Research Perspectives:
From Other Worlds:
Speculative Engagement Through Digital Geographies

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Abstract

Our ability to predict, explain, or control sociotechnical realities is being increasingly called into question by unprecedented phenomena in surveillance, in markets, and in other social and political domains. The apparatus of research—our current categories, instruments, arguments, and epistemic choices—rely on what is empirically accessible, i.e., on the past. Our research orientation toward the future assumes continuity and the extension of past patterns into a predictable and thus manageable future. In this research, we propose speculative engagement through digital geographies to make visible the processes of technological and cultural reconfiguration that result in unprecedented change. After describing the conception of "the future" in widely used research methods, we describe speculative engagement as a research orientation to disclose new categories, relationships, and values and a commitment to the performative relationships of our current research practices with potential future(s)[1]. Digital geographies are internally consistent and coherent worlds that are cognitively plausible but estranging. They are carriers of meaning and culture that underpin a broad class of methods to provide richly experienced "other worlds." We posit principles for effective digital geographies and provide an illustrative example of a digital human artifact that estranges us from current assumptions. Finally, we argue that our approach enables researchers to engage with the future on its own terms. In this way, researchers, designers, and policy makers can open current practices to new categories, relationships, logics, and values and make visible the unprecedented reconfigurations in which our research is implicated.

Keywords: Future(s), Speculative Engagement, Digital Geographies, Theorization, Technoculture

1 Introduction

The future stalks us. It is always waiting, barely out of sight, lurking around the corner or over the next rise. We can never be sure what form it will take. Often it catches us entirely unprepared (Susskind, 2018, p. 1).

Our research effort begins with the simple observation that our modern experience of living with technologies often does not meet what we envisioned or what our theories led us to anticipate. One of the founders of the internet stated that "it has become clear that the web is not living up to the high hopes we had for it. Built … for collaboration and empowerment, the web has been hijacked by crooks and trolls who have used it to manipulate people all over the world" (Berners-Lee,

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[1] Future(s) indicates not yet realized presents which are multiple and indeterminant. Henceforth written as "futures"

2018). Rather than dismiss this observation outright, we seek to understand how new research engagements can prepare researchers, designers, and policymakers to comprehend the emerging and unprecedented phenomena that we struggle to explain, understand, and critique.

Modern culture and our expectations for the future (e.g., what constitutes work, what social relations are and with whom, distinctions among entertainment, news, and politics) are becoming inseparable from technological networks (Haraway, 2018; Penley & Ross, 1991). But despite concerted efforts to manage or create, "the futures we are getting hardly seem like the ones we explicitly decide on; they are more like the messed-up ones we are drifting unwittingly and implacably into" (Tonkinwise, 2014, p. 170). Substantive reconfigurations of technologies, values, logic, and rationalities are unprecedented and largely invisible to our dominant research orientations. In many regards, we expect the future to be an extension of the past/present and we are surprised when the unexpected emerges. Examples of unprecedented change that cannot be extrapolated from the present include:

- Reconfigurations of power in distributing social goods, determining liberties, and setting legal boundaries through algorithmic classification of people by status, hierarchy, productivity, or trustworthiness. These enactments of political power affect billions of people (Chandler & Fuchs, 2019; Susskind, 2018).

- The legal implications of future robotic and human interactions rely, in part, on "the basic idea of exceptionalism … that a person, place, object, or concept is qualitatively different from others in the same basic category… We need to determine what differences matter" (Calo, 2015, p. 551). This legal discourse explicitly recognizes the need to establish solid foundations and insights that will enable the legal/cultural integration of robotics with human society into the future.

- When, how, and from whom personal and social data are collected, analyzed, and exploited has been radically transformed by new economic and political logic and new sociotechnical practices. Our research understanding has not kept pace as public and private spaces, official/nonofficial data collection, and the politics of safety are digitally reconfigured. In this configuration, privacy is neither a simple extrapolation from past/present concepts nor a monolithic variable across time and geography. Instead, it is disclosed as a condition of living, of "being known" (Igo, 2018) that *people inhabit.*

These reconfigurations are unprecedented in scale and scope and are largely invisible to dominant IS research practices. Our traditional categories, instruments,

arguments, and epistemic choices assume that the future can be extrapolated from existing data and patterns—i.e., from the past. Research practices privilege methods that reduce "futures to matters of anticipation, calculation, management, and pre-emption of risks and uncertainties" (Wilkie et al., 2017 p. 1) that are recognizable in the past/present. Unprecedented phenomena are unrecognizable because "when we encounter something unprecedented, we automatically interpret it through the lenses of familiar categories there by rendering inviable precisely that which is unprecedented" (Zuboff, 2019, p. 12). We need to unsettle the research apparatus and methods though which the future is formed and commit to sensing new forms of knowledge.

We argue that we need conceptual tools and observational skills to make futures a site of inquiry into often unremarked technological-social-legal-economic reconfigurations of the world, what we refer to as *technoculture*. We need intellectual structures to address the needs of future societies (Chiasson et al., 2011) because the dominant empirical focus on past/present use of information systems "is insufficient for forecasting sociotechnical futures if we accept that futures are complex and emergent" (Chiasson et al., 2018). This is not a matter of forecasting or predicting or of creating the world we desire. What is required is a relationship to multiple and indeterminant futures, not as an abstract concept but as "a profoundly vital component of the present (however defined) or, more fundamentally, a principle of present action" (Slaughter, 1998, p. 372).

