlier each day due to the earth's orbital motion around the sun, and the nightly movement across the sky traces an arc that limits each star's usefulness to point to the destination island; a star that is directly above the target island may soon sink below the horizon. Navigators thus recall a nightly progression of stars all pointing in the same direction, called a "**star path**," for each destination island. Such star paths vary with the seasons. Moreover, stars are invisible during daylight. The one exception is the star located most closely to the Earth—the sun. Like the stars at night the sun rises in the east and sets in the west. Therefore, as long as the sun is visible and fairly low in the sky—that is, early in the morning or late in the afternoon—a navigator can tell the direction in which the canoe is traveling. Navigators calibrate the fading star field at dawn to the direction of ocean swell and the rising position





**Image 36.**  
Mau Piailug reciting the stars,  
1984. Photo by Steve Thomas.  
UHM Library Digital Image  
Collections.

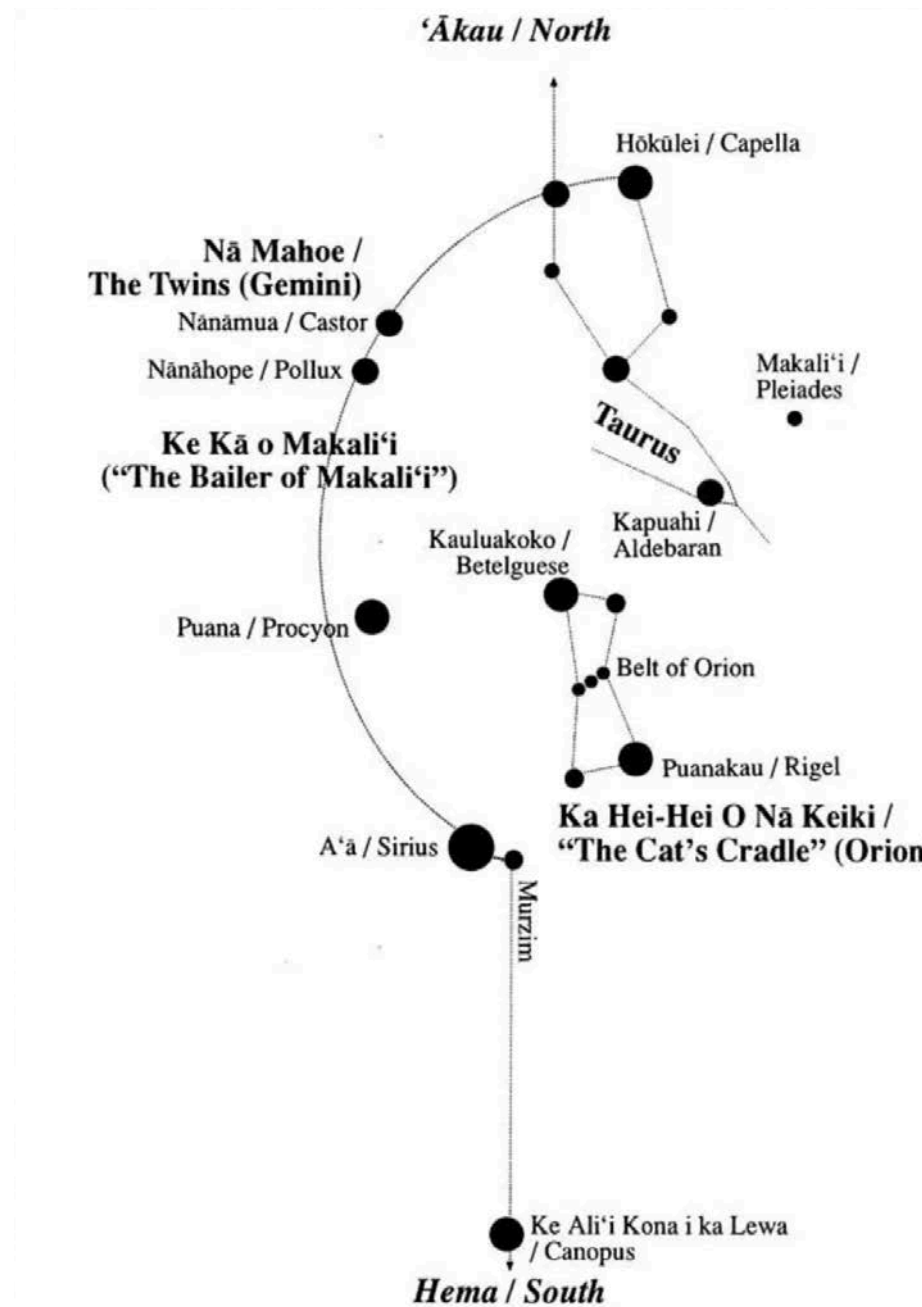


of the sun on the horizon. Since the earth's equator is tilted with respect to its orbit around the sun, the angular distance of the sun north or south of the celestial equator (declination) shifts annually from 23.5 degrees north to 23.5 degrees south; navigators' calibration of the sun to the star field must adjust for these daily shifts in the sun's rising and setting positions.

If the sky is overcast, whether during the day or the night, celestial navigation becomes unfeasible and other mechanisms are employed. The primary alternative is wave patterns. On the open sea, the most reliable waves are known as swell. Swells are large, regular waves produced by constant winds that blow over thousands of miles. Local winds may shift and create waves of a different kind, known as "seas" or "chop." Those differ in shape and feel from swell. In most regions of the tropical Pacific, at least one or two distinct swell patterns are usually detectable. In some regions, navigators discern as many as four.

Estimating position out of sight of land with consideration of leeway and current

Once out of sight of land, navigators maintain course and estimate their progress through **dead reckoning** procedures while taking into account how currents and winds displace the canoe from the intended course (leeway). Misjudgments of current streams and the sideways force of wind on the sail can result in sailing too far off the course line and missing landfall. When starting a voyage, navigators typically face astern and



**Image 37.** Diagram of the Hawaiian constellation Ke Kā o Makali'i. Courtesy of Polynesian Voyaging Society.

take a back bearing on their home island in order to check and compensate for the direction and strength of the current and the effects of leeway.

Two surviving systems illustrate how certain island groups focus on particular environmental phenomena. Navigators in the central Carolinian atolls estimate their



## Spotlight

### Water and the Sacred in Hawai'i— Kāne, Kanaloa, and Lono

Kāne and Kanaloa are together associated with sunlight, especially in relation to the sun's ecliptic, or movement north-south across the horizon throughout the year. These two deities also have distinct types of water that they preside over. Kāne is generally associated with fresh water and Kanaloa is generally associated with salt water and the sea. Incidentally, the Hawaiian chant *Ka Wai Ola a Kāne* accurately interprets what scientists call the hydrologic cycle, describing the life-giving waters of Kāne as being present in the horizon clouds, storm clouds, and mountain folds, pouring down from waterfalls, and welling up from springs. Water (*wai*) is life, thus the word for wealth in Hawaiian is *waiwai*.

Ruddy waters associated with storm floods rush down the narrow streams out into the broad wide calabash of the sea—the mixing of potent forces that brings forth life. Visually, the ocean turns the color of the 'awa drink, and thus Kāne and Kanaloa are well known for drinking 'awa (*kavakava*, *piper methysticum*) together, bringing the 'awa ceremony ritual symbolism as well. Many stories about specific places on the landscape describe the presence of groundwater through Kāne and Kanaloa's search for fresh water to mix the 'awa. The *Kumulipo* chant expresses this dualism as "*Wai'ololī*," the narrow stream rushing down the valley (for man), and "*Wai'ololā*," the broad stream (for woman). The round calabash that holds the mixed 'awa represents the female aspect of that gourd dualism. The narrow gourd from which the fresh waters of Kāne are poured into the calabash is symbolic of the narrow male form of the gourd, which hangs in the men's house for ritual use. That gourd also represents the god Lono, who holds those fresh waters of Kāne in his cloud form.

Lono, god of the agricultural year, has many weather forms, bodies that give him the names *Ka-hānai a-ke-akua* (adopted child of the gods), *Kūkulu-o-Kahiki* ([from] the pillars of Kahiki) *Lono-i-ka-makahiki* (Lono from places south of Hawai'i) and *Lono-i-ke-ao-uli-ali'i* (Lono whose head is hidden in the dark clouds) among others. These forms reveal how and why he is considered the adopted child of Kāne and Kanaloa. Meteorologically, Lono is associated with cyclonic activity related to extra-tropical cyclones and storm production in the upper latitudes. The convective cloudbursts associated with island heating are also associated with Lono, as well as convective weather (an interaction of warm and cold air), as it occurs in the doldrums where the tropical cyclones form—tropical low-pressure systems that come up from the south, most often in the winter months. Thus, Lono presides over ritual time from November to February, as marked in Hawai'i by the stars *Makali'i* (Pleiades) rising at sunset in the fall, until they stand overhead at sunset.

In summary, the radiant energy of the sun—Kāne [*ōnohi-o-ka-lā*—is most intense near the equator, where moisture picked up in the trade winds from the northern and southern hemispheres converges and the convective heating becomes intense. This convergence causes huge cloud banks and storms to form, where the lightning strikes and thunder rumbles, and rainbows often shine through patches of sunlight refracting on the falling rains. The heavy rains and sudden squalls—Lono [*nui-noho-i-ka-wai*], then arouse the sea (through wind/friction), whose potential for wave growth responds with the swelling of the sea. The patron is found in this case within the goddess *Nu'akea*, paired with this Lono deity. The result is the procreation of waves that propagate out in a swell train, a procession of wave after wave with similar properties traveling in sets—analogue to the birthing of generations, and waves of travelers (born on far-away seas) moving across the ocean and landing upon distant shores, in order to support the growth of the *lāhui* (the Hawaiian nation). The root of metaphor for waves and wave generation relates to this growth. Hence, the potent interaction between these male/female kinetic/potential *kinolau* empowers this god and goddess as the patrons of childbirth, growth, and maturity, provided that they have been blessed with Kāne's life-giving waters.



progress with a celestial-based concept described as a “moving reference island.” From this perspective, islands move around a canoe that is said to be fixed in place—the destination island appears to approach the canoe while islands lying off to the side appear to fall behind. The reference island, or etak, lies off to one side of the sailing course and is not visible at any time during the voyage. The navigator envisions how the reference island “moves” along the horizon in terms of shifting star bearings. The navigator is not concerned with the length of each voyaging segment, but rather how much time has elapsed before the reference island lies under the next star bearing. A second system, exemplified by navigators in the Santa Cruz Islands, is based on the winds but incorporates stars as well. Navigators in the Vaeakau-Taumako region use a wind compass to correlate the named positions with the rising and setting positions of celestial bodies, wind seasons, calendrics such as equinoxes and solstices, and inter-island voyaging routes.

In addition, since stars near the equator follow a consistent line of latitude, a navigator who looks straight up and sees a recognizable star will know the canoe’s latitude. A star that passes directly overhead is known as a zenith star. Since the navigator should also know the latitude of the target island, sighting on a zenith star should indicate the canoe’s position in relation to the intended destination.

### Homing in on the target island

The period when one approaches but cannot yet see the destination island is critical. If the canoe accidentally sails past, it could be thousands of miles to the next outcropping. It is important, therefore, to have mechanisms for homing in on one’s destination. Closer to land, navigators expand the range at which islands can be detected through various remote-sensing techniques. Observations of birds, clouds, swell patterns, sea animals, currents, tides, and shoals are common land finding techniques, but they vary according to island geography and local environmental features. Carolinian navigators developed an elaborate inventory of marine life that extends out to sea from an island along each of the star compass directions. They also observed the flight patterns of specific birds that nest on land but fly out to sea during the day to fish. Observations in the morning as the birds fly towards their fishing grounds or in the evening when they return home inform the navigator about the direction and distance to land. Navigators also pay attention to cloud formations that can be seen for considerable distances—high volcanic islands interrupt the flow of trade winds and produce distinct cloud effects and shallow lagoons of coral atolls may reflect their greenish colors on the undersides of clouds. Another common remote-sensing technique involves feeling the movement of the canoe in response to swell and current patterns that are disrupted by



islands, and it was in the seas of the Marshall Islands that navigators developed a comprehensive system of wave piloting, with ideas of swell pattern disruptions modeled and mapped in “stick charts” (Genz 2018). Through these techniques, low-lying coral atolls can generally be detected about thirty miles away, and high islands can be sensed about fifty miles away (Lewis 1994). In addition to these navigational signs, several are less commonly used and less well known. Navigators in the Vaeakau-Taumako region of the eastern Solomon Islands describe *te lapa* as underwater streaks of light that afford locational information for an island. There are several explanations for the physical basis of *te lapa* (Feinberg 2011; George 2012). The overlapping zones at which closely-spaced islands can be remotely detected affords the navigator the safety net of a “screen of islands”; rather than needing to directly hit the island destination, the navigator only needs to detect a nearby island and then home in on the intended target (Lewis 1994).

Overall, the technological innovations of first the single outrigger sailing canoe, followed by the double-hulled voyaging canoe, and then the lateen-rigged shunting outrigger canoe traces the general sequence of the Lapita expansion through Near Oceania, the long-distance movement in Polynesia, and the localized adaptations in places like the Caroline Islands and the Marshall Islands. The emerging picture

includes: (1) Lapita seafarers sailing short distances with outrigger canoes among the closely-spaced islands of Near Oceania with reference to visible islands, which is a form of piloting; (2) the descendants of Lapita culture developing the innovative double-hulled canoe technology to move greater distances over thousands of miles of open ocean to reach the remote archipelagoes and islands of Polynesia (Hawai’i, Rapa Nui, Aotearoa) and beyond to the shore of the Americas, made possible by navigational techniques of setting and maintaining position, estimating position through dead reckoning procedures, and homing in on the island target; and (3) developing a new hull and rig design in the form of shunting a lateen sail to afford a more efficient capture of wind energy for fast inter-island movement in the atoll societies including the Marshall Islands and the Caroline Islands. This is a broad sketch; another example of refinement and adaptation is how mariners in places like Samoa, Tonga, and Fiji adopted the lateen sail shunting system for their double-hulled canoes (*‘alia*, *kalia*, *drua*) reaching 100 feet in length to enhance the efficiency of transporting large numbers of people and cargo in their sphere of interaction and trade. The next section explores this and other networks of communication that developed in the post-settlement period.



# Classroom Activities

1. What are the main components of the outrigger sailing canoe? How did the canoe designs change over time in relation to the histories of exploring and settling Oceania?
2. What are the major design innovations of the shunting outrigger canoes of the Marshall Islands and the Caroline Islands? What are some of the similarities and differences in how the Marshallese and Carolinian canoes are associated with cultural meanings, values, and beliefs?
3. The analytical division of Oceanic navigation into setting and maintaining a course, estimating position once out of sight of land with consideration of leeway and currents, and homing in on the target island stems from an attempt by outside researchers to understand Indigenous wayfinding systems. Search for narrated stories from Oceanic navigators about their understandings and explanations of wayfinding, including how they teach the information to apprentices. How do these two perspectives compare?
4. Navigation researcher David Lewis documented that through various techniques used to remotely sense islands, low-lying atolls and islands can generally be detected about thirty miles away, and high islands can be detected much farther (Lewis 1994). Using the unlabeled Pacific map (CPIS), draw 30-mile radii around coral atolls and 50-mile radii around volcanic islands and “continental” islands. You will need to first identify the islands and also determine their geology, whether they are high islands (volcanic or continental islands) or low-lying (coral atolls). From this visual understanding of island geography and geology, what can you infer about “expanding the island target”? Are there any islands or groups of islands that appear easier or more difficult to reach? How does your understanding of navigating toward a “screen of islands” influence your comprehension of the overall settlement sequence of the Pacific (summarized in the previous section)?



## People of the Sea

In *The People of the Sea* (2006), historian Paul D'Arcy examines the oceanic connections of Pacific Islanders from the late eighteenth to late nineteenth centuries. Of note are the islanders who were known for their canoe-borne raids and unmatched sea power and referred to by others as "sea people." For the Tongan people of Tongatapu, these were the raiding kakai me tahi (people from the sea) of Ha'apai. In other island groups, smaller communities harbored sea warriors. For the Samoans, these were the 'aiga i le tai (family in the sea) of Manono; for the Fijians, these were the kai wai dina (sea people) of Bau; and for the Tahitians, these were the islands of Bora-Bora, known as, among other titles, "Porapora of the muffled paddle" in reference to the barely audible paddling of their raiding fleets (D'Arcy 2006, 113-116). In the outer-island languages between Yap and Chuuk various cognates of remathau refers to the island communities as "people of the ocean." And in the Marshall Islands, the navigator is referred to as ri-meto, or "person of the sea." These and other examples

illustrate how Pacific Islanders imagined their oceanic world, a perspective that Epli Hau'ofa referred to as our "sea of islands."

### *Post-settlement Interaction Spheres*

The history of Oceania is, in part, a history of voyaging. Seafaring made it possible for Pacific Islander ancestors to first make their way from island southeast Asia into southwest Oceania more than 50,000 years ago, and for Austronesian adventurers to sail from Taiwan and the Philippines south to New Guinea and east to Palau and the Northern Marianas beginning approximately 3,500 years ago. The descendants of those who ventured south would gradually spread out across the vast Pacific Ocean, establishing communities in the northern seas in the Marshall Islands and Caroline Islands and as far east as Hawai'i, the Marquesas, and Rapa Nui. The discovery and settlement of thousands of islands across





When those who hail from continents, or islands adjacent to continents—and the vast majority of human beings live in these regions—when they see a Polynesian or Micronesian island they naturally pronounce it small or tiny. Their calculation is based entirely on the extent of the land surfaces they see. But if we look at the myths, legends, and oral traditions, and the cosmologies of the peoples of Oceania, it becomes evident that they did not conceive of their world in such microscopic proportions. Their universe comprised not only land surfaces, but the surrounding ocean as far as they could traverse and exploit it, the underworld with its fire-controlling and earth-shaking denizens, and the heavens above with their hierarchies of powerful gods and named stars and constellations that people could count on to guide their ways across the seas. Their world was anything but tiny. They thought big and recounted their deeds in epic proportions. One legendary Oceanic athlete was so powerful that during a competition he threw his javelin with such force that it pierced the horizon and disappeared until that night when it was seen streaking across the sky like a meteor. Every now and then it reappears to remind people of the mighty deed. And as far as I'm concerned it is still out there, near Jupiter or somewhere. That was the first rocket ever sent into space. Islanders today still relish exaggerating things out of all proportion. Smallness is a state of mind. There is a world of difference between viewing the Pacific as “islands in a far sea” and as “a sea of islands.” The first emphasizes dry surfaces in a vast ocean far from the centers of power. Focusing in this way stresses the smallness and remoteness of the islands. The second is a more holistic perspective in which things are seen in the totality of their relationships.



~ “A Sea of Islands” Epeli Hau’ofa (1994)

millions of square miles of ocean space is one of the greatest achievements in all of human history.

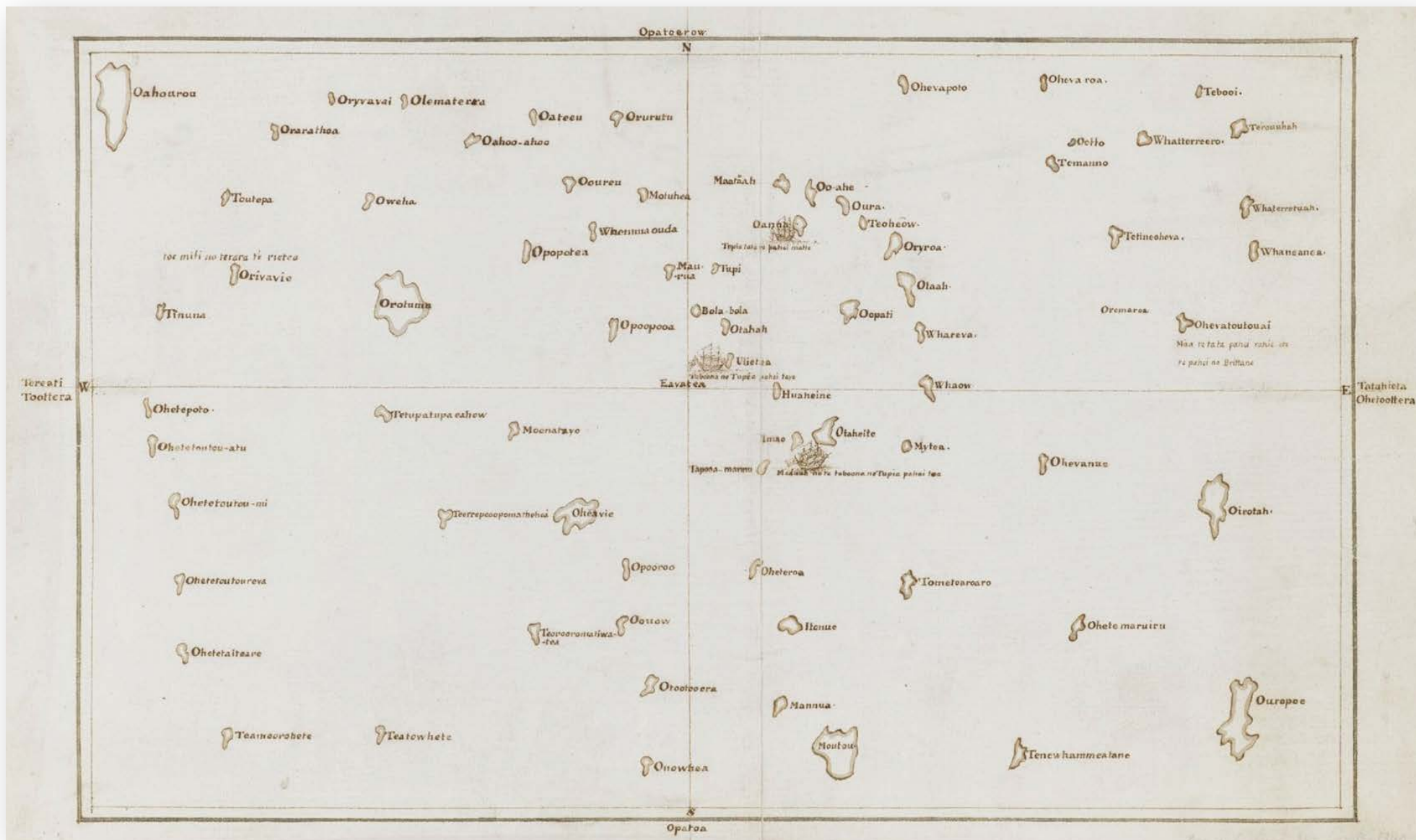
Voyaging did not end with the initial settlement of the region. In fact, Pacific Islanders remained highly mobile, regularly circulating across and among islands and island groups for any number of reasons: in search of food; to visit family and friends; to conquer or settle new lands; and, commonly, to maintain networks of exchange that offered access to coveted resources, technologies, valuables,

knowledge, and cultural and political capital that were limited or not available at home. This ongoing circulation led to the formation of a number of regional networks loosely designated as “native seas” by Pacific historian Damon Salesa. Post-settlement voyaging networks also challenge and transcend European-imposed demarcations of Polynesia, Melanesia, and Micronesia; the Indigenous networks were historically meaningful and practical.

#### Interview 12.

Click [here](#) to watch “Origins of Marshallese navigation on Bikini & Regional navigational schools in Micronesia,” narrated by Alson Kelen. Youtube, 1:50.





**Image 38.**

Tupaia was a Ra'iātea chief and expert navigator who joined the crew of Captain Cook's ship *Endeavor* in 1769 and traveled with them until his death in Batavia, Indonesia in 1770. Tupaia's expertise was a testament to the strength of Tahitian geographical and regional knowledge including the ability to sail without instruments or written maps. While aboard the *Endeavor*, Tupaia composed detailed and rich maps of the Pacific Islands including many he had never himself previously visited. Map drawn by Tupaia, 1769. British Library.

