

Digital Infrastructure, Liminality, and World-Making Via Asia: The Infrastructural Politics of Liminality

Introduction

ROLIEN HOYNG¹

Chinese University of Hong Kong, Hong Kong SAR

Discussions of digital and smart infrastructures have often assumed ubiquitous, global connectivity and data-driven governance in ways that made the concept of liminality seem redundant. Contesting such narratives, this Special Section features provocative discussions about frictions, interstices, and excesses involving blockchains/trains, smart cities, electronic waste, food rescue logistics, stacks, leaky Internet blackouts, and humanitarian “data signal trafficking.” The introduction provides a conceptual framework inspired by Simondon. It contends that digital infrastructures touch on something external that they do not fully control and therefore spur tensions and paradoxes of integration/disruption and convergence/excess. What I call the “infrastructural politics of liminality” unpacks such tensions and paradoxes by construing three axes, labeled “incorporation,” “territorialization,” and “signification” respectively. Accordingly, this section explores infrastructural world-making by mapping digital–material connections running “via Asia” that touch ground in Asia but that also produce its spaces, borders, and global extensions.

Keywords: digital infrastructure, smart infrastructure, liminality, Simondon, Asia, globalization

There was no trash chute connecting First Space directly with Third Space. The trash from First Space had to pass through a set of metal gates to be transported into Third Space, and the gates shut as soon as the trash went through. Lao Dao didn’t like the idea of having to go over the flipping ground, but he had no choice.

—*Folding Beijing*, Hao Jingfang (2015, para. 102), translated by Ken Liu

Rolien Hoyng: rolienhoyn@cuhk.edu.hk

Date submitted: 2021-04-05

¹Research for this article was supported by RGC Ref No. 23601417.

Copyright © 2021 (Rolien Hoyng). Licensed under the Creative Commons Attribution Non-commercial No Derivatives (by-nc-nd). Available at <http://ijoc.org>.

Beyond Protocol

The science fiction novelette *Folding Beijing* (Hao, 2015) narrates a future version of Beijing that consists of three distinct sociomaterial layers that alternate to occupy the earth's surface and become alive. The mechanisms to switch the layers and flip the ground simultaneously hold together and set apart the starkly disparate realities of a segregated city, from the posh consumption sites of First Space to the waste dumps of Third Space. The calibrated order relies heavily on logistical planning of a circular economy and is executed by means of extensive automation and constant monitoring. Nonetheless, the system, which combines "smart" digital technologies and clunky mechanical hardware, is not inviolable, as it produces its own fissures and excesses. Cheating the system, as the waste worker Lao Dao does, means reconciling seemingly incompatible experiences of control and excess, connectivity and containment, strangerhood and entanglement.

Discussions of smart infrastructures have often assumed ubiquitous, global connectivity and data-driven governance in ways that made the concept of liminality seem redundant. But as illustrated by *Folding Beijing*, these infrastructures remain invested with liminality in that the processes of infrastructural integration manifest disjunction and engender excess. That is to say, infrastructures that enable digital communication involve a host of different technomaterialities including mechanical hardware, undersea cables, databases, software platforms, and interfaces. Furthermore, they intersect with territories, bodies, and ecologies. The material multiplicity of infrastructures and the fact that they touch on something external that they do not fully control spurs tensions and paradoxes of integration and disruption, convergence and excess. Drawing on this insight, this Special Section shifts between the front-end and back-end of computing, and between data and matter or life, while juxtaposing technological design with the ramifications of actual operation.

Foregrounding tensions and paradoxes, this Special Section seeks an analytical angle onto globalization as a process of infrastructural world-making that parts with the narrative of smooth flow and connectivity. It investigates the future of globalization, at the very moment that globalization as the future has lost its assumptiveness, rendering the "end" of globalization imaginable at last (see also Cazdyn & Szeman, 2011). While translocal exchanges and global entanglements continue, disorientation vis-à-vis globalization derives from a greater sense of the unpredictability, unsustainability, and vulnerability of the global networks and systems supporting modern life. Moreover, this disorientation entails the simultaneous surge of geopolitical tensions and statist politics of recent years. Anticipating a new but also uncertain and by some vilified global power, it is said that "the next century will be Asia's" (Aouragh & Chakravartty, 2016; Thussu & Nordenstreng, 2021). Engaging this conjunction of imagined endings and beginnings, the primarily geographical focus of this Special Section is on connections running "via Asia" that touch ground in Asia but that also produce the spaces of Asia and beyond, its borders, and its extensions (Neilson, Rossiter, & Samaddar, 2018; Rossiter, 2017; Starosielski, 2015). Next to production of space, the phrase "via Asia" also alludes to temporality and the unfolding of globalization in time *via Asia*.