To critically engage with unprecedented phenomena, we argue for *speculative engagement with digital geographies* to unsettle the received view of the future and to disclose new categories, relationships, logics, and values underpinning unprecedented intertwining of culture and technology. Speculative engagement requires a commitment to new relationships between our current research practices and the future(s) that they entail (Hovorka & Peter, 2021). *Digital geographies* are internally consistent and coherent worlds that are cognitively plausible but estranging. They are carriers of meaning and culture that underpin a broad class of methods to provide richly experienced "other worlds" in which to ask questions, critically engage with implications of technology, and think in new ways about our research and futures.

This unsettling of current research apparatus is not intended to better predict a future, avoid problematic developments, or make a future safe (Haraway, 2016). The goal is for researchers, designers, and those involved in strategy and policy to take a critical view of current research in reference to potential futures and what kind of world our theories make (Schultze, 2017). Our research carries forward into [future] human conditions because "the future is living within the present. … it inhabits the relations that establish the interdependence of things" (Adam and Groves, 2007, p. 122). We must

accept our own role in perpetuating values such that our research brings "the technical and the political back into realignment so that questions about possible *livable worlds* lie visible at the heart of our best science" (emphasis added, Haraway, 2018, p. 39).

We first outline common conceptions of the future by categorizing future-oriented methods. We argue that the dominant orientation of future-studies methods is that the future, both societal and technological, is a predictable or manageable extension of the past. We contrast these conceptions of the future with digital geographies that use imaginative work to engage current research practices and apparatuses. This approach enables researchers, policy makers, and the public to inhabit [future] societal conditions, logic, values, and concerns, and critically evaluate present action. We illustrate a digital geography of ordinary, day-to-day encounters with digital humans and demonstrate how substantive research questions about our current research activities can be drawn from such a speculative engagement. We then enumerate principles of digital geographies that enable researchers to *look around the corner* at alternative possibilities and prepare themselves, organizations, and the broader public to disclose and respond to unprecedented futures. Finally, we argue that speculative engagement with digital geographies prepares IS researchers to grasp and illuminate phenomena that elude existing research apparatuses.

2   Conceptions of the Future

The desire to unlock the secrets of fate and make contact with the realm beyond the present is shared by archaic and modern cultures alike. Throughout the ages, this quest has taken numerous forms and has been entrusted to many different kinds of gifted specialists. (Adam & Groves, 2007, p. 2)

We look to historical accounts to illustrate that predictions regarding technological development and deployment have been reasonably accurate. In 1968, leading science and technology experts provided technology predictions looking 50 years into the future (Foreign Policy Association, 1968). Predictions included miniaturization of computers, long-distance face-to-face communications, social networks, and increasing computer storage (Karpf, 2018; Lepore, 2018). But outside the domain of technology "most of those machines have had consequences wildly different from those anticipated in 1968. … if history is any guide, today's futurists have very little credibility. An algorithm would say the same" (Lepore, 2018).

Unexpected consequences result from uncertainty in the established relationships among people, objects, institutions, and information (Adam & Groves, 2007; Brown et al. 2000) as institutional norms, politics, moral and legal prescriptions, and other cultural

structuring are enacted digitally. These new digital enactments reduce the reliability of current research practices to account for or even recognize unprecedented phenomena and illustrate that our present academic demarcations among politics, technology, social science, and economics exhibit a "vast porosity … and the inextricable entanglement of "technology' and "culture'" (Rhee, 2018, p. 136).

Additionally, our assumption of *what the future is* requires critical examination. To reassess our relationship with the future, we must first understand how the future is conceptualized in commonly utilized research methods. What the future is and who gets to define it is a contested space that has garnered attention throughout history (Slaughter, 1998; Urry, 2016).

Reviews of future studies (Chiasson et al., 2018; Markus & Mentzer, 2014; Popper, 2008) provide a broad overview of approaches used in academia and in corporate arenas. Future studies methods vary broadly in epistemology, conceptualizations of the future, and the purpose for which the methods are used. In an initial analysis, we categorize our selective review of methods to illustrate inherent epistemic differences and the assumptions of the method regarding the relationship of the present to the future (Hovorka & Peter, 2018; Peter et al., 2020). To better demarcate the assumed relationship to the future of the methods, we refine the categories in regard to the intended purpose of each category in orienting current research activities to the future (Figure 1; Appendix A).

2.1   Category 1: The Future Exists and Can Be Discovered

The purpose of methods in this category (Table 1; Appendix A) is to predict *the future* as given and thus prepare for what is to come, to manage risk, and to offer normative guidance for specific technologies or companies, sectors, or economies. Numerous methods fall under the umbrella of future-oriented technology analysis (Cagnin et al., 2008; Markus and Mentzer 2014) and are deployed in both academic and organizational contexts. Methods in this category commonly provide only a weakly defined concept of the future as "unproblematic: a common-or-garden space and or time; empty but not quite a vacuum; waiting to be filled for good or ill by us or by others" (Staton, 2008, p 53). The research apparatus (categories, relationships, boundaries, and properties) conceptualizes the future as an extension/ extrapolation of the past/present. People, when present, are rendered into a quantified generality, aggregated as data, or portrayed as objects for societal and organizational care or exploitation (Law & Mol, 2001). Methods assume a clear understanding of the behavior of actors who have a stake in the future and who will act to preserve and enhance their own interests (Wright & Cairns, 2011).

