

# *The Cosmopolitics of Outer Space*

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This paper for the Ostrom Workshop research series presents some very early ruminations and musings of work in progress that responds to recent calls to embrace “a space-inclusive anthropology” (Battaglia et al 2015: 248). This work aims to build on anthropology’s attunement to multiple scales of inquiry to investigate the complex dimensions of emerging field sites and cultural practices on space and here on Earth. Drawing on my previous work in Antarctica, I’d like to look at the constraints and potentialities of interrogating outer space in what is emerging as a distinct period of planetary science and novel space imaginaries of exploration and settlement.

I’d like to proceed by presenting three very brief vignettes. First, some general remarks on the need to develop critical accounts of the business of outer space and how venture capitalism off-Earth is emerging and mobilizing imaginaries of multiplanetary futures. Second, the relevance to study ethnographically how a country, in this case Australia, cultivates itself as a space faring nation, and decides to launch a new space agency. And third, how astrobiologists searching for extreme forms of life in terrestrial analogue sites create a cosmo-ecological imaginary of Earth as part of a larger cosmic imagination. What emerges from these three sites of analysis coming together is an ‘ecology of practices’ that specifies how our cosmos might be accounted for and valued.

## **Background: the relational trajectories of Antarctica and outer space**

Until recently, Antarctica and outer space have not been spaces “for humanity to attach to pre-existing flows of culture” (Glasberg 2012). Nonetheless, Antarctica has been a sphere of human endeavor for well over a century and outer space for just over fifty years. Humans are now physically present in Antarctica year-round with over a thousand transient and semi-permanent scientists, military, technicians, and two small civilian settlements in Chilean and Argentinean stations in the Antarctic Peninsula. These numbers expand to five thousand people in summer, in addition to the more than fifty thousand tourists who visit the fringes of the Antarctic continent every year. Over one hundred individuals from over 20 countries have ‘inhabited’ in space with relatively short hiatuses for the last two decades, and without interruption since 2000 by successive crews in the International Space Station, launched in 1998, and arguably the most expensive technological structure ever built.

Since 2012 I have been conducting anthropological work in Antarctica. My interest has been in telling a story of the processes of making and unmaking of Antarctica, how the southern polar region is being reimagined and remade. Doing ethnographic fieldwork with scientists, and logistics personnel in research stations or aboard ships, and with families in Antarctic outposts, I have looked at the ‘processes of becoming’ that are at play in Antarctic places by paying attention to practices of place-making. I have described ethnographically how these Antarctic cultural practices “sit on places” (to draw from Arturo Escobar’s work) and are routed (rather than rooted) through these places (to draw from James Clifford’s work) in ways that point towards distinct modes of subjectivity and sociality in extreme environments, which will likely require new vocabularies to attest to their complexities. I have

also described how notions of life are enlarged, incorporated, and appropriated in complex geopolitical contexts, following microbiologists prospecting extremophile organisms in the field. The impetus behind this endeavour has been to show how microbial worlds are becoming part of worlding processes and projects that further these extreme environmental landscapes. Extremophile organisms are made part of a market-driven search for bioactive components in areas highly sensitive to geopolitics at the same time as they become meaningful as proxies for speculating about the existence of extraterrestrial lifeforms. Hence, this emphasis on “microbial ontologies” is purposely designed to draw attention to the increasing expediency of conceptualizing extreme earthly ecologies as analogues for other planetary worlds, to trace the relational trajectories of Antarctica and Outer Space, and to reflect on what some argue is an emerging ‘extraterrestrial mode’ of thinking Earth (Helmreich 2012).

Antarctica and outer space are “imaginatively, historically, and juridically interconnected” (DeLoughrey 2014). Both are key to modern understandings of Earth and to the visualization of global environmental change and provide a site for ‘problematizing the planet’. Both are also places from where to speculate about future modes of existence on this planet, and, as I’d like to argue, of other planets too. Antarctica and outer space provide a platform to theorize the Anthropocene as an era of co-emerging socio-natures.

The idea is that these three vignettes will become three case study sites for a cosmopolitical approach to map out the potential multiplicity of mutually irreconcilable versions of outer space across space agencies; space entrepreneurs; space scientists and space publics. Paying attention to these subjects can highlight the exclusions and inequalities embedded in dominant discourses of outer space, and, in this case in the specific context of space exploration, identify possibilities for what Audra Mitchell calls “plural ethico-political responses” (Mitchell 2016). In turn, this “ecology of practices” framework would work as a generic method that illuminates these cosmopolitics by looking at how things, devices, discourses, practices, all generate realities, provide a sense of what counts, and what is valuable and known. In other words, how in the cosmopolitical dynamics of each of these sites, different things come to matter. This is to say that outer space is made up of all manner of practices, many of which are unnoticed by government politics and disregarded by science.