### Vasa Loloa/Vaha Loa

Archaeological artifacts, historical linguistic reconstruction, oral traditions, and other forms of evidence point to one such "native sea" network that linked the islands of Fiji, Tonga, and Sāmoa—along with Futuna, Lau, and other smaller island communities—from approximately 1000 CE through the dawn of the colonial era. Known as Vasa Loloa in Samoan and Vaha

Loa in Tongan, communities involved in this network used voyaging to acquire material goods and technologies from affiliated island communities. Material exchanges centered around canoe wood and red bird feathers from Fiji, tapa cloth and clothing from Tonga, and fine mats and tattooing from Sāmoa. As part of the network, Tongan canoe builders established residence on Lau island in Fiji in order to access



trees large enough to build canoe hulls, with the people of Lau serving as intermediaries between Tongan and Fijian chiefs to make this possible. Chiefs and members of high-ranking Fijian and Tongan families also frequently intermarried, strengthening ties between the two island groups. In the process, they forged and maintained economic and political alliances and borrowed and adapted cultural practices, beliefs, and even language. Made possible by regular voyaging, the Vasa Loloa/Vaha Loa network thus helps explain why Fiji, Tonga, and Sāmoa share so many political and socio-cultural features from canoe culture and language to shared oral traditions and cultural heroes, among others.

#### Kula

Another “native sea,” the kula exchange or kula ring, links communities in the Massim archipelago, including the Trobriand Islands, in southeastern Papua New Guinea. Participants travel hundreds of miles by canoe to exchange valuable items—red shell-disc necklaces and white shell armbands—with others in the network. The necklaces originate in the southern islands and are carried by travelers in a clockwise “ring” around the network. Travelers visit affiliated communities, where they may trade necklaces for the armbands, with armbands originating in the northern islands and carried by travelers in a counterclockwise “ring.” The

exchange network is thus not so much about the items themselves—the necklaces and armbands in fact have little practical value and recipients may only hold on to them for a short time before passing them on to someone else—but rather serves as a way for distant communities to forge and maintain relationships and for individual participants to demonstrate and enhance their social status or prestige in their own communities and in relation to others. The relationships created through the kula exchange are presumed to be lifelong, and carry with them mutual obligations including hospitality, protection, and assistance. This might include hosting members of the network during future visits, providing them with food or other resources, and offering protection from rival groups. The kula ring is thus an interisland support network made possible by ocean voyaging.

#### Sawei

In the region commonly known as Micronesia in northern Oceania, several voyaging networks linked communities in the western Caroline Islands to Yap; Palau and the Mariana islands (Guåhan and others); the Marshall Islands with Kosrae and Pohnpei to the west and Kiribati to the south; and Yap, Chuuk, Pohnpei, and Kosrae, among others. The sawei illustrates larger patterns of exchange and communication in this region.



The sawei network spanned thousands of miles linking twelve atoll communities known today as the western Caroline Islands (Ulithi, Woleai, Satawal, and others) with the Gagil district of Yap to the west. This was a multi-cultural system of gift exchange, religious and political tribute, disaster relief, and other forms of interaction that began in post-settlement ancestral times and continued until prohibited by the German administration (late 1800s), although the social relationships embedded in the system continue today. This is a multi-faceted system, where sawei can refer to trading networks, kinship relations, the basket that carries goods, and the land itself. The Gagil district (Yap) used the sawei system and alliances to enhance its authority, prestige compared to competing Yap districts (Rull and Tamil); yet Rull had strong ties to Palau in the southwest that brought balance to this power structure.

As part of this network, Carolinian islanders would visit Yap every three or so years, bringing with them various gifts and exchange items including pearl shells, turtle and coconut shell belts, coconut oil, sennit, pandanus sails and mats, and other items. These tended to be handmade, labor intensive items valued because of their rarity (such as Fais tobacco). In exchange, Carolinians received items available only on Yap—turmeric, Polynesian chestnuts, red-earth pigment, ceramic pots, and foods such as breadfruit, squash, and sweet potatoes. These tended to be more practical items. Goods were transported by large canoe fleets in an order reflective of their

status and position in the system. When it reached Yap, the fleet consisted of twenty-two canoes loaded with supplies and travelers who wanted to be part of the exchange and engage in informal trade. Similar to other voyaging exchange systems across Oceania, the sawei system was more than just trade of items.

Other important elements included an internal ranking of Carolinian islanders by distance from Yap that had political and religious dimensions. Yapese saw themselves as “owning” Carolinians and referred to them with parent-child language. Also, a strict protocol governed the exchanges, as well as obligations that each side had to fulfill. For example, Carolinians had to provide labor, religious offerings, and ceremonial dances. The system was largely maintained through



### Interview 13.

Click [here](#) to watch “Sawei interaction sphere,” narrated by H. Larry Raiget al. Youtube, 9:37



religious beliefs, practices, and rituals. Carolinians believed, for example, that a failure to participate would result in a Yapese sorcerer calling a storm to destroy the home islands.

Beyond the benefit of the items received, Yapese promised Carolinians with disaster relief such as providing land after storms and typhoons. This ensured the survival for low-lying coral atoll islanders residing in fragile ecosystems. In this respect, the sawei system was also about disaster relief. In addition to providing land, the relief also involved adoption by the Yapese from Gagil, as newly formed parent-child relationships could ensure the survival of young Carolinians as well as the elderly in the event they did not have any surviving family members to take care of them.

#### Ratak and Rālik

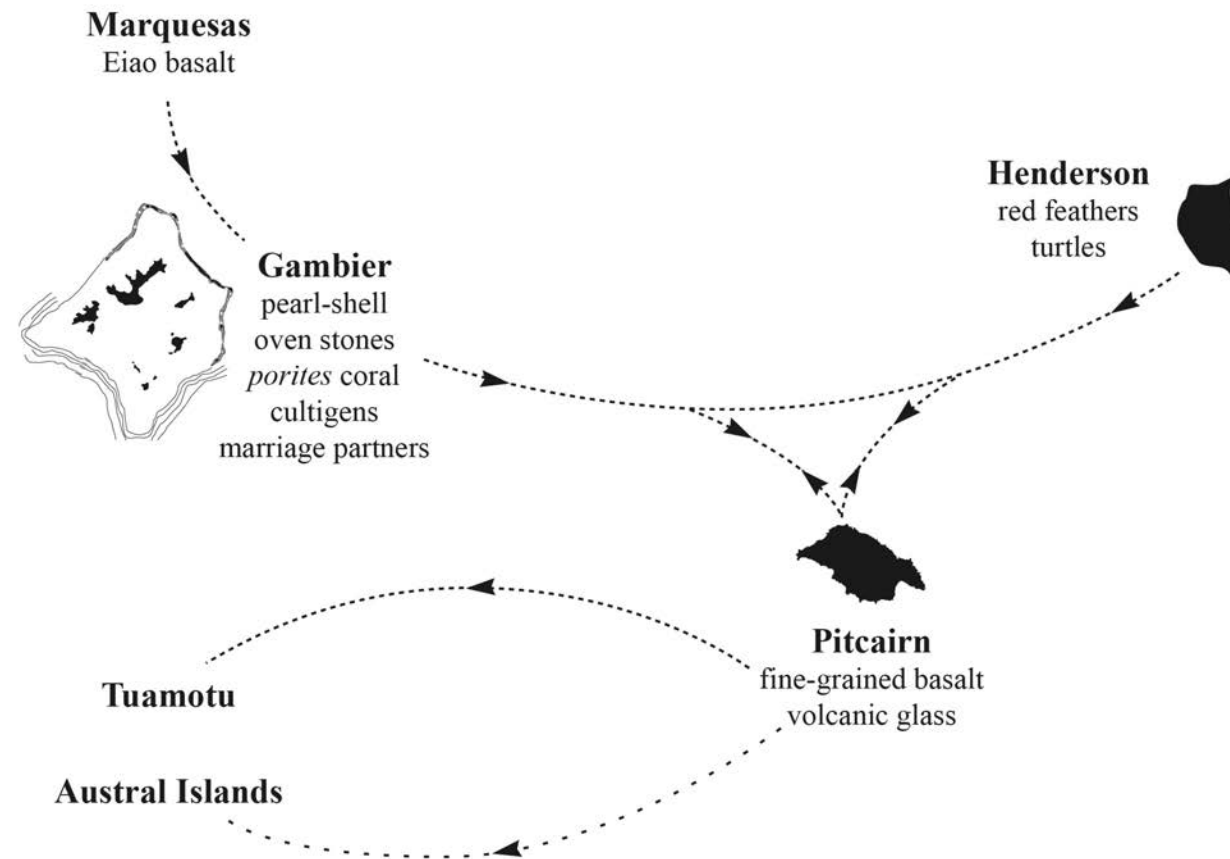
The founding ancestors who first inhabited the archipelago of the Marshall Islands forged a relatively homogenous community with a single language among its low-lying coral atolls and islands, expressed in their identification as “people of these islands” (*armij aelōñ kein*). With an oceanic area covering 750,000 square miles, the ancestral Marshallese differentiated themselves in part through geography, which is reflected in the place names of island groups and their localized seas. The eastern chain of islands is called Ratak or “sunrise,” and the western chain of islands is named Rālik, or

“sunset.” According to ethnographic research in the early 1900s, the main atolls and ocean within the eastern chain were called Ratak En (northern Ratak) and Ratak Rak (southern Ratak), and the main atolls and corresponding seas in the western chain were referred to as En in Meto (northern ocean) and Rak in Meto (southern ocean) (Krämer and Nevermann 1938).

The clearest indication for extensive communication networks through the Ratak and Rālik chains is language. Linguistic homogeneity in the Marshall Islands extends farther than anywhere else in Oceania. Regular social interaction among the inhabitants of the atolls, which are generally separated by single overnight voyages of less than one hundred miles, helped to maintain mutual linguistic intelligibility, and slightly longer distances with lesser degrees of communication worked to create regional Ratak and Rālik dialects.

Archaeologist Marshall Weisler (2001) conducted excavations on Utrok, which lies at the most marginal edge of permanently inhabited atolls in the northern Ratak chain, to begin to characterize pre-contact voyaging networks. The Marshall Islands encounter an extreme rainfall gradient, running from about 900 millimeters of rain per year in the arid north to about 4,000 millimeters of rain in the wet south. In the dry north, Utrok is subject to long-term inter-annual variability





**Image 39.** Model of multi-resource, non-symmetrical long-distance inter-island interaction sphere in the Eastern Pacific, with permission from Molle and Hermann 2018.

of rainfall and drought. This, in combination with typhoon damage and seasonal inundation of salt water, led to environmental buffering mechanisms that alleviated the impact of variability in periodic food shortages, such as drawing from the freshwater lens for cultivation of giant swamp taro and the use of subterranean pits of storage of breadfruit paste. In historic times, the dry northern atolls exchanged finished goods and some food, such as pearl fishhook, woven pandanus mats, turmeric, and arrowroot, for food from the wet southern atolls, including breadfruit and various fruits. Weisler suggests that Utrok may have been linked in a voyaging network with surrounding atolls and islands (Taka, Ailuk, Mejit, Jemo, and Likiep) and perhaps an atoll even more distant in the Rālik chain (Kwajalein).

#### Pitcairn, Henderson, and Mangareva interaction sphere

Remarkable networks of exchange also developed in the eastern Pacific, a region characterized by longer sailing distances and greater navigational challenges. One example is the interaction sphere among the Gambier Islands, the Tuamotu Islands, the Austral Islands, and the Pitcairn Islands. Archeological artifacts, oral traditions, and nineteenth century early historical texts composed by Mangarevans after the arrival of Catholic missionaries in 1934 reveal some of the dynamics of this interaction sphere. The very small, remote islands—Pitcairn and Henderson as well as Temoe in the Tuamotu

Islands–faced substantial challenges towards community stability in marginal environments; they traded high prestige resources (red feathers, turtles, particular stones) for agricultural and human resources from larger, more populous islands (such as Mangareva in the Gambier and the Austral Islands to the west). The eventual fate of the pre-contact interaction sphere that centered on and supported the settlement at Pitcairn may also have profound lessons for the present (Molle and Hermann 2018). Environmental degradation on Mangareva coupled with Mangareva politics led to the cessation of voyaging across this network prior to the arrival of outsiders and the eventual abandonment of Henderson and Pitcairn as permanent settlements. The sustainable wellbeing of communities in times of climactic and environmental change clearly depended on the continuance of voyaging.

When Epeli Hau'ofa (1994) wrote his seminal essay, "A Sea of Islands," he was reclaiming the ancestral notion that Pacific Islanders are intimately connected to the sea, and that the apparent "smallness" of the Pacific Islands from a non-Oceanic perspective (and also internalized by Pacific Islanders) was not reflective of the histories of voyages that viewed the ocean as a highway rather than a barrier. The voyages of interaction–the histories of seafaring after the early period of exploration, discovery, and settlement–demonstrate continued

communication between the home islands and those newly settled, as well as more localized networks. After the discovery of the Hawaiian archipelago approximately 1,200 years ago, for example, a period of two-way voyaging commenced in a well-established corridor between Hawai'i and Tahiti, but over time those long-distance connections ceased as priorities shifted to more local issues. The examples outlined in this section reflect this somewhat later period of voyaging, in which inter-archipelago networks were established and maintained. Some of these shifted and ceased prior to European colonization (the Pitcairn, Henderson, and Mangareva interaction sphere, for example), and some operated until the historic era with disruptions to seafaring through colonial prohibitions on the use of traditional canoes and navigation, the introduction of motorized vessels that often were expensive but afforded prestige, and other factors. Despite the decline and cessation of most of these post-settlement interaction spheres, certain aspects of the networks have continued. In many cases, the values placed on social relationships–such as certain forms of respect given to particular island communities–have endured even though the canoes have stopped plying the seas between them. The next section showcases several examples of voyaging organizations and their motivations to perpetuate their traditions of seafaring.



# Classroom Activities

1. Conduct research on a voyaging interaction sphere or network that developed after the settlement of Oceania that is not described in this section. What are the forms of evidence that illuminate how this voyaging network once operated, and what were the main reasons for the voyages? And, how did this voyaging network change over time (including possibly ceasing to function)? Compare and contrast this network to the voyaging interaction spheres mentioned in this section.
2. In addition to the movement of canoes that can be inferred from archaeological evidence of the location and movement of materials, what are some Indigenous ways of understanding, representing, mapping, or conceptualizing past inter-island alliances, including the values placed on social relationships?
3. Conduct research on a contemporary voyaging organization or seafaring society in a Pacific Islands community. In what ways do the canoes of that island community reflect the health (social, ecological, cultural) of that community? In what ways, and to what extent, is that island community still connected to neighboring islands similar to the ancestral inter-island alliances described in this section?
4. Expanding from **Question #4** in Section 1, imagine that our future interstellar space exploration results in discovering and settling a planet in another solar system. Rather than imagining science fiction scenarios in novels or movies, draw from the examples in this section to imagine if, and how, regular forms of communication between Earth and the newly settled planet would ensue. Which trajectory, based on the Pacific histories outlined in this section (and based on your own research of interaction spheres), seems most likely? And, if contact with alien life is made, what scenarios (if any) in the histories of Pacific voyaging and Western contact could be invoked to predict the outcome?



## Tributes to Pioneering Voyagers

There are so many members of the voyaging communities across Oceania who were pioneers, hailed as heroes for demonstrating their prowess at sea and supporting the systems of voyaging in the historic past and within living memory. These voyaging pioneers discovered new islands, served as cultural mediators during historic-era interactions with Western navigators, developed the vision to research surviving navigational traditions and use that knowledge for cultural revitalization, safeguarded sacred and specialized knowledge, used their voices for advocacy and social justice, and crossed cultural divides to empower local communities and inspire youth across Oceania to continue to look toward the past to confront current and future challenges. They also worked on land and at sea with diverse skills and understandings that made voyaging revival and continuance possible. Here we draw attention and pay tribute to selected individuals who represent the many pioneering Pacific voyagers who have come before and whose legacies continue to provide guidance. We view this section as an emerging written text to complement the many oral traditions that already memorialize these pioneers who have passed on. We acknowledge that other heroes are not featured here, and that this tribute can be expanded in future revisions of this volume and in other culturally appropriate ways.



## Kālepa Babayan (1956-2021)

The late captain and navigator of Hawaiian deep-sea voyaging canoes *Hōkūle‘ā*, *Hawai‘iloa*, and *Hōkūalaka‘i*, Chad Kālepa Baybayan has been a recognized leader of the voyaging renaissance since 1975. Trained under the tutelage of Satawalese master navigator Pius “Mau” Piailug, Kālepa was one of five Native Hawaiian navigators inducted by Mau into the weryeng school of navigation during a pwo ceremony on Satawal in 2007. A fierce advocate and champion for educating the next generation of ‘ōiwi (native) wayfinders and leaders, Baybayan amplified Hawai‘i’s rich heritage of deep-sea and deep-space exploration through his innovative work as the Director of Honuakai, the Exploration Sciences Division of ‘Aha Pūnana Leo and as the Navigator-in-Residence at the ‘Imiloa Astronomy Center of Hawai‘i. In his role at Honuakai he leveraged *Hōkūalaka‘i* as an immersive learning environment to promote the teaching of wayfinding and navigation through ‘ōlelo Hawai‘i (Hawaiian language), which was in a renaissance of its own. During his time at ‘Imiloa he developed and led cutting-edge curricula, outreach programs, and tools that accelerated and scaled the teaching of wayfinding to local and global audiences of all ages and diverse backgrounds.

Image 40.

Kālepa Babayan, 2018. Photo by Bob Douglas.





## Lijon Eknilang (1946-2012)

Born on Rongelap in 1946, Lijon Eknilang learned navigational knowledge informally as child by listening to elders' stories and sailing with them on fishing trips. Growing up in a matrilineal society, Lijon embraced the legendary feats of Litarmelu, the first Marshallese navigator. She found it easy to memorize the stories, legends and chants, but she never had the opportunity to take her navigation test to qualify her as a ri-meto (person of the sea). In 1954 her home atoll of Rongelap received radioactive fallout from the US nuclear testing program, which resulted in forced displacement from Rongelap. Two years after the fallout, military personnel burned everything on the atoll, including a book on navigation written by her father. Between 2005-2006 Lijon shared some of her memories—encoded in song—of the navigational knowledge she had learned in her youth. Lijon suffered health problems because of the US nuclear weapons testing program, which motivated her to pursue anti-nuclear activism. She has become iconic in the Marshall Islands for her international advocacy for the Rongelapese nuclear test victims.

### Image 41.

Lijon Eknilang, 2006. Photo by Joseph Genz.





## Ben Finney (1933-2017)

When anthropologist Ben Finney read Andrew Sharp's (1956) *Ancient Voyagers in the Pacific*, he questioned the argument that Polynesia was settled by accidental drift voyages, and he launched into experimental archaeology to understand ancestral patterns of voyaging. He first built a Hawaiian double-hulled canoe, *Nālehia*, learning that paddling was a poor source of auxiliary power. In 1973 Ben was a cofounder of the Polynesian Voyaging Society, which built and sailed *Hōkūleʻa* to Tahiti in 1976. Guided by Satawalese navigator Mau Piailug, the voyage demonstrated that long-distance non-instrument navigation over a distance of 2,000 miles of open ocean was possible. Ben chronicled the successive voyages of *Hōkūleʻa* and the training of wayfinders in Hawai'i and across the Pacific, adding to our understanding of how navigational practices and voyaging strategies enabled the exploration, discovery, and settlement of the islands of Oceania. Ben also championed the idea of blending academic inquiry with cultural revival, supporting the community's attachment to *Hōkūleʻa* as a symbol of cultural pride and revitalization.

Image 42.

Ben Finney, 2007. Photo by Richard Feinberg.





## Korent Joel (1948-2017)

Korent Joel—known as Captain Korent—was born in 1948 on Rongelap, in the northern Rālik chain of the Marshall Islands. Between the ages of 11-15, Korent Joel learned some of the principles of Marshallese navigation from his mother's father, Hemmerik Lewia. Most of the instruction took place informally while the two sailed their kōrkōr (small sailing canoe) in the lagoon of Rongelap to fish. Rongelap is a large circular atoll characterized by a ring of islets on the eastern half of the atoll and deep ocean passes on the western half. As a result, when Hemmerik and his grandson Korent sailed across the lagoon they often sailed out of sight of land and felt the motion of the westerly ocean swells. In addition to feeling how these swells affected the sailing canoe, Hemmerik initiated Korent's formal learning at a navigation training reef that simulated in shallow water how islands disrupt the patterning of swell. Due to the radioactive fallout from the U.S. nuclear weapons testing program, Captain Korent suspended his apprenticeship and moved to Majuro to complete high school and then to Hawai'i to learn sextant-based celestial navigation. Captain Korent worked for 30 years as a government ship captain, during which time he observed the swell and current patterns in his endeavor to better understand the Indigenous concepts of the ocean as the basis for the system of Marshallese wave piloting. Between 2005-2006 Captain Korent continued learning from a group of elders with surviving navigational knowledge and put those ideas to practice by guiding a vessel 120 miles between Kwajalein and Ujae. This navigation test (ruprup jokur) established Captain Korent as a ri-meto, a navigator or "person of the sea" with the longer-term goal of passing on the knowledge to an apprentice navigator, Alson Kelen.



Image 43.  
Captain Korent Joel, 2005.  
Photo by Joseph Genz.



# Kadu

In 1817, Kadu of Woleai Atoll in the western Caroline Islands, who had been living in the Marshall Islands for some years following an eastward drift voyage, boarded the ship *Rurik*, which had come to the region as part of the Russian Romanzoff expedition in search of a northwest passage linking the Atlantic and Pacific oceans. Like Tupaia, Kadu shared his extensive geographic knowledge of the Marshall Islands' Rālik chain with Captain Otto von Kotzebue. The captain used the information provided by Kadu to travel extensively around the Rālik islands and to produce maps charting the locations of several Marshallese atolls previously unknown to Europeans. Kadu sailed with Kotzebue to Alaska and rejoined the Marshallese nine months later, becoming a cultural broker between the Marshallese and Europeans.

## Image 15.

Profile portrait of Kadou. Lithograph by Ludwig Choris, 1822. Source: British Museum.