Table 1. Future Studies Methods (adapted from Hovorka and Peter (2018)

	Purpose	Underlying epistemic assumptions	Method
1	The focus is on prediction, risk reduction, and normative guidance for specific technologies, companies, or industry sectors.	*The future exists and can be discovered.* One or a limited number of factors determine future states. Current explanations of phenomena are stable.	Complex adaptive systems Cross-impact/structural analysis Datamining Delphi/expert panel Impact analysis Modeling/Agent-based simulation Prediction/forecasting roadmapping Scenario thinking/scenario planning Theory/theorizing Trend extrapolation/technology assessment Weak signals Wild cards
2	One theme focuses on planning, foreseeing, and managing social, political or economic outcomes and ill-defined problems. Another theme focuses on the role of design as critique and on the role of objects in experience.	*The future is transformed/ created through choice and action.* Knowable aspects of human, social and/or physical science principles create future states and can be manipulated. Challenges current social and technological trajectories and current knowledge as "it could be otherwise."	Antagonistic scenarios/war gaming Backcasting Critical design (e.g., speculative, discursive, and associative design) Design anthropology Design fiction Sociotechnical imaginaries Visioning
3	The focus is on engaging existing values and logic, highlighting disharmonies, encouraging critical reinterpretation, and connecting discourse in science and technology to power, social orders, and justice.	*Futures are actively imagined to critically engage the present.* Navigates epistemic distance to conceptually distinguish unexpected and unprecedented phenomena Active imaginative work manifests consistent and coherent worlds that are estranging to disclose assumptions underlying technoculture.	Artifacts from the future Critical design Ethnographic experiential futures Science fiction Thought experiments Utopias/dystopias *Note:* Methods in this category can be deployed for different purposes. When used to conjure other worlds within which to interrogate technoculture, these methods present possible futures as critiques of present-day assumptions.

2.2 Category 2: The Future Is Created through Choice and Action

The purpose of methods in this category is to critique the role of design and the implications and inscribed values of technological objects. Methods assume that fundamental aspects of human, social, and/or physical science principles probabilistically determine future states but can be foreseen and transformed. People are included as use cases (e.g., for technology development) or are represented by current cultural attitudes toward designed objects and technologies. Cultural norms are assumed to carry forward from the present, unexamined and uncontested, or are indeterminate and can thus be shaped into desirable forms (Adam & Groves, 2007). Some methods are used as creative activism to address socially and politically pernicious problems (Malpass 2017). Also included in this category are design/future studies methods that seek to make "images of the future more legible and concrete" (Candy & Kornet, 2019, p. 3). Critical design, discursive design, and design fiction use designed digital objects to challenge the orthodoxy of industrial design and also engage audiences in the present time in discourse regarding the impact of technological objects. Representative techniques (Table 1; Appendix A) focus on testing responses to radical technology, challenging dominant ideologies, and engaging in social and political activism (Malpass, 2017).

2.3 Category 3: Futures Are Actively Imagined to Critically Engage the Present

A distinct purpose of methods in this category is to enable participants to inhabit *other worlds* to experience the trade-offs that *living with technology,* what we term *technoculture,* entail. Although futures lie beyond the empirical demands of data-driven methods, we can navigate this epistemic distance

(Carolan, 2004) through speculative engagement with *other worlds* (Hovorka & Peter, 2021). Speculative engagement through the methods in Category 3 (Table 1; Appendix A) manifest technoculture and attendant phenomena that are both familiar and estranging. We term these internally consistent and coherent worlds that are cognitively plausible but estranging *digital geographies.* When employed to manifest coherent but estranging other worlds, these methods (e.g., artifacts from the future, utopias/dystopias, thought experiments) underpin efforts to engender a new apparatus of inquiry and new conceptual language for unexpected and unprecedented phenomena.

Our conceptualization of digital geographies provides a basis for critically engaging with our present research apparatus. Although new perspectives and relational ontology have entered IS research in the study of contemporary emerging phenomena, including social media, virtuality, mobility, and algorithmic agencies (Orlikowski, 2010) common future-studies methods (Categories 1 and 2) are underpinned by more causal and deterministic assumptions. Manifesting digital geographies provides opportunities to engage the future as a site of inquiry for critical analysis of our current research rather than propagating the unwarranted assumption of continuity of the present into an unknowable future.

3 Speculative Engagement through Digital Geographies

Speculation is fundamental to science and serves multiple functions (Achinstein, 2018; Swedberg, 2018; Wilkie et al. 2017). In addressing (future) other worlds, about which we have no data, speculation is not intended as a literal truth about possible or probable reality, but rather as "a way that explains not *why they occur*, but *what they are*" (Achinstein, 2018 p 45). Speculation can challenge orthodoxies and the received view that current trends and path dependencies will result (causally or deterministically) in "the future." In articulating *how it could be otherwise*, speculative engagements enable critical questions about the technocultural consequences of current research (Angheloiu et al., 2017; Haraway 2016; Law 2004). In addition, speculations reveal our responsibility for not closing out possibilities in futures inhabited by people culturally distinct from present-day people.

