Philosophy of Technology: Who Is in the Saddle?

> *Things are in the saddle, and ride mankind.*

—Ralph Waldo Emerson

Has technology grabbed the reins and galloped off with us under the saddle? Are entrepreneurs and research labs and marketers riding herd, spurring technological change with consequences for who we are and what we can become? Or is it all the rest of us, as users, driving what technology is developed and how it is incorporated into social and political life, for good or ill? Who deserves the credit and who the blame, for what effect?

These are not new debates, but communication studies, known more for neglecting philosophy than embracing it, has not always been party to the discussions, despite a recent fascination with new technologies in journalism and mass communication. The early days of the Internet followed by ubiquitous and powerful digital machines produced a heady optimism by many about the potential of social media for bypassing traditional gatekeepers and enabling robust networks of people across the globe. But those days are now covered in the trail dust of claims of fake news, contagions of hate and violence, trolls and bots, election interference, hacking, and opinion silos. Technology, appearing now to ride roughshod over hopes for democracy and community, is viewed in much public discourse as a culprit behind a world gone rogue.

Have media researchers been complicit in this swing of perceptions from utopian to dystopian? From savior to satan? From technological determinism to determined technology? Do we have enough grounding in the philosophy of technology to ask the right questions and steer a better conversation? Have we interrogated what technologies are and how and why they are developed, the uses to which they are put, and the claims made and consequences incurred?

This forum asked experienced scholars in mass communication theory and research how we should think about technology, what part it plays in how, and what we know and who and what we become. What technologies should be developed, by whom, for what purposes? And on what grounds should we judge them? The contributions in this forum give us a quartet of different voices, experiences, and problematics, raising more questions than answering them.

Jeremy Swartz and Janet Wasko start off by opening up considerations about what technology is and what it does, using examples of definitions from John Dewey to

Marshall McLuhan and beyond and conceptions of technology from biology and the environment to complex systems. On what grounds can we judge technologies, if they are the product of the same system as our values? More opportunities are needed for mass communication scholars to reimagine disciplinary and material boundaries and share research and engagement if we want to influence systems, they conclude.

Carolyn Marvin invites us to consider the long sweep of technological changes and the pattern of disruptions that come in their wake, from the printing press forward. These disruptions fundamentally reshape our social relations, as technologies provide the "sociospatial grids foundational to communicative practice." In other words, they manage social distance and trust. Thus, changes in technology produce crises in communicative relations by disrupting expectations and introducing new suspicions. Digital technologies have produced widespread anxieties that require new conventions to re-establish, "gradually and painfully," a new social geography.

Robert Logan shortens our historical view to the media developed since the 19th century, taking us through a brief tour of the phonograph, telephone, telegraph, and Internet and their unintended consequences. Initial optimism, including his own, about the possibility of decentralization of knowledge occasioned by digital media was wrong. These technologies have now turned the table on Marshall McLuhan's description of media. *We* are the extensions of media, completing technological systems for the profit and advantage of media businesses. He argues that as scholars we can only warn about such consequences and try to repair the damage caused by new monopolies.

While Beth Coleman, too, thinks we have experienced a profound shift in our relationship to technology, it has come from decentralization—the view of the "swarm"— rather than centralization. It began with the Enlightenment's elevation of humans over nature, who, hand in hand with their computational technology, achieved a reordered command–control system and a decentralized logic. Now, like runaway slaves, smart technology is "marooned"; it has escaped dominion, a coalition with a black aesthetic and politics of innovation, resistance, and freedom. The fusion of the informational and material world has created a built world that surrounds us, irresistibly beckoning. We ignore this change at our own peril, she warns.

Despite their differences, all four essays challenge us to reconsider what technology is, what changes are being wrought in who we are and how we know, and what we may or may not be able to do about it.

Lana Rakow, Associate Editor

An Inquiry Into Reimagining Technology

In this forum, we would like to contribute suggestions that communication and media scholars might consider in their study of technology. These brief philosophical and disciplinary tributaries account for only some of the interactions and transactions of technology. We suggest that scholars expand beyond disciplinary boundaries and explore interdisciplinary frameworks for conceptualizing technology. Furthermore, we argue it is important to consider theory-practice enacting immersion and inclusion for valuable interventions in research and development. Thus, our discussion presents

ideas about how technology might be studied and understood, including what technology is, what values technology contains, and what they are used for by whom.