XVII



*dess. et lith. par Choris*

*Lith. de Langlumé*

*Kadou,  
habitant des îles Carolines.*



## Maria Labushoilam (1921-2016)

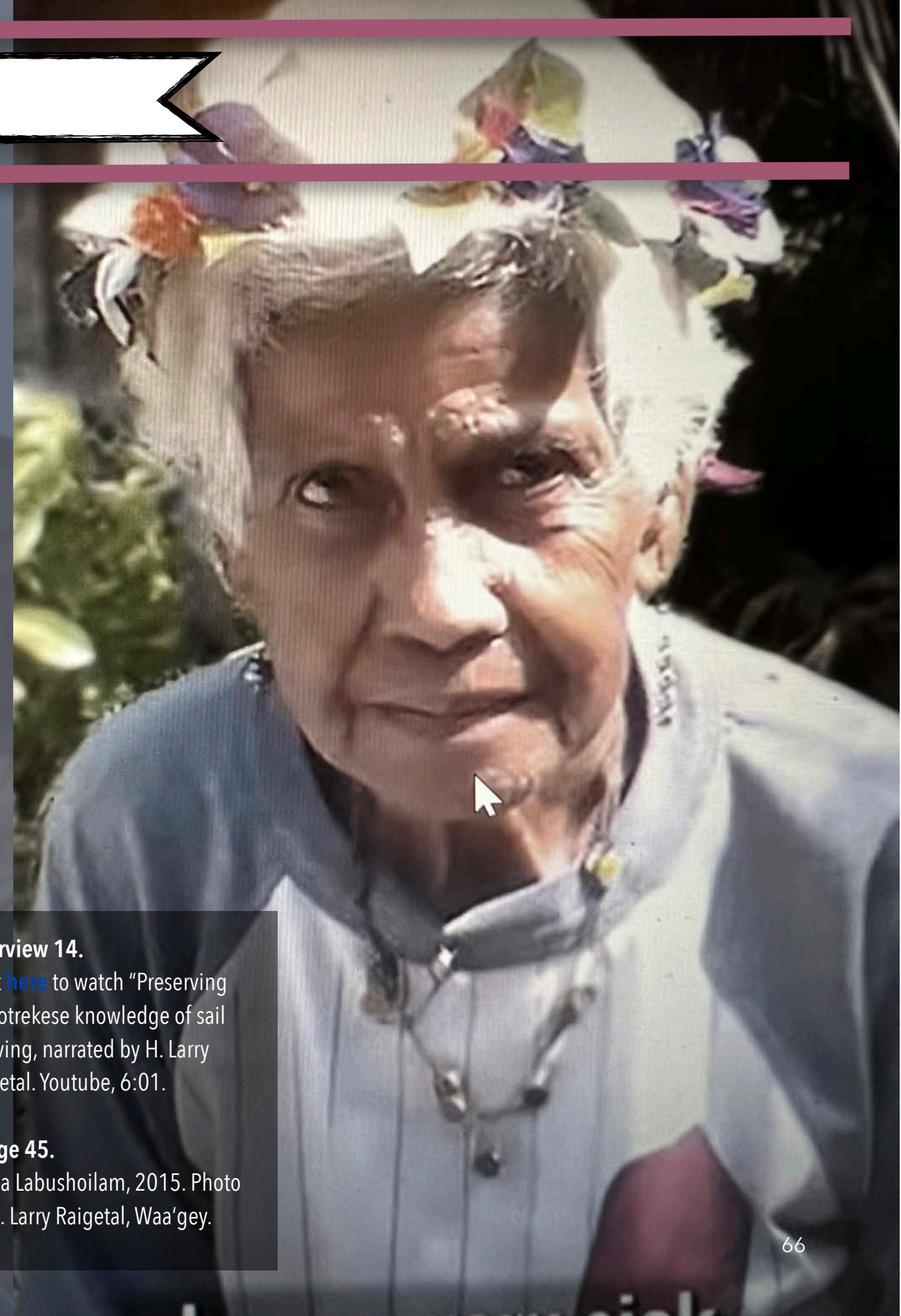
In recent years women in the Caroline Islands were approached to see if a pandanus sail could be woven for a voyage, and it was quickly realized that the knowledge was nearly lost. Maria Labushoilam, on her death bed at 95 years of age, was perhaps the last person on Lamotrek who knew how to weave a pandanus sail. The woven pandanus sail has a special type of weaving to ensure durability. The materials are also a special type of pandanus leaves. The preparation of the raw materials takes some time as the leaves have to be harvested, soaked in salt water, and then dried before the fibers are stripped and ready for weaving. For a couple of weeks, a number of women worked tirelessly with Maria to transfer the knowledge of pandanus sail weaving. Maria passed away weeks before the sail was completed, but only after she was satisfied that the knowledge had been reclaimed by her siblings and other apprentices. Unfortunately, she never saw the final outcome of the work. However, in her name the sail has taken a journey of its own. It has been showcased in Hawai'i, in New York during the Ocean Conference, in Hamburg at the G20 summit, and in Sydney at the Australia National Museum (Aguon 2021). The pandanus sail, along with a short documentary film, is scheduled to return to Lamotrek island to complete its journey.

### Interview 14.

Click [here](#) to watch "Preserving Lamotrekese knowledge of sail weaving, narrated by H. Larry Raigetel. Youtube, 6:01.

### Image 45.

Maria Labushoilam, 2015. Photo by H. Larry Raigetel, Waa'gey.

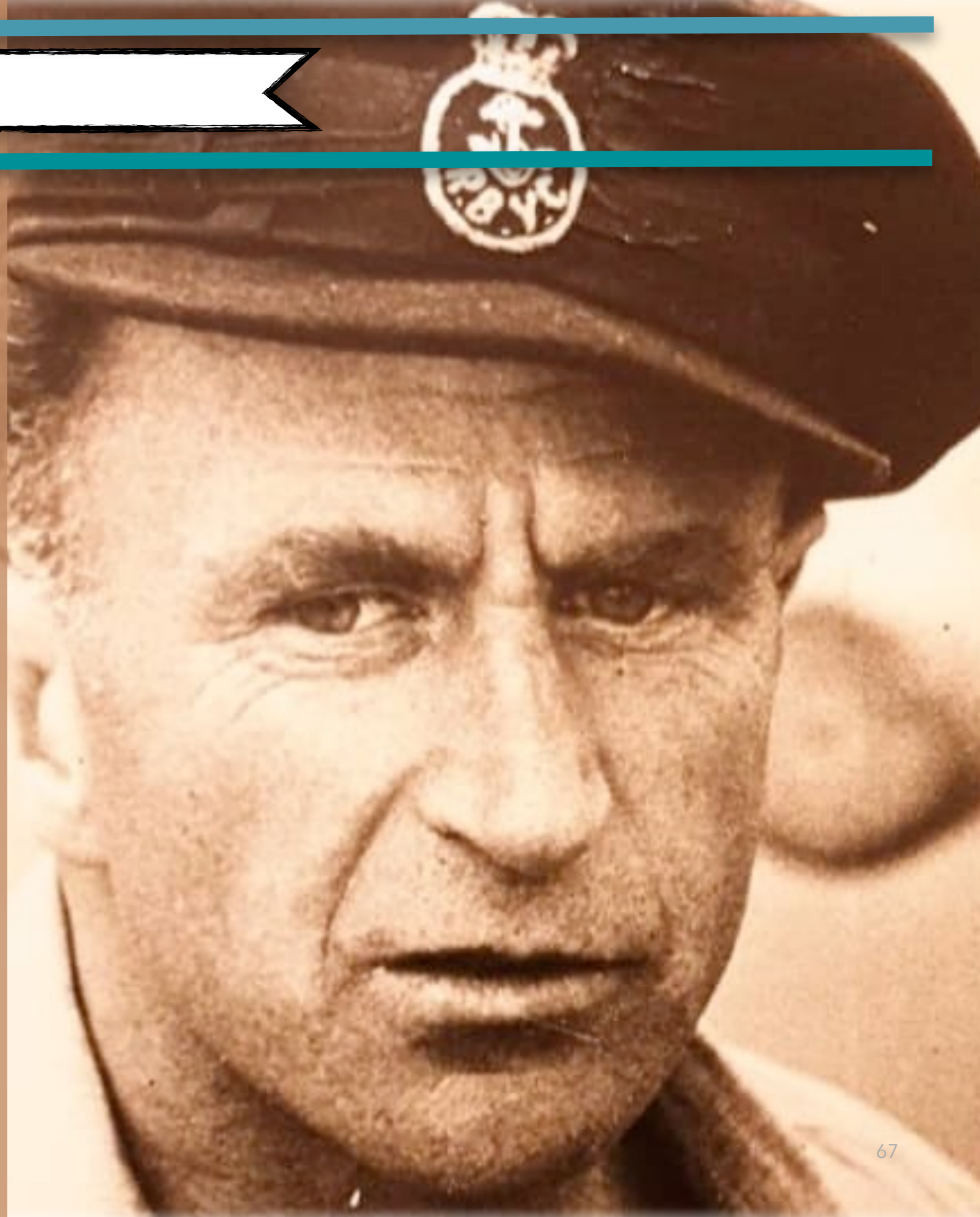




## David Lewis (1917-2002)

In 1972, David Lewis published a landmark book, *We, The Navigators: The Ancient Art of Landfinding in the Pacific*. Lewis spent nine months voyaging to island communities across the Pacific where navigational practices could be demonstrated at sea. Combined with historical records, Lewis provided a detailed account of wayfinding techniques, including orientation and course headings, dead reckoning once out of sight of land, and landfinding techniques that expanded the range at which islands could be remotely detected—ideas quite different from the conventional Western understandings of navigation framed in terms of longitude and latitude. Lewis helped rediscover the navigational skills needed to deliberately sail long distances and make safe returns, thus contributing to the academic debate on the intentional settlement of the Pacific.

Image 46.  
David Lewis. Courtesy of Barry Lewis.





## Pius "Mau" Piailug (1932-2010)

In the 1970s a group in Hawai'i began to revive their ancestral knowledge to build a voyaging canoe and sail it to Tahiti. They quickly realized that they had to find someone who was still capable of using the traditional wayfinding system to teach them the crucial knowledge and skills. Their search led them to the island of Satawal, part of Yap State in the Federated States of Micronesia, also known as the Caroline Islands. There they found Pius Piailug or "Mau," who traveled to Hawai'i to be part of this movement. Mau was his nickname because people of Satawal thought of him as the man with a hard shell like that of a mau (hawksbill turtle). Mau was trained and initiated as a weriyeng navigator. His masters and source of knowledge could be traced back to some of the best navigators in Polowat and nearby islands. In 1976 Hōkūle'a, the double-hulled canoe, successfully sailed to Tahiti with a Hawaiian crew through the wayfinding of Mau. The voyage of Hōkūle'a spurred the renaissance of seafaring which has since been actively spreading in influence in the spirit of reclaiming ocean identity across the Pacific. Mau continued to pass on his knowledge to his Hawaiian apprentices, beginning with the now renowned Hawaiian navigator Nainoa Thompson, who have carried the legacies forward through the Polynesian Voyaging Society.

Image 47.

Mau Piailug. Photo by Steve Thomas, 1984.  
UHM Library Digital Image Collections.





# Tupaia

In 1769, Tupaia of Ra'ia'atea worked closely with Captain James Cook and botanist Sir Joseph Banks during the voyage of the HMS Endeavour to chart seventy-four islands on a map based on his experiences voyaging and on remembered voyaging routes passed on through oral traditions. Centered on Tahiti, Tupaia's map spreads over forty degrees of longitude and twenty degrees of latitude—an area larger than the continental United States. Tupaia also shared with Cook the idea of strategically waiting for westerly wind shifts to sail in an upwind direction to the east, and then return home with the resumption of the easterly trade winds. Cook invited Tupaia to pilot through the Tuamotu Archipelago en route to Aotearoa. Because Tupaia was from the ancestral homeland of the Māori, he was able to establish working relationships between the Māori and European visitors.



**Image 48.**

A watercolor drawing of Maori trading a crayfish with Joseph Banks. Artwork by Tupaia in 1769.



# Classroom Activities

1. Conduct research to identify and learn about another pioneering voyager not listed here. Why did you focus on this person? Where are they from and when did they live? In what ways did they support their own community through their voyaging experiences? Why do you feel they are pioneering?
2. Write your own short biography of the pioneering voyager you discovered.
3. How could you imagine paying tribute to the pioneering voyager you discovered that would be meaningful to their descendant community?



# Contemporary Currents

Just as Pacific navigators used their observations and feelings of ocean currents and waves to navigate ([Section 2](#)) to enable the establishment and maintenance of inter-island networks that became encoded through language as local seas ([Section 3](#)), this section employs the metaphor of “currents” to conceptualize and understand the variety of contemporary seafaring practices. There is a general flow in the trajectory of seafaring. This can be traced chronologically, starting with the first observations by Western explorers. More detailed information is available to reconstruct the surviving seafaring institutions in the late 1700s through the late 1800s including the vestiges of the interaction spheres introduced in the previous section. An example of this is the shifting priorities in Hawai’i; long-distance two-way voyaging between Hawai’i and the ancestral homeland of Tahiti shifted to more local issues, such as settling the entire Hawaiian archipelago, intensifying agricultural practices with an increasing population, and beginning to centralize power—all of which made use of smaller

vessels designed for intra-archipelago transport and communication. A general waning of the post-settlement voyaging networks took place during this time period, which was accelerated with the complex, myriad impacts of colonialism and due, in part, to the inherent fragility of seafaring institutions (D’Arcy 2006). With the near-cessation in voyaging across the region, only a few communities continued to practice or retain the knowledge, and it wasn’t until the mid-20th century that large canoes were being built again in a few places.

Starting in the 1970s (but drawing from earlier attempts going back to the 1930s), the early phase of building large voyaging canoes in Hawai’i involved a series of experiments to ascertain the feasibility of long-distance voyaging and counter prevailing theories that the settlement of the Pacific was not accomplished by intentional two-way voyaging over long distances. This ushered in a new model of research that became known as experimental voyaging (see [Section 1](#)). With new



insights on canoe technology, design, and performance, and Indigenous wayfinding techniques and sailing strategies, experimental voyaging contributed substantially to the idea that post-settlement crossings of thousands of miles were possible and likely involved sailing strategies that exploited seasonal wind shifts.

The academic quest to end the debate on the prowess of ancient mariners in the Pacific sparked a renaissance of voyaging. By sailing in the wake of their ancestors, the pioneers of the 1970s experimental voyaging re-awakened a cultural pride of their maritime heritage. In some places where the traditions had survived like the Caroline Islands of the Federated States of Micronesia, inter-island travel was reinvigorated as the master navigators and canoe-builders reclaimed disused voyaging routes. This resurgence was also energized by the recognition that a Satawalese navigator, Mau Piailug, had been the wayfinder to guide *Hōkūle‘a* in 1976 with the creation of the Polynesian Voyaging Society. Mau’s Hawaiian protégé Nainoa Thompson learned some of the Satawalese ideas and blended them with his own understandings of astronomy to create a new Indigenous system of wayfinding. Nainoa’s experiential learning has galvanized a next generation of navigators in Hawai‘i and affected other island communities across the Pacific. This section traces the historical “currents” of voyaging and then

features several voyaging organizations through the experiences of the contributing navigation practitioners.

### *Indigenous Navigators during Moments of Contact with Western Explorers*

When Western explorers began circulating around Oceania in force in the eighteenth century, their knowledge of the region’s geography was extremely limited. As such, they frequently relied on Indigenous navigators and knowledge holders to identify, locate, and map islands, reefs, shoals, and other geographic bodies. As Pacific cultures were primarily oral, Indigenous knowledge of the region’s geography was primarily held in oral traditions—chants, songs, stories, and others—preserved and passed down through expert navigators for millennia. This knowledge was often profoundly localized, identifying those islands and atolls that were frequented by navigators within particular spheres of interaction. The “Ikid (Song-Story) of ʻĀinjin,” an oral tradition and navigation device from the Marshall Islands recounted by Jelibōr Jam and recorded by anthropologist Jack Tobin (2000), maps a journey taken by famed Marshallese navigator ʻĀinjin from Sapwuahfik (formerly Ngatik) atoll in the eastern Caroline Islands eastward to Pohnpei, Pingelap, and Kosrae, through the Rālik and Ratak chains of the Marshall Islands, southeast to Kiribati, and back again to Mile and Arņo atolls in the southern Marshalls. In



recounting ʻĀinjin's journey in detail, the *ikid* (song-story) doubles as a conceptual map of the Marshall Islands and neighboring islands and as a wayfinding device, as it describes the **seamarks** associated with particular atolls and islands as well as local seas.

Indigenous navigators across the region frequently shared their knowledge of local and regional geography with Western explorers looking to "discover" and chart islands previously unknown in the Western world. One well known example in eastern Oceania was the priest-navigator **Tupaia** of Ra'iātea who worked closely with Captain James Cook and botanist Sir Joseph Banks during the 1769 voyage of the *HMS Endeavour* to chart more than seventy islands on a map. For years, historians and other scholars believed the map was inaccurate because the placement of many of the islands is geographically incorrect. More recently, researchers Lars Eckstein and Anja Schwarz (2018) have posited that the map is an accurate representation of Tupaia's conceptualization of island locations based on navigational routes or itineraries rather than an aerial perspective.

Indigenous navigators and cultural experts to the north also shared their knowledge of local and regional geography with Western surveyors. In 1817, **Kadu** of Woleai in the western Caroline Islands, who had been living in the Marshall Islands for some years following an eastward drift voyage, boarded the

ship *Rurik*, which had come to the region as part of the Russian Romanzoff expedition in search of a northwest passage linking the Atlantic and Pacific oceans. Similar to Tupaia, Kadu shared his extensive geographic knowledge of the Marshall Islands' Rālik chain with Captain Otto von Kotzebue. The captain used the information provided by Kadu to travel extensively around the Rālik islands and to produce maps charting the locations of several Marshallese atolls previously unknown to Europeans.

### *Decline of Voyaging*

Historian Paul D'Arcy (2006), in his synthesis of historic-era Pacific Islander connections to the sea, demonstrates that numerous voyaging cultures throughout Oceania declined during the time period between 1770 and 1880. Many of the inhabitants of the high volcanic islands, with access to sufficient resources, no longer mounted long-distance overseas voyaging expeditions, and, in the case of Yap and Chuuk, relied on specialists from surrounding atolls. Even though voyaging was essential for survival in the atoll communities, it still declined. D'Arcy argues that the fragility of seafaring institutions, exacerbated during times of catastrophe, contributed to this demise rather than a gradual erosion of seafaring ability in the wake of Western influence. D'Arcy (2006, 94-97) notes that historically throughout Oceania the sharing of navigation, astronomy, weather forecasting, and to a lesser extent that of



canoe building was restricted and tightly controlled. Island societies could draw from a wide pool of sailors to handle the canoes, but there were relatively few trained navigators, astronomers, weather forecasters, and canoe builders. Natural disasters coupled with introduced Western epidemics could very quickly annihilate a community's seafaring expertise.

### *Cultural Revitalization*

Despite the general waning of the local and regional post-settlement voyaging interaction spheres, some of the island communities continued their traditions well into the first half of the twentieth century, with some remaining largely intact and some having ceased altogether. Starting in the 1970s, there were a series of initiatives to re-learn, strengthen, and revitalize voyaging. This section focuses on the trajectories of a few



#### **Image 49.**

The "Baker" explosion, part of Operation Crossroads, a nuclear weapon test by the United States military at Bikini Atoll on 25 July 1946. Photo by United States Department of Defense. Library of Congress.

#### **Interview 15.**

Click [here](#) to watch "Impacts of nuclear testing, narrated by Alson Kelen. Youtube, 1:20.



representative contemporary seafaring societies that were born from, or galvanized with, this renaissance of voyaging (see the Box, "Voyaging Organizations" for a comprehensive listing). These voyaging organizations represent formal institutions of learning and are largely driven by the desire to maintain or reforge ancestral traditions and strengthen cultural identity. There are, however, many places in the Pacific where canoes are sailed on a daily basis within the lagoons of atolls, near the coastal waters, and, in some cases, short-distance inter-island voyages. Sailing races in the Marshall Islands, for example, have drawn from this knowledge in the creation of a new national pastime.

Canoes have also been invoked as sites of resistance, with a telling example from the Marshall Islands. In 1960, two years after the last nuclear test in the Marshall Islands, the U.S. military expanded its installation on Kwajalein. Over 4,000 residents from two-thirds of the atoll were relocated to the islet of Ebeye to allow the use of Kwajalein as a bulls-eye target for the testing of intercontinental ballistic missiles (ICBMs). Dissatisfied with the emerging agreement to lease the land, which formed the heart of the unfolding Compact of Free Association between the United States and the newly sovereign Republic of the Marshall Islands, the landowners peacefully protested their relocation and living conditions on Ebeye, their disagreement over economic compensation, the length of the

lease of their land, the possibility of making their nation an exclusive U.S. military preserve, and their overall ill treatment. Their way of protesting involved launching a series of canoe "sail-ins" between 1977 and 1982. By sailing canoes to several islets that were restricted in the testing range, the residents of Kwajalein succeeded in disrupting several ballistic missile tests. These protests climaxed with a four-month long "sail-in" coined "Operation Homecoming" that eventually expanded to more than 1,000 Marshallese demonstrating on restricted islands enabled by canoe travel. These acts of resistance forced the U.S. to renegotiate the developing Compact of Free Association, which economically and militarily linked the two nations with its enactment in 1986 (Smith-Norris 2016, 111-124).



#### **Interview 16.**

Click [here](#) to watch "Ceremonies to become a navigator," narrated by Setareki Ledua. Youtube, 6:55.



## Spotlight Ethical Questions at the Intersection of Voyaging and Astronomy

For marginalized communities where the ocean represents the colonial imaginaries of slavery, dispossession, and displacement, Karin Ingersoll (2016) contrasts sinking and keeping afloat to articulate the complex layer of navigation shrouded within a colonial context. To sink signifies an assimilative move that allows colonial constructions to frame one's reality. However, the ability to stay afloat signifies a mark of resistance employing the skills of navigation as an act of preservation. Staying afloat, in this sense, becomes an act of cultural survival.

Despite the generative potentialities inherent in Indigenous voyaging cultures, the act of preservation may produce ethical dilemmas that are murky and difficult to navigate. In particular, the culture of voyaging is intimately tied to the colonial context of Mauna Kea and the controversial proposed construction of the Thirty Meter Telescope (TMT) in Hawai'i. For many Kānaka Maoli cultural practitioners, Mauna Kea is seen as a sacred place inhabited by deities in the wao akua, the uppermost section encircling the peak and is viewed as the spiritual piko of the Kānaka Maoli. Mauna Kea is also the preferred site to study the night sky because of the mountain's ideal conditions for viewing the stars with maximal clarity. The growing demand for building telescopes on Mauna Kea has been met with resistance and has resulted in an ongoing political and ethical contestation in managing activities (cultural and astronomical) on the mountain.

The practice of studying the stars that has defined the discipline of astronomy has also long been associated with many voyaging cultures. This history has been used to justify how voyaging cultures are closely tied to the colonial infrastructures and global industry of building telescopes on Mauna Kea. Kālepa Baybayan, a respected master navigator of Hōkūle'a, argued before his recent passing that his perspective on Mauna Kea "is based on a tradition of oceanic exploration and the legacy of people who left the safety of the coastline, sailed away, and in so doing discovered the stars" (DNLR 2016). He linked this tradition of oceanic voyaging to his own support for the construction of the TMT as the telescope will "with greater accuracy and speed, vastly increase the capacity for the kind of scientific research that is vital to the quest for mankind's future." He supported the construction of the TMT, conceiving the astronomical discoveries as logically connected to the revitalization efforts to preserve maritime heritage...

He writes: "Our ancestors were no different; they sought knowledge from their environment, including the stars, to guide them and to give them a better understanding of the universe that surrounded them...[The science of astronomy] teaches us where we have come from, and where we are going. Its impact has been positive, introducing the young to the process of modern exploration and discovery, a process consistent with past traditional practices." Staying afloat in this strategy understands Hawaiian maritime heritage preservation as linked to advancing modern scientific astronomical discoveries.

However, Emmalani Case (2021) argues that cultural revitalization projects in voyaging cultures may lead to re-producing colonial power relations rather than resisting them. Case challenges a voyaging future that is rooted within the colonial histories of astronomy. In her research with a group of kālāi wa'a (canoe builders) of Mauloa, a twenty-six-foot outrigger wa'a built from natural materials using traditional methods, she interviewed many of the members of the canoe's collective. Part of the collective's mission is to contribute to the Hawaiian revitalization of traditional methods of navigation in the Pacific. Case emphasizes that the history of Mauloa is intimately tied to Mauna Kea. . .