An example of speculative engagement is the narrative allegory of Frankenstein, written at a time of unprecedented shifts in the apparatus of knowledge creation and comprehension. The Frankenstein story (Shelley, 1818/2018) was not concerned with a monstrous being, but rather the "social consequence of that science … a being rejected by his creator who eventually turns to violence … he is an embodiment of social pathology" (Cranny-Francis, 1998, p. 65).

Shelley engaged humanity's reticence and unwillingness to reflect on and to take responsibility for the cultural productions of science and technology. By exposing Victor Frankenstein as an embodiment of the pursuit of technological mastery without concern for societal implications, Frankenstein's story provides neither explanations nor prescriptions but instead renders visible the values underlying scientific and technological pursuits. Thus, the focus of the speculative engagement is the technological-cultural geography of Shelley's imagined world. In making peoples' hopes, fears, and mundane behaviors visible in narrative form, the *geography of that world* and the actions of inhabitants within it become understandable and revelatory regarding our own assumptions and values about science and technology. It is to the geographies of our digital futures that we now turn.

In conceptualizing digital geographies as internally consistent and coherent worlds that are cognitively plausible but estranging, we diverge from fields such as design anthropology, critical design, design fictions, and related critical methods (for references see Appendix 1). This broad class of methods brings anthropological, ethnographic, and speculative concepts into design processes to critique and improve future outcomes of design activity. Related approaches are used to engage people with implications of digital objects or alternative futures. We draw from the literature on science fiction, artifacts from the future, utopias/dystopias, and related research on work of the imagination to show how digital geographies make consistent and coherent other worlds accessible as apparatuses for speculative engagement with unexpected phenomena. By speculatively engaging with future cultural life-worlds (Sandberg & Dall'Alba, 2009) and the processes by which they come about, the assumed challenges and benefits of contemporary technologies and the relations to the technocultures of future inhabitants are better problematized (Hovorka & Peter, 2021).

In this view, speculative engagement through digital geographies enables researchers, designers, and decision-makers to inhabit worlds in which boundaries, identities, and relationships are produced in practice rather than assumed as fixed, determined, or extended from the present. By focusing on "mundane, every day practices that shape the conduct of human beings toward others and themselves in particular sites" (Thrift, 1997, p. 126) rather than novel technological objects, these engagements require researchers to connect durable pasts and presents with unobservable futures (Aanestad, 2011; Risan, 2006) and focus attention on technologically enacted cultures in which humans and more-than-humans will exist. By presenting futures as inhabited and embodied, geographies provide sites of inquiry of difference (Wilson, 2009) and may require new concepts *and relations* of *how things came to be.*

For example, "I, Robot" (Asimov, 1950/2004) posits the "Three Laws of Robotics," through which Asimov explored autonomous robot behavior and the cultural implications of reconfiguring work, responsibility, and humanity. Like Shelley, Asimov's narrative world makes visible "our expanding abilities … and [the] evolving understanding of the responsibilities such abilities entail" (Guston et al., 2017). We see in Asimov's other worlds, the precursors for engaging with modern questions of accountability, responsibility, and security in AI; "robotic slavery"; the rights of intelligent beings; and the condition of humanity. Although the speculative engagements of the Robot series are decades old, they continue to inspire reflection on the conditions of *liveable worlds* by folding an *other world* back into our present research and knowledge practices (see for example: (Clarke, 1994; Murphy & Woods, 2009; Suchman, 2018).

3.1 An Exemplar: Waste Analysis Notification

The "Attention" sign (Figure 1) was placed in situ at a city planning meeting. Through the visceral discomfort it engendered, it established critical boundary-setting conversations that resonated with the embodied and lived experience of attendees in their everyday lives. It is an example of a material artifact drawn from a future where such signage is a normal and expected part of mundane activities and it exists on a background of social expectations, institutions, and familiar environments. The unease at the invasion of a familiar

space or private activity calls forth the trade-offs accompanying the Internet of Things, surveillance technologies, and public health, and performs privacy, social good, and data ownership in unexpected ways. It focuses attention on the commodification of everyday activity, the evaluation of privacy versus public interest, and the interests of official and nonofficial actors. Through encounters with the artifact, attendees at the planning meeting inhabit a *digital geography* replete with relationships, power structures, individual/social norms, and interconnected surveillance technologies, which becomes a site for critical inquiry.

The "attention sign" is an example of an artifact from the future (AftF) that "depict[s] richly imagined, lived-in future worlds with social, economic and political structures that go beyond narrow technology applications that are typically envisioned with traditional methods" (Peter et al., 2020). Speculatively engaging AftF (for additional examples see Peter et al., 2020) allows research and policy audiences to conceive of important unasked questions, discuss implications and what values are at stake, exposing certain aspects of the current world for critical reflection that normally go unthematized. Why is this happening? What values are at stake? Who benefits? Who is included/excluded and with what consequences? Although the artifact presents a technologically possible but unrealized future, the speculative engagement of participants mobilizes critical questions of whether, when, how, and where technologies intersect human activities.

