The privilege of taken for grantedness: On precarity and mobile media

Chris Ingraham [iD]
The University of Utah, USA

Justin Grandinetti [iD]
University of North Carolina at Charlotte, USA

Abstract

This essay makes a case for more critical inquiry in mobile media research around the privilege of taken for grantedness. As a critical supplement to Richard Ling's important work on the taken for granted dispersion and embedment of technologies such as the mobile phone or automobile into everyday life, we examine the precarity that such reliance involves. Taking certain media for granted makes other, more invisible vulnerabilities harder to see and acknowledge. We make this case using the example of TikTok, a short-form mobile streaming app that has rapidly become a go-to social media platform worldwide—as well as a massively "visible" infrastructure due to its associated geopolitical tensions and security concerns. In light of recent conversations about banning the platform, TikTok offers an instructive case study for the privilege of taken for grantedness and the deceptively precarious nature of our mobile media practices.

The ultimate maturation of any technology is its invisibility. Scholars from Martin Heidegger to John Durham Peters have observed that widely adopted tools and infrastructures are often unnoticed until they stop working: indoor plumbing, sidewalks, The

Corresponding author:
Chris Ingraham, The University of Utah, Languages and Communication Bldg. 255 S. Central Campus Drive, Rm 2400, Salt Lake City, UT, 84112, USA.
Email: chris.ingraham@utah.edu

Postal Service, cellular signals. All infrastructures strive toward the invisible. As an expression of their essential role in facilitating everyday life, paradoxically, the invisibility of some technologies and most infrastructures makes them evade attention until they breakdown. How, then, without having to lose the things so many people have come to expect and need, can we study what is so omnipresent and reliable that it seldom gets noticed for what it is? And how, if we do give such things attention, can the shortcomings of these built-dependencies be addressed in a way that helps us to imagine sturdier and more equitable ways of organizing society around them?

This article explores such questions by emphasizing the importance of ongoing critical inquiry in mobile media research around *the privilege of taken for grantedness*. Few scholars have been more astute about the becoming invisible of technologies and their supportive infrastructures than Richard Ling. In *New Tech, New Ties* (2008), for instance, Ling used observational methods drawn from sociologists to show that mobile phones enable the ritual interactions essential to creating social cohesion in everyday life. Later, in *Taken For Grantedness*, he used what he called "crude" methods of data collection (Ling, 2012: viii) to demonstrate that mobile phones have since become so indispensable to sociality as to go virtually unnoticed. Our interest is not in the largely beneficial dispersion and embedment of technologies such as the mobile phone or automobile across vast swaths of the planet, as was the case for Ling. Rather, as a critical supplement to such research, we are interested in the *vulnerability* and *precarity* that follows from taking a technology for granted once it is already socially embedded.

To examine this underside of technological and infrastructural taken for grantedness, we follow the example of TikTok, the short-form mobile streaming app that has rapidly become a go-to social media platform worldwide. TikTok belongs among what Ling (2012) calls *technologies of social mediation*: "legitimated artifacts and systems governed by group-based reciprocal expectations that enable, but also set conditions for the maintenance of our social sphere" (p. 7). For Ling, these technologies orient and organize, provide efficiency and utility, and set norms for vast amounts of the population— often without being noticed. Certainly, some important research has already attempted to render such invisible technologies visible, much of it focusing on infrastructures (Hartmann, 2018; Parks, 2015; Star and Bowker, 2002; Starosielski, 2015). But, in recent years, as wireless infrastructures have improved and smartphones have proliferated, platforms like TikTok have become more subtly embedded in the social mediation of everyday life as well. Not only are social media platforms becoming more mobile, both in terms of features and how likely users are to access them via mobile devices (Alton, 2021; Tankovska, 2021; YouTube, 2021), some have also noticed that the old line between platforms and infrastructures is becoming blurrier than it once was: each now provides essential and infrastructural services (Plantin et al., 2018). Indeed, the increasingly infrastructural taken for grantedness of social media has led some scholars to worry about the massive consequences that might result if the major social media platforms suddenly disappeared (Ohman and Aggrawal, 2019).