We recognize technology as practical arts, tools, techniques, processes, moral knowledge, and imagination to navigate our ever-changing world. In a broader sense, technology also can be understood as methods of intelligent inquiry and problem-solving. But technology is not merely a tool, fix, or repair. Technology can also be understood as complex systems in biology and ecology, organisms, and their ongoing relationships with their environments, viewed through the lenses of scale, pace, and pattern (Swartz, 2016).

Did technology start with the flint, the stone, the hammer? With Socratic dialogue or Plato's theory of forms? Did it begin with conduction, reaction, and transaction? With Ada Lovelace and Charles Babbage or the American Pragmatists? Did technology start with the molecule, the microbe, the datum? With Marie Curie, Alan Turing, or Norbert Wiener?[1] Did technology enframe—as a Heideggerian gestell—the environment as merely an object, not as a subject?[2] What is technology?

Defining Technology

Definitions of technology can be traced to antiquity, with the Greek *technē* typically defined as practical arts or craftsmanship, "broad activities of making or doing" (Hickman, 2001, p. 43), and set apart from *poiesis* or high art. Martha Nussbaum enlarges *technê* to include "a deliberate application of human intelligence to some part of the world, yielding some control over *tuchē* (chance or contingency); it is concerned with the management of need and with prediction and control concerning future contingencies" (Nussbaum, 1986, p. 94).

We argue that we need to question narrow definitions of technology, such as "the application of scientific knowledge for practical purposes."[3] When defining technology, it may behoove us to reconsider Marshall McLuhan's dictum:

> . . . the medium is the message. This is merely to say that the personal and social consequences of any medium . . . result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology. (McLuhan & Gordon, 1964/2003, p. 19)

McLuhan continues by stating that the content of any technology is always another technology. Thus, it is important to note the synonymous relationships between technology, medium, extension, and content. But, more critically, "the 'message' of any medium or technology is the change of scale, or pace, or pattern that it introduces into human affairs" (McLuhan & Gordon, 1964/2003, p. 20).

Value, Valuing, and Valuation

If media are technologies, then technology is the message, and the message is the scale, pace, and pattern. When considering technology through the lens of "the message," then is technology the scale of what encompasses value and/or values? Is

technology the pace, how fast or slow we are proceeding? And is technology pattern, where the relationships, directionalities, and interdependencies co-exist? These ideas are brought together in Vincent Mosco's discussion of technology's potential:

> Those who have power to advance certain of these [social potentialities] determine or shape the use of technology. This is not to suggest that all uses of technology are a function of power: rather, *power sets the pattern for the principal direction* of production, distribution, and use [emphasis added]. (Mosco & Wasko, 1988, p. 3)

James W. Carey offered another ethical treatment of technology when he addressed the nondual quality of value-making:

> We have available to us no ethics or values or morals or purposes with which to judge technology because our notions of value, morality, and purpose have been forged in the same cultural container with the technology. *Technology and value are merely two sides of the same coin* [emphasis added]. (Carey, 1990, p. 250)

Is this a self-fulfilling conundrum regarding value versus values, as a Google News representative recently explained? "Technology has value, but it doesn't have values. It's what we do with it" (Gingras, 2019). Rather John Dewey noted that value or values must be understood in relationship to the difference between valuation and valuing, that is, ". . . valuation as judgment (which involves thought in placing the thing judged in its relations and bearings) and valuing as a direct emotional and practical act" (Dewey, 1932/2008, p. 264).