Note: Sign at the Institute for the Future, 2017, Palo Alto, CA

Figure 1. Exploring the Technoculture Trade-Offs with Artifacts

Speculating through digital geographies makes visible the technocultural relations in possible futures that are multiple, unfolding from different origins, and revealing of sites of tension and discontinuity. This theorizing is not an instrumental approach to "making an imagined future safe or stopping something from happening that looms in the future, or clearing away the present and the past in order to make futures for coming generations" (Haraway, 2016, p. 1). Rather, geographies differentiate speculating *about futures* from *forays into futures* (Adam & Groves, 2007). For the former, assumptions of stability and continuity with the present underlie research attempts to predict, forecast, or intervene in what *we must prepare for*. In contrast, forays into future technoculture require geographies in which the embodied, situated, and relational experience of people provide the background from which phenomena are layered with surprising connections and made visible for research in the present.

4 Principles of Digital Geographies for Speculative Engagement

Nothing comes without its world (Haraway, 2018).

Digital geographies manifest internally consistent, coherent, and richly experienced worlds in which technoculture is visibly enacted. They underpin efforts to disclose technocultural configurations as unprecedented and allow the interrogation of current practices and *how it could be otherwise* by going beyond responses to specific digital objects or ideologies for their own sake. Such geographies can manifest through speculative engagement with multiple methods, including artifacts from the future (AftF), utopian narratives, thought experiments, discursive digital environments, and art installations that engage participants to inhabit fully realized worlds. For example, interacting with an AftF is already engaging in an *other world*—the imagined future from which the artifact is drawn (Peter et al., 2020). As the attention sign example (Fig 1) illustrates, cognitively, viscerally, and emotionally inhabiting the geography allows for the problematization of the performances and categories of that future and make visible implications of current research activity in a situated forum.

Inhabiting digital geographies that are cognitively plausible but estranging encourages researchers, designers, and policy makers to reconceptualize phenomena. In this other world, the technoculture is unfamiliar and estranging and has broken with our expectations and assumptions about the future. Thus, our existing categories and relationships may be revealed as inadequate for understanding how this world came about, and we are invited to critically compare its own logics, economic and political values, and

unprecedented phenomena to our current relationship with futures.

Although digital geographies invite new concepts and relationships, such research is not "anything goes" but rather a disciplined pluralism that acknowledges the role of speculation (Feyerabend, 1993) in asking why/how would this happen? Critically, these *other worlds* do not arise from an unpopulated and empty futures that we fill with our own expectations and assumptions. Instead, the future world is imagined so that its logics and values are cognitively plausible but alienating to participants. To accomplish this, we propose that effective digital geographies should adhere to four principles such that this future world is plausible and inhabited (navigable), critically and emotionally engages participants (cognitive estrangement), assumes that problems cross disciplinary boundaries and exhibit scalar differences (expansiveness), and makes visible new categories, logics, practices, and values (unprecedented).

4.1 Principle of Navigability

Navigability refers to the "knowing and thinking [that] are unconceivable without the multitude of relations that *make possible the worlds we think with*" (de La Bellacasa, 2017, p. 41, emphasis added). Navigability implies that imagined social, legal, and economic norms are made meaningful by people and situated technologies. Rather than considering the implications of a technological object, digital geographies make visible a culture in which technologies have meaning and function (Searle, 2007) in order to better understand the implications of technologies. Like the present-day world in which the implications and meaning of technologies are historic, coherent, and sociotechnical, digital geographies must provide a holistic understanding. The technoculture has a justified past, concepts and beliefs are understood as connected in relation to each other across the landscape, and the visible, tools, mood, and practices provoke a visceral response. These characteristics combine to make the imagined future *navigable* such that participants can make sense of the culture and envision actions that would be viewed as rational in that world. The functions technologies are only comprehensible within a social/cultural context and must enable people to act and thus navigate the rights, obligations, and interlocking complexity of the social world.

4.2 Principle of Cognitive Estrangement

The principle of cognitive estrangement "implies a state of partial and imperfect knowledge" (Parrinder, 2000, p. 7) that *makes the familiar strange,* troubles and disturbs our understanding of the technoculture we are inhabiting, and enables researchers to critically rethink the relations of digital systems and the embodied world. Cognitive estrangement performs a critical interrogation by engaging with a world that

does not provide complete continuity with our everyday empirical experience (Freedman, 2013; Parrinder 2000). Just as walking into a familiar room in which the furniture has been rearranged, radical configurations of social/political norms, values, and technologies seem simultaneously known and alien. Methods including science fictions, utopias, and artifacts from the future provide effective digital geographies through the juxtaposition of the familiarity of everyday technology with technocultural estrangement in the future it co-constitutes. Fantasy and phantasmagoria are avoided because the digital geography enables participants to connect rationally to the imagined world and makes visible the disconnections of this imagined world to the participants' own empirical world (Freedman, 2013). In addition, estrangement is enhanced by *affective* responses (Freedman, 2013; von Stackelberg & McDowell, 2015) to the experienced technoculture that unsettle our expectations. Through demonstrating and viscerally engaging the participants' own values and logics, digital geographies avoid abstract futurism and provoke critical examination of assumptions in present-day situated sociotechnical research (Haraway, 2016).