Consistent with Babayan's recognition that the stones for the adzes to carve the canoes came from the quarry of Mauna Kea, Case notes, "The canoe builders generally agree that the life of any canoe begins in the uplands, where the materials necessary to build it come from" (67). While many of the k̄alai wa'a are also kia'i (protectors) of Mauna Kea, she recognizes that this view is not universally held by many of the K̄anaka Maoli voyaging cultures. If voyaging cultures become so tied to Hawaiian cultural revitalization that "all the research and writing about wa'a in Hawai'i is generative, empowering and useful, it can also begin to lock us into particular framings, shaping what is and isn't acceptable in society" (75). Opposed to other cultural revitalization efforts, such as Hale Kukukia'imauna and the ahu on Mauna Kea, which was destroyed by the State, according to Case, the function of the wa'a is perceived as non-threatening, "as long as it stands as a symbol of the past, in other words, it cannot disrupt visions of a non-Indigenous future, or settler futurities" (74). In response to some K̄anaka Maoli supporters of the TMT to "share the mountain," Case argues that these arguments fail to envision an Indigenous-centered future and instead supports a settler futurity in which settler desires are enabled to "endure and prosper" (79). Staying afloat in this strategy understands Hawaiian maritime heritage preservation linked to the cultural preservation resistance on Mauna Kea.

In summary, cultural survival through maritime heritage preservation generates distinct and opposing ethical actions in relationship to supporting or resisting the TMT on Mauna Kea.

### Further Discussion

1. How might you understand the role of building the TMT on Mauna Kea in either fostering voyaging traditions or suppressing them?
2. How might you understand the role of the resistance effort comprised of many Native Hawaiians who value voyaging traditions, such as some of the members of the crew of Mauloa?
3. Evaluate K̄alepa Baybayan's reasons to support the construction of the TMT. If endeavors to support the advancement of astronomical knowledge are linked to perpetuating Hawaiian navigation culture, is there a moral responsibility to support the construction of TMT?
4. If voyaging cultures are tied to other Indigenous practices, such as prayer, ritual and ceremonies on Mauna Kea, then what is the moral responsibility of voyaging cultures in responding to these nested and overlapping Indigenous practices whose aims may be interpreted to be in conflict with each other?
5. In what ways can Mauna Kea be shared with astronomy and cultural practitioners? Given the strong association of Mauna Kea as a sacred place, can the mountain ever be shared with non-Hawaiian astronomers?
6. Evaluate Case's argument that the function of the canoe is perceived as "non-threatening." What do you think she means?
7. The canoe is important in reclaiming the past that was lost due to colonial suppression, but how might the effort of reclaiming a past centered on voyaging inform an ethical future for Native Hawaiian sovereignty?
8. In what ways does the colonial context inform the ethical dilemma of preservation and cultural revitalization? Consider Baybayan's or the caretakers' (kia'i) conceptions of resistance (staying afloat) that aims to preserve Indigenous cultural practices.



### *Polynesian Voyaging Society*

In 1976 the double-hulled voyaging canoe *Hōkūleʻa* sailed over 2,000 miles south from Hawaiʻi to Tahiti. The canoe, built with modern materials as a replica of an ancestral Polynesian design, translates as “the star of gladness” named after the zenith star (Arcturus) that indicates the latitude of Hawaiʻi when sailing north from Tahiti. Re-establishing this ancient voyaging corridor between Hawaiʻi and Tahiti demonstrated the feasibility of long-distance navigation and voyaging, and also, with the genesis of the Polynesian Voyaging Society, ushered in a renaissance of voyaging that spread beyond the shores of Hawaiʻi. The first voyage was navigated by a Satawalese master navigator, **Pius “Mau” Piailug**. The following attempt to sail to Tahiti in 1978 started with tragedy, as a capsizing off the coast of Molokaʻi resulted in one crew member being lost at sea. Mau returned to Hawaiʻi the following year to train Nainoa Thompson. When Nainoa guided *Hōkūleʻa* in 1980 from Hawaiʻi to Tahiti, more than six centuries had passed since the last long-distance voyaging canoe had been navigated by a Hawaiian. Nainoa took what he learned from Mau and developed a system of wayfinding by synthesizing Oceanic principles and practices of navigation with Western scientific knowledge. His bridging of ancestral and contemporary epistemologies has elevated the art of seafaring and wayfinding in Hawaiʻi, throughout Oceania, and beyond as a source of cultural pride and a vehicle to catalyze action and accelerate network-building to solve climate change.



**Image 50.**

*Hōkūleʻa* and family return to Honolulu after completing a 47,000-mile, three-and-a-half year voyage around the world. June 17, 2017. Photo by Ian Masterson.



**Image 51.**

Double-hulled voyaging canoe, *Hōkūleʻa*. Photo by Ian Masterson.





**Image 52.**  
Yapese canoe, 2016. Photo by  
H. Larry Raigetel.

**Interview 17.**  
Click [here](#) to watch "Waa'gey,"  
narrated by H. Larry Raigetel.  
Youtube, 1:19.

### *Waa'gey*

The Waa'gey program on Yap is grounded in the belief that Indigenous knowledge and skills are transformed into technologies, and applications of these technologies are not only simple and practical but conducive to the environment in which these societies live and depend. It is a stewardship system designed to sustain future generations by caring for our Earth. The organization is dedicated to keeping traditional practices alive, including skills of seafaring and all its applicable knowledge like weaving, handicraft making, and sustainable methods of using resources such as local fish traps by engaging elders who can pass these vital skills on to the younger

generation. The mission of Waa'gey is to assist various communities throughout Yap who are facing an array of social, environmental, and economic issues. It aims to identify issues of concern, integrate with environmental, educational, and cultural systems, and suggest appropriate ways of addressing these issues with community involvement and continuity. The vision of Waa'gey is "using traditional skills to confront tomorrow's challenges." Since its establishment, the organization has worked with elders who possess Indigenous knowledge in canoe carving, traditional navigation, canoe house building, sail weaving, voyage food preparations, and herbal medicine among many other skills. The Waa'gey program transfers skills by pairing young with the elders to carry out practical training.

### *Remathau Community of Hawai'i*

The Remathau Community of Hawai'i is a nonprofit 501(c)(3) organization established in 2019 in Kailua-Kona to promote the cultural and educational needs of the diasporic Remathau community in the state of Hawai'i. Remathau translates to "people of the ocean" in the languages of the Outer Islands of the state of Yap in the Federated States of Micronesia. These Outer Islands include Ulithi, Woleai, Satawal, Ngulu, Lamotrek, Ifalik, Faraulep, Fais, Elato, and Eauripik. The annual Remathau Graduation is hosted at Wow Wow Park in Kailua-Kona to celebrate Remathau youth navigating success in all levels of



education including primary to postsecondary levels. The Remathau heritage of traditional wayfinding and navigation is promoted each year by the symbolic raising of a sail of a voyaging canoe housed at the park. This action and the canoe symbolize the journey of Remathau youth departing on their journey, achieving their goal of graduating, and bringing their knowledge home to their community. The canoe housed at Wow Wow Park is believed to be of Polowatese design due to the unique form of its bow and bow tip, from the island of Polowat in the state of Chuuk. It was brought out to Hawai'i where it remained at Kawaihae for several years before being gifted to the late Mau Piailug, and it was later brought to Wow Wow Park to be



**Image 53.**  
Yapese canoe at the Remathau graduation ceremony at Wow Wow Park, Hawai'i Island, 2022. Photo by Joseph Genz.

incorporated into the Remathau graduation ceremony. The Remathau Community of Hawai'i plans to acquire land for the purposes of canoe carving to continue the cultural education of their youth. Remathau elder and canoe carver Santus Wichimai has actively carved canoes for the local Native Hawaiian communities on Kaua'i. For the Remathau community in Hawai'i, organizing together has marked both a renewal of canoe culture and reawakening of traditional knowledge for diasporic Remathau youth striving for success in education.



## Spotlight University of Guam: Navigation and Indigenous Education Within Institutions of Higher Learning

In the central Carolinian islands, the safeguarding of sacred knowledge (temai-rong) traditionally involved intergenerational sharing, where learning is situated in homes, other formal spaces such as canoe houses and women's houses, and in engagement with the surrounding environment. There was a heavy emphasis on learning through the transfer of skill. This was also confined to closed circles of lineages, including family and clan members, friends, and on rare occasions, someone deserving to guard ancestral knowledge. Teaching was always by word of mouth, providing historical context through legends, myths, and stories. Such learning of information or "theories" was heavily complemented by actual hands-on or practical exercises during which apprentices learn the finer details of the skills and crafts. Thus, it was only fitting that their classrooms not only had no walls but were inclusive of their surrounding environment—the land, seas, and the skies. There were no textbooks nor were there recording devices.

When the islands in this region were colonized—and later became mapped and glossed as Micronesia—infrastructures and resources were quickly set up to carry out formal learning within the walls of a classroom. Children were required to go to schools and to learn from a teacher who was likely not a family or clan member or even a community elder. Furthermore, the new teacher used textbooks or other resources to deliver knowledge. This new system of learning effectively put a separation of the two realms of schooling and began the steady decline of sharing traditional knowledge and values in the region.

Before and during the COVID-19 pandemic, the University of Guam—the highest institution of formal learning in northwestern part of the Pacific—began looking at ways to incorporate Indigenous values, knowledge systems, and practices into its curriculums and classrooms. With a committee guided by the Para Hulo' strategic plan, the University of Guam began to bring the two frameworks together, developing the concept of Island Wisdom, which is the ability to "move fluidly and deftly through the confluence of local and modern visions of the world—between Micronesian island cultural and western frameworks—in a relationship based on mutual benefit in order to strengthen our communities and island lifeways."

Recognizing the challenges of bringing the two spheres of learning together, the university made the decisive move of reaching out directly to communities and to Indigenous knowledge bearers to work alongside and provide valuable input. This led to the development of teaching curriculums in highly specialized Indigenous bodies of knowledge, two of which are the Traditional Seafaring System and Herbal Healers. A 15-credit certificate program in the Micronesian Seafaring System was launched in 2022, offering courses in traditional navigation, canoe building, and canoe house building. Since its inception, a canoe house has been built and used as classroom. A voyaging canoe has also been constructed and used. In addition, six new traditional navigators were also initiated through the pwo ritual.

### Video 2.

"What is Island Wisdom" by the Center of Island Wisdom at the University of Guam. Click [here](#) view online and read the full article.



### *Waan Aelōñ in Majel*

Since 1992, the Waan Aelōñ in Majel (Canoes of the Marshall Islands) program, located on Majuro, has integrated the Marshallese culture–canoe building, traditional and contemporary boat building, sailing, navigation, woodworking, and weaving–into education. Technical and professional woodworking skills are taught through the traditional method of demonstration and participation in small groups. The purpose of this training method is to enable the participants to learn these skills through a structured but non-formal, hands-on approach. The traditional aspect of the vocational training is designed to increase the participants' self-esteem, independence, and confidence. It also develops a strong awareness of Marshallese history and cultural identity. In addition to vocational training for at-risk youth, the Waan Aelōñ in Majel program has partnered with the public-school system (K-12) and the College of the Marshall Islands (CMI) for culturally resonant curriculum development centered on Marshallese canoes. This unique cultural platform has also served as the focal point in educating students about ocean literacy and stewardship by building and maintaining environmentally responsible vessels. Waan Aelōñ in Majel has worked in collaboration with CMI to establish a literacy and numeracy curriculum to help the youth transition into the adult basic education program at CMI. Since 2020, Waan Aelōñ in



**Image 54.**

Marshallese canoes beached near the canoe house of Waan Aelōñ in Majol, Majuro, 2006. Photo by Joseph Genz.



**Image 55.**

Classroom at Waan Aelōñ in Majol, Majuro, 2015. Photo by Joseph Genz.



**Image 56.**

Re-lashing the outrigger of Jitdam Kapeel at Waan Aelōñ in Majol, Majuro, 2009. Photo by Joseph Genz.

**Interview 18.**

Click [here](#) to watch “Waan Aelōñ in Majel,” narrated by Alson Kelen. Youtube, 4:20.

**Interview 19.**

Click [here](#) to watch “Working with youth in a canoe-building course at the College of the Marshall Islands,” narrated by Alson Kelen. Youtube, 2:15.



Majel has worked with traditional canoe and boat experts from the outer islands along with marine engineers from Germany and Australia to design three zero emission crafts for transport inside the lagoons.

### *Drua Sailing Experience*

In the past, the Lau group of Fiji served a hub of drua (canoe) building. Co-author Setareki Ledua recently retraced the ancestral voyaging route from Suva to the Lau group by sailing a modern drua. Part of the inspiration for this homecoming voyage was to demonstrate and remind the people of Fiji that there is still a solution for daily transportation in the outer islands. In 2018-2019 a grant was secured to design and

implement a Drua Sailing Experience for training youth in Suva. The program teaches about the history and legacy of the drua. It also identifies the different types of native timber that were used to build drua. Understanding the parts of the canoe and knot tying are also important components of the program. Youth also learn the sailing skills and fundamentals of navigation. In 2019-2020 the focus was on implementing the youth training program at the Vuda Marina located on the west side of Viti Levu. Although disrupted by the global pandemic of COVID-19, this initiative will involve the development of a safeguarding plan to enhance continuity and transmission of traditional knowledge and skills associated with drua building and restoration.

### **Image 57.**

Drua Sailing Experience program in Fiji. May, 2022. Photo by Setareki Ledua.

### **Image 58.**

Canoe in its boathouse in the islands of Vava'u, Tonga. Designed by Louis Le Breton and lithography by Ph. Blanchard published in 1846. National Library of Australia.

### **Interview 20.**

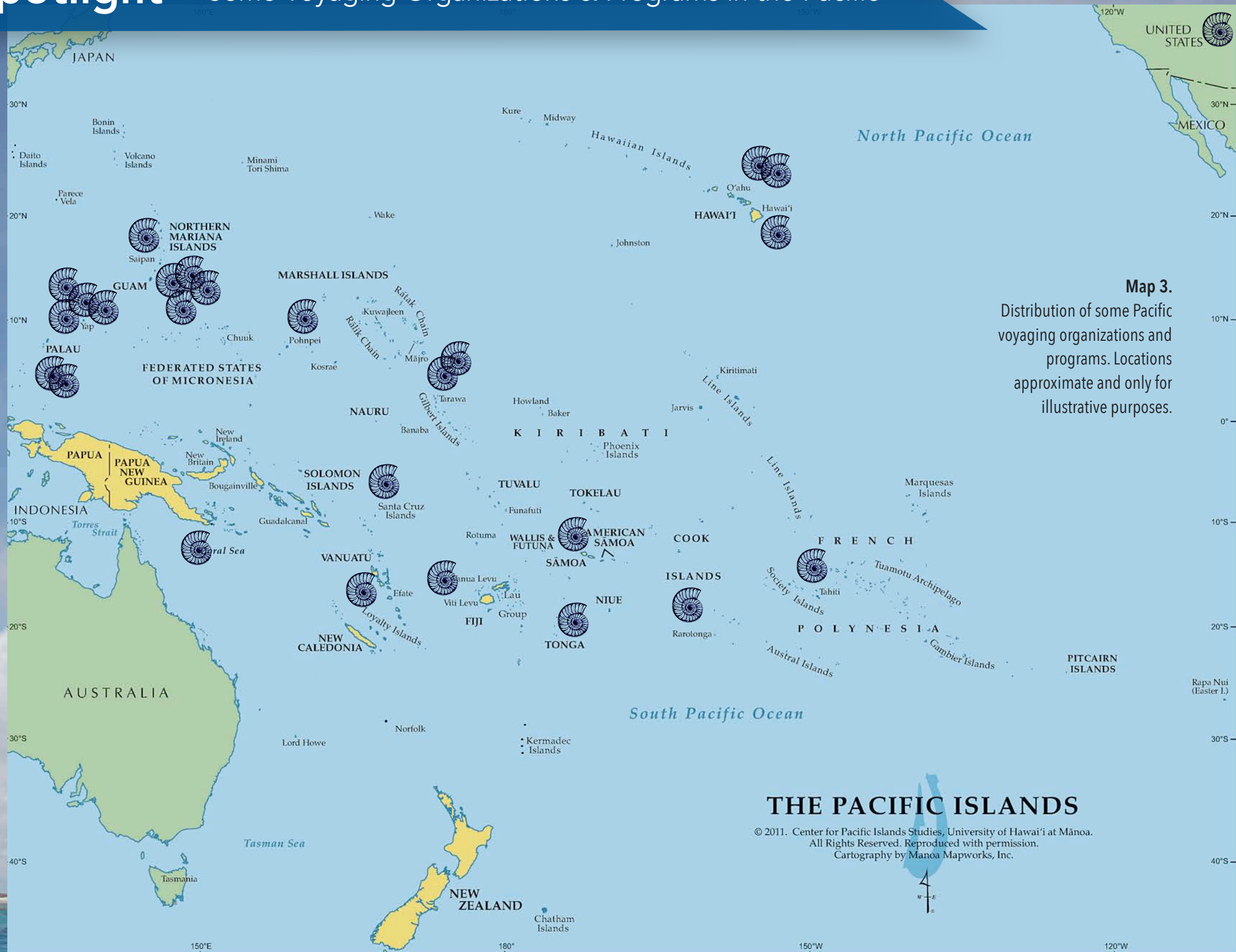
Click [here](#) to watch "Drua Sailing Organization," narrated by Setareki Ledua. Youtube, 3:18.





# Spotlight

## Some Voyaging Organizations & Programs in the Pacific





# Spotlight

## Some Voyaging Organizations & Programs in the Pacific

Voyaging Organizations & Program	Location	Voyaging Canoes	Leadership	Resources
Cook Islands Voyaging Society	Rarotonga, Cook Islands	<i>Maire Nui</i> <i>Marumaru Atua</i> <i>Takitimu</i> <i>Te Au O Tonga</i>		<a href="http://cookislandsvoyaging.org">cookislandsvoyaging.org</a>
Drua Sailing Experience	Vuda Marina, Fiji	<i>i Volasiga Vou</i>	Setareki Ledua (co-author)	<a href="https://www.facebook.com/druaexperience">@druaexperience (Facebook)</a>
Faafaite i te ao Maohi Tahiti Voyaging Society	Papeete, Tahiti	<i>Faafaite</i>	Moeata Galenon, navigator Hinatea Lefay, President	<a href="https://www.facebook.com/faafaite">@faafaite (Facebook)</a>
Federated States of Micronesia Fisheries & Maritime Institute	Yap, Federated States of Micronesia	<i>Okeanos Waa 'Qab</i> <i>Okeanos Ambassador</i>	Ali Haleyalur, Grand Master Navigator Okeanos Yap	
Fundación Ao Tupuna	Rapa Nui	<i>Vaka Kuini Analola</i>	Lynn Rapu Tuki, Director	<a href="http://Aotupuna.org">Aotupuna.org</a>
'Imiloa Astronomy Center	Hilo, Hawai'i		Ka'iu Kimura, Executive Director	<a href="http://imiloahawaii.org">imiloahawaii.org</a>
Madau Project	Honolulu, Hawai'i	<i>Chechemeni Öreni</i> <i>Ēlen Öreni</i>	Dr. Nicole Yamase, Team Leader Carol Ann Carl, Team Secretary Desiree Yamase, Team Treasurer Placito Eseluqupi, Master Canoe Carver	<a href="https://www.facebook.com/the-madau-project">@the-Madau-Project (Facebook)</a> <a href="https://www.instagram.com/themadauproject">@themadauproject (Instagram)</a>
Micronesian Voyaging Society	Koror, Palau	<i>Alingano Maisu</i>	Shallum Etpison, President Sesario Sewralur, Grand Master Navigator	<a href="https://www.youtube.com/channel/UCqWz8v8v8v8v8v8v8v8v8v8">"Micronesia Voyaging Society" (Youtube)</a> <a href="https://www.facebook.com/micronesian-voyaging-society">@micronesian-voyaging-society (Facebook)</a> <a href="http://MVS-Yokohama-Online.wixsite.com">MVS-Yokohama Online (wixsite.com)</a> <a href="https://www.facebook.com/alinganomaisu">@alinganomaisu (Facebook)</a>
Nā Kālai Wa'a	Kamuela, Hawai'i	<i>Makali'i</i>	Pomai Bertelmann, President	<a href="http://Nakalaiwaa.org">Nakalaiwaa.org</a>



# Spotlight

## Some Voyaging Organizations & Programs in the Pacific

Voyaging Organizations & Program	Location	Voyaging Canoes	Leadership	Resources
Native Canoe Program, Department of American Indian Studies, University of Minnesota-Twin Cities	Minnesota, United States		Vicente (Vince) Diaz, Founder & Director Mannas Sikau, Master Navigator Mario Benito, Master Navigator	<a href="#">"Sailing to the future on traditions of the past" by West Central Tribune</a>
Okeanos Foundation for the Sea	Palau, Majuro, Pohnpei, Yap, Vanuatu	<i>Okeanos Palau</i> <i>Okeanos Waa'Qab</i> <i>Okeanos Ambassador</i> <i>(Okeanos Marianas)</i> <i>Okeanos Pohnpei</i> <i>Okeanos Vanuatu</i>	Ali Haleyalur, Grand Master Navigator Jerry Joseph, Captain, Okeanos Waa'Qab	<a href="http://Okeanos-foundation.org">Okeanos-foundation.org</a> <a href="#">@okeanosfoundation (Facebook)</a> <a href="#">@okeanosfoundation (Instagram)</a> <a href="#">@okeanosfoundationforthesea9032 (Youtube)</a>
Polynesian Voyaging Society	Honolulu, Hawai'i	<i>Hōkūle'a</i> <i>Hikianalia</i> <i>Hawai'i'loa</i>	Nainoa Thompson, President	<a href="http://Hokulea.com">Hokulea.com</a>
Remathau Community of Hawai'i			Linus Soholmar, President Marky Yolwa, Vice President	<a href="http://RemathauCommunityofHawaii.org">RemathauCommunityofHawaii.org</a> <a href="#">@RemathauHawaii (Facebook)</a>
Samoa Voyaging Society Aiga Folau o Samoa	Apia, Samoa	<i>Gaualofa</i> <i>Va'atele</i>		<a href="http://Wendymorrison.com.au">Wendymorrison.com.au</a>
Tongan Voyaging Society	Nuku'alofa, Tonga		Aunofo Havea Funaki, Managing Director	<a href="#">@tongavoyagingsociety (Facebook)</a>
Traditions About Seafaring Islands (TASI)	Guam	<i>Saina</i>	Frank Cruz	<a href="#">"Proa to sail from Taiwan to Guam" by Detroit Free Press</a>
Traditions Affirming Our Seafaring Ancestry (TASA Inc.)	Guam		Sandra I. Okada, President	<a href="#">@tasavoyagers (Facebook)</a>
Ulitao	Guam		Ron Acffale	<a href="http://Ulitao.org">Ulitao.org</a>



# Spotlight

## Some Voyaging Organizations & Programs in the Pacific

Voyaging Organizations & Program	Location	Voyaging Canoes	Leadership	Resources
University of Guam Island Wisdom Seafaring	Guam	<i>Ininan Ilawol</i>	Dr. Melissa Taitano Dr. Monique Storie	
Vaka Taumako Project Vaka Valo Association	Taumako, Temotu Province, Solomon Islands	<i>Tepuke</i> <i>Tealolili</i>	Jonas Hollani, Chairman Simon Salopuka, Executive Director	<a href="http://Vaka.org">Vaka.org</a> <a href="http://Vakavalo.schoolzineplus.com">Vakavalo.schoolzineplus.com</a>
Waa'gey	Yap, Federated States of Micronesia		H. Larry Raigetal, President (co-author)	<a href="http://Waagey.org">Waagey.org</a> "Waa'Gey - Mysteries of the Wayfinding Voyagers" (Youtube) <a href="https://www.facebook.com/waagey">@waagey</a> (Facebook)
Waan Aelōñ in Majel	Majuro, Marshall Islands	<i>Jitdam Kapeel</i>	Alson Kelen, Director (co-author)	<a href="http://Canoesmarshallislands.com">Canoesmarshallislands.com</a>
Yap Traditional Navigation Society	Yap, Federated States of Micronesia	<i>Mathow Maram</i>	Ali Haleyalur, Grand Master Navigator	"Traditional Voyaging" at <a href="http://Visityap.com">Visityap.com</a> <a href="https://www.facebook.com/yaptns">@yaptns</a> (Facebook)
500 Sails	Saipan, Northern Mariana Islands	<i>Ānimuyi</i> <i>Aunty Oba</i> <i>Richard Seman</i> <i>Deedee</i> <i>Anaguan</i>	Pete Perez, Executive Director Kuen-Hee Han, Director of Development and Community Programs Marjorie Atalig Daria, Director of Cultural Maritime Training Center Antonio Piailug, Master Navigator Cecilio Raikiulipiy, Master Navigator Mario Benito, Master Navigator	<a href="http://500sails.org">500sails.org</a> <a href="https://www.facebook.com/500sails">@500sails</a> (Facebook)
(TBA)	Milne Bay, Papua New Guinea		Modakula Kunuyobu, Manager, Milne Bay Tourism Bureau	"Massim canoes in the Milne Bay Province, Papua New Guinea" at <a href="http://OceanicArtSociety.org.au">OceanicArtSociety.org.au</a>





**Image 59.**  
*i Volasiga Vou* (The New Rising Star)  
voyaging canoe, Fiji, 2019. Photo courtesy  
of Island Encounters Photography.

