

## Conceptualizing Difference in SETI: Xenanthropological Theory and Methods. M. P. Oman-Reagan<sup>1</sup>,

<sup>1</sup>Vanier Scholar, Department of Anthropology, Memorial University, Canada omanreagan@mun.ca

Anthropological theory and methods offer new ways to help us “step out of our brains” [3] and overcome the tendency to search “for other versions of ourselves” [3] in the search for extraterrestrial intelligence (SETI). This paper proposes SETI researchers draw on anthropological theory, ontology, and multispecies ethnography to imagine “how intelligent life interacts with its environment and communicates information” [3].

While anthropologists have historically focused on differences and similarities in human cultures, some have lately turned their focus to objects, technologies, non-human life, and the ways complex systems or structures operate. Anthropologists are now studying topics as varied as: telescopes, particle physics, cyborgs, futures, minerals, plants, insects, fungi, microbes, molecules, waves, oceans, and possible forms of extraterrestrial life [e.g. 1, 6, 11, 14, 15, 19, 22, 23, 28, 29, 30, 32, 33, 34, 37]. These recent moves to de-center the human from anthropology offer models for further shifts away from anthropocentrism that may be necessary in the next generation of SETI research.

A central problem in anthropology is how to conceptualize and communicate across *difference*. As a discipline that seeks to make sense out of difference, Anthropology has a robust history of engagement with SETI’s search for different forms of intelligence [8, 13]. Speculative fiction about extraterrestrial intelligence (ETI) such as *Dark Orbit* [9], *Blindsight* [39], *Solaris* [26], or work by Butler, Le Guin, Elgin, and others are often engaging in speculative ethnography. Incorporating the recent inclusion of non-humans in anthropology, the study of ETI cultures in SETI could be considered scientific speculative ethnography, a practice we could call *xeno-anthropology* (the study of extraterrestrial cultures). *Xeno-* (alien) communicates not just outside (*exo-*), but of a different origin.

Approaching aspects of SETI research in terms of xenanthropology also reminds us to consider ETI as *people*—beings with agency, culture, technology and other traits we ascribe to our species. To link SETI with the *anthropos* (human) at the root of anthropology is not to say ETI will be like us, but rather they may be people who are different in ways that push the limits of our astrobio-logical and anthropological imaginations.

Anthropological insights from (1) contemporary theory, (2) ontological approaches, and (3) multispecies ethnography can facilitate and encourage overcoming anthropocentric thinking. Such work helps our earthly expectations and imaginations try to account for extraterrestrial possibilities, inviting us to ask: “what ideas are we thinking other ideas with?” [12], i.e. what ideas

are we relying on in order to *think* our other ideas? what are our prior assumptions?

The insights from these three areas can be applied to SETI theory, experimental design, development of markers for communication and intelligence, target identification, and development of instrumentation. By engaging with anthropology, SETI researchers can develop methods and practices that encourage stepping out of our human minds and imagining a radically different, less anthropocentric, ETI perspective.

**1. Anthropological Theory:** SETI has historically drawn on analogies from anthropology to explain cultural change, technological change, and first contact scenarios, however these analogies often rely on outdated theories instead of the most recent insights [e.g. 7, 40]. For example, SETI has sometimes used the idea of “primitive” vs. “advanced” civilizations, and considered such models of development as inevitable or natural (toward increased energy use, or expansion, for example). However, these unilinear and hierarchical models of change are holdovers from 19<sup>th</sup> century anthropology. As the study of human “progress” encountered emerging biological theories intended to explain diversity of life in terms of evolution, a *progressivist social evolutionism* arose which considered differentiation in human societies as equivalent to variation seen in organisms. Within a hierarchy of all biological life, human beings were positioned as the highest form and Europeans developed a parallel hierarchy of cultures in which their own society was considered the highest form of civilization. Although these models were slight improvements over theological explanations for cultural difference popular at the time, they have long since been abandoned by the disciplines that constructed them as ineffective at describing reality and as political remnants of 19<sup>th</sup> century ideologies [e.g. 5, 36]. Newer research and theory on social and cultural change should be incorporated into SETI models.