Drawing on the notion of cosmopolitics (Stengers 2010; Latour 2004) as a conceptual framing is useful as a way to move beyond the silos of space policy and traditional geopolitics, to connect the emerging imaginaries of outer space with the cultural specificities of a new kind of ‘environment’ and a new space economy. In line with recent calls that invite that we turn away from the notion of space-as-frontier to embrace a more cosmopolitical notion of space-as-environment (Olson 2018), I am interested in discussing both the opportunities as well as the challenges and the limits of ethnography for studying “space-on-Earth”. As Valerie Olson has argued, the relationship between the social and the ecological does not necessarily end at Earth’s upper atmosphere “because it is a ‘natural’ boundary for earthly forms of life” (Olson 2018). In fact, space becomes a new environment in the inexorable search for new energy resources and is becoming a novel kind of periphery, especially the lower orbit.

This is intimately linked to how planetary scientists, space engineers, astrobiologists, space policy-makers, and others working within the contested terrains of space science, exploration, settlement, law, and resource extraction, are constructing diverse, sometimes conflicting and contested visions for human futures in space. In this regard, I am interested in drawing on contemporary debate on how might anthropological thinking and ethnographic practice contribute to resist the language of “colonisation”, “manned” missions, and “frontiers”. And drawing on Isabelle Stengers’ (2010) notion of cosmopolitics, is useful to illustrate how the science and politics of space exploration are a constructive enterprise, a diverse, interdependent, and highly contingent system that does not simply discover preexisting truths but, through specific practices and processes, helps shape them.

## Cultures Beyond the Earth / Space-as-Environment

Before continuing it's pertinent to mention briefly that anthropology has an intriguing history of engagements with outer space. Starting with the pioneering work of Margaret Mead in the late 1950's and others who developed a focus of inquiry on the question of future extraterrestrial communities. In the 1970s, a series of interdisciplinary symposia brought scholars together to discuss possible cultures of the future as captured in an edited volume "Cultures Beyond the Earth: The Role of Anthropology in Outer Space" (Maruyama et al. 1975).

Forty years later, this work has been rearticulated by a new group of anthropologists interested in outer space who have renewed the call to take outer space seriously as a field site that invites novel theoretical and methodological approaches. These interests range from a reconceptualization of the future of humans in space (Valentine 2012; Valentine et al. 2009); how planetary scientists cultivate proximal encounters and visualize outer space as 'outer places' (Messeri 2016; 2017); how space "offers and shapes an analytic of limits and ever-opening horizons—epistemological and physical— that provokes new understandings of humanness, environment, temporality, and of inter-species life on Earth" (Valentine et al. 2012); how contemporary "environmental power" is bound up with the production of national technical and scientific access to outer space (Olson 2018), or what are the intricate processes for familiarizing outer space (Praet and Salazar 2017), or what does the new imaginaries of space faring nations looks like. My interest in drawing from this work is primarily to paint a picture of how anthropologists' attempts at querying and queering outer space, is shaping theoretical and methodological approaches that may open novel possibilities and productive areas of inquiry at the intersections of space sciences, political ecology, technosocialities, and social imaginaries.<sup>1</sup>

### Vignette One: The business of outer space: venture capitalism off-Earth

Last year was a very important turning point in space exploration. It marked the 60th anniversary of the launch of Sputnik 1 on October 4th 1957, the first artificial Earth satellite launched into an elliptical low Earth orbit. This was the event that is today commonly agreed to have started the Space Age and which Hanna Arendt described in 1957, as "second in importance to no other, not even to the splitting of the atom" (Arendt 1958) in her critique of this event as an example of what she called 'earth alienation'. It was also the 50th anniversary of the signing and entering into force of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, commonly referred to as the Outer Space Treaty, in 1967.

2017 was also important as NASA discovered a record number of exoplanets located in circumstellar human habitability zones to a sun, while Ghana launched its first satellite and India announced plans to send Chandrayaan-2, it's second mission to the Moon in January 2019 which will carry an orbiter that will travel around the Moon; a lander that will attempt India's first controlled, soft landing; and a rover. China turned an important page in establishing its intent to become the new main player in space exploration. The Xi Jinping administration's massive investment in China's space program and in advanced technology sectors such as robotics and artificial intelligence are no doubt testbeds for China to showcase its capacity as a global leader in so called 'frontier' science and technology research and development in the next few decades. While SpaceX successfully launched its twelfth Commercial Resupply Services mission.

