

ASTROPROSPECTING: ACCOUNTING FOR “PLACE” IN SPACE SCIENCE INFRASTRUCTURE.

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Introduction: With the collapse of the Arecibo observatory in the December of 2020, the outpouring of grief and loss that came from the online community showed that, more than a space of scientific importance, Arecibo held social significance to the island. However, it is becoming increasingly evident that we currently lack the conceptual and theoretical tools to account for the impact that scientific facilities have on a place as astronomy observatories become contested spaces, such as the case of the Square Kilometer Array and the Thirty Meter Telescope. The work presented here is a work-in-progress project that explores the limitations of impact assessment literature on research infrastructures. In asking, “How can we account for how astronomy clusters impact their host communities without reducing locality to spaces of natural resources?”, I propose a conceptual framework that merges perspectives from feminist infrastructure studies and Latin American STS to redress existing gaps in research infrastructure literature.

Overview of Work: Knowledge of how research infrastructures affect the daily lives and social dynamics of the context in which they are embedded is limited. Despite this, big research infrastructures continue to be proposed as a model for knowledge-making, often with institutional claims of “benefits to the community.” Applying analytical and conceptual frameworks from the field of Infrastructure Studies and Latin American Science & Technology Studies, this qualitative research asks whether and in what ways the development of a large astronomy cluster in the Atacama Desert in northern Chile—including the Atacama Large Millimeter Array (ALMA) and the Atacama Astronomy Park (AAP)—has affected the Antofagasta region and the lives of local communities. The aim of this research is to eventually investigate, through documentary research and ethnographic fieldwork, how research infrastructures and their locales are co-produced to understand these infrastructures *in situ*—taking into consideration the social and cultural context in which they are built as well as the broader transnational networks involved in the facilities’ development. The research question therefore focusses on understanding both local impact and global power dynamics in this distinct sub-set of the global science infrastructure system. This question also arises in response to a clear gap in the existing impact assessment literature, which is focussed on innovation and economic outcomes of research

facilities in the North, and reveals a marked gap in understanding societal impacts in the South.

Theoretical Framework: This project draws from the interdisciplinary field of Science & Technology Studies. It applies conceptual and theoretical frameworks from Infrastructure Studies to the study of Big Science research infrastructure. It thus expands our understanding of how Big Science has come to shape and affect not only the nature of science and scientific knowledge-making, but also in what ways it tendrils out to affect the lives of communities in which these facilities are installed. Furthermore, research in impact assessment of research infrastructures has repeatedly shown a dearth of knowledge of their societal impacts. This project moves towards filling that gap through qualitative methods that favor local narratives and context-driven approaches in ways that yield novel insights into the social and cultural factors that interplay with scientific infrastructures. Finally, both Big Science research in Science and Technology Studies and impact assessment methodologies have often favored the study of facilities in the global North. This project focuses on a cluster of facilities in Latin America, financed by the global North, assisting in our understanding of North-South dynamics in research financing, data politics, and distribution of benefits.

Relevance to Conference: Preliminary desk research on facilities such as the ALMA and the Square Kilometer Array (SKA) in South Africa finds that large-scale infrastructure projects were implemented without intensive consideration of their social context. Given Astro2020’s panel report on the state of the profession and societal impacts, more research on the intersections between research facilities and their localities is urgently needed, as the escalating tensions around the Thirty-Meter Telescope in Hawaii has continued to demonstrate. Initial policy recommendations are clear: It is critical to undertake social impact studies from the very beginning of the science infrastructure design process. Empty spaces on maps are not empty – they are rich social places with a justifiable need for agency, accountability, and engagement. Much of science (whether physical sciences, social sciences, or natural sciences) has had to contend with its historical entanglements with colonial practices, including in extractivist approaches to land and data. Astronomy may very well have to reflect upon its own practices and impacts as facilities and projects continue to grow in scale, both in terms of collaboration as well as impact.