
Exploring the extra-planetary

Social studies of outer space

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In the autumn of 2021, a new course debuted at Jagiellonian University in Kraków, Poland. The ‘Social Studies of Outer Space’ listing promises prospective students ‘an opportunity to discuss and engage in a critical and multidisciplinary analysis of some of the most pressing questions facing space exploration and its relation to social, environmental and political processes and mechanisms that have structured the contemporary world’. We designed the course as members of the Anthropological Research into the Imaginaries and Exploration of Space (ARIES) research project, a five-year multi-pronged endeavour to investigate the relations between space, resources, technologies, climate change and the future.

Our current team comprises four international scholars investigating different relations with outer space through an anthropological lens. More than 20 students signed up for the seminar, which consisted of 15 90-minute sessions. Students were offered readings on a space-related theme each week – topics included scientific knowledge-making, environmental sustainability, colonialism and justice, and the economics of New Space, among others.

Teaching the Social Studies of Outer Space was our first collaborative effort as an academic team and, in many ways, an opening gambit – an initial attempt at establishing Jagiellonian University in the burgeoning field of space anthropology. To us, the sense of this task was clear: anthropology needs to address the ways space touches human lives, and Jagiellonian, the intellectual home of both Copernicus and Malinowski, is ideally suited to host a project bridging cosmology and ethnography. Yet, to our students, the ambition seemed quixotic. When asked during our first session, most admitted that they had not encountered the concept of space anthropology before (one gingerly wondered why it should be taught here in Krakow, a city with no rocketry infrastructure and such thick smog that the stars are hardly visible). Fair enough.

At first glance, the connection between outer space and anthropological enquiry is not immediately evident. Historically, the discipline lets anthropic relations be overdetermined by notions of a spherically enclosed *terra* that brackets out anything above the Kármán line (Olson & Messeri 2015). But, of course, human imagination and action have never been bound by this aeronautical delineation. As we discussed in class, our daily lives regularly intersect with outer space – we get lost in the stars with sci-fi novels; we find ourselves on earth with satellite GPS; and as one student remarked, our bodies contain heavy atoms forged in supernovae. The human stuff is star stuff.

Fittingly, as Battaglia et al. (2015) point out, turning attention towards space proves to be a conceptually rewarding endeavour – it can shake up core anthropological notions like identity and scale while exposing overlooked relations and opening novel avenues of thought. And indeed, dedicated academic engagement with space has enriched the discipline and proved that anthropology remains vital for understanding humanity’s continued expansion beyond the earth (Aiken 2015). So, it is unsurprising and auspicious that more researchers are turning their gaze upward. Today, the social science of outer space is found in numerous journals, conferences, and popular publications. The International Space Station Archeological Project (ISSAP), a space research group led by Dr Alice Gorman and Dr Justin Walsh, recently conducted the first archaeological survey of the International Space Station (ISS). When designing our course, we had a wealth of material to choose from. In crafting our syllabus, our intention was to give a broad overview of the field, including what we see as foundational texts in the contemporary turn towards space – like Praet and Salazar’s (2017) early exploration, ‘Familiarizing the extra-terrestrial/Making our planet alien’ – as well as pieces just as valuable, yet more obliquely related – like Eshun’s (2003) ‘Further considerations of afrofuturism’.

In this exercise, we observed several distinct threads emerging within recent work. We would like to take this space to elaborate on these themes. We will begin with research that is most readily legible as ‘space anthropology’ before tracing out other research avenues that pass through, connect with and frame outer space. We hope to create a more comprehensive picture of space anthropology and demonstrate its inescapable relevance to contemporary anthropology.

Space sciences

The research most plainly positioned as space ethnography is tightly focused on the lifeworlds and practices of those directly working within classical ‘big science’ projects (Lambright 2014). Prominent examples include recent monographs such as: Vertesi’s *Seeing like a rover* (2015) and *Shaping science* (2020), both detailed accounts of the organizational politics animating recent exploratory missions; Messeri’s *Placing outer space* (2016), an astute analysis of the placemaking practices of planetary scientists; and Olson’s *Into the extreme* (2018), a critical look at the ecological thinking shaping spaceflight worksites. These valuable works deftly handle various issues, from the contingency of knowledge production to the intricacies of human-technology relations.

Among these is Zara Mirmalek’s *Making time on Mars* (2020), which follows NASA (National Aeronautics and Space Administration) mission scientists and engineers as they seek evidence of a watery past on the red planet. Remotely operating two Mars exploration rovers – sending instructions on where to go, what to do and when to send data and rest – demands that the scientists organize their lives and work activities according to an entirely new temporality: Mars time. Due to Mars’ slower rate of axial rotation, a Martian day, or sol, is approximately 40 minutes longer than its terrestrial counterpart. Accordingly, scientists must accommodate this time disjuncture continuously – each workday begins at a different terrestrial clock time. What is more, the robots’ solar batteries, which gradually degenerate due to dust in the Martian atmosphere, require that the rovers operate only during Martian sunlight hours. In turn, scientists must analyze rover data and plan the next steps during Mars’ non-sunlight hours.