4.3 Principle of Expansiveness

The recognition that "how we gather, store, analyze, and communicate our information, in essence how we organize it, is closely related to how we organize our collective [political] life" (Susskind, 2018, p. 120) suggests that IS phenomena are increasingly overstepping the traditional boundaries of the discipline. One of the striking characteristics of IS phenomena is their expansiveness, the dramatic scale at which they are observed, and the scope of complex interconnections with other phenomena. Yet the practical constraints of empirical research often result in small-scale phenomena, (over)simplification, and a desire for parsimonious explanatory mechanisms.

Effective digital geographies recognize that digitization has expanded beyond individual-, group-, and organizational-level phenomena and the discrete and bounded organizational systems that formed the origins of the IS discipline. Now strange and innovative technologies are implicated in new ways of acting and conjuring the fundamental principles of politics, humanities/arts, work/play, and in other endeavors of the human condition. Many current phenomena lie at the interstices between disciplines and result from interconnections among technological systems with no clear boundaries and globe-spanning reach.

Expansiveness challenges the common assumption that studying small-scale instances of a problem provides knowledge at other scales. Large-scale research on interpersonal or institutional trust, digital power, or environmental care, are conceptually different problems than related issues at smaller scales (Boulding, 1956). A simple thought experiment is revelatory: "Would an ant be able to read if we shrunk a book to its scale?" This is not a question of literacy, learning, or language. Rather, the molecular attraction between pages at an ant-book scale would make the book impossible to open. This scalar variance means that "changes in scale produce system effects that are disproportionate to regular changes in quantity" (Yelavich & Adams, 2014). By making large-scale phenomena visible, digital geographies enable the problematization of technology trends and practices that may develop in unexpected ways before new values and logics are visible in empirical data.

4.4 Principle of the Unprecedented

As the experience of technology and collective life defies our expectations, our theoretical apparatus struggles to make sense of the *unprecedented* (Hovorka & Peter, 2021; Orlikowski, 2010). New apparatuses, including digital geographies, are needed to make the unprecedented visible because "when we encounter something unprecedented, we automatically interpret it through the lenses of familiar concepts, thereby rendering invisible precisely that which is unprecedented" (Zuboff, 2019, loc 267). For example, the rise of surveillance capitalism and the increasing digital control of collective life occurred incrementally and required radical conceptual reinterpretation to become visible against the background of prior concepts of progress and economic benefits. By relying on empirical data and turning to existing categories, concepts, and relationships, our research apparatus turns novel phenomena into extensions of the past. By estranging us from the mundane, effective digital geographies, make visible the technology-culture reconfigurations that are unprecedented. As the unprecedented is conceptualized in new terms, new logics-in-action (Zuboff, 2019) and relationality are disclosed. For example, Rhee (2018) uses the cultural imaginaries of robotic imagery to reconstruct our understanding of humans through robot-human interactivities. In the process of reclaiming the human, the question of reconfiguring or even rejecting future visions of robots (Suchman, 2018), human-AI hybrids, and the proclaimed inevitability of job loss emerges.

We argue that the proposed four principles articulate qualities of effective digital geographies for speculative engagement. Additional principles may become evident as researchers speculatively engage with and further refine digital geographies. As an extended example, we now present an existing assemblage of technologies that have advanced by an order of magnitude in the past decade and now verge on unprecedented human-computer interactions.

5 A Speculative Engagement with Digital Humans

From Carrie Fisher in Rogue One: A Star Wars Story to Paul Walker in the Fast & Furious movies, dead and magically "de-aged" actors are appearing more frequently on movie screens. Sometimes they even appear on stage: next year, an Amy Winehouse hologram will be going on tour to raise money for a charity established in the late singer's memory. (Winick, 2018)

Animated hyperrealistic human characters that look, behave, and sound like real people are an emerging technology stemming from special effects in the film, television, theatre, video game, and simulator industries (Seymour et al., 2018). Broadly termed "digital humans," these agents and avatars are not only employed as clones of deceased artists but have also been deployed as digital assistants, models for fashion houses, social media influencers, and fake versions of heads of state. The speed with which they are entering our lives reveals extraordinary advances in the underlying technologies, capabilities, and business growth, and hints at new technocultural norms and an enlarged scope of associated interactions.

As a first step in disclosing what is at stake as digital humans enter our lives, we engage an *artifact from a future* in which digital humans are ubiquitous and normal. Our entry point to this digital geography is an employment separation letter (Figure 2) that specifies departure terms for employees by reminding them that their personal digital avatar—a hyperrealistic avatar that can be puppeteered by a human or AI in real time for teaching or presentation purposes—will remain for use at the university's discretion for 20 years.

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Private and confidential

Walt Davidson
Associate Dean of Executive Education
25 July 2023

Alex Petersen
133 Castlereagh
Minneapolis, MN 55454

Dear Dr Petersen,

I am writing to you about the conclusion of your employment with the Carlson School of Management at the University of Minnesota on 28 July 2023.

This letter seeks to clarify your departure terms as discussed in our Zoom meeting.

Your personal digital avatar will remain at the University's discretion as per the terms of your employment for 20 years. We wish to remind you at this point that you will be contacted for consent for any physical alterations of your avatar, and we may deploy/ or retire your digital avatar without notice.

Whilst you are not obliged to do so, you may wish to notify us of any changes that are pertinent to your digital avatar in the coming years.

You will receive your final paycheck on July 31.

Finally, if you wish to take part in an exit interview with HR for internal data purposes, it would be greatly appreciated, though you are in no way obliged to do so.