In this introduction, I propose to study digital infrastructure by revisiting liminality as a concept deriving from the postcolonial critique of a previous mode of globalization and colonization with the aim to underscore the disjunctions and excesses produced through infrastructural operation. The next sections discuss two notions of infrastructural liminality: as *lingering in the interstices* of infrastructural networks and as *arising from* infrastructural operation. These notions, I argue, help us analyze infrastructural world-making when

globalization as the future appears uncertain. To further such an analysis, I introduce the "infrastructural politics of liminality" and outline its three axes, labeled respectively "incorporation," "territorialization," and "signification." I present the contributions to this Special Section in relation to these axes.

Infrastructural World-Making: Whither Liminality?

Prevalent analyses of digital infrastructure and globalization since the 2000s often attended to what Hardt and Negri (2000) have termed Empire, an inclusive space devoid of insides and outsides, borders, and efficacious territorial sovereignty. For instance, Galloway's (2004) ground-breaking analysis of protocol argued that to enable heterogeneity and the distribution of autonomy to individual locales, or nodes, in a given network, standardization and infrastructural interoperability at a lower level would be required. Following this thesis, locality and heterogeneity persist but are not as fundamental as global standardization. Rather, they are contained, coopted, and exploited by new forms of capitalist control that are enabled by the Net's universalizing, integrative, and radically inclusive infrastructure. Concerns over hegemony, subalternity, and liminality are replaced by the focus on a protocological, posthegemonic mode of control (Galloway, 2004; see also Beer, 2009; Deleuze, 1992; Lash, 2007), to which cultural difference remains inconsequential due to ubiquitous infrastructural integration, datafication, and algorithmic power. The latter can incorporate any way of life by working from within its object, which it transposes to the abstract language of data and modulates through feedback loops. In other words, control as management technique concerns the molding of whatever kind of life through datafication. Power as control assumes an imminent reality of cybernetic control that constitutes a self-preserving autopoietic order by means of continuous self-correction, modulation, and foreclosure.

While having made important contributions to understanding power at times of increasing digitization, connectivity, datafication, and surveillance, the control thesis made postcolonial critiques oriented onto liminality and subalternity seem superfluous (Mignolo, 2005; Mookerjee, 2010). The word *liminality* derives from "threshold" (*limen* in Latin) and in cultural theory connotes instances in which socially constructed knowledge is challenged by ambiguous states or transgressive becoming that do not befit its categorizations and projected order (Turner, 2008). Though liminality is often used to underscore erasure and violence in representational practice, it can also be associated more positively with the subversive potential of the outcast who falls beyond social categories, or with the excessive, nongovernable character of subaltern lifeworlds (Chakrabarty, 2000; Grossberg, 2000; Spivak, 1998). Considering liminality in the context of digital infrastructure, we can go back to the waste worker Lao Dao, who cheats the switching mechanisms in *Folding Beijing*. As Lao Dao knows all too well, fissures and excesses are very much part of infrastructural operation. But how, and to what effect, do liminal excesses persist?

From Liminality to Transduction

Taken to the context of infrastructure, my first conception of liminality revolves around the interplay between infrastructural materiality and the different realities, contexts, and environments it spans. For instance, logistical media can be conceived as technologies, infrastructure, and software, and they "coordinate, capture, and control the movement of people, finance, and things" (Rossiter, 2016, p. 5). As Rossiter (2016) argues, "Infrastructure makes worlds. Logistics governs them" (p. 5). Yet the excess of