Mirmalek uses the ensuing coordination, which she describes as an ‘interplanetary work system’ (ibid.: 15), to discuss the organizational relationship between clock time and work. By framing Mars time as a culturally produced sense of temporality, the author unveils deep-seated assumptions about normative temporal orders on earth. In this way, Mirmalek treats the extra-terrestrial as a mirror to reflect on and defamiliarize otherwise imperceptible aspects of sociality on earth, an analytical move widely shared in ethnographies of outer space (e.g. Battaglia et al. 2015; Buchli 2020; Helmreich 2012; Parkhurst & Jeevendrampillai 2020; Valentine 2016).

However, what *Making time on Mars* does particularly well is to capture the two-way relationship between the celestial and the quotidian. In describing this scientifically mediated interplanetary work, it shows how off-earth action and the geometries of celestial bodies command a certain influence on earthly social relations and material practices. As studies of infrastructure show, highlighting this relational quality is imperative as off-earth processes now increasingly impinge on everyday life (Clormann & Klimburg-Witjes 2021). For instance, ground-based infrastructures and satellite-supported services are vulnerable to space weather and orbital debris (Gärdebo et al. 2017; Taylor 2020).

These studies of technicians and technicity are excellent entry points into extra-planetary anthropology – not exactly unexpected given the frequency that NASA’s iconic ‘meatball’ insignia appeared on our students’ sweatshirts and laptops. And undeniably, such ethnography remains essential, especially as New Space, an umbrella term for the emerging private, financialized and deregulated space industry, reconfigures and complicates earlier modes of space exploration. However, through our lively in-class sessions, students also demonstrated an eagerness to exit the laboratories and follow lines of enquiry beyond professional, strictly scientific environments. This leads to works addressing other ways emergent relations to outer space reshape sociality on the ground. This theme is particularly evident in ethnographies grappling with the power relations and inequalities imposed by space infrastructures and megaprojects like launch sites.

Ground control

Peter Redfield’s *Space in the tropics* (2000) is the first interrogative ethnography handling space infrastructures’ political and historical background. He shows how the French overseas territory of French Guiana, despite being on the European periphery politically and geographically, remains central in two seemingly unconnected yet intertwined European projects. The first was the operation of a French penal colony from the 1800s until the mid-1900s. The second was a spaceport for the French (and later European) Space Agency from 1964, a mere decade after the final closing of the colonial prisons. Addressing the questions ‘does it matter where things happen?’ and ‘more precisely, what might it reveal that different things happen in the same place?’ (ibid.: xiv), Redfield traces the shadow of empire looming over the Centre Spatial Guyanais and demonstrates how the power relations, labour, work organization and (racial) inequalities are carried over from colonial pasts into aspirations towards an (inter)planetary future (Redfield 2002).

Alice Gorman explores similar themes in her work. Her recent articles carefully elucidate how colonial pasts remain entangled with space-bound futures. Building on Redfield’s work, she notes the parallels between Kourou in French Guiana and another launch site located in Woomera, Australia. Despite being geographically distant, these facilities share similar histories as colonial possessions and penal colonies remade as state-of-the-art aerospace ports. Comparing these sites, Gorman fleshes out how Western governments repeatedly dismissed and downplayed the existence and desires of local communities to create space for a new phase of technologically backed colonial expansion and resource extraction. She demonstrates how ‘elitist modern imaginings of the future collide with local views of the value of their own heritage’ (Gorman 2007).

In this way, any state’s ongoing push into orbit and beyond is always rooted in terrestrial politics, both past and present. This dynamic has always been an uncomfortable reality, even early in the space race – both the US and the USSR were heavily reliant on Nazi scientists and knowledge forged for war at Peenemünde, Germany (Gorman 2005). In the case of the launch sites at Kourou and Woomera, the terrestrial politics require local communities to be made invisible so that vast swathes of land can be treated as ‘sacrifice zones’, places deemed disposable by those with territorial control (ibid.: 12; Klinger 2018).

Similarly, Sean T. Mitchell’s ethnography *Constellations of inequality: Space, race and utopia in Brazil* (2017) traces the colonial histories that shape experiences of race and inequality around the Alcântara Space Center, a spaceport in northeastern Brazil. We are shown how expanding this (currently inoperative) satellite launch site generates a complex constellation of often conflicting understandings. For authorities, the facility was both a source of profit and a symbol of national status; for various locals, it was either a threat to livelihood or a potential source of revenue. For instance, the spaceport construction in the 1980s disrupted the entire surrounding community. The process forced many locals to relocate, pushing them into perpetual poverty.