Intelligent Inquiry and Problem-Solving

Using Dewey's definition, Larry Hickman summarized a notion of the technological in our lives, defined as "the invention, development, and cognitive deployment of tools and other artifacts, brought to bear on raw materials and intermediate stock parts, with a view to the resolution of perceived problems" (Hickman, 2001, p. 26). Mark Johnson reimagines Dewey, Nussbaum, and Hickman when he identifies

> . . . moral knowledge as a form of technology . . . as any intelligent, skillful means for transforming experience. This is the expansive sense in which Dewey understood the term: "all the intelligent techniques by which the energies of nature and [humans] are directed and used in satisfaction of human needs; it cannot be limited to a few outer and comparatively mechanical forms." (Dewey, 1930/1984, p. 270; Johnson, 2014, pp. 227-228)

Another instance where intelligent inquiry and the two sides of the same coin appear is in Eric Schatzberg's historical study. Among his suggestions for rehabilitating technology are to not reduce technology to instrumental reason, to rescue it from determinists, and to correct the unbalanced scholarly understanding of technology, including tendencies to elevate theory over practice and discourse over materiality (Schatzberg, 2018, pp. 235-236).

Complex Systems

Technology can also be understood through the lens of complex systems science. A number of scholars have already begun to explore the relationships between biological, environmental, and (ecological) pattern recognition systems (Bar-Yam, 1997; Morales, Gershenson, Braha, Minai, & Bar-Yam, 2018). For example, Luciano Floridi appropriates McLuhan's dictum by reinforcing a biological account of technology when he states that, ". . . in the genetic code, the medium (the genes) are the message" (Floridi, 2010b, p. 80). Sandra Braman (2004), who referred to recombinant DNA as a meta-technology, McLuhan and Gordon (2003), and Floridi, (2010a, 2010b), as well as Robert H. Carlson (2010, p. 1), who stated that "biology is the *oldest* technology," illustrate the need for a transdisciplinary conceptualization of technology.[4]

Technology could also be defined as environment (Anderson, 2016), or, as Neil Postman stated, "a medium is a technology within which a culture grows" (Postman, 2000). Consequently, some researchers are finding that transdisciplinary and even antidisciplinary research and development is useful for bringing about pattern recognition modalities (e.g., network and ecosystem analysis, machine and deep learning).[5] The next step could be the integration of collective intelligence as technology in our lives (Malone et al., 2008; Parikka, 2010, pp. 49 and 157; Judge, 2003).[6]

Given these developments, there is a need for enacting melioristic theory-practices for addressing technological change. One such possibility was demonstrated by the recent University of Oregon "What is Technology" conference-experience, which fostered a collaborative network and shared possibilities across communication, science, art, media, and design.[7] More such opportunities are needed for mass communication scholars to remix, regenerate, and reimagine our disciplinary boundaries and to share research and engagement for purposes of influencing systems.

Conclusion

This discussion has briefly reviewed only a few frames that communication scholars might consider intriguing. Building a fuller and richer account of the schematizations of technology may prove necessary with increasing environmental and ecological complexities and responsibilities. This will be even more important as an emerging "new materialism" integrates both physical (analogue) and representational (digital) systems with values and imagination as technologies. This brings us back full circle to earlier discussions of the problem of standards by which to judge, regulate, and/or control technologies. We look forward to works that continue to explore these frames via an integration of disciplinary approaches, and that contemplate complex systems—conceptual and experiential—in the study of technology.

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Social Distance, Social Trust, and Technology

My childhood memory of religion is singing in church. The music deeply moved me, but even more important was how being part of a group experiencing itself as a congregation washed over me. All those melded voices produced the social harmony we aspired to. We turned singing together into a technology of solidarity: Song was a medium through which social connectivity was forged and traveled, a joyful production and reception of social relations, immediate and dense.

Social relations are the final purpose of every medium, if we define media as affordances for seeking emotional and spiritual succor and knowledge of our fellows against the backdrop of the world they disclose. More mechanically, media technologies hail relational underpinnings for communicative events into existence. They do this with templates for managing social distance, which exists in formal and informal rules that allow folks we trust to come socially close to us, while those we don't are kept at arm's length or walled out altogether. How we insulate or expose ourselves through mediated conventions hold in place sociospatial grids that are foundational to communicative practice. Skillful navigation of familiar choreographies of social approach and avoidance is the mark of a well-socialized individual and a constant object of human concern.

