Troubled Worlds: New directions in Information Research, Practice and Pedagogy

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Abstract. This blue sky proposal argues that next-generation students, educators, and scholars of information studies have a critical opportunity to remake the field by breaking down technology-social-environment divides and reintegrating a concern for nature into our analyses. We frame three research opportunities for information studies: techno-social-environmental care ethics, governance of computing resources, and designing with the environment.

Keywords: Environment · Ethics · Bodies · Embodiment · Computing.

1 Introduction

Today information technology plays an increasingly vital role in a mounting environmental crisis. Experts warn that as the earth warms seven degrees Fahrenheit by 2100, the computing industry will further perpetuate environmentally unstable conditions by expanding energy demands, relying on precarious sourcing practices, growing the production of e–Waste, and fueling a market of technology and data consumption (e.g. Houston, et al. 2016, Lepawsky and McNabb 2010, Lepawsky and Mather 2011; Ensmenger 2018). Fears of collapse and uncertainty have prompted efforts to rework and rethink approaches to building, maintaining, and using technology. For example, right to repair advocates argue for allowing people to open up, adapt, and restore their computational devices without voiding their warranties (Houston and Jackson 2016, Graziano and Troga 2017). Media studies scholars break down nature-culture dualisms and show how the media infrastructures are imbricated in earthly concerns (Parks 2005; Parks and Swotch 2012; Starosielski 2015; Starosielski and Walker 2016). Human Computer Interaction researchers grapple with the tensions between the obsession with novelty and short timescales and the desire to create sustainable technology (e.g., Silberman et al 2014; DiSalvo, Sangers and Brynjarsdttir 2010). Indigenous scholars and advocates seek to situate humanity in a broader ecological web that emphasizes living lightly on the planet (Kimmerer 2013, Gómez-Barris 2017). And artists experiment with the integration of the environment and computing while living on a damaged planet (Allahyari, et al. 2017, Ståhl, et al. 2014, Ståhl and Lindström 2018).

Despite these important inroads, the computing industry and wider information field has largely bracketed computing related practices from concerns for

the environment. This separation has resulted in the mounting consumption of resources with the cost of resource-intensive practices often disproportionately falling on those who need them the most.

To account for these shifts, this blue sky proposal argues for bringing a concern for entanglement of technological, social, and environmental actors into our classrooms, into our research, and into our computing practices. Below we outline a three-part research agenda focused on a socio-environmental care ethics, governance of computing resources, and designing with the environment. We suggest that information scholars have a critical opportunity to remake next-generation computing fields by noticing the entanglements of world-building practices, bodies, and environments.

A quick note on the form of this proposal before moving forward. We view this article as an exercise in advocacy and, as such, our writing necessarily simplifies complex phenomenon and vast bodies of literature. In this simplification, we hope to make room for ideas about changing modes of instruction, scholarship, and activism. Yet, change in this field will necessitate inviting complexities and complications back in through empirically-grounded insights, rich theoretical interventions, and inventive methodological approaches that inform and rework computing in the Anthropocene across the decades ahead.

2   Techno-environmental care ethics

Interventions practiced by scholars of feminist care ethics and indigenous ethics (Puig de La Bellacasa 2017, Smith 2013, Todd 2016, Zembylas 2017) have insisted that nature/culture binaries cannot hold, and point us to the conclusion that computing-nature binaries must be broken down. Such care ethics emphasize the multiplicitous ways in which humans exist in relation to each other and to material resources. Scholars position care ethics in opposition to conceptions of the individual that ignore both public resources such as roads or electrical infrastructures and webs of human relations in understandings of how human agency is produced and shaped. Indigenous care ethics emphasize multidimensional sociomaterial interconnections, reciprocal responsibilities in human/nonhuman relationships, respect for wisdom that comes with age, restoring responsibilities to the environment, and political autonomy and symbiotic responsibility with lands (Duarte 2017; Todd 2016; Whyte and Cuomo 2017). Feminist and indigenous care ethics call upon us to consider the larger webs of relations in which informational activities rely.

Recent work in the fields of infrastructure studies, computing history and media history empirically show how infrastructures are inevitably and inextricably entangled in the natural world (e.g. Ensmenger 2018, Carse 2014, Finn 2018, Parks and Starosielski 2015, Starosielski 2015; Ensmenger and Slayton 2017, Lécuyer, 2017, Cohn 2017). In drawing out attention to this entanglement, scholars attempt to re-embed historical studies of computing and information work in the environment. They invite contemporary studies of information to consider wider swaths of peoples, materials, and practices as "relevant" to this field. For

example, ongoing research by Ensmenger (2018), drawing on Gabrielle Hecht (2012), illustrates the multiple ways in which socio-material computing infrastructures and "nature" are co-constituted—be it through the astonishing energy consumption of technofantastic cryptocurrencies or the superfund sites which permeate Silicon Valley. Those imbrications draw in a whole new set of actors to our studies of the information technology. In his words, "[by] focusing the material underpinnings of the digital economy—in other words, by the relationship between 'computing power' and more traditional processes of resource extraction, exchange, management, and consumption—we can tell a more global and inclusive history of computing that encompasses unconventional and heretofore neglected participants in the digital economy" (Ensmenger 2018).