However, it was also a boon to locally recruited labourers who profited from the construction of new dwellings. For those refusing relocation, resistance informed an emergent, politicized identity whereby activists began to understand themselves as black. Illuminating this atmosphere of suspicion and antagonism around the spaceport allows Mitchell to situate the launch site within broader shifts in Brazilian society, as the country’s communities and institutions adapted from a military dictatorship to its post-1985 political order.

Habitable worlds

Towards the end of our course, a depressingly relevant film debuted on the streaming service Netflix. Adam McKay’s pitch-black comedy *Don’t look up* imagines how we would grapple with the discovery of a comet on a collision course with earth. Humanity’s political and social response to this existential threat in the film mirrors our actual response to climate change; politicians dither and debate; capitalists seek ways to profit, and the public either futilely fret or openly deny the problem. In the end, a select few leave earth behind for a better future in the stars. Our students would recognize the metaphor instantly.

From our very first class, the relationship between space exploration and climate change was a recurring topic of discussion. Readings covered how astronautics has transformed our thinking on the planet’s ecology (Anker 2005) and fuelled pernicious dreams of limitless expansion and post-planetary futures for an elite minority (Tabas 2020). Students critically interrogated human conduct on earth and considered the serious potential that space expansion could simply export these transgressions in space. Most sustained it deeply unethical to leave earth to die (Gastol 2022), while a select few enjoy the possibility of starting over somewhere else.

As one student surmised, there is a risk in simply recreating ‘capitalism – but in space’ (Pala 2022). Still, others were moved to question anthropocentric perspectives – what if we saw the universe as sentient and animate? How would humanity treat other types of life in space? As a

friend, foe or exploitable resource? As one student mused in their final essay, ‘maybe we are simply not needed at all, [maybe] climate destruction simply lets us know that we are redundant in the universe?’ (Cieślak 2022).

Recent research bears out our students’ intuition that space exploration necessarily entails questions of environmental justice. Extra-planetary scholars have pushed social science to grapple with the environmental footprint of our off-earth ambitions, citing everything from the chemical effluvia of rocket engines to the mounting potpourri of artificial space debris as potent agents of degradation. The geographer Julie Klinger’s (2021) unfolding work on the environmental footprints of space engagement is an excellent example of how social studies of space can be integrated into the ongoing discussions around geopolitics, extractivism and its impacts.

In *Rare earth frontiers: From terrestrial subsoils to lunar landscapes* (2018), she positions the potential rare earth mining sites on the moon alongside those in China and Brazil to demonstrate how the speculative hype around these natural resources serves as a mere proxy for broader geopolitical and economic ambitions. She shows how the extractive frontier in outer space becomes part of longstanding earth-bound struggles over resource production, territorial politics and ecological protection.

If what humans do in space inherently connects to their relations and conflicts on earth, then environmental and other social justice issues are not just abstract concepts. Instead, they must be put at the forefront of academic and popular debates about space exploration. However, this process is not near complete. Although it is now widely recognized that we need more ‘diversity’ in space, this rarely extends beyond calls for more women or people of colour or more indigenous or queer *astronauts*. This, of course, does little to safeguard or sustain the larger ecological systems these astronauts necessarily rely on (Rahder 2019). Indeed, it is a start, yet the promise of space comes from its capacity to hold more radical futures for many. Here, social science again offers avenues to understand the universe otherwise.

Event horizons

While human collectives have not always had the technical means to physically reach beyond the atmosphere, they have not been confined to a strictly terrestrial existence either. Through science fiction, speculative thinking and other forms of alternative connections with the cosmos, various communities have forged powerful relations with outer space that can be as consequential as planting a flag in the lunar regolith. As many researchers point out, fictional worlds have inspired and informed the approaches and achievements of various space programmes throughout history (Brown 2013; Dunnet 2021). The influence of astrofuturistic visions is still evident throughout the industry now – when SpaceX commissioned their next-generation spacesuits, they hired a Hollywood costume designer to perfect their slick aesthetics (Howell 2020). Thus, social scientists must probe these various other avenues relating to space. Our students certainly did. Their final essays used films like *Star trek*, *Black panther*, *Blade runner* and novels by Jules Verne and Kim Stanley Robinson to discuss thorny social issues like exclusion, ethics and identity.

By exploring space narratives, scholars can become more sensitive to visions of the cosmos and the future that depart from dominant discourses. This method is exemplified in William Lempert’s work on Indigenous science fiction, highlighting how different peoples use the genre to think through futures that significantly depart from the present and thereby open ‘a rare discursive space for alternative futuring’ (Lempert 2014: 164). In discussing works by Lisa Jackson (Ojibwe) and Nanobah Becker (Diné), he emphasizes Indigenous science fiction’s ‘demonstrated potential for expressing and transforming such imaginative spaces’ (ibid.: 173).