lifeworlds vis-à-vis logistical media and their data infrastructures may disrupt control. Following this line of inquiry, this Special Section considers how difference is reduced to datafied and encoded territories and bodies that are governed through infrastructural and logistical operation. Yet though heavily technological-deterministic visions of governance and development abound, liminal and subaltern realities continue to resist governance by infrastructural apparatuses, which come with their own epistemological blind spots and ideological exclusions (Hoyng, 2019; Mejias, 2013). Historically subaltern populations can pose challenges in new ways. For instance, if paper databases used to architect ontologies of populations and land in the service of colonial rule in India, digital infrastructures offer new means for today's "smart" governance initiatives such as the Aadhaar project, which started out with unique citizen identification numbers. Biometrics promises superior "immediate," universal identification, while geographic information system (GIS) maps supposedly enhance transparency in urban planning. Yet the drive toward governance through datafication triggers frictions between the status of the subject as user of information systems, as citizen with rights, and as participant in the subaltern networks of the "political society" in the postcolonial city (Sundaram, 2017; see also Abraham, 2018; Arora, 2016). As Datta (2018) writes, "postcolonial citizenship must now directly address the subaltern 'other' within and across new forms of power vested in the digital" (p. 408).

However, according to a second conception, liminality can be considered as the excess borne from infrastructural operation. Simondon's notion of transduction reflects the two senses of liminality: (i) as edge of infrastructural operation and (ii) as transformative and excessive emergence that exceeds the current order. Transduction underscores the knitting together, and in doing so the transformation, of disparate, disjunctive realities. At stake is not just the order of individual entities and objects (such as "technology" and "human" or "society") but also the order of preindividual potential of the technical object and its milieu (Grosz, 2012; LaMarre, 2013, p. 86). As Simondon (1992) notes, "*Instead of grasping individuation using the individuated being as a starting point, we must grasp the individuated being from the viewpoint of individuation, and individuation from the viewpoint of preindividual being, each operating at many different orders of magnitude*" (emphasis in the original; p. 311). Hence, the point is not how infrastructure connects between, and interrelates, individuated beings, but rather how it *performs* relations that *enact* becomings, drawing on transformative potential that can lead to different individuations (or actualizations). Infrastructural integration rearticulates the prior terms of the technical system and its milieu, leading to an emergent process of individuation (Massumi, De Boever, Murray, & Roffe, 2012; Simondon, 1980, 1992).

Liminality as transduction can be understood in terms of such transformative potential to give rise to new sociotechnical realities. STS scholar Paul Dourish (2017) deploys the concept of transduction to see "networked arrangements as historically particular crystallizations of not just technical but also institutional, economic, and political potentialities" (p. 198). His account of "othernets" provides an interesting overview of alternatives to the current Internet that have existed, and are possible, due to the influence of the particular "milieu." For instance, such milieus have comprised the digital divide in rural India, where a bus used to collect search queries from villagers in the morning and brought back search results in the evening; or the imperatives of the command economy, which informed OGAS, the Soviet proto-Internet, as documented by Peters (2016). However, the notion of transduction has also served to call for specific attention to the relations of "what is not yet individuated," rather than the agency and efficacy of "social actors in control of, confronted with, or subject to technological objects," to speak with MacKenzie (2005,

p. 396). Differentiating “machine theory” from STS scholarship (or, at least some version of it), Fisch (2018) has used transduction to push for “novel conceptual formulations” that pertain to emergent sociotechnical ensembles (p. 9). Focused on the case of the train network in Tokyo, his machine theory highlights “cultures and practices of technological mediation that are irreducible to categories of identity, community, nation, agency, and subjectivity” (Fisch, 2018, p. 6). Such uptakes of transduction can be associated with proposals offered under labels such as posthumanism, machinic assemblages, and ontogenesis. Each of these defies hylo-morphist hierarchical oppositions such as form–matter, means–end, and mind–body and instead highlights processes of becoming, deterritorialization, and emergence, respectively (DeLanda, 2016; Deleuze & Guattari, 1987; Grosz, 2012; Soncul & Bollmer, 2020).