At the outset of the 21<sup>st</sup> century, while ongoing efforts in space law and policy continue to embrace the question of governance regimes beyond the terrestrial, a new space economy is blossoming as boundaries of global ecologies and economies extend far below and above Earth's surface, and space

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<sup>1</sup> See the panel at the 2015 AAA Conference, Denver. Anthropology of Outer Space: Familiar Scales, Strange Sites. Organised by Kira Turner Michael P. Oman-Reagan and Lisa R. Messeri See <http://religionandtechnology.com/aaa2015/>

tourism gives a glimpse into a very different engagement with outer spaces, particularly the low orbit and Luna. This context has given rise to a “critical astropolitics of outer space” (Havercroft and Duvall 2009), interested not only in the militarization and securitization of outer space, but also in examining the ways in which outer space is being opened to off-Earth capitalist expansion. Evidence of this first point can be seen in the fact that this year, United States Vice President Mike Pence confirmed plans to create a “Space Force” as the sixth branch of the US military, echoing comments from Donald Trump, who had said earlier that “American dominance in space” was imperative and that space was a war-fighting domain, just like the land, air and sea.

Let’s make no mistake. Outer space will be a defining domain of human enterprise in the coming decades and will significantly transform how we grasp with life on Earth. There is not only a novel reimagining emerging of the planet as embedded in a wider space ecology. New actors, new industries and new technologies are changing the way space is accessed and used. As of 2018, there are 72 government space agencies in operation, while private space corporations such as SpaceX, Deep Space Industries, or Planetary Resources, now fall in rank with the “big six” space agencies: NASA, ESA (Europe), JAXA (Japan), IRSO (India), RFSA (Russia), and CNSA (China). As global firms anticipate, by 2030 the space industry sector could be worth more than US\$3.5 trillion globally.

A report from US-based investment firm Space Angels states that in 2017 private investors in the US invested US\$3.9 billion into commercial space companies with a record 120 venture capital firms in operation. In this context, some space entrepreneurs have gone to the point of claiming that humans ought to become a “multiplanetary species” (Musk 2017). While I can’t corroborate if Elon Musk full understands the weight of his remarks, these should not be taken lightly. In fact, they should be taken very seriously and might form the basis of an ethnographic project that provides a critical account of the ways through which venture capitalism is not only mobilizing concrete imaginaries of space exploration and settlement, but also how capitalist enterprise is transforming and reshaping the registers of outer space as an expanded new environment that can be calculated and valued. One consequence of this phenomenon for anthropologists, as Debora Battaglia observes “is a suspicion that the move to space, now and in the future, constitutes a movement of terrestrial stratified and spatialized socioeconomic and political relations into the cosmos” (Battaglia 2012: 247). This of course includes any idea of colonization or settlement.

As of today, several companies have their sights set on the moon, and they’re ramping up their plans to deliver spacecraft to its surface. Only three nations—the United States, the Soviet Union, and China—have successfully soft-landed on the moon, and their missions were all carried about by national agencies. No company has ever placed a spacecraft on the moon (yet), but if a few key players have their way in the next decade, the lunar surface could soon be littered with them.<sup>2</sup>

In 2015, during the last year of the Obama administration, the United States Government updated its commercial space legislation with the passage of the Commercial Space Launch Competitiveness Act, sometimes referred to as the Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act of 2015. The update to US law explicitly allows US citizens to “engage in the commercial exploration and exploitation of ‘space resources’ [including ... water and minerals].” The right does not

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<sup>2</sup> See Marina Koren, ‘The Moon Is Open for Business’, *The Atlantic*, 28 September 2018. <https://www.theatlantic.com/science/archive/2018/09/spacex-space-moon-commercial-business/571357/> This article highlights how, for many years, launching things into space was the work of governments. Only national agencies had the money, the technology, or the political motivation to propel humans around Earth and send probes to explore other planetary bodies. A big change is observable in the past decade, as companies entered the scene with their own rocket technology. Today, while NASA’s space shuttle program is defunct, SpaceX’s Falcon 9 rocket makes a trip every couple of weeks, delivering all kinds of satellites into orbit. For these companies, the moon is not a national interest concern as it was during the 1960’s and early 1970’s. Or perhaps not evidently so. It is a marketplace. Instead of aiming for flagpoles in the regolith, they pursue customers, in the government and commercial sectors, who will pay to have their hardware deliver to the moon, or mine its crust for minerals. They want to help convert the ice on the moon’s polar regions into usable resources, such as fuel for a deep-space mission. And they want the work to produce revenue, just as rocket launches have for SpaceX.

extend to biological life, so anything that is alive may not be exploited commercially. The Act further asserts that "the United States does not [(by this Act)] assert sovereignty, or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body." Some are arguing that the United States' recognition of ownership of space resources is in effect an act of sovereignty, and that the act violates the Outer Space Treaty. All of this is also indicative, as Lisa Parks has observed, that as a growing amount of "signals, transactions, images and events either take shape within or pass through orbital space", it is ever more urgent to have a better understanding of how this space "is organized, who controls it and how it has been contested" (Parks 2013: 66).

Against this backdrop, and notwithstanding that Australia was the third nation behind the US and the former Soviet Union to launch a satellite into space in 1967, since then, the country has developed niche areas of strength, but has lacked a sustained and coordinated national space strategy. Perhaps that's about to change.