In summary, there were various flows or metaphorical “currents” of voyaging during the early to late historic period. Following a decline and near-cessation, we now see a renaissance of voyaging. The instrumental efforts of the Polynesian Voyaging Society to blend knowledge systems (Satawalese navigation and Western astronomy) and spur a resurgence in voyaging has now shifted to re-strengthening relationships across the Pacific, building solidarity with Indigenous groups across the globe, and raising awareness for environmental stewardship and sustainability. In another “current” are the various traditions that have largely survived, with the knowledge continuing to be passed on and the re-activation of disused voyaging routes. These are the experiences of the Yapese with the Waa’gey program and the Islanders of Satawal, Lamotrek, and Polowat, as well as the people of Taumako with the Vaka Taumako Project. And yet another “current” lies between these two—the traditions that had largely ceased by the early- to mid-1900s but that have been rediscovered, remembered, put back into use, and have drawn selectively from other ways of knowing such as Western science in the efforts to revitalize the long-distance voyages. This is characteristic, in different degrees, of the Marshall Islands with the Waan Aelōñ in Majel program and in Fiji with the Drua Sailing Experience. These and other seafaring societies and institutions of higher learning with navigation programs are grounded in common goals—promoting cultural pride through the cultural meanings of canoes, educating youth through the canoe as a “floating classroom,” documenting and preserving maritime heritage, and using the canoe as a symbol of environmental sustainability. In the final section we explore another use of the canoe by several canoe organizations that is still emerging—voyaging as Indigenous resilience to climate change impacts.



# Classroom Activities

1. In what ways are the contemporary voyaging and canoe-building organizations in Hawai'i (Polynesian Voyaging Society), Yap (Waa'gey), the Marshall Islands (Waan Aelõñ in Majel), and Fiji (Drua Sailing Experience) providing for the needs of their respective communities?
2. Visit a seafaring or canoe-building organization or participate in a voyaging or wayfinding program or event in your local community. What are the goals of the program? In what ways is the program connected to your local community and addressing local needs?
3. There are some communities in the Pacific in which the knowledge of voyaging has not been practiced in hundreds of years—the stories and memories of elders may not be sufficient to rebuild the foundation of ancestral seafaring. But this does not necessarily mean that some of the knowledge has not been passed on, or that it no longer survives in other modes such as etched in petroglyphs, embedded within the lyrics of songs, choreographed in dance, or carved in tattoos. Taking the role of advocacy either within your own community or as an ally and supporter, suggest a possible way forward in the goal of bringing back traditional canoes in those communities that no longer have them.
4. Research about a contemporary artist whose work includes some aspect of seafaring. Describe what the artwork means to the artist and reflect on what the artwork means to you. Then, create your own artwork that reflects a thematic element of seafaring that resonates with you.



## Resiliency of Voyaging as Climate Change Adaptation

In this section we provide an overview of the socio-cultural impacts of climate change along with a synthesis from previous sections on the adaptive capacity of Pacific Islanders especially through voyaging. This leads to a discussion of current Pacific shipping scenarios and showcases a Pacific-centered approach to research on the decarbonization of transport that draws, in part, on ancestral voyaging technologies and social networks.

### *Socio-cultural Impacts of Climate Change*

At the Opening Ceremony of the UN Secretary-General's Climate Summit in 2014, Marshallese poet Kathy Jetñil-Kijiner summoned the wicked urgency of global climate change into view, describing and visualizing in stark terms what were, and may be are, for too many the unimaginable consequences of global warming for her home islands and for islands across Oceania whose coasts and, for low-lying islands entire territories, are put at risk by a rapidly heating planet and rising

“**men say that one day  
that lagoon will devour you  
they say it will gnaw at the shoreline  
chew at the roots of your breadfruit trees  
gulp down rows of your seawalls  
and crunch your island's shattered bones...**”

**Dear Matafele Peinem  
by Kathy Jetñil-Kijiner**

sea levels. For communities across the region, sea level rise is compounded by the problems of environmental degradation, biodiversity loss, marine and terrestrial pollution, and other aspects of climate change such as changing growing seasons, diminished or increased rainfall, and increasing number and intensity of super-storms. In recent decades, long-running socio-economic changes including population growth, urbanization, globalization, and continuing or emerging resource extraction regimes such as deep-sea mining have also



come into view as hazard drivers for Oceania's communities and environments (Kelman 2017).

Specific climate shifts that have already been observed include rainfall decreases in the eastern Pacific and increases in the western Pacific with further shifts following these trends projected in the coming decades with significant effects expected on fresh water access, agricultural viability, and increased risk of drought and/or flooding (IPCC 2013; Keener et al. 2018). In addition, ecosystem services provided by mixed agroforests are expected to be impacted by drought, flooding, soil and water salinization, wind, disease, pests, and human-induced land use changes (Friday et al. 2017; Keener et al. 2018). For low-lying atolls, extreme water levels related to sea level rise, storm surges, and extraordinary high tides can be disastrous, overwashing entire islands and damaging fresh water resources and agriculture while also increasing coastal erosion (Hoeke et al. 2013; Keener et al. 2018; Storlazzi et al. 2018). Food sources and livelihoods will be affected by tuna habitat shifting eastward and shore erosion limiting bird and sea turtle nesting (Bell 2013; Keener et al. 2018). The overlapping, or dual exposure, to multiple co-occurring climate risks presents serious challenges for adaptation. Importantly, the 4th National Climate Assessment emphasizes that "[t]he rich cultural heritage of Pacific island communities comprises spiritual, relational, and ancestral interconnectedness with the

environment and provides land security, water and energy security, livelihood security, habitat security, and cultural food security" (Keener et al. 2018).

This persistent crisis of the "now" at the intersection of natural and human systems calls into view, as in Jetñil-Kijiner's clarion call, the urgent need to lay new foundations towards sustaining the wellbeing of regional communities and their island homes. This radical challenge was reinforced by the Heads of State for the Pacific Islands nations in 2018 when in their shared Boe Declaration on Regional Security, they affirmed, "that climate change remains the single greatest threat to the livelihoods, security and wellbeing of the peoples of the Pacific." Of particular concern is the increased risk of extreme sea level events—created through a combination of storm-generated waves, storm surges, king tides, and El-Nino-Southern Oscillation (ENSO)-induced sea level changes—that are conceived of as "a clear threat to communities' existence" (Keener et al. 2018:1272). One possible adaptive pathway is resettlement; however, migration for many island communities is not viewed as a viable long-term solution due to the unquantifiable loss of place-attachment, cultural and social integrity and practice, and livelihood. Rejecting resettlement (e.g., Campbell and Bedford 2022; Hermann and Kempf 2017) increases the necessity of co-developing adaptive pathways and



community resilience in situ—within and across islands—drawing from ancestral knowledge and practices.

*Adaptive Capacity of Voyaging in Response to Environmental Changes and Disasters*

Oceania's peoples have a vast repository of Indigenous, traditional, or local ecological knowledge (sometimes referred to as IEK, TEK, or LEK), developed and practiced over centuries that enabled populations to thrive in the face of past environmental and social risks (Lauer 2017). There is growing recognition of the valuable insights that customary resource use, traditional taxonomic and ecological knowledge, complex social networks, and heritage management in the Pacific can provide for understanding how culturally-grounded social-ecological systems can be resilient to climate change (Granderson 2017; McMillen et al. 2017). Indigenous and local knowledge systems in the Pacific have deep histories of resilience to environmental variability (Lauer and Aswani 2009; Lauer 2017). Returning to and drawing inspiration from these systems of customary resource use offers locally grounded insights into climate adaptation initiatives. The roles of customary and community leadership, social networks, and institutions are important in successful cultural resource management, especially during disaster recovery (Lauer 2012; McMillen et al. 2014; Nunn et al. 2017; Pascua et al. 2017).

Voyaging and navigation systems in the Pacific may be among the most important regional reservoirs of expertise, flexibility, and perceived agency to “mobilize for change” (Wongbusarakum et al. 2021, 104508) to address climate risks and meet the challenge of navigating towards a sustainable future that supports adaptation and resilience building through increasing the economic, social, cultural, and spiritual well-being of islands and their communities. As demonstrated in the previous sections, voyaging illustrates use of Indigenous knowledge rooted in environmental knowledge and based on supportive systems of community engagement (D'Arcy 2006). There is a solid foundation of scholarly research on the science and cultural dimensions of canoe-building and non-instrumental navigation (Lewis 1994), ancestral migration routes (Kirch 2000), and the resurgence of long-distance voyaging through cultural revitalization projects focused on the strengthening of cultural identity (Finney 2003; Genz 2018; Mushynsky et al. 2022). Established and rapidly developing archaeological evidence and historical records of inter-island exchange networks now provide an increasingly profound understanding of the distribution of resources across vast expanses of ocean (Irwin et al. 2022; Molle et al. 2018; Sheppard 2022). The sawei interaction sphere, described in [Section 3](#), connected Yap to outer islands 2,000 miles distant in a tributary relationship, in which Yapese administrators sent





**Image 60.**  
The Waan Aelōñ in Majol program's new canoe design (catamaran with Marshallese lateen sail) with sustainable materials for intra-lagoon transportation of copra and other resources, Majuro, 2022. Photo by Gary Ehram.



relief supplies after damages wrought by typhoons or other environmental disasters (Alkire 1978). Regional aid networks have also been identified in other parts of the Pacific, such as Vanuatu, where land, food, and other resources have been leveraged to support reconstruction of affected communities after volcanic eruptions (Niroa and Nakamura 2022; Pfalzgraf 2021). Intra- and inter-archipelago aid networks play a crucial role in adaptive capacity with respect to local resource deficiencies and resilience in the face of past climatic and environmental risks and disasters (Campbell and Bedford 2022; Jacka and Posner 2022).

#### *Historical Context of Sustainable Sea Transport*

The ability to explore, discover, and settle the world's largest ocean and then to develop intra- and inter-archipelago networks including for disaster relief relied on the development of canoe technology that only required the aerodynamic power of the sail as a means of propulsion. With sailing canoes, the wind is a never-ending source of power—a truly sustainable means of sea transportation. Historic maritime analyses (e.g. Couper 2009; D'Arcy 2006, 2008; Finney 1994, 2003; Howe et al. 2006; Irwin 1992) concur on a common picture at the time of European contact of an ocean heavily populated with Indigenous sailing vessels of size and capacity comparable with or greater than that of the arriving Europeans.

Such technology was highly developed and functional, diverse in type, readily available and an essential facet to all aspects of life, from artisanal fishing and local village transport to inter-island and inter-archipelago warfare, trade, and diplomacy. Prior to Western intervention and colonization of the Pacific, sea transport was readily available, appropriate, locally owned and operated, and sustainable.

#### *Current Pacific Domestic Shipping Scenarios*

Sea transport remains the most critical lifeline for the Pacific Islands, a reality only reinforced by the recent COVID-19 pandemic. Providing adequate, efficient, and reliable domestic shipping is one of the most difficult challenges in the region. Many routes are commercially marginal. The estimated 2,100 domestic ships servicing the Pacific Islands are often old and many do not meet recognized safety standards but are retained in service because they provide essential services to remote communities. Shipping disasters directly attributable to substandard ships are regular events; the *Princess Ashika* in Tonga with loss of 74 lives in 2009 and the *Rabual Queen* in PNG in 2012 with more than 200 lives lost are two examples.

Fuel comprises ~40-60% of domestic fleet operating costs in the Pacific and this figure is projected to increase. Lack of access to affordable and appropriate shipping finance, and as importantly shipping insurance, means many Pacific countries



**Image 61.**

Pasha Hawaii's *Horizon Enterprise* container cargo ship departs the Honolulu harbor, as seen from Sand Island in Honolulu, Oahu, Hawai'i. Photo by Tony Webster.



are locked into a vicious cycle of replacing old worn out ships with other old worn-out ships or a reliance on donated vessels from bi-lateral partners, many of which are far from energy efficient and expensive to operate and maintain. The growing international momentum toward a full decarbonization agenda for international shipping (discussed in more detail below) raises both a challenge and an opportunity for Pacific states. The danger is the dependency on increasingly outdated and expensive diesel-based technologies. The opportunity is to utilize climate finance to match-step other parts of the world in a shipping transition. While developing a Pacific response to climate change based on innovative green shipping technologies is informed by Epeli Hau'ofa's imagery of a "sea of islands," it is important to recognize that according to the United Nations, Pacific Small Island Developing States (PSIDS) are characterized by their geographical remoteness, small

population sizes, small national economies, and even smaller internal markets (UNCTAD 2014). The result is considerable natural economic disadvantage compared to their international counterparts (Newell 2016).

The second challenge is the Pacific region's almost total dependency on imported fossil fuel. The lack of Indigenous fossil fuel resources means that Pacific nations are completely dependent on imported fossil fuel fuels for transport (on average approximately 3/4 of all fuel consumption) (Mofor et al. 2013). Fuel dependency therefore places the region at the mercy of swings in oil prices, thus increasing transport costs and contributing to economic instability. This is further compounded by the geographical remoteness of PSIDS from fuel sources, thus creating supply chain problems in a region where the maritime logistics infrastructure is increasingly vulnerable to extreme weather events.

The maritime transport requirements of most PSIDS are characteristically small-scale. Vessels of 10,000 gross tonnage are at the top end of the regionally-operating fleets, while most national fleets consist of vessels well under 5,000 tons and generally less than 1,000 dead weight tonnage. At the village level, open or partly-covered skiffs powered by outboard engines of 15-75 horsepower are the normal mode of connectivity for intra and inter-island transport. While village vessel sizes are small, they are required to work in blue water conditions, often on routes of 100 miles or more.



In 2012, the first international conference on sustainable shipping in the region since 1945 convened, and this marked a watershed academic approach to the debate on decarbonization of transport for Pacific communities. The Sustainable Sea Transport Talanoa (SSTT) was hosted by the University of the South Pacific (USP) on behalf of a coalition including the Fiji government, the Fiji Islands Voyaging Society, and other partners. The SSTT made a commitment to initiate a period of collaborative and multidisciplinary inquiry to allow an evidence-based approach to be effected. As a result, the Marshall Islands developed a national transport target in the Majuro Declaration on Climate Leadership. The Marshall Islands then established a center for sustainable transport in 2015 culminating in the first National Action Plan by any PSIDS.

*Micronesian Center for Sustainable Transport (MCST)*

The **Micronesian Center for Sustainable Transport** (MCST) offers a Pacific-centered approach to research on decarbonization of transport. This evidence-based approach from the Marshall Islands and academic inquiry with multiple partners is situated around a number of core assumptions. Pacific domestic shipping is an essential need but is at a crisis point. The primarily old, poorly maintained fleets or often inappropriate externally donated vessels that have dominated Pacific domestic shipping for the past half century are not

sustainable. A 1.5-degree Celsius agenda (global warming contained within a 1.5-degree Celsius temperature upper limit) demands nothing less than a paradigm shift of unprecedented magnitude in Pacific transport decarbonization. Either inaction or pursuing the conventional approach of following international trends will see increasing cost from outdated technologies and fuels, and a widening technology gap with the fleets of advanced economies. Failure to match step with the fast-growing international progress on shipping decarbonization in a Pacific-centric transition pathway exposes Pacific countries to ever increasing penalties as the climate emergency deepens through ongoing dependence on ever more expensive and outmoded fossil fuel technologies.

There is a growing movement to transition to low carbon shipping including both innovative technologies such as flettner rotors (Nuttall and Kaitu'u 2016) that rest on technology transfer to the Pacific Islands (Nuttall et al. 2016) and a return to the use of traditional canoes as an Indigenous response for climate change adaptation (Nuttall 2012). In particular, the 2018 Laucala Declaration on Pacific Islands Transport is a regional initiative to decarbonize Pacific Islands sea transportation (MCST 2021). This is aligned with the United Nations' International Maritime Organization (IMO), which is targeting all cargo ships to halve greenhouse-gas emissions by 2050 (Almendral 2021). The efforts of the MCST demonstrate



how more voyaging canoes that harness the power of the wind means lessening dependence on fossil fuels, and this would reduce socioeconomic vulnerability to external rises in oil prices and lower carbon emissions (Nuttall 2013). With potential periodic global breakdowns in transport of fuel (due to pandemics, political instability, and necessary phasing out of fossil fuels), restoring expertise from traditional voyaging is necessary for developing sustainable ocean transport policy. But, systems of seafaring offer more than wind-powered transportation—voyaging knowledge enables the reactivation of older inter-island networks based on kinship and cultural values.



**Image 62.**

Alson Kelen and Captain Korent Joel sailing in the lagoon of Ujae Atoll, Marshall Islands, 2006. Photo by Joseph Genz.

In addition to the technical components of the voyaging systems such as navigation (Lewis 1994) and canoe design (Nuttall et al. 2014), it is the social

systems that sustain the communities over time and across space that are critical to understand and re-enact. The social institutions and networks embodied in Pacific voyaging systems facilitated information exchange and knowledge transmission such as the sharing of models of customary resource management and mobilizing collective responses in times of uncertainty (such as the sawei interaction sphere). Foundational to these systems were the social dynamics that had been established and maintained through cultural expressions of reciprocity (such as the weaving of sails and the food preparation). Some voyaging organizations such as Waan

**Interview 21.**

Click [here](#) to watch “Applying traditional navigation to climate change,” narrated by Alson Kelen. Youtube, 4:55.



Aelōñ in Majel in the Marshall Islands and Waa'gey on Yap share the long-term goal of implementing sustainable sea transport with traditional canoe technology to decarbonize shipping economies within the lagoons and between islands. And such sustainability rests on the traditional forms of community engagement.

In summary, there is an increasing recognition that some solutions to climate change may reside with Indigenous peoples through their lived experiences and ancestral memories of developing resilience strategies to cope with environmental hazards historically (Granderson 2017). While many Pacific Islanders are embracing Western science and modern innovations to adapt to the various climate change impacts, there is a need to understand and include community values, aspirations, perspectives, and experiential knowledge in decision making processes (Marra et al. 2021). Gathering, compiling, analyzing, and sharing knowledge of the resiliency of

Pacific voyaging systems will enhance policies and guidance, and provide for increased community engagement that would lead to better understanding and more effective use of information. As conversations continue to unfold about climate migration, alternatives and activities that facilitate Pacific community adaptation in place are necessary and have long been prioritized by communities. As outlined in this section, the MCST, working in partnership with local voyaging organizations, government agencies, and universities, is a pioneering initiative that centers the role of ancestral knowledge.



**Image 63.**  
Repairing a sail with a hand-sewing machine, Majuro, 2015.  
Photo by Joseph Genz.



# Classroom Activities

1. What kinds of impacts of climate change do you see in your own community? What are some of the stories you have heard from your own community about changes in the environment?
2. Sustainable sea transport (SST) involves both introducing and transferring new technology to the Pacific Islands such as flettner rotors, and also returning to the use of traditional canoes as an Indigenous response for climate change adaptation. Conduct research on flettner rotors and other innovative technologies being proposed for SST. In your opinion, which approach (transferring technology to the Pacific or transferring technology *from* the Pacific) should be emphasized more in the future? Why do you think so?
3. What are other examples—outside of seafaring—in which island communities in the Pacific are returning to their ancestral knowledge as ways to confront and adapt to the impacts of climate change?
4. One way to access ancestral knowledge of voyaging is through the preservation of material items and symbolic expressions that are documented in museums, such as canoes, canoe models, navigational teaching devices, and archaeological artifacts including adzes used to carve canoes and other items. Visit a local museum or research the online database of a museum with Pacific collections to learn more about the cultural artifacts of seafaring that have been preserved. Summarize the museum information (what is the object, how was it curated in the museum and by whom, what was it used for, and any other relevant information). Then, evaluate the potential for the curated object to be used, in partnership with community members, to help address issues of climate change impacts and island resiliency.



---

## Conclusion

“**Wa kuk, wa jimor...**  
***Canoe to bring us together,***  
***canoe belonging to everyone...***”

### Interview 22.

Click [here](#) to watch “Marshallese proverb, Wa kuk, wa jimor,” narrated by Alson Kelen. Youtube, 1:00.

There is a revealing proverb from the Marshall Islands that may serve as a representative idea about the significance of the canoe for the people of Oceania. In an oral tradition, a creator goddess, Jineer ilo Kobo, shares that the canoe lies at the heart of what it means to be a “person of the sea” in the following proverb: “Wa kuk, wa jimor. Waan kōjipañ koj, waan kōkkure kōj. Waan jokkwier,” or “Canoe to bring us together, canoe belonging to everyone. Canoe to help us, canoe to destroy us. Canoe to give meaning to our lives” (Tobin 2002, 14–15, paraphrased by Miller 2010).

This proverb and reverberations of similar philosophies across the region can be understood as spanning different temporalities—the past, present, and future. [Sections 1-3](#) create a picture of the technological ingenuity and experiential knowledge of the

environment to undertake voyages into the unknown in pursuit of the possibility of discovering new islands. The waves of exploration and discovery, followed by return voyages home and then back to the newly discovered islands, led to the settlement of every inhabitable island in the Pacific Ocean (as well as reaching Madagascar to the west, the Americas to the east, and the subpolar regions near Antarctica to the south); this covers an area that is a third of the entire globe. Voyaging did not stop there, of course, but continued in long-distance two-way voyaging corridors followed by more local inter-island sailing within archipelagoes within regular voyaging interaction spheres.

Voyaging is also of the “now.” Echoing the Marshallese proverb “canoes to bring us together,” there is intense, passionate, inspiring



work of activists and their communities to revitalize, re-activate, and energize cultural practice and transmission toward restorative justice and sovereignty. **Section 5** showcases four seafaring organizations, but there are many more efforts underway. Canoes are awakening the spirit of the sea and reforging and reclaiming ancestral identities. Canoes are used as sites of protest and resistance to enduring legacies of colonialism, especially ongoing practices of militarization. And canoes are used as symbols of environmental stewardship. In particular, the Polynesian Voyaging Society launched (June 2023) Moananuiākea, a 4-year circumnavigation of the Pacific where crew members of *Hōkūle‘a* and *Hikianalia* will aim to “ignite a movement of 10 million ‘planetary navigators’ by developing young leaders and engaging communities around the world to take part in navigating the earth towards a healthy, thriving future” (PVS 2023).