Infrastructural World-Making Via Asia

How does infrastructural liminality, considered in the above two ways, assist us in studying infrastructural world-making “via Asia”? “Asia as method” is a formulation key to current scholarship on Asia that extends postcolonial critique by probing alternative—meaning deimperialized and decolonial—narratives, analyses, and modes of knowledge production regarding Asia. Kuan-Hsing Chen’s (2010) influential *Asia as Method* approaches localities as dynamically evolving and syncretic “base-entities” (p. 252). Studying any place is a “way to understand an aspect of the contemporary world” (Chen, 2010, p. 253), yet at the same time doing so offers a particular, local angle. For Chen, such an angle helps one to perceive distinct realities that remain unaccounted for in dominant, and dominant-critical, paradigms. Somewhat similarly to Chen, this Special Section turns to space as analytic to avoid universalist narrative. Yet without disputing the value of Asia as method (including in the context of STS and infrastructure studies; see Anderson, 2012; Gonzaga, 2020), the aim of the analysis proposed here ultimately differs from Chen’s quest for the particularity of locality and the attachment to the local as the privileged site and scale of identification, critique, and imagination. Studying the process of infrastructural world-making “via Asia” requires heeding potential shifts and challenges incurred by infrastructural operation to established notions of region and topography. Situatedness exists in relation to not just the governance logics of statecraft but also extrastatecraft (Easterling, 2014; see also Plantin & Punathambekar, 2019); not just geopolitical territory but also infrastructural and protocological territoriality (Rossiter, 2017); and not just borders but also techniques of bordering (Mezzadra & Neilson, 2013).

Moreover, it is possible to associate Simondon’s milieu with what Chen (2010) refers to as the “spaces, sectors, and planes that existed prior to the moment of colonial encounter and global conquest, and that are still actively working in contemporary daily life” (p. 224). In this vein, Hui (2016b) explores how Chinese traditional philosophy can be repurposed, not for the execution of a nativist dream of origins, but for inventive, cosmopolitical, or cosmotechnical, praxis (p. 307). In this view, cultural particularities and potentialities offer resources for transductions constituting alternative sociotechnical futures (Grosz, 2012, p. 54; Hui, 2016b, pp. 301–312), and such multiple modernities (Grossberg, 2010) do not need to be territorially delimited, but can evolve beyond their site of origin.

Toward an Infrastructural Politics of Liminality

What I call the “infrastructural politics of liminality” comprises the tensions and paradoxes of integration/disruption and convergence/excess. There are three axes to such politics.

Axis One: Incorporation

The first axis of the infrastructural politics of liminality concerns the *incorporation*, incapacitation, and exploitation of liminal difference through the workings of digital infrastructure that advance technical interoperability and spatial integration. My conception of this axis draws on Simondon’s (1980) critique of the cybernetic view of information that treats the latter as abstract; reduces all life to this abstraction; and is geared toward command and control (see also Deleuze & Guattari, 1987; Mills, 2015; Terranova, 2006). What such cybernetics offer is a homolingual regime that erases and incapacitates differences only to reconstruct them on controllable terms. Homolingualism implies hylomorphic reductions as a means of formalizing—that is, transposing into data—lifeworlds, which supports biopolitical governance and accumulation. The universalizing disposition of such datafication has informed the colonial-imperialist enterprise (Rieder, 2020; Solomon, 2016). But more recently it has enabled phenomena such as platform imperialism (Jin, 2017), whereby still foremost U.S.-based companies can act as mediators for local or translocal activity elsewhere. Such corporations reap the benefits from enacting the “connecting link,” for instance when Uber smart city applications mediate Indian local life and business (see Antenucci, this Special Section). Profits are gained through exploitation of data as resource, which mimics colonial methods of extractivism. Hence, data *mining* as a metaphor evokes the mining of planetary resources, along with the struggles over property and commons in colonized lands (Mezzadra & Neilson, 2017; see also Couldry & Mejias, 2019). The reference to colonialism and imperialism can further be taken to indicate the relevance of place and race in biopolitical algorithmic governance, along with questions of data commons and sovereignty (Chun, 2018; Lovett et al., 2019).