### **Vignette two: Australia as a space faring nation?**

In July 2018, the Australian Government launched a new Australian Space Agency. This is perhaps the most important development in this sector in this country over the past 60 years, notwithstanding that Australia was the third nation, behind the US and Soviet Union, to launch a satellite into space in 1967. Since then, the Australia has developed niche areas of strength, but has lacked a sustained and coordinated national space strategy. Today the Australian space industry is worth A\$3.9 billion. To capitalize on its unique geographical advantages and world-leading expertise and R&D in frontier science and technology, the new Australian Space Agency (ASA) has set an ambitious strategic plan to 2030. Framed as the "most industry-focused space agencies in the world" (Clark 2018) and with just \$41 million in funding to establish itself over the next four years (a significantly limited budget in comparison with nearly all other established national space agencies), ASA has set its key priorities on the lower orbit (i.e telecommunications, geo-positioning systems, Earth observation services). As ASA strives to develop opportunities to 'become a global leader in pushing earth's links with space even further' (Clark 2018) and demonstrate how the space sector can deliver significant national economic, social and cultural impacts, it remains unclear what the best strategies are to engage the public in 'familiarizing outer space', especially young people and multicultural communities, and to develop a critical account of novel top down and bottom up social imaginaries of Australia as a space faring nation.

Here I draw on the work of Jessica O'Reilly in Antarctica and on the IPCC to look at how Australian planetary scientists and policymakers use expertise as their primary model of governance, in ways that not only lends Australian space exploration a particularly technocratic coating but also disrupts the sense of an exemplary epistemic community. Not unlike other cases internationally, this case study of institution in the making will develop insights on how outer space imaginaries shape the kinds of space policy and management that are possible. Australia is increasingly reliant on space-enabled services, in particular those that use satellite information in applications that protect and advance national interests.

### **Familiarizing the extra-terrestrial and making our planet alien**

To complete these "ecologies of practice" framework, I focus the attention on terrestrial analogues. Unique sites on Earth that are used as proxies for outer space environments and which came into prominence in the late 1990s for their assumed, past or present, geological, environmental or biological conditions resembling other celestial bodies. Outer space involves much more than human worlds and imaginaries of outer spaces must include sites for human *and* nonhuman ecologies. I think it's important to take these nonhuman worlds and ecologies seriously when producing a "slowed down" politics for outer space (to paraphrase Stengers). Only then an ontological politics that conceives a care-

oriented cosmopolitics of outer space might begin to be possible, as a process of composing common worlds off-Earth. The study of the socio-technical practices and imaginaries that emerge from the scientific search for extra-terrestrial life in terrestrial analogue sites provides insights into how ideas and technologies about life in outer space not only emerge and develop together with the representations, identities, discourses, institutions and the *material politics* of objects that give practical effect and meaning to these ideas, but also how a novel cosmopolitics of outer space might be mobilised, where planetary sciences become both a constructive enterprise and a highly contingent system. Hence a study of the Australian Space Agency (ASA), space entrepreneurs and start-ups, and scientific research in terrestrial analogue sites in three countries, can illustrate how scientific knowledge both embeds and is embedded in (and co-produced with) social identities, institutions, representations and discourses (Jasanoff 2004). Thus, on the one hand, ways of knowing outer space are inseparably linked to the ways in which outer space is organized, governed and controlled. On the other hand, ways of knowing outer space are also inseparably linked to different ontological formations beyond modern science and political economies.

### Concluding remarks

Engaging with this incipient but fertile field of anthropology of outer space opens up an opportunity to simultaneously critique the limits of ethnography while embracing new ethnographic openings to develop novel accounts of how lives and materialities in these sites represent specific forms of human and non-human being, rendering these spaces on and off-Earth as constitutive and generative, not simply as contextual. This is part of an intellectual move towards a 'deterrestrialization of thought' (Howe 2015) that implies an exploration of the "vitalities, materials, and movements that are skyward, spacey, and atmospheric" (Howe 2015: 206). Scientific and technological processes are carried through specific practices that shape and are shaped by the material politics and ontologies of distinct technologies, and objects, and associated infrastructures deployed in these key sites and places. There is in turn a concomitant process of familiarizing the extra-terrestrial and making our planet alien (Salazar 2013; 2015; 2017). A double movement at play across competing 21<sup>st</sup> century cosmic imaginations. On the one hand, there is a distinctive move toward viewing the extra-terrestrial in familiar terms and comprehending it by means of conceptual frameworks that we, earthlings, are accustomed to. On the other hand, there is a growing approach to understanding our own planet in unfamiliar terms, especially in astrobiology, where so-called 'analogue' sites and 'extreme' environments are used as proxies to provide clues about the biology and geology of other planets.

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