Well-understood and traveled social distance is a condition for establishing the levels of social trust that facilitate group tasks. Consider as a medium, for a moment, an intercontinental ballistic missile that suddenly and profoundly rearranges offensive and defensive distances between uneasy neighbors. Its presence demands the creation of new conventions of trust that all parties must embrace to secure the peace going forward. Social trust spaces are held together by notions of legitimate authority, role expectations, and displays of mutual regard. They must have predictable features that participants can rely on. We hold the world still long enough to act according to reciprocally observed rules that construct the proper matrix of social distance. When new technological affordances instigate sudden and severe reconfigurations of a matrix that has thereby been rendered unintelligible, the fallout is a crisis in communicative relations.

The existential core of any medium is not its thingness, in this view, but how ways of deploying it shape trust and suspicion. Historically, new media are more or less revolutionary according to how completely they restructure social proximity and social distance in communicative practice.

Relations do not exist on a separate phenomenal plane that media merely streamline. To understand the historical and social impact of communication technology, we must understand how media construct and deploy matrices of social trust.

New technologies confront us with change when they blow up conventions by which we have managed social distances to our liking. To experience social distance as unexpectedly shortened or lengthened is to suffer dramatic shocks to the taken-for-granted social geography that grounds our social reality. Those once insulated and protected by formerly familiar notions of right proximity may find themselves exposed and vulnerable when these are fractured. And those who seem at first to profit from

newly cleared paths to those who were once socially remote to them may discover such powers come with troubling vulnerabilities of their own. Socially speaking, this is a hot mess. Terrible anxieties ripple through the body politic until new ways of safely navigating radically reconstructed social distance are gradually and painfully established.

Cue recent history for examples of whiplash from intricately woven fabrics of social trust once thought to be stable. When a president addresses his supporters directly, or casually threatens allies and enemy states on Twitter, mediated distance that kept the immediacy and weight of presidential power at a safe remove from both citizens and foreign powers has been alarmingly breached with the potential for disastrous consequences.

When corporations get close enough to effortlessly enter a private world we thought was securely our own, while asymmetrically lengthening at the same time our access to them, important distances of accountability have been ruptured.

When social media vault over gatekeepers who kept news at a distance from audiences until it could be processed for truth, journalistic safeguards have little purchase. Malfeasers who hide behind deepfakes and bots are able to seduce news consumers into untrustworthy connectivity, the detection of which is in only the most rudimentary stages. "Fake news" is the shortcut description of a general and disturbing collapse of trust in a reliably shared picture of the world.

Has there been anything like it before?

There has.

Printing was once as disruptive as digital media have turned out to be.

The new technology of printing was hailed as a providential device by religious insurgents determined to disrupt the Church's interpretive monopoly on the most important medium of the time, holy scripture. Printed vernacular bibles read by laymen drastically shortened the distance between worshipers and God in Catholic Europe. Partly precipitated by printing, religious wars shook Europe until the Treaty of Westphalia codified a new political stability that placed ecclesiastical authority at a distance from nation-state power. The nation-state that printing did so much to create now faces its own existential challenges from changes in social distance occasioned by cyberespionage tactics that permit groups bent on chaos to penetrate geopolitical borders and threaten, at the least, national electrical grids and emergency communication systems.

Another example is as follows: In contrast to scribal maps once held as state secrets, printed maps were easily reproduced and rapidly corrected to reflect accumulating navigational knowledge. These more accurate printed maps were able to shorten social distances between New and Old World civilizations with explosive historical consequences.

We can think of today's news sphere as manifesting a kind of anecdotal warning system of unnerving consequences that follow from breaches in previously buffered social distances. Consider Anthony Weiner, the U.S. congressman who mistakenly tweeted sexually explicit images of himself to a network of followers willing and able to send them to the world, an early sign of the vastly expanding territory of public

shame created by a world of digitally reconfigured social distances. Or Tyler Clementi, a college freshman, who took his own life after his roommate webcammed and tweeted him kissing another man in what he thought was a private encounter invisible to anyone else. Conversely, digital screens lengthen distances between social media pugilists who, lacking the inhibitions of face to face encounter, turbocharge a toxic politics of digital call and response.