However, infrastructural integration and data’s homolingualism should not be taken for granted, but considered as sites of struggle. At every switch or extension, (human and nonhuman, social and material) forms of resistance can put smooth connectivity and infrastructural integrity at peril (Parks & Starosielski, 2015; Rossiter, 2016; Sandvig, 2013). In this issue, Tsvetelina Hristova, Brett Neilson, and Ned Rossiter look at different levels of hardware and software of logistical and transportation infrastructures of the Belt and Road Initiative (BRI). They investigate blockchain technology along with the YuXinOu block train that runs from China to Europe via Central and West Asia. “Imperial harmonization” through standardization of protocols, in this case, stands in the service of Chinese expansion of markets and negotiates the regulatory and material traces of Cold-War pasts. However, both block technologies cope with choke points and externalities that constitute instances of contingency. As the authors conclude, the block as technology remains vulnerable to idiomatics that resist efficiency, calculation, and verification.

Evelyn Wan, in this issue, unpacks infrastructural waste: hardware that becomes electronic waste, often handled in informal circuits, as well as virtual content, handled by moderators. By drawing on empirical accounts and artistic reflections on waste work, Wan explores how power and inequality express themselves temporally, in the dual forms of slow violence and slow death for workers. Her account discusses waste work

in liminal spaces in Asia, but also speaks of actual and potential “boomerang effects” that extend beyond Asia back into the spaces of consumption in the so-called developed world elsewhere.

Looking at smart city development in Kolkata, India, Ilia Antenucci steers away from a depiction of the smart city as a site of smooth control. Instead, she highlights the multiple and intersecting speculative logics at work in “smart,” algorithmic computation as well as real-estate speculation in the city, and the financialization of innovation. What is striking in this article is the degree of failure of smart-city projects, which, however, does not stand in the way of extraction of value. As Antenucci writes, smart city projects are a testbed, operating through a speculative logic. The disjuncture between urban realities on the ground, and the promises of the future city opens the way for real estate and financial ventures, and for the operations of capitalist platforms.

Axis Two: Territorialization

The second axis of inquiry attends to sociotechnical *territorializations*, whereby digital/smart infrastructures become part and parcel of geopolitics as well as the governance of territories and populations (see also Hu, 2015). Other scholars have already recounted the institutional histories of the protocological politics of standardization and highlighted that the development of digital infrastructure remains integral to ongoing geopolitical, intrainperial, and postcolonial struggles (Aouragh & Chakravarty, 2016; Dourish, 2017; Rossiter, 2017). For instance, TLD (top-level domain) names in URLs are only allocated to countries recognized by the United Nations. Yet, though Hong Kong and Taiwan currently enjoy TLD status, could shifting geopolitical balance affect such protocological classifications, as exemplified by a recent incident in which China forced foreign airliners to change the country designation of Taiwan? Ironically, considering that many localist and populist movements have grown on and with the Internet, the protocological classifications can be at odds with the identifications, passions, and energies that emerge on the very digital networks they sustain.

However, Bratton (2016) reminds us that digital infrastructures are not simply subjected to geopolitics and claims to sovereignty per se. Probing processes of transduction or sociotechnical emergence, Bratton (2014) argues,

It is not at all clear whether, in the long run, Cloud platforms will overwhelm state control on such flows, or whether states will continue to evolve into Cloud platforms, absorbing the displaced functions back into themselves, or whether both will split or rotate diagonally to one another. (p. 4).

Taking this idea further and into the context of China’s digital infrastructure, Gabriele de Seta in this Special Section explores a complex picture of “how, in a generalized undoing of sovereignty across the globe, states absorb features of the stack as much as the stack absorbs features of a state.” He unpacks three sociotechnical configurations: the gateway, the sieve, and the dome. His intervention aims at a “topological analysis of the geopolitics of computation,” which includes processes of transduction transforming state authority and statecraft.

The next author, Nishant Shah, reviews Internet shutdowns and information blackouts in India. He argues that such control measures suggest the suspension of all computation networks but in fact multiple backdoors and loopholes facilitate information to flow. Internet shutdowns do not stand in the service of stopping the circulation of “fake news,” as state authorities claim. But more so, the shutdown facilitates the circulation of state-endorsed (dis)information that now can monopolize the scene. Unpacking another manifestation of coalescence and mutual affection between state power and digital infrastructure, Shah shows that states can exploit the seemingly illicit, aleatory forces emerging from the blocked Internet. This leaky, excessive communication is not simply liminal vis-à-vis state power but reinforces state power through repression of dissent.