Studying technologies of social mediation is challenging, especially those that are at once so embedded and taken for granted. Inspired by many of the aforementioned infrastructural accounts, our research methods draw from a variety of sources for the purposes of mapping complex global relations to tell better stories about the often-invisible

technologies that structure everyday life. We are also inspired by Ling's own methodologies, and accordingly draw from personal observation of TikTokkers, from qualitative and quantitative research in mobile media studies, and from widely publicized news reports around TikTok, to reveal some embedded and complex vulnerabilities associated with the app that might otherwise go unacknowledged. Because these vulnerabilities are not limited to TikTok, but rather exemplify some broader scales of precarity pertinent to all mobile technologies of social mediation, we hope they might illustrate the importance of more attention to such issues in future mobile media research.

To date, most research on the vulnerabilities associated with mobile communication has focused on those who, because of poverty or other forms of disenfranchisement, have not fully reaped their benefits. This is crucial work. But it leaves room in the literature to acknowledge and address those vulnerabilities caused not just by a lack of certain technological privilege, but by having the privilege to take technologies for granted in the first place. Accordingly, the reason for our research on TikTok is not merely to contribute insights into that particular platform; but, rather, to treat it as a helpful illustration of the broader technological vulnerabilities that manifest different but entangled forms of precarity in everyday life. TikTok makes a compelling example because its vast popularity has made it "invisible" for the millions of subscribers who take it for granted, while at the same time it has become a highly "visible" infrastructure due to its associated geopolitical tensions and security concerns.

In light of repeated conversations about banning the platform, TikTok underscores the deceptively precarious nature of our mobile media practices—what we will refer to as the *privilege of taken for grantedness*. Since its launch in 2018, TikTok quickly came to rival such major social media platforms as Facebook and YouTube. Yet, TikTok's cultural relevance extends beyond its exponential rise in popularity. The Indian government instituted an outright ban of the app in 2020, and the governments of the United States, Pakistan, Japan, Indonesia, and Australia have all considered similar policies due, in large part, to geopolitical tensions over concerns that data collected by the app could be accessed by the Communist Party of China (Gray, 2021). Although these security concerns are debatable (Neyaz et al., 2020; Jia and Ruan, 2020), this example demonstrates the fragile and precarious nature of taking mobile media for granted. An app used by millions of people today could be completely inaccessible tomorrow.

Such a concern has global relevance, as more elective apps, especially social media, are often those that constitute the habitual and day-to-day ways that people "play" with their phones, even in contexts marked by more precarity (Sey, 2014). We don't wish to speak too broadly about the multitude of ever-changing mobile media compositions around the globe; it would be impossible to completely disentangle the interlocking strands of embedded mobile media. But, to address the taken for grantedness of mobile communication without attending to the more modulated and embedded forms of precarity that make such taken for grantedness a privilege for some—and a risk for others—is to miss an opportunity to think more critically about the ways that commonplace technologies consequentially organize social life.

In this article, then, we address the privilege of taken for grantedness beyond the auspices of any "digital divide" in one's access to mobile technologies, and instead consider the precarities that come already built-in to any normalized reliance upon them. Certainly,

to the degree that mobile technologies have become taken for granted, one's very reliance on them makes one more vulnerable to their loss. As we have learned from literature exploring dependency, emotions, and mobile phones, the intimate attachments people have to their devices and favorite platforms creates a strong reliance upon them (Cumiskey and Ling, 2015; Hjorth and Lim, 2012; Lasen, 2004; Ross and Campbell, 2021; Vincent, 2005; Vincent and Fortunati, 2009). That reliance puts people in a precarious position relative to the devices, infrastructures, supply chains, manufacturing processes, and regulatory systems that make it possible for mobile communication to function *as* invisible to begin with. Assessing the taken for grantedness of TikTok—as one example among other key configurations of the mobile landscape—accordingly has implications for both the present and future of mobile media research. Identifying these implications involves considering not only the embedded invisibility of mobile devices, but also the infrastructures these devices rely upon; the platforms that enable groups to come together; the geopolitical and regulatory frameworks underpinning these services; as well as the cultural practices that these mobile media compositions enable—and also constrain.