Thank you for your service to the the University of Minnesota. We look forward to your digital self remaining in the lives of our students for many years to come.

Yours sincerely,

Walt Davidson
Associate Dean of Executive Education

PLEASE KEEP A COPY OF THIS LETTER FOR YOUR RECORDS

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Note: AftF created by authors in 2018 for graduate University class "The Future of Business"

Figure 2. Letter of Employment Separation Artifact

This AftF engages our familiarity with employment (and termination), with hierarchies of power, and with the unease of facing uncertainty. But it also creates a visceral sense of unfairness and it problematizes how, where, and if digital humans are appropriate. Further, it triggers a critical interrogation of the values, copyright, and legal issues, and the social norms in which this contract would make sense. The artifact engenders cognitive estrangement by making the familiar letter of employment separation disturbing and foreign. It allows audiences to articulate concerns regarding power, identity, authenticity, and deception by asking us to inhabit a landscape in which digital humans are a normalized aspect of everyday life.

Speculative engagement through this artifact highlights what questions we need to ask about known concepts, relationships, and values and discloses new unproblematized technocultural configurations. By engaging this AFtF, current salient concepts such as legal concerns, copyright, and ethical issues raise research questions such as:

- Who owns the digital human and what rights accrue? (e.g., Can a digital human be aged / remain ageless; can a digital human be repurposed into new employment settings or be deployed in a different profession?)

- What are the [legal] challenges to creating digital humans of a living/deceased person without consent?

- Is deception normalized by having a digital human puppeteered by someone else (or an AI?)?

In addition, this AFtF discloses concepts of concern including power, human rights, and trust. New conceptualizations for phenomena can lead to research questions including:

- Should ownership and the puppeteering of a living person's identity be cast as a form of digital slavery? Or a form of theft? Or reverence?

- What social relationships between humans and AI-driven digital humans present challenges to our current understandings of humanity?

- Are new concepts of trust, truth, or reality required to account for situations where the "human" with whom one is interacting may/may not be entirely fictitious?

Engaging such artifacts also functions in strategy, design, or policy making contexts by making visible to audiences aspects of the current world for critical reflection that normally go unthematized. These engagements create awareness of how the world would need to change holistically and the complex nature of forces and relations that are at work in negotiating a future.

6 Conclusion

What we lack is our bearings. ... Categories, arguments, conclusions, and choices that would have been entirely obvious in earlier times are obvious no longer. Patterns of perceptive thinking that were entirely reliable in the past now lead us systematically astray. Many of our standard conceptions of technology reveal a disorientation that borders on dissociation from reality. And as long as we lack the ability to make our situation intelligible, all of the "data" in the world will make no difference. (Winner, 1978 p 7-8)

Digital phenomena are not politely staying within the traditional boundaries of the IS field. Broadly speaking, the cultural implications of rapid technological developments have not followed the theoretical expectations created by the IS field. Scholars in a wide range of fields have been both surprised and dismayed when the promises of technological developments are compared to the realities of societal outcomes. Technological advances have been achieved, but troubling new cultural issues and a broad spectrum of destructive behaviors have manifested. Our dominant research orientations, which treat the future as a manageable extension of the present following familiar logics, processes, and cultural norms, obscures the potential for radical technocultural (re)configurations in which our research is already implicated.

For futures to become sites of inquiry rather than mostly familiar versions of the present, we must engage rich, coherent, and plausible worlds in which boundaries among entities, identities, and phenomena have been enacted (Schultze & Orlikowski, 2010) in surprising and unexpected ways. Speculative orientations and methods can free researchers from orthodoxies and encourage new perspectives, conceptualizations, language, and relationships in accounting for unprecedented and possibly unrealized configurations.

We describe one theorizing approach, *speculative engagement through digital geographies*, through which researchers engage with the future on its own terms. This can open current research to new categories, relationships, logics, and values and make visible the unprecedented reconfigurations of which our research is a part. Such digital geographies are not intended to predict, forecast, or foresee *what the future will be*. Rather, this approach problematizes the reification of our current research apparatus and prepares researchers to encounter and engage with unexpected and unprecedented phenomena. It challenges IS theorization regarding a broader spectrum of phenomena than mainstream IS literature embraces and liberates our thinking regarding *what is around the corner*.

Speculative engagement is the revelatory activity of identifying and engaging with serious issues and opportunities in modern technoculture(s) and preparing to participate in current and new debates regarding how, where, and under what conditions technologies intersect society. These debates require that we acknowledge our own role in conditioning the (future) lives of people and more-than-humans, highlight the dramatic implications of technoculture across many academic fields and professions, and invite participation across the academy, public and private sectors, and the public.

While a jumping-off point for inquiry might be an empirical observation such as Zuboff's (2015) recognition that media platforms have been collecting vast amounts of individual data, digital geographies break from the predicted trajectories of technologies and current problematizations. As sites for speculative engagement, digital geographies manifest rich descriptions of *other worlds* from which phenomena are drawn, and expand the theoretical and practical domain of interest for IS scholars. Digital geographies allow for the exploration of alternative technocultures that fold back into present research. By imagining how technology is relationally intertwined with work, people, politics, and the environment, a variety of alternative technocultures of humans and more-than-human entities make visible what is at stake. We inhabit the viewpoint of *a future time* to look back and critically assess how current research is oriented to the human condition in both short- and long-term views.