There are culturally specific versions across Oceania of another proverb that explains how Pacific Islanders must turn to

the past to move forward into the future. In Hawaiian this is the proverb “Ka wa ma mua, ka wa ma hope,” which literally means “the time in front, the time in back” and can be interpreted as standing firmly in the present, with one’s back to the future, and eyes fixed upon the past, seeking historical answers for present-day dilemmas (Kame’eleihiwa 1992). Voyaging is also about tomorrow and the wellbeing of communities. Section 6 provides one exciting potential for the power of ancestral voyaging to be utilized as a means of adaptation to climate change impacts. This is a 21st century manifestation—and hopefully the first of many—of Epeli Hau’ofa’ vision of reclaiming an Oceania worldview expressed as “a sea of islands.” The wellbeing of Pacific communities rests on the ocean, the islands and archipelagoes, and the enduring relationships that were once forged through the voyaging networks. The canoe, and the knowledge systems of seafaring, are central to this movement toward a deep Indigenous futurity.

“**Ka wa ma mua, ka wa ma hope...**  
***The time in front, the time in back...***”





**Image 64.**  
Marshallese voyaging  
canoe, *Jitdam Kapeel*, at  
dawn, 2015. Photo by  
Joseph Genz.



# Classroom Activities

The overarching theme of this volume is the idea of returning to ancestral wisdom to face the future. Anthropologist Ben Finney (2003) captured the sentiment of returning to ancestral wisdom in the title of his book, "sailing in the wake of the ancestors."

1. Explore similar expressions and proverbs in different island communities across Oceania, expressing in different languages this idea of turning to the past with its repository of Indigenous knowledge to confront current and projected challenges in the future. What are the cultural meanings of the proverbs and other linguistic expressions?
2. Reflect on the significance of this idea for that community and more broadly for Pacific Islanders across the region and in the diaspora, and reflect on what this means to you.



**Image 65.**  
Ben Finney on the  
Taumako alo lili  
voyaging canoe, *Te  
Nohoanga o Lata*,  
2007. Photo by  
Richard Feinberg.



# References

- Agrawal, Arun. 1995. Dismantling the Divide Between Indigenous and Scientific Knowledge. *Development and Change* 26:413–439.
- Aguon, Julian. 2021. To Hell With Drowning. *The Atlantic*. November 1, 2021. Electronic resource, <https://www.theatlantic.com/culture/archive/2021/11/oceania-pacific-climate-change-stories/620570/>, accessed March 15, 2023.
- Alkire, W.H. 1978. *Coral Islanders*. Arlington Heights, Illinois: AHM Publishing.
- Almendral, A. 2021. Can Massive Cargo Ships Use Wind to Go Green? *New York Times Magazine*. Electronic resource, <https://www.nytimes.com/2021/06/24/magazine/cargo-ships-emissions.html>, accessed July 11, 2021.
- Beaglehole, John C., ed. 1955. *The Journals of Captain James Cook on his Voyages of Discovery: Vol. I. The Voyage of the Endeavour, 1768–1771*. Cambridge: Hakluyt Society.
- Bell, J. D., A. Ganachaud, P. C. Gehrke, S. P. Griffiths, A. J. Hobday, O. Hoegh-Guldberg, J. E. Johnson, R. Le Borgne, P. Lehodey, J. M. Lough, R. J. Matear, T. D. Pickering, M. S. Pratchett, A. S. Gupta, I. Senina, and M. Waycott. 2013. Mixed Responses of Tropical Pacific Fisheries and Aquaculture to Climate Change. *Nature Climate Change* 3(6):591–599.
- Biggs, Bruce G., and Mary Veremaluma Biggs. 1975. No Ciri Kalia. Working Papers in Anthropology, Archaeology, Linguistics and Maori Studies No. 42. Auckland: Department of Anthropology, University of Auckland.
- Campbell, John R. and Bedford, Richard D. 2022. Climate Change and Migration: Lessons from Oceania. In *Routledge Handbook of Immigration and Refugee Studies*, edited by Anna Triandafyllidou. London: Routledge.
- Carl, Carol Ann. 2022. Seiseiwei–Paddle Onward. Electronic Resource, <https://www.empoweredpi.org/pasifika-art-gallery>, accessed March 3, 2023.
- Case, Emmalani. 2021. *Everything Ancient Was Once New: Indigenous Persistence From Hawai‘i to Kahiki*. Honolulu: University of Hawai‘i Press.
- Chappell, D. 2010. A “Headless” Native Talks Back: Nidoish Naisseline and the Kanak Awakening in 1970s New Caledonia. *The Contemporary Pacific* 22(1):37–70.



- Collerson, Kenneth D., and Marshall I. Weisler. 2007. Stone Adze Compositions and the Extent of Ancient Polynesian Voyaging and Trade. *Science* 317:1907–1911.
- Couper, A.D. 2009. *Sailors and Traders: A Maritime History of the Pacific Peoples*. Honolulu: University of Hawai'i Press.
- D'Arcy, Paul. 2006. *The People of the Sea: Environment, Identity, and History in Oceania*. Honolulu: University of Hawai'i Press.
- Department of Land and Natural Resources. 2016. Written Direct Testimony of Chad Kālepa Baybayan. Electronic Resource, <https://dlnr.hawaii.gov/mk/files/2016/10/WDT-Baybayan-C.pdf>, accessed December 1, 2022.
- Eckstein, Lars, and Anja Schwarz. 2018. The Making of Tuapaia's Map: A Story of the Extent and Mastery of Polynesian Navigation, Competing Systems of Wayfinding on James Cook's Endeavour, and the Invention of an Ingenious Cartographic System. *The Journal of Pacific History* 54(1):1–95
- Feinberg, Richard. 2011. In Search of te Lapa: A Navigational Enigma in Vaeakau-Taumako, Southeastern Solomon Islands. *Journal of the Polynesian Society* 120(1):57–70.
- Feinberg, Richard (ed). 1995. *Seafaring in the Contemporary Pacific Islands: Studies in Continuity and Change*. DeKalb, IL: Northern Illinois University Press.
- Feinberg, Richard. 1988. *Polynesian Seafaring and Navigation: Ocean Travel in Anutan Culture and Society*. Kent: Kent State University Press.
- Feinberg, Richard, and Joseph Genz. 2012. Limits of Language for Conveying Navigational Knowledge: Way-finding in the Southeastern Solomon Islands. *American Anthropologist* 114(2):336–350.
- Finney, Ben R. 2003. *Sailing in the Wake of the Ancestors: Reviving Polynesian Voyaging*. Honolulu: Bishop Museum Press.
- Finney, Ben R. 1989. *From Sea to Space*. Honolulu: University of Hawai'i Press.
- Finney, Ben R. 1985. Anomalous Westerlies, El Niño, and the Colonization of Polynesia. *American Anthropologist* 87(1):9–26.
- Finney, Ben, Paul Frost, Richard Rhodes, and Nainoa Thompson. 1989. Wait for the West Wind. *Journal of the Polynesian Society* 98:261–302.
- Friday, J. B., K. Friday, and C. Elevitch, 2017: Appendix A: Regional summaries: Hawaii and the U.S.-Affiliated Pacific Islands. *Agroforestry: Enhancing Resiliency in U.S. Agricultural Landscapes Under Changing Conditions*. Schoeneberger, M. M., G. Bentrup, and T. Patel-Weyand, Eds., U.S. Department of Agriculture, Forest Service, Washington, DC, 147–153.
- Genz, Joseph H. 2018. *Breaking the Shell: Voyaging from Nuclear Refugees to People of the Sea in the Marshall Islands*. Honolulu: University of Hawai'i Press.



- Genz, Joseph H. 2014. Complementarity of Cognitive and Experiential Ways of Knowing the Ocean in Marshallese Navigation. *Ethos* 42(3):332-351.
- George, Marianne. 2012. Polynesian Navigation and Te Lapa-'The Flashing'. *Time and Mind: The Journal of Archaeology, Consciousness and Culture* 5(2):135-174.
- Gladwin, Thomas. 1970. *East is a Big Bird: Navigation and Logic on Puluwat Atoll*. Cambridge, MA: Harvard University Press.
- Goodenough, Ward. 1953. *Native Astronomy in the Central Carolines*. Philadelphia: University of Pennsylvania Press.
- Granderson, Ainka A. 2017. The Role of Traditional Knowledge in Building Adaptive Capacity for Climate Change: Perspectives from Vanuatu. *Weather, Climate, and Society* 9(3):545-561.
- Hau'ofa, Epeli. 1994. Our Sea of Islands. *The Contemporary Pacific* 6(1):148-161.
- Hermann, E. and Kempf, W. 2017. Climate Change and the Imagining of Migration: Emerging Discourses on Kiribati's Land Purchase in Fiji. *The Contemporary Pacific* 29(2):231-263.
- Hoeke, R. K., K. L. McInnes, J. C. Kruger, R. J. McNaught, J. R. Hunter, and S. G. Smithers. 2013. Widespread Inundation of Pacific Islands Triggered by Distant-source Wind-waves. *Global and Planetary Change* 108:128-138.
- Howe, K.R. (ed). 2007. *Vaka Moana: Voyages of the Ancestors: The Discovery and Settlement of the Pacific*. Honolulu: University of Hawai'i Press (Original: 2006).
- Huth, John E. 2013. *The Lost Art of Finding Our Way*. Cambridge, MA: Belknap Press.
- Ingersoll, Karin. 2016. *Waves of Knowing: A Seascape Epistemology*. Durham, NC: Duke University Press.
- Ingold, Tim. 2000. *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*. London and New York: Routledge.
- IPCC, 2013: Annex I: Atlas of Global and Regional Climate Projections. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, and P. M. Midgley, Eds., Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1311-1394.
- Irwin, Geoffrey. 2007. "Voyaging and Settlement." In *Vaka Moana: Voyages of the Ancestors: The Discovery and Settlement of the Pacific*, edited by K. R. Howe, pp. 55-91. Honolulu: University of Hawai'i Press (Original: 2006).
- Irwin, Geoffrey. 1992. *The Prehistoric Exploration and Colonization of the Pacific*. Cambridge, UK: Cambridge University Press.



- Irwin, G., Flay, R.G., Dudley, L. and Johns, D. 2022. The Sailing Performance of Ancient Polynesian Canoes and the Early Settlement of East Polynesia. *Archaeology in Oceania* (0):1-17.
- Jacka, J.K. and Posner, S. 2022. How the Enga Cope with Frost in the 21st Century: Food Insecurity, Migration, and Development in the Papua New Guinea Highlands. *Human Ecology* 50(2):273-286.
- Kame‘eleihiwa, Lilikalā. 1992. *Native Land and Foreign Desires: Pehea Lā E Pono Ai? How Shall We Live in Harmony?* Honolulu: Bishop Museum Press.
- Kelman, I., 2017. How Can Island Communities Deal with Environmental Hazards and Hazard Drivers, Including Climate Change? *Environmental Conservation* 44(3):244-253.
- Keener, V.W., Helweg, D.A., Asam, S., Balwani, S., Burkett, M., Fletcher, C., Giambelluca, T., Grecni, Z., Nobrega-Olivera, M., Polovina, J., Tribble, G. 2018. Ch. 27: *Hawai‘i and U.S. Affiliated Pacific Islands: The Fourth National Climate Assessment*. U.S. Global Change Research Program, Washington, DC.
- Kirch, Patrick V. 2017. *On the Road of the Winds: An Archaeological History of the Pacific Islands Before European Contact*. Second Edition. Berkeley: University of California Press.
- Krämer, Augustin, and Hans Nevermann. 1938. Ralik-Ratak (Marshall-Inseln). In *Ergebnisse der Südsee-Expedition, 1908-1910 II. Ethnographie, B: Mikronesien*, Volume 11, edited by Georg Thilenius, pp. 215-232. Hamburg: Friedrichsen, de Gruyter & Co.
- Lauer, M., 2017. Changing Understandings of Local Knowledge in Island Environments. *Environmental Conservation* 44(4):336.
- Lauer, M., 2012. Oral Traditions or Situated Practices? Understanding How Indigenous Communities Respond to Environmental Disasters. *Human Organization* 71(2):176-187.
- Lauer, Matthew, and Shankar Aswani. 2009. Indigenous Ecological Knowledge as Situated Practices: Understanding Fishers' Knowledge in the Western Solomon Islands. *American Anthropologist* 111(3):317-329.
- Lewis, David. 1994. *We, the Navigators: The Ancient Art of Landfinding in the Pacific*. Second Edition. Honolulu: University of Hawai‘i Press. (Original: 1972).
- Lynch, K. 1960. *The Image of the City*. Cambridge, Massachusetts: The Technology Press and the Harvard University Press.
- Marra, J., C. Courtney, and L. Brewington. 2021. *The Pacific Islands Climate Storybook*. Honolulu: The Pacific Regional Integrated Sciences and Assessments Program.



- McMillen, H.L., Ticktin, T., Friedlander, A., Jupiter, S.D., Thaman, R., Campbell, J., Veitayaki, J., Giambelluca, T., Nihmei, S., Rupeni, E., Apis-Overhoff, L., Aalbersberg, W., and Orcherton, D.F. 2014. Small Islands, Valuable Insights: Systems of Customary Resource Use and Resilience to Climate Change in the Pacific. *Ecology and Society* 19(4):44.
- McMillen, H., Ticktin, T. and Springer, H.K. 2017. The Future is Behind Us: Traditional Ecological Knowledge and Resilience Over Time on Hawai'i Island. *Regional Environmental Change* 17(2):579-592.
- Mofor, L., Nuttall, P., and Newell, A. 2015. Renewable Energy Options for Shipping: Technology Brief. Bonn: IERENA.
- Molle, G. and Hermann, A. 2018. Pitcairn Before the Mutineers: Revisiting the Isolation of a Polynesian Island. In *The Bounty from the beach: Cross-cultural and cross-disciplinary essays*, edited by S. Largeaud-Ortega, pp. 67-94. Canberra: ANU Press.
- Mushynsky, J., McKinnon, J., Cabrera, G. and Tudela, H. 2022. The Foundation of Island Identity: Chamorro Maritime Practices and Resistance in the Commonwealth of the Northern Mariana Islands. *AlterNative: An International Journal of Indigenous Peoples*, p. 11771801221084123.
- Newell, A., Nuttall, P., Prasad, B., and Veitayaki, J. 2016. Turning the Tide: The Need for Sustainable Sea Transport in the Pacific. *Marine Policy* 75:249-259.
- Niroa, J.J., and N. Nakamura. 2022. Volcanic Disaster Risk Reduction in Indigenous Communities on Tanna Island, Vanuatu. *International Journal of Disaster Risk Reduction* 74:1-10.
- Nunn, P.D., Runman, J., Falanruw, M. and Kumar, R. 2017. Culturally Grounded Responses to Coastal Change on Islands in the Federated States of Micronesia, Northwest Pacific Ocean. *Regional Environmental Change* 17(4):959-971.
- Nuttall, P. 2013. *Sailing for Sustainability: The Potential of Sail Technology as an Adaptation Tool for Oceania*. PhD Thesis, Victoria University of Wellington.
- Nuttall, P., P. D'Arcy, and C. Philp. 2014. Waqa Tabu-Sacred Ships: The Fijian drua. *International Journal of Maritime History* 26(3):427-450.
- Nuttall, P., M. Vahs, J. Morshead, and A. Newell. 2016. The Case for Field Trialing and Technology/knowledge Transfer of Emerging Low Carbon Maritime Technologies to Pacific Island Countries. In Burton, V. (Ed) *Renewable Energy: Sources, Applications and Emerging Technologies*. Nova Science Publishers, New York.
- Pappas, Leah, and Alexander Mawyer. 2022. The Place of Space in Oceanic Linguistics. *Oceanic Linguistics* 61(1):1-67.
- Pascua, P.A., McMillen, H., Ticktin, T., Vaughan, M. and Winter, K.B. 2017. Beyond Services: A Process and Framework to Incorporate Cultural, Genealogical, Place-based, and Indigenous Relationships in Ecosystem Service Assessments. *Ecosystem Services* 26:465-475.



- Pawley, A., and M. Pawley. 1994. Early Austronesian Terms for Canoe Parts and Seafaring. In *Austronesian Terminologies: Continuity and Change*, edited by A. K. Pawley and M. D. Ross, pp. 329–361. Canberra: Australian National University.
- Pfalzgraf, F.C. 2021. Maintaining Land and Life in Vanuatu: Indigenous Alternatives of Recovery Following the Manaro Eruption on Ambae, Vanuatu. *The Journal of Environmental Media* 2(1):5.1–5.13.
- Polynesian Voyaging Society. 2023. Moananuiākea: A Voyage for Earth. Electronic Resource, <https://www.hokulea.com/pvs-to-launch-moananuiakea-voyage/>, accessed April 1, 2023.
- Pyrek, Cathleen Conboy and Richard Feinberg. 2016. The Vaeakau-Taumako Wind Compass as Part of a "Navigational Toolkit." *Structure and Dynamics* 9(1):41–69.
- Salesa, Damon. 2018. Native Seas and Native Seaways: The Pacific Ocean and New Zealand. In *New Zealand and the Sea: Historical Perspectives*, edited by Frances Steel. Pp. 24-41. Wellington, New Zealand: Bridge Williams Books.
- Sharp, Andrew. 1956. *Ancient Voyagers in the Pacific*. Wellington: Polynesian Society Memoir 32.
- Sheppard, P.J. 2022. Southeast Solomon Islands in Regional Perspective: Settlement History, Interaction Spheres, Polynesian Outliers and Eastward Dispersals. *The Journal of the Polynesian Society* 131(2):113–184.
- Smith, Linda Tuhiwai. 1999. *Decolonizing Methodologies: Research and Indigenous Peoples*. Dunedin: University of Otago Press.
- Smith-Norris, Martha. 2016. *Domination and Resistance: The United States and the Marshall Islands During the Cold War*. Honolulu: University of Hawai'i Press.
- Storlazzi, C.D., Gingerich, S.B., Van Dongeren, A.P., Cheriton, O.M., Swarzenski, P.W., Quataert, E., Voss, C.I., Field, D.W., Annamalai, H., Piniak, G.A. and McCall, R. 2018. Most Atolls Will be Uninhabitable By the End of the 21st Century Because of Sea-level Rise Exacerbating Wave-driven Flooding. *Science Advances* 4(4):9741.
- Teaiwa, Teresia K. 2005. The Classroom as a Metaphorical Canoe: Cooperative Learning in Pacific Studies. *WINHEC: International Journal of Indigenous Education Scholarship* (1):38–48.
- Thomas, Steve. 1987. *The Last Navigator*. New York: Henry Holt and Company.
- Tobin, Jack. 2002. *Stories from the Marshall Islands: Bwebwenato Jān Aelōñ Kein*. Honolulu: University of Hawai'i Press.
- Turnbull, David. 2000. *Masons, Tricksters, and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge*. Studies in the History of Science, Technology and Medicine. Amsterdam: Hardwood Academic Publishers.



UNCSTAD 2014. World Investment Report. United Nations Conference on Trade and Development. Electronic resource, [https://unctad.org/system/files/official-document/wir2014\\_en.pdf](https://unctad.org/system/files/official-document/wir2014_en.pdf), accessed April 30, 2022.

Weisler, Marshall I. 2001. *On the Margins of Sustainability: Prehistoric Settlement of Utrok Atoll, Northern Marshall Islands*. Oxford: Archaeopress.

Wongbusarakum, S., M. Gorstein, R. Pomeroy, C.L. Anderson, and A. Mawyer. 2021. Mobilizing for Change: Assessing Social Adaptive Capacity in Micronesian Fishing Communities. *Marine Policy* 129(1):104508.



---

# Recommended Resources

## General Books

- Finney, Ben R. 2003. *Sailing in the Wake of the Ancestors: Reviving Polynesian Voyaging*. Honolulu: Bishop Museum Press.
- Feinberg, Richard. 1988. *Polynesian Seafaring and Navigation: Ocean Travel in Anutan Culture and Society*. Kent: Kent State University Press.
- Genz, Joseph. 2018. *Breaking the Shell: Voyaging from Nuclear Refugees to People of the Sea in the Marshall Islands*. Honolulu: University of Hawai'i Press.
- Gladwin, Thomas. 1970. *East is a Big Bird: Navigation and Logic on Puluwat Atoll*. Cambridge, MA: Harvard University Press.
- Howe, K.R. (ed). 2007. *Vaka Moana: Voyages of the Ancestors: The Discovery and Settlement of the Pacific*. Honolulu: University of Hawai'i Press (Original: 2006).
- Irwin, Geoffrey. 1992. *The Prehistoric Exploration and Colonization of the Pacific*. Cambridge, UK: Cambridge University Press.
- Kirch, Patrick V. 2017. *On the Road of the Winds: An Archaeological History of the Pacific Islands Before European Contact*. Second Edition. Berkeley: University of California Press.

Lewis, David. 1994. *We, the Navigators: The Ancient Art of Landfinding in the Pacific*. Second Edition. Honolulu: University of Hawai'i Press. (Original: 1972).

Strathern, Andrew, Pamela J. Stewart, Laurence M. Carucci, Lin Poyer, Richard Feinberg, and Cluny Macpherson. 2017. *Oceania: An Introduction to the Cultures and Identities of Pacific Islanders*. Second Edition. Durham, NC: Carolina Academic Press.

## Documentaries and Ethnographic Films

- The Navigators: Pathfinders of the Pacific*. 1983. Sam Low. 60 minutes.
- Wayfinders: A Pacific Odyssey*. 1996. Public Broadcasting System (Gail Evenari).
- Papa Mau: Wayfinder*. 2010. Palikū Documentary Films. Na'alehu Anthony.
- We, the Voyagers: Lata's Children. Part 1: We, the Voyagers: Our Vaka; Part 2: We, the Voyagers: Our Moana*. 2020. Vaka Taumako Project.
- Sacred Vessels: Navigating Tradition and Identity in Micronesia*. 1997. Vicente Diaz. 29 minutes.

## Section 1

Anderson, Atholl, John Chappel, Michael Gagan, and Richard Grove. 2006. Prehistoric Migration in the Pacific Islands: A Hypothesis of ENSO Forcing. *The Holocene* 16 (1):1-6.

Anderson, Atholl, and Gerard O'Regan. 2000. To the Final Shore: Prehistoric Colonization of Subpolar Polynesia. In *Australian Archaeologist: Collected Papers in Honor of Jim Allen*, edited by Atholl Anderson and Tim Murray, pp. 440-454. Canberra: Coombs Academic Publishing.

Avis, Chris, Alvaro Montenegro, and Andrew Weaver. 2008. Simulating Island Discovery During the Lapita Exploration." In *Canoes of the Grand Ocean*, edited by Anne Di Piazza and Erik Pearthree, pp. 121-142. Oxford: British Archaeological Research (BAR) Archaeopress.

Finney, Ben, Paul Frost, Richard Rhodes, and Nainoa Thompson. 1989. Wait for the West Wind. *Journal of the Polynesian Society* 98:261-302.

Horrige, Adrian. 2008. Origins and Relationships of Pacific Canoes and Rigs. In *Canoes of the Grand Ocean*, edited by Anne Di Piazza and Erik Pearthree, pp. 85-106. Oxford, UK: British Archaeological Research (BAR) Archaeopress.