In drawing together environmental histories of computing with care ethics, we hope to accentuate questions about how information work sustains and harms the complex webs of relations which underpin computing. Following Maria Puig de la Bellacassa (2017), we are inspired to speculate how a politics of care for the various peoples and materials involved in computing might change our orientation towards information studies.

3   Governance of Computing Resources

There can be no question that the dominant orientation towards our everyday material existence requires rethinking (Chin 2016; DiSilvey 2007; DiSalvo 2014). Yet, to affect broad change, governance approaches must go beyond targeting individual actions to examine society-wide policy and governance initiatives. Greenpeace's "Clicking Green" report provides a helpful example of indirect governance. Highlighting how Internet companies consume energy, it puts pressure on these companies to consider cleaner energy sources (Cook, et al. 2017).

Addressing the governance of computing resources requires a focus on the broad role of production and consumption in computing—resource-intensive production of massive amounts of always-available data (Hogan 2015), production of electronic detritus (Gabrys 2011; Williams et al. 2008; Lepawsky 2015; Lepawsky and McNabb 2010, Lepawsky and Mather 2011), consumption of energy to run devices (Thatcher et al 2015), consumption of conflict metals to produce electronics, as well as the growing consumption of online "content." Close examination of the institutions which facilitate the massive consumption of computing involves questioning an economic order which encourages these resource-intensive trends (Bennet et al 2017). Collaborations with scholars of environmental policy and science can help information and technology researchers understand how to design technology policies and governance programs that account for wider structural forces embedded in legal regimes and policy outcomes (Jackson, et al. 2014). Such collaborative activity also invites the necessarily difficult task of becoming even more interdisciplinary—folding knowledge about effective environmental policy into understandings of computing practices and industries within critical studies of computing.

Of course, as many researchers have shown, people's understandings of climate change rely on computing models and information systems to understand and engage with the environment (e.g. Edwards 2017; Fortun 2012; Lave 2015). We are not arguing that all consumption of computing is problematic. However, the use of computing resources by climate scientists potentially raises important questions: What are the "right" uses of computing resources? When is the use of computing resources justifiable from the perspective of resource consumption? When is it wasteful? Responses to these questions might take into account the price of computing power serves to fairly distribute resources. Yet, we might argue that the market is not the most judicious distributor of environmentally-costly computing resources when it comes to public needs. For example, nonprofit public interest technology projects are not well funded compared to companies such as Facebook. Information studies can explore opportunities for equitable distribution of computing resources and explore approaches for enticing information workers to develop less-resource intensive technologies.

4   Designing with the Environment

In a final strand of research, we call for widening our approaches to the design of computing technology through a deep and ongoing engagement with the injustices (social, racial, environmental, etc.) that they may occlude, perpetuate, or further entrench. Rubrics of "here-and-now" prototyping (Bodker and Kyng 2018) underpin the development of computing infrastructure, but they often fail to amplify the legacies of environmental care already at work. This engagement involves reimagining the form and nature of design methods in order to nourish alternatives.

Drawing on critical empirical scholarship interrogating participatory design and techno-ethics (Armute forthcoming, Bardzell 2018, Irani 2018, Avle, et al 2017, Rosner 2018), new research approaches look beyond the conventional start and end points of design processes to observe the wider logics that computing practices draw upon and reproduce (Houston, et al., 2016, Jackson 2014). Rather than design for target users, scholars create the conditions for designing with both humans and nonhumans, individuals and collectives, materials and environments impacted by computing (sometimes unknown and unknowable) (e.g. see Dew Rosner, in submission; Bennett and Rosner 2018, Rosner 2018). Informed by scholars of critical race studies, disability studies, and feminist theory, they trouble a hierarchy of knowledge that sets apart the expertise of those devising and building worlds from those who inhabit and belong to them (Tran O'Leary 2018).

This work invites computing scholars to situate technology development within wider social and material landscapes. Across multiple scales of intervention, it not only struggles against particular codifications of design (e.g. personas), but also seeks to elevate existing alternatives and their legacies of community-building (Bennett, et al, in submission; Lampinen, et al. 2018; Light, et al. 2017). Across these encounters, scholars begin to grapple with their own

complicities (Ratto 2018) and responsibilities (Forlano 2017) in what Tsing calls life without the promise of stability (Tsing 2015, p.2). In information studies, designing with the environment means that design work must entangle the long-term environmental effects of living on a damaged planet with the work required to create and adapt that planet for a just technological future.

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