Speculative engagement through methods including artifacts from the future, science fictions, and utopias manifest digital geographies to problematize our sociotechnical research at a fundamental level. It shifts attention to the endurance and stabilization of technology and culture across time (rather than focusing on disruption and innovation) and to ethical and political concerns of everyday reconfiguring, rather than the eruption of surprising failures or events. It also returns ethical discussion to sociotechnical research (Chiasson et al., 2018) and acknowledges interdependencies between people and more-than-human natural systems, not as a matter of moral order or utilitarian benefit but as a condition for the continuation of life (de La Bellacasa, 2017). This opening-up of research offers unique and challenging opportunities to the IS community. It exposes the heart of Frankenstein's problem—humankind's current exhortation of and passive response to all things technological is based on an unfounded belief that "what man has made, he can also change" (Winner, 1978, p. 134). Viewed as unquestioned progress, technology becomes infrastructure, politics, marketplaces, and a virtualized world in and of itself without recognition of unanticipated conditions and unprecedented consequences of technoculture.

Technologies and our visions of them have powerful social and environmental consequences resulting from human choices rather than from inevitable, self-organizing technology. Although researchers are not creating the future, research manifests the values that researchers hold for the inhabitants of futures who, human and more-than-human, must live within persistent technocultural configurations. Learning *from other worlds* provide researchers, policy makers, and designers a critical voice. To paraphrase from Aristotle's rhetorics, *most of the things about which we make decisions, and into which we therefore inquire, present us with alternative possibilities.* (Kennedy, 1991, #2074)

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Appendix A: Future Studies Approaches Exemplars

This appendix contains illustrative studies from academic and industry sources that provide exemplars of common future-studies approaches. Since all methods are not well represented in IS, some approaches (in particular, in Category 3) have been illustrated with discussions of the method itself (e.g., Levitas, 2013; Parrinder, 2000; Peter et al., 2020) or exemplars drawn from adjacent disciplines (e.g., Squier, 2004).

Table A1. Future Studies Methods (Exemplars)

	Purpose	Technique	Examples
1	The focus is on prediction, risk reduction, and normative guidance for specific technologies, companies, or industry sectors.	Theory / theorizing	Zuboff (2015); Zuboff (2019)
		Modeling / agent-based simulation	Fang et al. (2018)
		Complexity / datamining	Park & Mithas (2020); Pentland et al. (2020)
		Complex adaptive systems	Marjanovic & Cecez-Kecmanovic (2017)
		Prediction/ forecasting	Diebold (2015); Shmueli & Koppius (2011)
		Trend extrapolation / impact analysis / technology assessment	Adomavicius et al. (2008); Cagnin et al. (2008); Haegeman et al. (2013); Kristensen (2016); Van Den Ende et al. (1998)
		Cross-impact / structural analysis	Choi et al. (2007); Leveson (2016)
		Scenario thinking / scenario planning	Bañuls et al. (2017); Börjeson et al. (2006); Wright & Cairns (2011); Schwartz (1996)
		Roadmapping	Phaal et al. (2001); Phaal & Muller (2009)
		Delphi / expert panel	O'Kane et al. (2016); Gordon (1994); Dickson et al. (1984)
		Wild cards / weak signals	Mendonça et al. (2004)
2	One theme focuses on planning, foreseeing and managing social, political, or economic outcomes and ill-defined problems. Another theme focuses on the role of design as critique and on the role of objects in experience.	Backcasting / visioning	Herrmann (2010);Quist (2007)
		Antagonistic scenarios / war gaming	Kurtz (2003); Schwarz (2009)
		Foresight / social foresight	Gray & Hovav (2008); Slaughter (2004)
		Sociotechnical imaginaries	Jasanoff & Kim (2015)
		Design anthropology	Drazin (2012); Gunn et al. (2013)
		Design fiction	Angheloiu et al. (2017); Dunne & Raby (2013); Bleecker (2009)
		Critical design / discursive design	Linehan et al. (2014); Yelavich & Adams (2014); Malpass (2017); Tharp & Tharp (2019); Yelavich & Adams (2014)
3	The focus is on challenging existing values, highlighting disharmonies, encouraging critical reinterpretation, and connecting discourse in science and technology to power, social orders, and justice.	Thought experiments	Brendel (2004); Dennett (2013)
		Science fiction	Steinmüller (2003); Squier (2004); Streeby (2018); Parrinder (2000)
		Ethnographic experiential futures Artifacts from the future	Candy & Kornet (2019); Peter et al. (2020)
		Utopias / dystopias	Gordin et al. (2010); Drexler 1990); Levitas (2013)

About the Authors

Dirk S. Hovorka is an associate professor in the Business Information Systems Discipline at the University of Sydney. His current research seeks to recenter the *livable worlds* that scientific practices bring forth through theory, design practices, and how we think about "the future" in terms of technology, society, and biophysical environments. He is the recipient of multiple teaching awards and co-author of the AIS 2011 Best Paper "Secondary Design: A Case of Behavioral Design Research." He is a senior editor of the *Journal of the Association for Information Systems* Research Perspectives, *Communications of the Association for Information Systems* associate editor, and HICSS co-chair of the "Knowing What We Know (Theories in IS)" mini-track.

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