There are opportunities for positive empowerment in reassembled social distance, of course, not perils only. The world saw this in the digital mobilizations of protesters in the Arab Spring that briefly shortened the space between citizens and rulers. We know that YouTube videos have changed the distance between victims of police brutality and a broader citizenry to whom such injustices were previously invisible. From this has emerged a national reckoning about racial bias in the policing of people of color.

Layered conventions connect and separate us for purposes to which media have always been central—engaging others, expanding imaginative experience, exchanging wealth, exerting power, seeking safety, identifying friends. Following the seismic reconstruction of social distance in the wake of digital technology, new conventions of protection and exposure must now be invented to make social relations right. Trust and suspicion, which indispensably shape social relations, must be rearticulated to new topographies of connectivity. Our experience of the world will be unfamiliar and unstable until that happens.

Carolyn Marvin
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Communication Technology Philosophy: Repairing the Damage

The only thing that a philosopher of communication technology can do is to make the users of technology aware of the subliminal effects of media that are independent of their content. The philosopher of communication technology can have no impact on what technologies will be developed, but perhaps they can have some influence on how they are used. The evolution of technology is such that if an enhancement of a technology can be developed it will be developed, and if someone can make money by making that enhancement of a technology available in the marketplace, it will be exploited commercially.

The inventors or developers of a technology are not always aware of how their invention can be used or exploited commercially. Thomas Edison thought that the Victrola or record player that he invented would be used by an executive to dictate and record letters or reports that his or her secretary could type up. He never entertained the thought that it could be used to record music, missing its most important application. Alexander Graham Bell was not trying to invent the telephone for voice communication at a distance but rather he was trying to develop a hearing aid for those with hearing loss. Both his mother and his wife were deaf. His research into this problem

led inadvertently to the telephone, which totally transformed social and economic life. As an example of how communication media have unexpected impacts, both the record player and the telephone are prime examples. Recorded music reduced the amount of amateur music making in the home as one could rely on records for home entertainment instead of home-based music making. It also led to a significant reduction of sheet music sales. The telephone, however, greatly reduced the use of the telegraph with the Internet finally finishing off Western Union's telegram service. Western Union has now been reduced to transferring funds from one part of the world to another. Western Union's interaction with Alexander Graham Bell long ago illustrates how difficult it is to predict the impact of a new technological development. Graham Bell, shortly after developing his prototype for the telephone, went to Western Union offering them a partnership to develop his invention. As Graham Bell's prototype was still rather crude, Western Union passed up on the offer and hence lost the opportunity to completely dominate communications in North America.

Another example in more recent times of the inability to predict the impact of a new technology was the development of the personal computer (PC) and the course of action of Apple and IBM. Apple was a pioneer in the development of the PC as a start-up working out of the garage of Steve Job's family, and IBM of course was the dominant company for computing as the PC first emerged. Jobs and Wozniak maintained control of their hardware, their software, and their operating system. When IBM decided to go into the PC business, they gave away the development of the software and the operating system to Microsoft and the development of the microchips to process the PC's data to Intel. As a result, this gave rise to IBM PC clones and the demise of IBM's PC business. It also created Microsoft as a software mega-monopoly and Intel as the dominant microchip developer and manufacturer. Apple went on to become the dominant player in the PC and digital device and service arena and the very first company to achieve a market value of one trillion dollars. Steve Jobs was not only an astute developer of technology but also a philosopher of communication technology par excellent (Logan, 2016).

The Philosophy of the Internet and the World Wide Web

So much for history. Let us now turn to the crisis facing us with the public use of the Internet numbering in the billions and the rise of the Internet mega-monopolies of the likes of Facebook, Google, Apple, Amazon, and Microsoft, to mention the Top 5. As an early adopter of the Internet and the cofounder of a Web development company, Gutenberg Internet Services that also engaged in knowledge management consulting, I looked upon the Internet as a liberating force that would allow all of its users a platform for controlling their access to and dissemination of information. I, along with many others, believed that the Internet would have a decentralizing effect and bring an end to monopolies because everyone on the Net would have the ability to communicate to a global audience. The reverse has happened; monopolies are bigger than ever as is the case with companies listed above. In 2010, I wrote, "The Internet and the World Wide Web have played a prominent role in the breakdown of Industrial Era

monopolies of knowledge by providing a medium whereby non-professionals have been able to share their experiences and network their knowledge" (Logan, 2010, p. 282). Not my best prediction.