As we move into space and it becomes more a part of our environmental and cultural landscape [10], that change may shape the ongoing coevolution of Earth life. Insights from environmental space anthropology suggest we consider coevolution beyond the planetary scale, to include solar systems, and interstellar space, as we search for ETI who may be living outside the restrictions of a single planetary influence. An emerging “space-inclusive anthropology” [2] can examine both human and non-human engagements with space, studying how scientists produce knowledge at a distance [27], how humans and non-humans develop social relationships as we move into space [30], and how ETI might

interpret messaging objects like the Voyager record [18]. Space was once considered outside the scope of anthropology, however new subfields dedicated to space, and recent attention to science studies, provide opportunities for collaboration with anthropologists as advisors, partners, and co-authors [e.g. 40].

**2. Ontological Anthropology:** An ontological approach to anthropology addresses the question of *difference* using methods also relevant to SETI. Speculation about extraterrestrial life sometimes describes ETI in terms of what seems rational, common sense, natural, or familiar. One lesson of anthropology, however, is that what we perceive as normal is not universal on Earth, which suggests it is unlikely to be universal across interstellar space and beyond. Carl Sagan noted that from a planetary perspective we seem “scarcely distinguishable” from the other inhabitants of Earth [35], and yet from anthropological research we learn that some people tell us a rock is alive [38] or twins are birds [4]. These beliefs seem vastly different from those of SETI scientists but may be small relative to differences we will likely encounter with ETI.

Ontological anthropology attempts to account for seemingly vast differences in world views without relying on the idea that people who hold them are wrong. A similar approach will be necessary to communicate with ETI, not only for diplomatic reasons, but for searching, messaging, and comprehending. Ontological approaches to difference can help us translate from different modes of understanding into our own, and understand those systems on their own terms.

An ontological approach also asks us to consider when we encounter something truly different that the concepts we have may be inadequate to describe the data, “let alone to ‘explain’ or ‘interpret’ it” [4]. Like other scientific methods, ontological anthropology uses encounters with new data to transform or replace existing analytical concepts. For example, it may be necessary to break from a reliance on Cartesian ontology which defines a *self* (the mind) vs. an *other* (the world) in order to imagine or understand a radically different ETI perception or existence [e.g. 25]. An ontological approach challenges dualist distinctions to suggest there are not only different world *views*, but may be different *worlds*. Such conceptual shifts are helpful as we attempt to imagine and relate to an ETI experience of the universe in which “the world” may look, feel, and act entirely different due to differences in biology, mind, or culture [31]. Recent anthropology also offers “extraterrestrial relativism” [17] and other non-anthropocentric ways of thinking about existence through different natures, minds, and experiences.

**3. Multispecies Methods:** Multispecies ethnography approaches non-human subjects on their own terms,

much like Herzing's ethnographic work with dolphins [e.g. 20, 21]. Interdisciplinary multispecies research has the potential to expand our ideas about possibilities and definitions of life [e.g. 16]. With the emergence of multispecies ethnography, the *anthropos* in anthropology stands for both humans conducting the research, as well as other agents and beings engaging with them, such as machines, technology, systems, minerals, ecosystems, and other species [24].

It is just as likely that the intelligent life we encounter on other worlds or in space may think like an octopus, an ant, or a dolphin, as it may think like a human. Non-human life here on Earth is one SETI test-case for ETI, and yet there has not been enough attention in SETI to non-human architecture, social organization, and cultural practice. We are surrounded by non-humans with language and yet have not managed to communicate. Multispecies ethnography can help us study the technology, intelligence, language, and culture of non-human life with the same attention and seriousness given to humans. This is an important distinction from most animal behavior studies which often begin with the assumption of anthropocentric superiority, a mistake SETI cannot afford to make.

**Additional Information:** (A) This paper offers a framework to reconsider anthropocentric assumptions about: how abundant and diverse intelligent life is; how it communicates; and how to search for and detect it [3]. (B) The adaptation of existing software to socio-cultural data (e.g. eHRAF World Cultures) might offer big data analysis opportunities (e.g. D-PLACE.org). Advances in machine learning/AI could allow the use of environmental and other data in modelling possible ETI cultural forms and evolution (with many caveats).

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