Irwin, Geoffrey. 2011. Sailing from Polynesia to the Americas. In *Polynesians in America: Pre-Columbian Contacts with the New World*, edited by Terry Jones, Alice A. Storey, Elizabeth A. Matisoo-Smith, and José Miguel Ramírez-Aliaga, pp. 395-417. Lanham: Alta Mira Press.

Irwin, Geoffrey. 2008. Pacific Seascapes, Canoe Performance, and a Review of Lapita Voyaging with Regard to Theories of Migration. *Asian Perspectives: Journal of Archaeology for Asia & the Pacific* 47(1):12-27.

Kirch, Patrick V. 2010. Peopling the Pacific: A Holistic Anthropological Perspective. *Annual Review of Anthropology* 39:131-148.

Rehg, K. 1995. The Significance of Linguistic Interaction Spheres in Reconstructing Micronesian Prehistory. *Oceanic Linguistics* 34(2):305-326.

## Section 2

Ascher, Marcia. 1995. Models and Maps from the Marshall Islands: A Case in Ethnomathematics. *Historia Mathematica* 22:347-70.

Ammarell, Gene. 1999. *Bugis Navigation*. New Haven: Yale University Southeast Asia Studies.

D'Arcy, Paul. 2006. *The People of the Sea: Environment, Identity, and History in Oceania*. Honolulu: University of Hawai'i Press.

Feinberg, Richard. and Joseph H. Genz. 2012. Limits of Language for Conveying Navigational Knowledge: Way-finding in the Southeastern Solomon Islands. *American Anthropologist* 114(2):336-350.

Feinberg, Richard, and Marianne George. 2008. Seafaring in the Polynesian Outliers. In *Encyclopedia of the History of Science, Technology, and Medicine in Non-Western Cultures*, edited by Helaine Selin, pp. 1,983-1,989. Berlin, Heidelberg, and New York: Springer-Verlag.



- Finney, Ben R. 1998. Traditional Navigation and Nautical Cartography in Oceania. In *Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies*, edited by David Woodward and G. Malcolm Lewis, *The History of Cartography* 3(2):443-492. Chicago: University of Chicago Press.
- Frake, Charles. 1995. A Reinterpretation of the Micronesian "Star Compass". *Journal of the Polynesian Society* 104:147-158.
- Genz, Joseph H. 2016. Resolving Ambivalence in Marshallese Navigation: Relearning, Reinterpreting, and Reviving the "Stick Chart" Wave Models. *Structure and Dynamics: eJournal of Anthropological and Related Sciences* 9(1):8-40.
- Genz, Joseph H. 2014. Complementarity of Cognitive and Experiential Ways of Knowing the Ocean in Marshallese Navigation. *Ethos* 42(3):332-351.
- George, Marianne. 2012. Polynesian Navigation and Te Lapa-'The Flashing'. *Time and Mind: The Journal of Archaeology, Consciousness and Culture* 5(2):135-174.
- Goodenough, Ward. 1953. *Native Astronomy in the Central Carolines*. Philadelphia: University of Pennsylvania Press.
- Haddon, Alfred C., and James Hornell. 1975. *Canoes of Oceania*. Bernice Pauahi Bishop Museum Special Publications. Honolulu: Bishop Museum Press. (Original: 1936-1938.)

Huth, John Edward. 2013. *The Lost Art of Finding Our Way*. Cambridge, Massachusetts: The Belknap Press of Harvard University Press.

Thomas, Steve. 1987. *The Last Navigator*. New York: Henry Holt and Company.

### Section 3

Nicole A. Mello. 2017. *Ko 'a Heiau Holomoana: Voyaging Set in Stone*. MA Thesis. University of Hawai'i at Hilo.

Weisler, Marshall I. 1997. Prehistoric Long-distance Interaction at the Margins of Oceania. In *Prehistoric Long-Distance Interaction in Oceania: An Interdisciplinary Approach*, edited by Marshall I. Weisler, pp. 149-172. Auckland: New Zealand Archaeological Association Monograph.

### Section 5

Delisle, Christina T., and Vicente Diaz. 1997. *Sacred Vessels: Navigating Tradition and Identity in Micronesia*. Documentary film. Color with black and white sequences, 28 minutes. Guam: Moving Islands Production.

Evans, Jeff. 2021. *Reawakened: Traditional Navigators of Te moana-nui-a-Kiwa*. Honolulu: University of Hawai'i Press.

Finney, Ben R., Bernard J. Kilonsky, Stephen Somsen, and Edward D. Stroup. 1986. Re-learning a Vanishing Art. *Journal of the Polynesian Society* 95:41-90.

Finney, Ben R. 1994. *Voyage of Rediscovery*. Berkeley: University of California Press.

- Finney, Ben R. 1979. *Hokule'a: the Way to Tahiti*. New York: Dodd, Mead & Company.
- Genz, Joseph H. 2017. Without Precedent: Shifting Protocols in the Use of Rongelapese Navigational Knowledge. *Journal of the Polynesian Society* 126(2):209–232.
- Genz, Joseph H. 2011. Navigating the Revival of Voyaging in the Marshall Islands: Predicaments of Preservation and Possibilities of Collaboration. *The Contemporary Pacific* 23(1):1–34.
- Genz, Joseph H., Jerome Aucan, Mark Merrifield, Ben R. Finney, Korent Joel and Alson Kelen. 2009. Wave Navigation in the Marshall Islands: Comparing Indigenous and Western Scientific Knowledge of the Ocean. *Oceanography* 22(2):234–245.
- Kyselka, Will. 1987. *An Ocean in Mind*. Honolulu: University of Hawai'i Press.
- Low, Sam. 2013. *Hawaiki Rising: Hōkūle'a, Nainoa Thompson, and the Hawaiian Renaissance*. Waipahu, HI: Island Heritage Publishing.
- Miller, Rachel L. 2010. "Wa Kuk Wa Jimor: Outrigger Canoes, Social Change, and Modern Life in the Marshall Islands." MA thesis, University of Hawai'i at Mānoa.
- Section 6
- Bach, Hannaa, and Teis Hansen. 2023. IMO Off Course For Decarbonisation of Shipping? Three Challenges For Stricter Policy. *Marine Policy* 147:105379.
- Corbett, Jack, Mélodie Ruwet, Yi-Chong Xu, and Patrick Weller. 2020. Climate Governance, Policy Entrepreneurs and Small States: Explaining Policy Change at the International Maritime Organisation. *Environmental Politics* 29(5):825–844.
- Earsom, J. and T. Delreux. 2021. A Nice Tailwind: The EU's Goal Achievement at the IMO Initial Strategy. *Politics and Governance* 9(3):401–411.
- Micronesian Center for Sustainable Transport. 2023. Electronic Resource, <https://www.mcst-rmiusp.org/>, accessed April 30, 2022.
- Newell, A., P. Nuttall, B. Prasad, and J. Veitayaki. 2016. Turning the Tide: The Need for Sustainable Sea Transport in the Pacific. *Marine Policy* 75.
- Nuttall, P. 2020. Small Islands With a Strong Voice: Why Pacific Islands are Playing a Critical Role in the Current Shipping Decarbonization Debate. Article No. 46 *UNCTAD Transport and Trade Facilitation Newsletter* N°85 - First Quarter 2020. Electronic Resource, <https://unctad.org/news/small-islands-strong-voice-why-pacific-islands-are-playing-critical-role-current-shipping>, accessed February 1, 2023.
- Nuttall P. 2012. Steering a Course For the Future With Sticks, Stones, Grass and a Little Sharkskin: The Case for Revitalisation of Sail Technology and Sailing Culture as a Practical Sea-transport Response to Climate Change and Fossil Fuel Dependence/supply Issues in Fiji. *Journal of Pacific Studies* 32:163–175.



- Nuttall, P. and A. Newell. 2016. Transitioning to Low Carbon Shipping Module Sustainable Sea Transport Solutions for SIDS: Pacific Island Countries Case Studies. Online toolkit hosted by UNCTAD. Electronic Resource, <http://unctadsftportal.org/sftftoolkit/transitioningtolowcarbonshippingmodule/>, accessed February 1, 2023.
- Nuttall, P. and J. Veitayaki. 2015. Oceania is Vast, Canoe is Centre, Village is Anchor, Continent is Margin. In H.D. Smith et al. (eds) *Routledge Handbook of Ocean Resources Management*. Earthscan Publications Ltd.
- Nuttall, P., M. Vahs, J. Morshead, and A. Newell. 2016. The Case for Field Trialing and Technology/knowledge Transfer of Emerging Low Carbon Maritime Technologies to Pacific Island Countries. In Burton, V. (Ed) *Renewable Energy: Sources, Applications and Emerging Technologies*, pp. 159–185. Nova Science Publishers.
- Nuttall, P., A. Newell, I. Rojon, B. Milligan, and A. Irvin. 2021. Pacific Island Domestic Shipping Emissions Abatement Measures and Technology Transition Pathways For Selected Ship Types. *Marine Policy* 132:October.

---

# Images and Media

Cover. Digital adaptation of "Outrigger sailing canoe of Yap, Mathaumeram." Photo by Karen Tu, 2013. Courtesy of Waa'gey. "Archipel des Carolines; Proa de Satawal." Circa 1819. Source: UHM Library Digital Image Collections. Accessed July 1, 2023, <https://digital.library.manoa.hawaii.edu/items/show/7002>.

Header Section 1. 'Ohulenui Kanehoalani. Kualoa, Hawai'i. May 9, 2013. Photo: Courtesy of Ian Masterson. (Found on page 15)

Header Section 2. Young boys practicing their canoe-handling skills on Taumako's reef flat. Taumako, 2008. Photo: Courtesy of Richard Feinberg. (Found on page 32)

Header Section 3. Archipel des Carolines; Proa de Satawal. Circa 1819. Source: UHM Library Digital Image Collections. Accessed July 1, 2023, <https://digital.library.manoa.hawaii.edu/items/show/7002>. (Found on page 51)

Header Section 4. Untitled. Hilo, Hawai'i. April 21, 2018. Photo: Bob Douglas. (Found on page 60)

Header Section 5. Ko'olaupoko. Kualoa, Hawai'i. May 9, 2013. Photo: Courtesy of Ian Masterson. (Found on page 71)

Header Section 6. Outrigger Lashings. August 17, 2009. Photo: Courtesy of Joseph Genz. (Found on page 89)

Image 1. Interview with co-author H. Larry Raiget al. 2022. Photo: Joseph Genz. (Found on page v)

Image 2. Co-authors in attendance at the Teaching Oceania series workshop at the University of Hawai'i at Mānoa. Tomainne Joab, Jerolynn Myazoe, Celeste Hao, Shania Tamagyongfal, Monica LaBriola, Ian Masterson, Darienne Dey, Richard Feinberg, Joseph H. Genz, H. Larry Raiget al, Setareki Ledua, Alexander Mawyer, Peter Nuttall, Celia Bardwell-Jones, and Tarcisius Kabutaulaka. 2022. Photo: Foley Pfalzgraf. (Found on page xiii)



- Image 3. The Voyaging Canoes in Taiohae Bay, Nukuhiva. 1995. Photo by Monte Costa. Source: Hōkūle‘a Archives. [https://archive.hokulea.com/holokai/1995/reports\\_nukuhiva.html#to\\_nukuhiva](https://archive.hokulea.com/holokai/1995/reports_nukuhiva.html#to_nukuhiva). (Found on page 3)
- Image 4. Map of the 1995 voyaging expedition, Na 'Ohana Holo Moana. 1995. Source: Hōkūle‘a Archives. [https://archive.hokulea.com/holokai/1995/reports\\_nukuhiva.html](https://archive.hokulea.com/holokai/1995/reports_nukuhiva.html). (Found on page 3)
- Image 5. Stick chart. Hilo, Hawai'i. April 1, 2015. Photo: Courtesy of Joseph Genz. (Found on page 9)
- Image 6. Rebbelib Marshallese stick chart. Hilo, Hawai'i. June 1, 2023. Photo: Courtesy of Joseph Genz. (Found on page 10)
- Image 7. Mattang Marshallese stick chart. Hilo, Hawai'i. June 1, 2023. Photo: Courtesy of Joseph Genz. (Found on page 10)
- Image 8. Meddo Marshallese stick chart. Hilo, Hawai'i. June 1, 2023. Photo: Courtesy of Joseph Genz. (Found on page 10)
- Image 9. Maui fishing Aotearoa out of the ocean. Photolithograph of ink drawing by Wilhelm Dittmer. In Dittmer, Wilhelm, Te Tohunga. The ancient legends and traditions of the Maoris, orally collected and pictured by W. Dittmer. London: Routledge, 1907. Alexander Turnbull Library.
- PUBL-0088-049. Used with permission. <https://natlib.govt.nz/records/22470770>. (Found on page 16)
- Image 10. Sor-Fest 40, 1939. Photo by Douglas Oliver. Source: The Douglas Oliver Collection, Bougainville, 1938-1939, UHM Library Digital Image Collections, accessed July 2, 2023, <https://digital.library.manoa.hawaii.edu/items/show/12231>. (Found on page 17)
- Image 11. Pu'u 'Ōhulehule and Kanehoalani. Kualoa, Hawai'i. May 9, 2013. Photo: Courtesy of Ian Masterson. (Found on page 19)
- Image 12. Sun over Mokoli'i during the 2013 Spring Equinox. Kualoa, Hawai'i. May 28, 2013. Photo: Courtesy of Ian Masterson. (Found on page 19)
- Image 13. Yapese small fishing canoe. Yap, FSM. 2014 . Photo: Courtesy of H. Larry Raigetel, Waa'gey. (Found on page 22)
- Image 14. Excavations at the Nombe rock shelter taken in 1979 during early fieldwork led by the Australian National University. Photo: Barry Shaw. Phys.Org, 2022. <https://phys.org/news/2022-10-papua-guinea-megafauna-humans.html>. (Found on page 22)

- Image 15. Lapita potsherd from Talepakemalai site with face motif vessel. Mussau Island group, Papua New Guinea. 1986. Photo: Courtesy of Patrick Kirch. (Found on page 23)
- Image 16. Yapese canoe at sunset. Guam. 2016. Photo: Courtesy of H. Larry Raigetel, Waa'gey. (Found on page 24)
- Image 17. Basalt adze (N-2721.04). Department of Public Affairs - Public Information Office. Source: UHM Library Digital Image Collections, accessed July 2, 2023, <https://digital.library.manoa.hawaii.edu/items/show/19230>. (Found on page 25)
- Image 18. Stely, Carving with Adze - 2. 1984. Yap, FSM. Photo by Steve Thomas. Source: UHM Library Digital Image Collections, accessed July 2, 2023, <https://digital.library.manoa.hawaii.edu/items/show/9815>. (Found on page 25)
- Image 19. Canoe building on Yap. Yap, FSM. 2014. Photo: Courtesy of H. Larry Raigetel, Waa'gey. (Found on page 27)
- Image 20. Canoe building on Namo, Marshall Islands. April 18, 2006. Photo: Courtesy of Joseph Genz. (Found on page 27)
- Image 21. Yapese canoe with traditional pandanus sail in 2022. Guam. 2016. Photo: Courtesy of H. Larry Raigetel, Waa'gey. (Found on page 29)
- Image 22. Marshallese voyaging canoe, *Jitdam Kapeel*. 2015. Photo: Courtesy of Joseph Genz. (Found on page 30)
- Image 23. Model of lateen-rigged shunting outrigger canoe, Marshall Islands. 2010. Photo: Dino Morrow. (Found on page 33)
- Image 24. Kennedy, Alex. Model drua (sailing canoe). 2002. Wood carving by Alex Kennedy, 2002. Accession FE011790. Photo: Te Papa Tongarewa (Museum of New Zealand). CC BY-NC-ND 4.0. <https://collections.tepapa.govt.nz/object/648912>. (Found on page 34)
- Image 25. Sor-Fest 02. Northern Solomon Islands, c. 1939. Photo by Douglas Oliver. Source: UHM Library Digital Image Collections, accessed July 7, 2023, <https://digital.library.manoa.hawaii.edu/items/show/12249>. (Found on page 35)
- Image 26. A refurbished alo lili voyaging canoe, *Te Nohoanga o Lata*, taken for a test sail on Taumako's fringing reef. 2007. Photo: Courtesy of Richard Feinberg. (Found on page 35)
- Image 27. Archipel des Carolines; Proa de Satawal. Engraved illustration. Caroline Islands, c. 1819. Source: UHM Library Digital Image Collections, accessed July 7, 2023, <https://digital.library.manoa.hawaii.edu/items/show/7002>. Found on page 36)



- Image 28. Archipel des Carolines. Engraved illustration. Caroline Islands, 1835. Source: UHM Library Digital Image Collections, accessed July 7, 2023, <https://digital.library.manoa.hawaii.edu/items/show/7000>. (Found on page 38)
- Image 29. Arno 1950. Arno Atoll. 1950. Photo by Jack Tobin. Source: UHM Library Digital Image Collections, accessed July 7, 2023, <https://digital.library.manoa.hawaii.edu/items/show/13362>. (Found on page 40)
- Image 30. Marshallese voyaging canoe, *Jitdam Kapeel*. 2015. Photo: Courtesy of Joseph Genz. (Found on page 40)
- Images 31-35. Shunting of a Marshallese canoe. 2006. Photo: Courtesy of Joseph Genz. (Found on page 41)
- Image 36. Reciting the Stars, Pa'afu Lesson - 20. 1984. Photo by Steve Thomas. Source: UHM Library Digital Image Collections, accessed July 7, 2023, <https://digital.library.manoa.hawaii.edu/items/show/9897>. (Found on page 45)
- Image 37. Ke Kā o Makali'i. Source: Polynesian Voyaging Society. Accessed July 16, 2023. [https://archive.hokulea.com/ike/hookele/hawaiian\\_star\\_lines.html](https://archive.hokulea.com/ike/hookele/hawaiian_star_lines.html). (Found on page 46)
- Image 38. Tupaia. Chart of the Society Islands. Pen and Ink. Circa date. Source: British Library. MS 21593 C. Public Domain. <https://www.bl.uk/collection-items/the-society-islands>. (Found on page 53)
- Image 39. Molle, G. and Hermann, A. Model of multi-resource, non-symmetrical long-distance inter-island interaction sphere in the Eastern Pacific. Map. In *The Bounty from the beach: Cross-cultural and cross-disciplinary essays*, edited by S. Largeaud-Ortega, pp. 67–94. Canberra: ANU Press. Used with permission. (Found on page 57)
- Image 40. Kālepa Babayan. Hilo, Hawai'i. April 21, 2018. Photo: Bob Douglas. Used with permission. (Found on page 61)
- Image 41. Lijohn Eknilang. Majuro, 2006. Photo: Courtesy of Joseph Genz. (Found on page 62)
- Image 42. Ben Finney. Honiara, Solomon Islands, 2007. Courtesy of Richard Feinberg. (Found on page 63)
- Image 43. Captain Korent Joel. Majuro, Marshall Islands. 2005. Photo: Courtesy of Joseph Genz. (Found on page 64)

- Image 44. Chorus, Ludwig. 1822. Kadou, habitant des iles Carolines (Kadou, an inhabitant of the Caroline Islands). Lithograph. Oc2006, Prt.227. British Museum. <https://www.britishmuseum.org/collection/image/576516001>. (Found on page 65)
- Image 45. Maria Labushoilam. Lamotrek, FSM, 2015. Photo: Courtesy of H. Larry Raigetel, Waa'gey. (Found on page 66)
- Image 46. Portrait of David Lewis. Courtesy of Barry Lewis. Used with permission. (Found on page 67)
- Image 47. Thomas, Steve, Mau Piailug Holding Canoe Ropes - 2, UHM Library Digital Image Collections, accessed July 7, 2023, <https://digital.library.manoa.hawaii.edu/items/show/10835>. (Found on page 68)
- Image 48. Tupaia. 1769. Maori trading a crayfish with Joseph Banks, drawing by Tupaia. Watercolor on paper. MS 15508, f 12. Western Manuscripts Collection, British Library. [https://searcharchives.bl.uk/primo-explore/fulldisplay?vid=IAMS\\_VU2&docid=IAMS040-003395028&context=L](https://searcharchives.bl.uk/primo-explore/fulldisplay?vid=IAMS_VU2&docid=IAMS040-003395028&context=L). (Found on page 69)
- Image 49. United States Department of Defense. 1946. The 'Baker' explosion, part of Operation Crossroads, a nuclear weapon test by the United States military at Bikini Atoll, Micronesia, on 25 July 1946. [https://upload.wikimedia.org/wikipedia/commons/8/86/Operation\\_Crossroads\\_Baker\\_%28wide%29.jpg](https://upload.wikimedia.org/wikipedia/commons/8/86/Operation_Crossroads_Baker_%28wide%29.jpg). (Found on page 74)
- Image 50. *Hōkūle'a* and family return to Honolulu Harbor after completing a 47,000-mile, three-and-a-half year voyage around the world. Honolulu, Hawai'i. June 17, 2017. Photo: Courtesy of Ian Masterson. (Found on page 77)
- Image 51. Double-hulled voyaging canoe, *Hōkūle'a*. Hawai'i. June 27, 2005. Photo: Courtesy of Ian Masterson. (Found on page 77)
- Image 52. Yapese canoe. Lamotrek, FSM. 2016. Photo: Courtesy of H. Larry Raigetel. (Found on page 78)
- Image 53. Yapese canoe at the Remathau graduation ceremony at Wow Wow Park, Hawai'i Island. 2022. Photo: Courtesy of Joseph Genz. (Found on page 79)
- Image 54. Marshallese canoes beached near the canoe house of Waan Aelōñ. Majol, Majuro. 2006. Photo: Courtesy of Joseph Genz. (Found on page 81)
- Image 55. Classroom at Waan Aelōñ. Majol, Majuro, 2015. Photo: Courtesy of Joseph Genz. (Found on page 81)



- Image 56. Re-lashing the outrigger of Jitdam Kapeel at Waan Aelōñ in Majol, Majuro. 2009. Photo: Courtesy of Joseph Genz. (Found on page 81)
- Image 57. Drua Sailing Experience program Fiji. May, 2022. Photo: Courtesy of Setareki Ledua. (Found on page 82)
- Image 58. Pirogue double sous son hangard, Ile Vavao. Art by Louis Le Breton. 1846. Lithograph by Ph. Blanchard. PIC Volume 593 #S11213, National Library of Australia. <https://catalogue.nla.gov.au/Record/19115/Holdings?> (Found on page 82)
- Image 59. *i Volasiga Vou* (The New Rising Star) voyaging canoe. Fiji. 2019. Photo: Courtesy of Island Encounters Photography. (Found on page 87)
- Image 60. The Waan Aelōñ in Majol program's new canoe design (catamaran with Marshallese lateen sail) with sustainable materials for intra-lagoon transportation of copra and other resources catamaran, Majuro, 2022. Photo by Gary Ehram. (Found on page 92)
- Image 61. Pasha Hawaii with containers as seen from Sand Island in Honolulu, Hawaii. Honolulu, Hawai'i. January 31, 2020. Photo by Tony Webster. [https://commons.wikimedia.org/wiki/File:Pasha\\_Hawaii,\\_Maersk,\\_and\\_Horizon\\_Lines\\_Shipping\\_Containers\\_on\\_Horizon\\_Enterprise.jpg#/media/File:Pasha\\_Hawaii,\\_Maersk,\\_and\\_Horizon\\_Lines\\_Shipping\\_Containers\\_on\\_Horizon\\_Enterprise.jpg](https://commons.wikimedia.org/wiki/File:Pasha_Hawaii,_Maersk,_and_Horizon_Lines_Shipping_Containers_on_Horizon_Enterprise.jpg#/media/File:Pasha_Hawaii,_Maersk,_and_Horizon_Lines_Shipping_Containers_on_Horizon_Enterprise.jpg). (Found on page 94)
- Image 62. Alson Kelen and Captain Korent Joel sailing in the lagoon of Ujae Atoll, Marshall Islands. 2006. Photo: Courtesy of Joseph Genz. (Found on page 96)
- Image 63. Repairing a sail with a hand-sewing machine. Majuro, Marshall Islands. 2015. Photo: Courtesy of Joseph Genz. (Found on page 97)
- Image 64. Marshallese voyaging canoe, *Jitdam Kapeel*, at dawn. 2015. Photo: Courtesy of Joseph Genz. (Found on page 101)
- Image 65. Ben Finney on the Taumako alo lili voyaging canoe, Te Nohoanga o Lata. Taumako, Solomon Islands, 2007. Photo: Courtesy of Richard Feinberg. (Found on page 102)
- Interview 1. Raigetel, H. Larry. 2022. "A navigator's values." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tomainne Joab. April 22, 2022. Youtube, 1:59. [https://youtu.be/cSvj5jRMm\\_Q?si=YFtlbli8Af6-8-5i](https://youtu.be/cSvj5jRMm_Q?si=YFtlbli8Af6-8-5i). (Found on page 7)

