Introduction: Machinic Visions of the Planetary

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At a time of increasing challenges that concern our relationship to the environment, including looming and continuing environmental crises, sociopolitical designations of alterity, and the uncertainty of a planetary future outside of capital's globalizing social forms, we address how new forms of vision and visuality brought forth through technologies envision planetarity and planetary relations. Imaging technologies are central to consider as sources of knowledge about the environment. Their image output has the power to reconfigure relations of the planetary and can and can act as a source of speculative reimagining. The development and dependence on machine vision technologies such as satellite imaging, wide-scale algorithmic platforms, statistical modeling programs, drones equipped with LiDAR, and other sensing networks with visual output bring about an expansion of the perceptual scope. Through inquiries into the themes of scale, alterity, nonhuman entanglements, and operational imaging, this issue asks how machinic ways of seeing generate a new aesthetics of planetarity. Throughout the various contributions included in this issue, attention is placed on the

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technical affordances and potentialities of machinic vision technologies. Then, too, the contributing authors probe how these technologies and the modes of perception they engender contribute to the figuring of diverse subjectivities as enmeshed and entangled with regard to both technical and environmental processes. How do modes of perception by machine vision intervene in our knowledge production of the environment? How can interdisciplinary inquiries into the output of machine vision (e.g., resulting technical imagery) contribute to the role they play in understanding planetarity and its contemporary conditions? This inquiry is based on an understanding that our knowledge of the physical environment—both in the threats that are posed to it and its expansion beyond earthly borders—is increasingly negotiated through technological and automated engagements of machine vision, and that the visuality of these technical systems is a central aspect to consider through a historical and critical as well as speculative lens.

Machine vision and its technical modes of perception have been recognized in recent cultural discourse as a phenomenon that both conditions and reconstitutes how we understand vision and visuality in the contemporary sphere (see Azar, Cox, and Impett 2021; Paglen 2014; Parisi 2021). Addressing this back in 1999, John Johnston, drawing on theorization of Gilles Deleuze, Felix Guattari, and Paul Virilio, coined the term *machinic vision*, describing it as a "new sense" and "presupposing, not only an environment of interacting machines and human-machine systems but a field of decoded perceptions that, whether or not produced by or issuing from these machines, assume their full intelligibility only in relation to them" (Johnston 1999, 27). Johnston's interest in exploring this notion of machinic vision—and indeed ours within this stream—concerns the kinds of perceptions these systems make possible. Johnston described a mode of visual perception that lies within nonhuman objects and forms, including having the properties of being "gaseous" and/or fluid as well as allowing disembodied perspectives otherwise impossible and unseen (Johnston 1999, 28). As the contemporary development of digital and algorithmic technologies of machinic vision increasingly intervene in a wider societal context, this new sense necessitates not only critical inquiry and attention to the kinds of perceptions made possible but also critical inquiry that is grounded within the contexts of their implementation and epistemological function.

The increased attention to and use of the term *planetary* has been formulated through multiple fields of study such as media and design theory and broadly within the humanities. In contrast to the centralization—and what has been criticized as universalizing—of human agency found within the discourse of the Anthropocene, the term *planetarity*, as it was originally coined by the literary and postcolonial theorist Gayatri Spivak, proposes a relational ethics that recognizes multiple modes of alterity. Defined within the contexts of the subaltern and postcolonial theory, Spivak's term differentiates itself from perspectives of environmentalism and globalization that view Earth as an

undivided natural space (Spivak 2015, 290). Instead, planetarity acknowledges a differentiated political space and the notion that "the planet is in the species of alterity, belonging to another system; and yet we inhabit it, on loan" (Spivak 1999, 44). If we were to discuss these perspectives through images, the first widely distributed image of Earth in color on the cover of Stuart Brand's *Whole Earth Catalogue*, taken in 1967, could be seen as canonizing this ideology of globalization—as a view of Earth that conflates "natural space" with "political space" (Spivak 2015, 290–92). Brand's campaign around the publication of that particular image and its reception were loaded with the ideological claims of a universalizing human community in unity on a singular planet Earth. Instead, planetarity recognizes pluralistic and incommensurate relationships between systems and scales and the ways in which we are, as Spivak states, "bound to the subjective conditions of envisioning planetarity" that are not always "susceptible to the subject's grasp" (Spivak 2015, 290–92). This stream and the images that are its subjects of inquiry offer several perspectives on the modes of alterity that are afforded through machine vision, perspectives that take into consideration pluralities and nonhuman entanglements, instead producing alternative imaginaries and approaches that provide a diversity of conditions of planetarity.

Philosopher of technology Benjamin Bratton has argued that planetarity is a phenomenon made visible through computational processes. For Bratton, the ways in which the planetarity comes into focus are through computational modeling technologies, such as those that model and monitor climate change, in which the statistical accrual of data is generative of alternate senses of scale and entanglement (Bratton 2019, 9). Bratton describes planetary-scale computation as a "plural epistemological technology," locating its utilization within scientific fields as a function of "the technological exteriorizations of astronomic imaging, the dynamic flux of planetary ecological processes (i.e., 'climate change') … only comprehensible through the multivariate quantitative abstractions of simulations of Earth's past, present, and future" (Bratton 2022, 149). Building off this perspective, we focus on the topic of machine vision systems as part of and partial to the epistemological function of wide-scale computation because through their visual output—that is, the synthesizing of "quantitative abstractions"—the data becomes visible, graspable, concretized, and, in other words, subject to actionable knowledge. The advances in machine vision and its production of images intervene in our conception of the physical world.