Axis Three: Signification

The third line of inquiry examines what Simondon calls *signification*, which—as opposed to signal transmission between given entities (individuated beings)—stands for transductive emergence of sociotechnical novelty when disparate realities find resolution. The ethical-political quality of this moment can be understood in terms of the emergence of a more inclusive and affirmative system: more beings (or, in fact, underlying preindividual forces) find resonance and amplification and contribute to transformation of the system (Grosz, 2012; Hui, 2016a; Mackenzie, 2002; Mills, 2015; O’Neil, 2016; Simondon, 2012). For instance, whereas cybernetic systems formalize realities into signal for the sake of control, signification comprises the ethicopolitical moment of a feedback loop relaying illegible “noise” stemming from the milieu and conjuring a transformative reaction. Yet how to save “noise”—as the dilemma of irreducible, liminal difference—from cybernetics of control? And how can it trigger signification and induce a novel, more inclusive sociotechnical network?

Daisy Tam works through dualities of signal/noise in the context of food waste recovery in Hong Kong. Her article draws on an action-based research project that develops an actual logistical system to assist food rescue NGOs that redistribute food to impoverished communities in Hong Kong. Her work seeks to inspire networks of ethical relations that orient logistics on dissemination, rather than accumulation, of value as well as data. Because of the lack of classification, food waste equals excess and noise that logistics has no way of dealing with other than disposal. But can there be a mode of communication that indexes noise and reconfigures it as significant and purposive?

Monika Halkort’s article discusses sea rescues of refugees by activists on the waters that border West Asia, Europe, and the MENA region. The European Union’s militarized surveillance apparatus, which is tasked with border control at sea, effectuates vulnerability and abuse through the micropolitics of frequencies and data signals. But, due to the tactics of skillful promigration activists, the apparatus also opens up possibilities for resistance and attentiveness to destitute bodies and injustices. Paralleling Simondon’s notion of signification, Halkort’s take on resonance refers to reciprocities in flows of affect, information, and bodies that either shape ethicopolitical responsiveness, or fail to do so. This contribution shows the struggles unfolding in the liminalities and excesses of sociotechnical networks in the context of border making at the intersection of geopolitical regions.

References

- Abraham, I. (2018). Prehistory of Aadhaar: Body, law, and technology as postcolonial assemblage. *East Asian Science, Technology and Society: An International Journal*, 12(4), 377–392. doi:10.1215/18752160-7218326
- Anderson, W. (2012). Asia as method in Science and Technology Studies. *East Asian Science, Technology and Society: An International Journal*, 6(4), 445–451. doi:10.1215/18752160-1572849
- Aouragh, M., & Chakravartty, P. (2016). Infrastructures of empire: Towards a critical geopolitics of media and information studies. *Media, Culture & Society* 38(4), 559–575. doi:10.1177/0163443716643007
- Arora, P. (2016). The bottom of the data pyramid: Big data and the Global South. *International Journal of Communication*, 10, 1681–1699.
- Beer, D. (2009). Power through the algorithm? Participatory Web cultures and the technological unconscious. *New Media & Society*, 11(6), 985–1002. doi:10.1177/1461444809336551
- Bratton, B. (2014, March). The black stack. *E-flux Journal*, 53, 1–12.
- Bratton, B. (2016). *The Stack: On software and sovereignty*. Cambridge, MA: MIT Press.
- Cazdyn, E., & Szeman, I. (2011). *After globalization*. Malden, MA: Wiley-Blackwell.
- Chakrabarty, D. (2000). Subaltern studies and postcolonial historiography. *Nepantla: Views from South*, 1(1), 9–32.
- Chen, K. H. (2010). *Asia as method: Toward deimperialization*. Durham, NC: Duke University Press.
- Chun, W. H. K. (2018). Queering homophily. In C. Apprich, W. H. K. Chun, F. Cramer, & H. Steyerl (Eds.), *Pattern discrimination* (pp. 9–98). Lüneburg, Germany: Meson.
- Couldry, N., & Mejias, U. (2019). Data colonialism: Rethinking Big Data's relation to the contemporary subject. *Television and New Media*, 20(4), 336–349. doi:10.1177/1527476418796632
- Datta, A. (2018). The digital turn in postcolonial urbanism: Smart citizenship in the making of India's 100 smart cities. *Transactions of the Institute of British Geographers*, 43(3), 405–419. doi:10.1111/tran.12225
- DeLanda, M. (2016). *Assemblage theory*. Edinburgh, UK: Edinburgh University Press.
- Deleuze, G. (1992, Winter). Postscript on the societies of control. *October*, 59, 3–7.

- Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia*. Minneapolis: University of Minnesota Press.
- Dourish, P. (2017). *The stuff of bits: An essay on the materialities of information*. Cambridge, MA: MIT Press.
- Easterling, K. (2014). *Extrastatecraft: The power of infrastructure space*. London, UK: Verso.
- Fisch, M. (2018). *An anthropology of the machine: Tokyo's commuter train network*. Chicago, IL: University of Chicago Press.
- Galloway, A. (2004). *Protocol: How control exists after decentralization*. Cambridge, MA: MIT Press.
- Gonzaga, E. (2020). Infrastructure as method in archipelagic Southeast Asia. *Verge: Studies in Global Asias*, 6(2), 60–64. doi:10.5749/vergstudglobasia.6.2.0060
- Grossberg, L. (2000). The figure of subalternity and the neoliberal future. *Nepantla: Views from South*, 1(1), 59–89.
- Grossberg, L. (2010). *Cultural studies in the future tense*. Durham, NC: Duke University Press.
- Grosz, E. (2012). Identity and individuation: Some feminist reflections. In A. De Boever, A. Murray, J. Roffe, & A. Woodward (Eds.), *Gilbert Simondon: Being and technology* (pp. 37–56). Edinburgh, UK: Edinburgh University Press.
- Hao, J. (2015). Folding Beijing. *Uncanny Magazine* (Ken Liu, Trans.). Retrieved from <https://uncannymagazine.com/article/folding-beijing-2/>
- Hardt, M., & Negri, A. (2000). *Empire*. Cambridge, MA: Harvard University Press.
- Hoyng, R. (2019). Aggregations of the opaque: Rethinking datafication and e-waste. *First Monday*, 24(4). doi:10.5210/fm.v24i4.9866
- Hu, T. H. (2015). *A prehistory of the cloud*. Cambridge, MA: MIT Press.
- Hui, Y. (2016a). *On the existence of digital objects*. Minneapolis: University of Minnesota Press.
- Hui, Y. (2016b). *The question concerning technology in China: An essay in cosmotechnics*. Falmouth, UK: Urbanomic.
- Jin, D. Y. (2017). Digital platform as a double-edged sword: How to interpret cultural flows in the platform era. *International Journal of Communication*, 11, 3880–3898.

- LaMarre, T. (2013). Afterword: Humans and machines. In M. Combes, *Gilbert Simondon and the philosophy of the transindividual* (pp. 79–108). Cambridge, MA: MIT Press.
- Lash, S. (2007). Power after hegemony: Cultural studies in mutation? *Theory, Culture & Society*, 24(3), 55–78. doi:10.1177/0263276407075956
- Lovett, R., Lee, V., Kukutai, T., Cormack, D., Rainie, S. C., & Walker, J. (2019). Good data practices for indigenous data sovereignty and governance. In A. Daly, K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Amsterdam, The Netherlands: Institute of Network Cultures.
- Mackenzie, A. (2002). *Transductions: Bodies and machines at speed*. London, UK: Continuum.
- Mackenzie, A. (2005). The problematising the technological: The object as event? *Social Epistemology*, 19(4), 381–399. doi:10.1080/02691720500145589
- Massumi, B., De Boever, A., Murray, A., & Roffe, J. (2012). "Technical mentality" revisited: Brian Massumi on Gilbert Simondon. In A. De Boever, A. Murray, J. Roffe, & A. Woodward (Eds.), *Gilbert Simondon: Being and technology* (pp. 19–36). Edinburgh, UK: Edinburgh University Press.
- Mejias, U. A. (2013). *Off the network: Disrupting the digital world*. Minneapolis: University of Minnesota Press.
- Mezzadra, S., & Neilson, B. (2013). *Border as method, or the multiplication of labor*. Durham, NC: Duke University Press.
- Mezzadra, S., & Neilson, B. (2017). On the multiple frontiers of extraction: Excavating contemporary capitalism. *Cultural Studies*, 31(2/3), 185–204. doi:10.1080/09502386.2017.1303425
- Mignolo, W. (2005). On subalterns and other agencies. *Postcolonial Studies*, 8(4), 381–407. doi:10.1080/13688790500375082
- Mills, S. (2015). Simondon and big data. *Platform: Journal of Media and Communication*, 6, 59–72.
- Mookerjee, S. (2010). Subaltern biopolitics in the networks of the commonwealth. *Journal of Alternative Perspectives in the Social Sciences*, 2(1), 245–280.
- Neilson, B., Rossiter, N., & Samaddar, R. (2018). Making logistical worlds. In B. Neilson, N. Rossiter, & R. Samaddar (Eds.), *Logistical Asia: The labor of making a world region* (pp. 1–20). Singapore: Palgrave MacMillan.
- O'Neil, C. (2016). *Weapons of math destruction*. New York, NY: Broadway.
- Parks, L., & Starosielski, N. (2015). Introduction. In L. Parks & N. Starosielski (Eds.), *Signal traffic: Critical studies of media infrastructures* (pp. 1–30). Urbana: University of Illinois Press.