Interview 2. Ledua, Setareki. 2022. "Sustainability as a Canoe and Organizational Skill." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tomainne Joab. April 22, 2022. Youtube, 3:18. [https://youtu.be/ULHvIFFTWJE?si=vhwsVB-FsgNulh1\\_](https://youtu.be/ULHvIFFTWJE?si=vhwsVB-FsgNulh1_). (Found on page 7)

Interview 3. Hao, Celeste. 2022. "Experience of feeling your way home; sighting the island of Ta'ū during the voyage of Hōkūle'a in 2014." Seeking Samoa: A Taupou's Voyage Home. 'Imiloa Astronomy Center. January 27, 2015. Youtube, 40:15-49:03. <https://youtu.be/N1ysqXv9bV4?t=2415>. (Found on page 16)

Interview 4. Kelen, Alson. 2022. "Marshallese legend of the origins of navigation." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tomainne Joab. April 22, 2022. Youtube, 3:00. <https://youtu.be/M0TqJlnBlhE?si=4KGxznH5lboxoEfd>. (Found on page 20)

Interview 5. Ledua, Setareki. 2022. "Canoes (drua) of the Lau group of Fiji." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tomainne Joab. April 22, 2022. Youtube, 4:32. [https://youtu.be/ExnmaWQY5j8?si=Y1\\_rzd3sFBJkRdAa](https://youtu.be/ExnmaWQY5j8?si=Y1_rzd3sFBJkRdAa). (Found on page 34)

Interview 6. Ledua, Setareki. 2022. "Sail patterns." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tomainne Joab. April 22, 2022. Youtube, 4:22. <https://youtu.be/uskS6DgA3s4?si=jsZH5UnEw9cLTN1>. (Found on page 34)

Interview 7. Raigetal, H. Larry. 2022. "Roles of the crew members in Carolinian voyaging." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tomainne Joab. April 22, 2022. Youtube, 3:48. <https://youtu.be/YxVtGEhswZY?si=6HQn9Lo1UkU4bMnt>. (Found on page 37)

Interview 8. Raigetal, H. Larry. 2022. "Roles of women in Carolinian voyaging." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tomainne Joab. April 22, 2022. Youtube, 4:14. [https://youtu.be/9rwN0AKerwo?si=eaNfXQ6S3vA-\\_OP3](https://youtu.be/9rwN0AKerwo?si=eaNfXQ6S3vA-_OP3). (Found on page 37)

Interview 9. Raigetal, H. Larry. 2022. "The ancestral spirit of Selang in Carolinian voyaging." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tomainne Joab. April 22, 2022. Youtube, 3:37. <https://youtu.be/T2YEWrm4gwk?si=uqIQzH4axmuYx93>. (Found on page 37)



Interview 10. Raigetel, H. Larry. 2022. "The grand master navigator in Carolinian voyaging." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 2:22. [https://youtu.be/ng0fKfi-6Us?si=A13xtas\\_noLw0EEY](https://youtu.be/ng0fKfi-6Us?si=A13xtas_noLw0EEY). (Found on page 43)

Interview 11. Ledua, Setareki. 2022. "Values of wayfinding." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 6:17. <https://youtu.be/ygoDWHN6Jyk?si=Fp3pZsfsgQukNoLN>. (Found on page 44)

Interview 12. Kelen, Alson. 2022. "Origins of Marshallese navigation on Bikini & Regional navigational schools in Micronesia." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 1:50. <https://youtu.be/u5KmxMAWoxo?si=FC0YM79Gx3Xy4E9c>. (Found on page 52)

Interview 13. Raigetel, H. Larry. 2022. "Sawei interaction sphere." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 9:37. <https://youtu.be/mKBeyGF7wYA>. (Found on page 55)

Interview 14. Raigetel, H. Larry. 2022. "Preserving Lamotrekese knowledge of sail weaving." Interview by Jerolynn Myazoe,

Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 6:01. <https://youtu.be/PtR1MiviJmI?si=jppwXfNdcy8lZ0gr>. (Found on page 66)

Interview 15. Kelen, Alson. 2022. "Impacts of nuclear testing." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 1:20. <https://youtu.be/twFIM0wbx0c?si=hhDvIHctSOv0n8Zf>. (Found on page 74)

Interview 16. Ledua, Setareki. 2022. "Ceremonies to become a navigator." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 6:55. [https://youtu.be/8Wl2NfPdPyM?si=7S4YzChZZr2bQ\\_Ud](https://youtu.be/8Wl2NfPdPyM?si=7S4YzChZZr2bQ_Ud). (Found on page 75)

Interview 17. Raigetel, H. Larry. 2022. "Waa'gey." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 1:19. [https://youtu.be/6b\\_7BGmji-c?si=e3XOf06WbRZ-4elu](https://youtu.be/6b_7BGmji-c?si=e3XOf06WbRZ-4elu). (Found on page 78)

Interview 18. Kelen, Alson. 2022. "Waan Aelöñ in Majel." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 4:20. <https://youtu.be/o8x7Dsdb-oE?si=OrnKPqRExXtlNP2b>. (Found on page 81)

Interview 19. Kelen, Alson. 2022. "Working with youth in a canoe-building course at the College of the Marshall Islands." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 2:15. <https://youtu.be/9YmtvqG6kTg?si=E6wqxMBaOBkDi9I0>. (Found on page 81)

Interview 20. Ledua, Setareki. 2022. "Drua Sailing Organization." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 3:18. [https://youtu.be/eN7silMmSDQ?si=KymLlb\\_wJ5pRTZkF](https://youtu.be/eN7silMmSDQ?si=KymLlb_wJ5pRTZkF). (Found on page 82)

Interview 21. Kelen, Alson. 2022. "Applying traditional navigation to climate change." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 4:55. [https://youtu.be/ww7bSnvfYoM?si=SNX-Kj2gd6\\_OThlv](https://youtu.be/ww7bSnvfYoM?si=SNX-Kj2gd6_OThlv). (Found on page 96)

Interview 22. Kelen, Alson. "Marshallese proverb, Wa kuk, wa jimor." Interview by Jerolynn Myazoe, Shania Tamagyongfal, and Tromainne Joab. April 22, 2022. Youtube, 1:00. <https://youtu.be/JFPVuXRzDGg?si=eSRJ5hgzpmrXuzCj>. (Found on page 99)

Map 1. Map of the Pacific Islands. Prepared by Manoa Mapworks Inc. for and reproduced with permission of CPIS. (Found on page viii)

Map 2. Austronesian migrations in the Pacific, 2023. Prepared by Hetereki Huke. (Found on page 21)

Map 3. Distribution of some Voyaging organizations and programs, 2023. Prepared by Teora Morris and adapted from Map of the Pacific Islands. Prepared by Manoa Mapworks Inc. for and reproduced with permission of CPIS. (Found on page 83)

Spotlight Image 1. Sprouting coconut. n.d. Photo: Courtesy of Alex Mawyer. (Found on page 12)

Spotlight Image 2. Rebbelib Marshallese stick chart. Hilo, Hawai'i. June 1, 2023. Photo: Courtesy of Joseph Genz. (Found on page 34)

Spotlight Image 3. Fall Equinox, 2008. September 23, 2008. Photo: Courtesy of Ian Masterson. (Found on page 42)

Spotlight Image 4. Rainbow over Hakipu'u. O'ahu, Hawai'i. October 11, 2010. Photo: Courtesy of Ian Masterson. (Found on page 47)



Spotlight Image 5. View of Mauna Kea from Mauna Loa observatory, Island of Hawai'i. Hawai'i. September 13, 2010. Photo by @Nula666. CC BY-SA 3.0. [https://commons.wikimedia.org/wiki/File:Mauna\\_Kea\\_from\\_Mauna\\_Loa\\_Observatory,\\_Hawaii\\_-\\_20100913.jpg](https://commons.wikimedia.org/wiki/File:Mauna_Kea_from_Mauna_Loa_Observatory,_Hawaii_-_20100913.jpg). (Found on page 76)

Spotlight Image 6. University of Guam. Mangilao, Guam. December 5, 2011. Photo by Daderot. [https://commons.wikimedia.org/wiki/File:Decoration\\_-\\_University\\_of\\_Guam\\_-\\_DSC00992.JPG](https://commons.wikimedia.org/wiki/File:Decoration_-_University_of_Guam_-_DSC00992.JPG). (Found on page 80)

Spotlight (Classroom Activities). Island bay. n.d. Photo: Courtesy of Alex Mawyer.

Video 1. Carl, Carole Ann Carl. 2022. ""Seiseiwei-Paddle Onward." Vimeo, 3:19. <https://vimeo.com/681157769>. (Found on page 12)

Video 2. University of Guam. 2022. "What is Island Wisdom?" Youtube, 1:41. <https://www.uog.edu/student-services/rfk-library/island-wisdom.php#:~:text=Formally%2C%20Island%20Wisdom%20is%20the%20ability%20to%3A&text=This%20means%20our%20work%20at,through%20the%20partnerships%20we%20make>. (Found on page 80)

## *Agency*

In the social sciences, the term agency brings into view the capacity or ability of individuals or collectives to enact change in the world or to resist the enactments of others.

---

### **Related Glossary Terms**

Empowerment

---

**Index**

Find Term



## *Austronesian*

Austronesian languages are a language family widely spoken in island Southeast Asia, Taiwan, Madagascar, and the islands of the Pacific Ocean.

---

### **Related Glossary Terms**

Lapita

---

**Index**

Voyaging in the Pacific - Oceania's Deep Time

## *Colonial projects*

Because colonization was never one simple process that played out in every aspect of life in exactly the same way and because, in many cases, there were diverse powers working to establish control for different reasons over different aspects of a colonial situation, scholars sometimes use the term colonial project to focus on one domain in which colonization has occurred or is occurring due to the efforts and actions of one or another agent.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term



## *Culturally grounded*

Scholarship is culturally-grounded when it rests upon a foundation of cultural knowledge or practice.

---

### **Related Glossary Terms**

Place-based

---

**Index**

Find Term

## *Culture*

Notoriously difficult to define, culture is most simply the beliefs, values, and practices which an individual possesses by virtue of having been raised by and belonging to a particular group of people.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term



## *Dead-reckoning*

Once out of sight of land, navigators maintain course and estimate their progress through dead reckoning procedures while taking into account how currents and winds displace the canoe from the intended course.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

Voyaging in the Pacific - Canoe Culture

## *Decolonization*

The legal, political, social, cultural, and economic process through which a colony becomes self-governing or independent.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term



## *Deep time*

A term borrowed from geology, the term deep time reminds readers of the challenge of thinking about or understanding the past, particularly the past prior to or in the absence of memory or records (whether written or otherwise).

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time

## *Diaspora*

A group of people living away from their ancestral homeland, often in more than one location.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term



## *Double-hulled canoe*

A double-hulled canoe contains two hulls rather than a main hull and a single outrigger, which increases the size and carrying capacity.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

Voyaging in the Pacific - Canoe Culture

## *Embodied knowledge*

Embodied knowledge is knowledge from the senses.

---

### **Related Glossary Terms**

Epistemology

---

**Index**

Voyaging in the Pacific - Introduction and Overview



## *Empowerment*

Process by which agency is acquired by those who have been marginalized or previously excluded.

---

### **Related Glossary Terms**

Agency

---

**Index**

Find Term

## *Environmental change*

Environmental change is a constant and ongoing feature of a dynamic Earth. However, the term has a particularly heightened significance in the Anthropocene when the intensity and impact of human driven environmental change such as climate change, sea level rise, ocean acidification, loss of biodiversity, and other factors, is putting the wellbeing of local communities and their environments at risk.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term



## *Epistemology*

Epistemology is a branch of philosophy concerned with the nature of knowledge, or how we know what we know. Academic disciplines frequently differ in the procedures they use to produce and evaluate knowledge.

---

### **Related Glossary Terms**

Embodied knowledge

---

### **Index**

Voyaging in the Pacific - Oceania's Deep Time

## *Genealogy*

Genealogy is a key feature of how cultures organize their social lives around the world, and in many Pacific Islands contexts, genealogy is a foundational dimension of individual and collective identity and plays a central role in Indigenous epistemology.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term



## *Globalization*

Since the early 19th century, advances in transportation, communication, and other technologies have led to an intensifying and accelerating flow of ideas, things, and persons, across national borders resulting in an incredibly complex interdependence of markets, governments, and social lives across the globe.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

## *Holistic Anthropology*

Holism is an approach that combines the evidence from several branches of anthropology, including archaeology, historical linguistics, biological anthropology and socio-cultural anthropology.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time



## *Indigenous*

Indigenous refers to the native people of a place. Indigeneity was recognized by the United Nations Declaration on the Rights of Indigenous Peoples, begun in the early 1980s and formally adopted in 2007, which “establishes a universal framework of minimum standards for the survival, dignity and well-being of the indigenous peoples of the world and it elaborates on existing human rights standards and fundamental freedoms as they apply to the specific situation of indigenous peoples.” See [https://www.un.org/development/desa/indigenouspeoples/wpcontent/uploads/sites/19/2018/11/UNDRIP\\_E\\_web.pdf](https://www.un.org/development/desa/indigenouspeoples/wpcontent/uploads/sites/19/2018/11/UNDRIP_E_web.pdf).

---

### **Related Glossary Terms**

Indigenous epistemologies, Indigenous knowledge

---

**Index**

Find Term

## *Indigenous epistemologies*

Indigenous epistemologies are culturally-grounded ways of producing, evaluating, or circulating knowledge about the world.

---

### **Related Glossary Terms**

Indigenous, Indigenous knowledge

---

### **Index**

Voyaging in the Pacific - Introduction and Overview

Voyaging in the Pacific - Introduction and Overview



## *Indigenous knowledge*

Knowledge about natural resources such as terrestrial or marine geographical features, of weather and climate, or of local species, or about particular cultural practices transmitted over generations within a particular Indigenous context.

---

### **Related Glossary Terms**

Indigenous, Indigenous epistemologies

---

### **Index**

[Find Term](#)

[Voyaging in the Pacific - Introduction and Overview](#)

[Voyaging in the Pacific - Oceania's Deep Time](#)

## *Interaction sphere*

An interaction sphere is a voyaging network or sphere of communication that is maintained by long-distance voyaging canoes.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time



## *Lapita*

The name of an archaeological site in New Caledonia characterized by a distinctive pottery with a decorative motif made by "dentate-stamping." The term Lapita also refers to a maritime culture associated with this pottery and other archaeological artifacts that generally maps onto the early exploration and expansion of Austronesian seafarers through Near Oceania and penetrating into Remote Oceania.

---

### **Related Glossary Terms**

Austronesian

---

### **Index**

Voyaging in the Pacific - Oceania's Deep Time

## *Lateen-rigged outrigger canoe*

The lateen-rigged outrigger canoe employs a triangular sail that is attached to a mast that angled toward the one end of the canoe and the lower end of the sail is attached at the very front of the canoe; when shunting, the mast is canted toward the other end and the lateen sail is moved the other end as well. The outrigger float remains to the windward side of the canoe for stability and to help maintain a straight course.

---

### **Related Glossary Terms**

Outrigger sailing canoe, Shunting

---

**Index**

Voyaging in the Pacific - Canoe Culture



## *Mana*

A word meaning divine or supernatural power, authority, or power to lead, in many Pacific languages, including Hawaiian, Tahitian, and Māori.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

## *Mythology*

Mythology is a body of knowledge passed on through oral tradition that is encoded with environmental and cultural information.

---

### **Related Glossary Terms**

Drag related terms here

---

### **Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time



## *Near Oceania and Remote Oceania*

Near Oceania is the corridor of inter-visible islands extending from island Southeast Asia to the eastern edge of the Solomon Islands, and beyond that is Remote Oceania, characterized by longer distances between archipelagoes.

---

### **Related Glossary Terms**

Drag related terms here

---

### **Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time

Voyaging in the Pacific - Oceania's Deep Time

## *Oceania*

Oceania is a critical term for perceiving and experiencing the Pacific Islands region as a dense network of profound connections and relationships, not islands in a far sea but a "sea of islands" as Tongan anthropologist and novelist Epeli Hau'ofa observed.

---

### **Related Glossary Terms**

Drag related terms here

---

### **Index**

Find Term

Voyaging in the Pacific - Introduction and Overview



## *Outrigger sailing canoe*

The outrigger sailing canoe is a single-hull canoe that is connected to an outrigger float, which adds stability and functions like a keel to allow the canoe to move relatively straight through the water with minimal sideways pushing from the wind.

---

### **Related Glossary Terms**

Lateen-rigged outrigger canoe

---

**Index**

[Find Term](#)

Voyaging in the Pacific - Canoe Culture

## *Papuan*

Papuan languages are concentrated on the large island of New Guinea and the adjacent Bismarck Archipelago.

---

### **Related Glossary Terms**

Drag related terms here

---

### **Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time



## *Pilotage*

Pilotage in Western navigation is the use of landmarks to find one's way and is characteristic of inter-visible voyaging in Near Oceania during the initial Austronesian expansion. In Oceanic navigation out of sight of land, wave piloting is a technique of using seamarks for wayfinding (in the Marshall Islands, for example).

---

### **Related Glossary Terms**

Drag related terms here

---

### **Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time

## *Place-based*

Research is place-based if it emphasizes the centrality of place in identifying critical questions to be asked, appropriate means for asking those questions, and takes into account the significance and potential value and impacts of the work to the local communities in which it is located.

---

### **Related Glossary Terms**

Culturally grounded

---

**Index**

Find Term



## *Protocols*

Most simply, protocols are culturally recognized and approved procedures for engaging in a specific action or practice. Researchers anywhere in Oceania must learn to navigate appropriate protocols for working with and in communities.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

## *Representations*

Among critical theorists and literary scholars, representation refers to the historical accumulation of traditions of depiction in literature, scholarship, and the visual and performing arts which shapes how outsiders and insiders perceive, understand, experience, feel, and act towards that which has been depicted. In Oceania, the last centuries have been dominated by representations of the region often crafted by European and American visitors which profoundly distorted the dignity and lived experience of the region's Indigenous peoples and local communities and even the islands themselves.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term



## *Resilience*

Refers to the capacity of communities to adapt and respond to changes in the world.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

## *Seafaring*

Seafaring involves a comprehensive system of knowledge that includes canoe building, seamanship, navigation, canoe voyaging, astronomy, weather, land and ocean resources, spiritual connections, social relationships, gendered roles, and other integrated bodies of knowledge.

---

### **Related Glossary Terms**

Voyaging, Way-finding

---

### **Index**

[Find Term](#)

Voyaging in the Pacific - Introduction and Overview



## Seamarks

Seamarks are navigational aids of the ocean that afford directional information of an island, such as disrupted wave patterns.

---

### Related Glossary Terms

Drag related terms here

---

### Index

Find Term

Voyaging in the Pacific - Contemporary Currents

## *Seascapes*

Derived as a formation from the term landscape, seascape refers to views and meanings of the sea.

---

### **Related Glossary Terms**

Drag related terms here

---

### **Index**

Find Term

Voyaging in the Pacific - Introduction and Overview



## *Shunting*

Shunting is the process of changing the position of the mast from the ends of the symmetrically-shaped long axis of the hull of the lateen-rigged outrigger canoe; the lower end of the sail is temporarily attached to the "bow," which becomes the "stern" when the sail is moved to the other end; as a result, the wind always blows from the direction of the outrigger float.

---

### **Related Glossary Terms**

Lateen-rigged outrigger canoe

---

### **Index**

Voyaging in the Pacific - Canoe Culture

Voyaging in the Pacific - Canoe Culture

## *Star compass*

In the Pacific, a star compass conceptually divides the horizon into thirty-two points arranged symmetrically about a north-south axis, such that the rising and setting positions of stars provide the names for abstract segmentations of the horizon that can be used to indicate the direction of surrounding islands.

---

### **Related Glossary Terms**

Zenith stars

---

**Index**

Find Term



## *Star path*

Stars rise and eventually sink below the horizon, and they are only useful navigationally when they are visible. A star path is a series of stars that follow a similar trajectory, enabling navigators to maintain their course by following a sequence of stars, each of which is visible when needed.

---

### **Related Glossary Terms**

Zenith stars

---

**Index**

Voyaging in the Pacific - Canoe Culture

## *Stick chart*

Stick charts are teaching devices, typically made by lashing thin sections of the aerial roots of pandanus, that navigators in the Marshall Islands use to represent Indigenous wave concepts. One class of stick charts (mattang or wapepe) abstractly models the conceptual framework of Marshallese wave navigation by showing the ways in which islands disrupt the patterning of swell and currents. Another class of stick charts maps the positions of real atolls and actual swell patterns, ranging from regional medo to the rebbelib that depicts an island chain or the entire archipelago.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term



## *Systematic exploration strategies*

Systematic exploration strategies involve mariners searching upwind against the direction of the prevailing easterly trade winds by either tacking back and forth against the winds, or by exploiting seasonal westerly wind shifts, and, whether finding uninhabited land or not, returning home with the resumption of the trade winds to then set out on future colonizing expeditions.

---

### **Related Glossary Terms**

Drag related terms here

---

**Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time

## *Tacking*

Tacking is changing directions of a sailing vessel with the mast positioned near the middle of the vessel; when sailing into the direction from which the wind blows, the bow of the canoe is turned toward and through the wind, such that the direction of the wind changes from one side of the canoe to the other.

---

### **Related Glossary Terms**

Drag related terms here

---

### **Index**

Find Term

Voyaging in the Pacific - Oceania's Deep Time

Voyaging in the Pacific - Canoe Culture



## *Voyaging*

Voyaging is sailing a canoe long distances out of sight of land across the ocean using traditional navigation techniques to reach a targeted island destination.

---

### **Related Glossary Terms**

Seafaring

---

**Index**

Find Term

Voyaging in the Pacific - Introduction and Overview

## *Way-finding*

Way-finding (also wayfinding) is navigating by sensory cues from the external environment including following star paths and other visible cues, and "feeling the way."

---

### **Related Glossary Terms**

Seafaring

---

**Index**

Voyaging in the Pacific - Introduction and Overview



## *Zenith stars*

Zenith stars are stars that during their nightly progression across the sky rise directly overhead. A particular island is likely to have one or more zenith star(s). If the navigator knows the zenith star(s) for a particular island, they can affirm that the vessel is at the correct latitude and continue following the star toward the desired target. On north-south voyages, for example, navigators can sail upwind of the island until its zenith star is above the canoe, and then change direction downwind, maintaining the zenith star above the canoe to make windward landfall.

---

### **Related Glossary Terms**

Star compass, Star path

---

### **Index**

Voyaging in the Pacific - Oceania's Deep Time