This work strengthens longstanding academic critical engagements with other strains of astroculture, namely afro-futurism and feminist science fiction. These – the latter of which literary scholar Marleen Barr (1994) prefers to call ‘feminist fabulations’ due to the lingering patriarchal connotations of modern science – help identify and challenge hierarchies and exclusions lurking in space expansion imaginaries (Kilgore 2003).

However, not all alternative relations to space rely on fiction – anthropological literature and ethnographies also open alternative pathways to thinking about space exploration. One of the most popular readings on our syllabus came from a collective that published under the name of their homeland, Bawaka Country in northeast Arnhem Land, a region in the Northern Territory of Australia. In their work, authors portray an Indigenous-led understanding they call Yolŋu ontology, an experience of the world emergent through the relationality and co-becoming of place/space – in this conception of reality, the ‘outer’ of ‘outer space’ does not hold. Taking the Yolŋu songspiral of Guwak as a guide, Bawaka Country et al. (2016) share how the Yolŋu people conceive Sky Country as intimately connected to life on earth and how contemporary space ventures may disrupt established Indigenous relations to what lies above.

Scholarship on earthly encounters with the extra-terrestrial provides another challenge to the outer of outer space idea. Recent ethnographies of Susan Lepselter and Diana Pasulka delve into the ways extra-terrestrial forces hold space here on our planet. Lepselter’s (2016) *The resonance of unseen things: Poetics, power, captivity, and UFOs in the American uncanny* invites the reader into a world where close encounters with beings from beyond are substantial experiences. Through talking with UFO believers, she uncovers the ways conspiracies concerning alien visitation harmonize with both narratives of the captivity of colonial America and contemporary feelings of anxiety and malaise.

Through her emphasis on the stories told by believers themselves, Lepselter shows that the extra-terrestrial is not something ‘just’ out there but also firmly embedded in the lives and identities of people on earth. Pasulka’s (2019) *American cosmic: UFOs, religion, technology* takes a similar subject on a different trajectory. This ethnographic look at UFO believers tracks how this community’s social, material and media structures resemble the contours of modern religious practice. Together, these insightful publications offer novel attempts to rethink the relations between space, the earth and society – they show that social science can still find use in the old imperative to make the familiar strange and the alien familiar.

Escape velocities

The above represent a few of the major topics, themes and approaches that the social studies of outer space have pulled into their orbit. Some, such as Vertesi or Mitchell, grasp the new push towards the stars by hewing closely to traditional modes of enquiry and analysis. Others, such as the work of Bawaka Country et al., ask anthropology to find new ways of understanding space and society. There is value in both. But, as Victor Buchli’s (2020) recent move to conduct material culture studies of the ISS show, the gap is not as vast as it seems. Indeed, studies of space and in space present unique challenges – it is true that ‘even the concept of “fieldwork” as it has been enshrined in the discipline is a distinctive artefact of terrestrial geometries of time and space’ (ibid.: 18). However, anthropologists and their related colleagues have a deep well of tools and concepts

to draw upon. Even the most time-tested methods of ethnography may be reworked and refined to address new planetary and extra-planetary concerns.

Even as anthropology innovates and iterates to better limn the nuances of human relations with the cosmos, the discipline must not forget its hard-learned lessons. The imperative to critique power and arc scholarship towards justice cannot be jettisoned as we reach for higher altitudes. As some increasingly look upward for new avenues for research, it bears reminding ourselves that the critical role of space anthropology lies in its capacity to challenge established premises of analytical thought and social organization.

By often acting at the margins of scientific and political concerns, anthropological research is well positioned to foreground environmental and social justice issues as they are experienced from various perspectives and vantage points. Moreover, this concern with justice should not be confined to our analyses, and it should be present throughout the entire research process. Space anthropology, therefore, is a nascent subfield that offers more than just a fascinating new research topic. It may also force us to revisit some of the longstanding and emergent ethnographic and theoretical approaches in the search for ethics and a method that provides a critical answer to the powerful trends of the day.

Conclusion

As the new space age churns onward and upward, social scientists will need to expand along with it. Towards the end of our course, we worked with our students to map the trajectories taken by recent astro-scholarship. Intended as a simple revision of the main topics and concepts covered in the seminars, the exercise also showed the disparate paths social science has taken and pointed towards the many ways it could advance the future. Thanks to the map, we can see where our work may further shift the balance between the contending social forces and perspectives on space. We are excited to explore these possibilities, as are our students eager to know more about contemporary research, including our own projects. As the ARIES project, we are embarking on comparative research that will involve a wide variety of groups across sites and scales, including indigenous communities, local residents living near space infrastructures and scientists, entrepreneurs and activists. As our work continues, we hope we can build on what has been achieved, while contributing to the overall project of space anthropology. ●

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