Not only have these mega-monopolies arisen, but they are now exploiting us, the users of their services. Marshall McLuhan (1964) in his book *Understanding Media: The Extensions of Man* posited that our technologies, our tools, and our media are extensions of our bodies and our psyches. The digital media that are dominated by the mega-monopolies are still extensions of our psyches, but a flip or reversal has occurred. We, the users of these digital media, have become extensions of the media controlled by the mega-monopolies in the following sense. Every keystroke we make, every bit of data we provide are scooped up by these media companies and used to their advantage and profit. The feedback of the users of digital media become the feedforward for those media (Logan, in press). Our data are used by these companies and their customers to whom they sell our information to compromise our democracies as was case with the 2016 U.S. presidential election and the Brexit campaign in the United Kingdom, which includes the activities of Cambridge Analytica.

More than ever before, the philosophers of communication technologies are needed to help our political and business leaders to understand the dangers that the mega-monopolies of digital and Internet-based technologies and the services they provide pose to our democratic societies. This is not a mere academic exercise but an essential course of action to preserve our democratic heritage before it is too late.

Robert K. Logan
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Technology of the Surround

My argument is twofold. Smart tech is irresistible. And it surrounds us.

Those conditions combine—bizarrely perhaps but distinctly—in bridging modalities of ontology: the metaphysics of technology and the information science of technology. The former inquires into technology's "nature" and the latter into its categories and properties. Clearly, empirical groupings such as "categories" and "properties" are accessible in a way that "nature" is a matter of critical position. Nonetheless, we, and this is a global societal invocation, must address the two *in relation*. If we abandon the meta for the utilitarian of the applied, we will have abandoned ship on a human future. I do not mean that as an anthropocentric land grab. Rather, the question is, "If this next generation of technology is irresistible and if it surrounds us, what is it?"

A narrow form of "smart" can be defined as automation of objects and processes: like a coffee maker that turns itself on and orders refill coffee pods. Or traffic lights that decide when to turn green based on real-time traffic conditions. Foremost, though "smart" means the automation of decision-making by way of sensor-rich networked technologies that populate the world with an Internet of things (IoT) and artificial intelligence (AI) (Coleman, in press). Such radical automation underwrites new

technological behaviors that reorder the historical frame of command–control toward a decentralized swarm.

Irresistible

In this moment of emergence, there is consensus on one front: everyone hates the work "smart" as a figure of daily life because it is inhuman. "Neoliberalism" powers this change, literally paying for the development of the technology; yet as an economic concept, it only begins to mark the fractious moment in the social contract we inhabit. Nonetheless, like a lightning bolt from the heavens, just as the world of civic publics narrows, technology beckons again, signaling new futures. To quote from André 3000's (2003) "Happy Valentine's Day" lyrics, "Everyday's the fourteenth." Like Cupid's arrow, smart tech is irresistible—as all technologies have been from the printing press to the atomic bomb. Amoral as a cat and just as seductive.

The dominant figure of Western philosophy techné as it is transformed to technology (craft plus application or the mechanical arts) is the prosthesis. The Greek myth of Prometheus as the Titan with the forethought to steal fire from the gods represents supplemental knowledge that lights human passage beyond and above that of animals and nature (Stiegler, 1998). Obviously, other cosmologies do not elevate the human view above all else. But, from the age of Enlightenment to the present, most technologies in their ontological claim do. In this sense, the turn at hand is a technologically driven one—a philosophical shift mandated by a computational one.

The Surround

The coalition of Black as an aesthetic and as a politics with the autonomous computational machinic is a coincidence of history and of innovation. Technology is of course "about" innovation. But so readily is a transatlantic Blackness as a concept and phenomenon (Glissant, 1997). One can say, "Hold on, the liberation theology of black aesthetics as black freedom cannot be equated with mindless machines." And that is certainly true. The equation of slave machine is precisely what the maroons fled from into the swamp and darkness. But the ruthless logic of modernity and its future forecasts take their own recursive turn in what is historically—and increasingly hysterically—referred to as the "subject." Unlike the "common wealth, poverty and the blackness of the surround" (Harney & Moten, 2013), we have a machinic surround of marooned sensors and artificial intelligence, escaped from human dominion.