The following collection of articles and an artist's interview address specific aspects of envisioning planetarity and provide insight into machinic ways of seeing as epistemological operations. In "Pluralising the Planetary: The Radical Incompleteness of Machinic Envisioning," Anna Munster and Michael Richardson analyze the logic and implementation of computational wide-scale environmental monitoring systems such as Microsoft's Planetary Computer and Amazon's partnership with the start-up, Overstory. The authors

problematize claims of scalar equivalence and the assumption of interoperability across media, infrastructure, and optics that this planetary platform of seeing Earth constitutes. Instead, through referencing artistic practices of Tega Brain and Indigenous approaches to AI development via Country Centered Design, a design methodology of Indigenous peoples in Australia, they propose a more pluralistic and nonhuman set of Earth images and imaginings. Through this means, they argue that a computational planetary vision has the potential to operate within a pluralistic universe of seeing, in which ongoing and radical incompleteness is core to its imaging.

Ideas of planetarity are also referenced in the context of contemporary artistic research with its engagement with material, form, and perspective. For example, the 14th Gwangju Biennale exhibition in South Korea with its corresponding symposium titled "Confluences of Art and the Planetary" referenced "planetarity" as a way of framing a category of artworks that "imagine an alternate future that counters and aims to rebalance the effects of unequal modes of production and consumption from late capitalist economic infrastructures" (14th Gwangju Biennale, 2023). In the discussions that emerged from the symposium and within the exhibition itself, Indigenous knowledge production and cosmological entanglements between nonhuman relations, processes, and logics were referenced as reflections on planetarity in artists' works. Likewise, in "Machinic Landscapes: Aesthetics of the Nonhuman," Lila Lee-Morrison references contemporary artistic practices that work in the landscape genre, culminating at the intersection of technology and nature. Drawing on conceptualization within the philosophy of technology and landscape theory, Lee-Morrison examines the work of artists Daniel Lefcourt, Mishka Henner, and Davide Quayola and their utilization of algorithmic programs, 3D modeling, satellite imaging, and drones equipped with LiDAR technology. Lee-Morrison examines how these artworks express an aesthetic entanglement between machinic and organic forms of representation. This article contributes an analysis of the aesthetics of systems of alterity, both technological and environmental.

In "The 'Cartographic Impulse' and Its Epistemic Gains in the Process of Iteratively Mapping M87's Black Hole," Paula Muhr analyzes the first empirical images of a black hole produced by the global effort of the Event Horizon Telescope. Rather than approach these images as straightforward visual representations, Muhr contextualizes them within their operational status. Through a deep analysis of the statistical and algorithmic processes by which the images were constructed and then referenced by astrophysicists, Muhr describes the multiple output images as incurring a cartographic impulse, a concept put forth by Sybille Krämer. Muhr discusses how these images operate as maps, and as such, as epistemic tools that incorporate ideological underpinnings of the field in which they were produced. Muhr dissects the processes by which an unknowable object becomes known through

forms of (non)representation. Muhr's analyses of astrophysical techniques of sensing, detecting, and visualizing include how these methods inform a study of place-making in relation to planetary-scale environments.

Analyses of historical representations found in film, photography, and video techniques also contribute to this theme through the ways they inform and provide antecedents to the modes and conditions of machinic vision. In "Ecologies of Scale in the Age of Satellites and Television," Amy Rust explores scale as a medium through its representation in two films, Haskell Wexler's *Medium Cool* and Stanley Kubrick's *2001: A Space Odyssey*. Drawing on the iconic 1968 NASA photograph *Earthrise* and the cultural moment it encapsulated, Rust examines how we think about proximity, distance, and scale through the introduction of remote viewing technologies such as broadcast news and space-age technologies. Contrary to the view that distance and scale entail impersonal power relations, Rust argues for a reconsideration of the homogeneity and hierarchy often associated with these concepts. Planetarity has been approached as a "praxis" by Jennifer Gabrys (referencing Spivak), which defines not only the figure of the planet as "other" but also how conditions of alterity may define the subject through collectivity and collective responsibility for unequal conditions of humans and nonhumans living on the planet (Gabrys 2018). Concurrently, the development of Rust's media theory of scale follows this line of thinking, approaching distance as preserving diversity and interdependence across vast and varied environments. Through her analyses of these two iconic films and their representations of scale, Rust views scale as an interface where scalar regimes meet and interact, fostering mutual responsibility and connection.

Lastly, the artist's interview with Susan Schuppli by Lila Lee-Morrison discusses Schuppli's video artworks and her direct engagement imaging technologies, data visualization, and sonic dimensions of sound recording. Schuppli's development of the term *environmental media* and its expression through her video works addresses entanglements of representation emanating from technical and environmental sources. The discussion focuses around Schuppli's video artworks *Trace Evidence* (2016), *Can the Sun Lie?* (2014), *Nature Represents Itself* (2018), and *Not Planet Earth* (2021), all of which engage with historical and forward-looking perspectives on visual regimes brought about through climate change. In reviewing these works, the discussion broaches topics central to an aesthetics of planetarity concerning challenges such as scale and abstraction and how they figure in her work.

The texts in this stream provide a series of interdisciplinary perspectives on the ways in which new forms of vision and visuality are brought forth through technologies in the context of planetarity. We hope they bolster further critical inquiry into the ways in which contemporary modes of seeing are enmeshed with knowledge production of the environment and configure our shifting relationship to and within it.

Banner Image: *Terraform (Luma Heightfield),* **Daniel Lefcourt, 2018. Courtesy of the artist.**

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