- Peters, B. (2016). *How not to network a nation*. Cambridge MA: MIT Press.
- Plantin, J. C., & Punathambekar, A. (2019). Digital media infrastructures: Pipes, platforms, and politics. *Media, Culture & Society*, 41(2), 163–174. doi:10.1177/0163443718818376
- Rieder, B. (2020). *Engines of order: A mechanology of algorithmic techniques*. Amsterdam, The Netherlands: University of Amsterdam Press.
- Rossiter, N. (2016). *Software, infrastructure, labor: A media theory of logistical nightmares*. New York, NY: Routledge.
- Rossiter, N. (2017). Imperial infrastructure and Asia beyond Asia: Data centers, state formation, and the territoriality of logistical media. *The Fibreculture Journal*, 29, 1–20. doi:10.15307/fcj.29.220.2017
- Sandvig, C. (2013). The Internet as infrastructure. In W. H. Dutton (Ed.), *The Oxford handbook of Internet studies* (pp. 86–108). New York, NY: Oxford University Press.
- Simondon, G. (1980). *On the mode of existence of technical objects* (N. Mellamphy, Trans.). London, Canada: University of Western Ontario.
- Simondon, G. (1992). The genesis of the individual. In J. Crary & S. Kwinter (Eds.), *Incorporations* (pp. 297–319). New York, NY: Zone.
- Simondon, G. (2012). Technical mentality. In A. De Boever, A. Murray, J. Roffe, & A. Woodward (Eds.), *Gilbert Simondon: Being and technology* (pp. 19–36). Edinburgh, UK: Edinburgh University Press.
- Solomon, J. (2016, Spring). Logistical species and translational process: A critique of the colonial-imperial modernity. *Intermédialités*, (27). doi:10.7202/1039809ar
- Soncul, Y., & Bollmer, G. (2020). Networked liminality. *Parallax*, 26(1), 1–8. doi:10.1080/13534645.2019.1685775
- Spivak, G. (1998). Can the subaltern speak? In C. Nelson & L. Grossberg (Eds.), *Marxism and the interpretation of culture* (pp. 271–312). London, UK: Macmillan.
- Starosielski, N. (2015). *The undersea network*. Durham, NC: Duke University Press.
- Sundaram, R. (2017). The postcolonial city in India. From planning to information? *Techniques & Culture*, 67. Retrieved from <https://journals.openedition.org/tc/8494>
- Terranova, T. (2006). The concept of information. *Theory, Culture & Society*, 23(2/3), 286–288. doi:10.1177/0263276406023002115

Thussu, D., & Nordenstreng, K. (2021). Introduction. In D. Thussu & K. Nordenstreng (Eds.), *BRICS media: Reshaping the global communication order?* (pp. 1–20). New York, NY: Routledge.

Turner, V. (2008). Liminality and communitas. In M. Lambek (Ed.), *A reader in the anthropology of religion* (pp. 326–340). Malden, MA: Blackwell.