This machinic surround does not negate industrial and postindustrial critiques of simulacra and simulation, *pace* Debord and Baudrillard. But it changes the emphasis and orientation of knowledge, production, and agency away from Modernist tropes of man-a-machine or even the long romance of the cyborg to the ubiquitous and often invisible. Unlike us, who are revealed as if by floodlight. Human contours are ever more legible with facial recognition, data mapping, and other tracking programs. This is an effect of being surrounded. Everything is animated. We now live in a world where objects count themselves and us.

An IoT interaction is based on the conditions of pervasive media technology in which devices talk to each other, automatically updating agendas, programs, scripts, and so on—creating a network of machine-to-machine (M2M) communication. M2M communication represents "a world-wide network of uniquely addressable interconnected objects" (European Technology Platform on Smart Systems Integration [EPoSS], 2008, p. 4). It describes a merger of the informational and material world in which common objects are imbued with computational power that allows them to be self-identified, self-activated, and self-controlled across a network. This is a granular level of command and control that is also, perhaps most disturbingly, decentralized. The specter that haunts a global postmodernity is not so much Big Brother or the Panopticon (although the surveillance aspect of this array of things is nontrivial); rather, it is the swarm view of insects or drones.

The two attributes of smart tech—irresistible and surround—speak to an important and fairly imperceptible change in technology. When we first went on the Internet, we could communicate with each other in virtual chat rooms, then social media, and so on. The online virtual world reflected our lived experience (Coleman, 2011). With IoT and AI embedded in the built environment (real world), we have an equal and opposite effect: The informational layer that described our life online has now been built into the buildings, streets, and objects around us. In other words, we walk amid this informational relay. It surrounds us.

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Beth Coleman
University of Waterloo

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Notes

1. Also consider explorations of the concept of technology by Agamben (2009), Feenberg (2002), Franssen, Lokhorst, and van de Poel (2018), Grosz (2008), Hickman (2001), Ihde (1990), Mitcham (1994), and Mitcham & Schatzberg (2009).
2. "Enframing means the gathering together of that setting-upon which sets upon man, i.e., challenges him forth, to reveal the real, in the mode of ordering, as standing-reserve. Enframing means that way of revealing which holds sway in the essence of modern technology and which is itself nothing technological" (Heidegger, 1954/1996, p. 20).
3. Technology. (2019). In *OxfordDictionaries.com*. Retrieved from https://en.oxforddictionaries.com/definition/technology
4. For other bio-inspired approaches, see Logan, 2007; Logan, 2008; Myers, 2012; Thacker, 2004; Weiss, 2002, and the Institute of Electrical and Electronic Engineers Transactions on Molecular, Biological, and Multi-Scale Communications website (https://ieeexplore.ieee.org/servlet/opac?punumber=6687308). For discussions of disciplinarity, see Brandt et al., 2013; Lang et al., 2012; Osborne, 2015; Popa, Guillermin, & Dedeurwaerdere, 2015.
5. On transdisciplinary research, see Visualizing Complex Systems Science (CSS) (n.d.) and Pam (2010). On antidisciplinary research, see the MIT Media Lab (https://www.media.mit.edu/research/?filter=groups).
6. Also see the MIT Center for Collective Intelligence (https://cci.mit.edu).
7. The "What is . . .?" conference–experience–exhibition series has been hosted at the University of Oregon in Portland for the last 10 years. *"What is Technology?"* (2019) included *topics such as* Patterns, History of Technologies, Platform Studies, Solutions

Culture, Technological Determinism, IoT, Narrative, Slow News, Social Media, Embodiment, Narrative, Biological/Environmental Solutions, Trust, Identity, Criticism, Policy, Education, Memory, Feminism, and Curation. This year's event was presented in collaboration with the Light Court Commons exhibition, *PATTERNS*, and the Oregon Museum of Science and Industry (OMSI). See *whatis.uoregon.edu*.

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