With this in mind, we proceed in the following structure. First, we discuss digital divide thinking relative to mobile media research on precarity, showing that the two are not the same, despite having many of the same priorities. After doing so, we organize our remaining discussion into three sections about different types of precarity associated with mobile communication media at large, but exemplified by TikTok in particular: first, in respect to the individual human *subject* (not everyone gets to take the same things for granted); second, in respect to the technical *object* (not all devices or apps are as reliable as they seem); and, third, in respect to the *planet* (not forever will the earth provide resources to support mobile media). These three scales or variables are not intended to be fully discrete, and certainly not comprehensive. Yet, as we conclude by suggesting, attention to precarity across its interconnected levels of individual subjects, technical objects, and finite resources might help mobile media scholars continue their work to identify the surprisingly fragile and contingent web of relations that come with such widespread reliance on mobile technologies.

Digital divides and precarity

Research on who benefits and who is left out of technological adoption is commonly done under the banner of the "digital divide." The term names the ongoing inequality of access to digital information, networked communication, and generally the use of those devices and technologies whose affordances are increasingly integral to the daily maintenance of society (Van Dijk, 2020). Despite widescale infrastructural development and cultural adaptation of digital media worldwide, digital divides remain persistent even today. Yet, there is still no consistent agreement about the best ways to approach them. Sinikka Sassi (2005), for instance, has identified four prominent approaches to the digital divide: technocratic; social structure; information structure and exclusion; and modernization and capitalism. While each recognizes inequalities in access to networked communication resources and technologies, each also seeks to redress them in different ways, through different priorities, and with different understandings of the problem. Given this

diversity of approaches, some scholars have challenged the dichotomous character of digital divide thinking itself, favoring more gradated and locally attuned understandings over one-size-fits all answers (e.g. Loh and Chib, 2022; Selwyn, 2004). Adriana de Souza e Silva et al. (2011) characterize the problem as one of reifying "the notion of a digital divide and a distinction that may not exist in the way we frame it, or a technological dichotomy which may not be a productive way of problematizing social issues" (p. 421). Others have been more stringent still, suggesting that the supposition of digital divides—and the attempt to control them from a distance—is effectively a form of "digital colonialism" (Coleman, 2019; Kwet, 2019).

Our own research here is motivated by searching for a figure of thought adequate to the real inequities around mobile communication that doesn't posit a uniform "divide" and then condescend to imagine what kind of life is better for someone else across it. Despite the promises of a better life through tech that we may hear from the Mark Zuckerbergs and Ma Huatangs of the world, determining in advance what modes of being are appropriate for and in the best interest of others is not our business. Attending to *the privilege* of being able to take mobile media for granted, however, might shift the emphasis from the givenness of mobile communication to the ways that coming to rely on it leads to vulnerabilities—even for those on the supposedly preferred side of the divide.

Where "vulnerability" implies an occasional and sometimes willing exposure to the possibility of harm, however, "precarity" implies a more persistent insecurity, the kind that can only be wrought by large, layered, and systemic factors that are difficult to trace, hence being rendered somewhat imperceptible. In our attempts to trace these interrelations, we underscore that the precarity associated with the privilege of taking mobile media for granted is less minor than it may seem. What's more, there are plenty of other "divides" being fostered even among those who have such privilege. In other words, insofar as digital divides exist, they are not just markers of those who have integrated information and communication technologies into their lives, on one side, and those who haven't, or haven't to the same degree, on the other. Instead, there are divides and associated precarities even among those privileged enough to be equipped, fully online, literate in digital cultures, and "permanently connected" (Ling, 2017). Some of these divides are spread by design, some by algorithmic, infrastructural, or geopolitical factors beyond any individual's control. Others just come as a price for opting in. What they all disclose, though, is the entangled precariousness of mobile media—and the need for more work to sort it out.

Research on precarity and its likenesses among mobile media scholars has indeed existed for some time. To a degree, Ling's work on taken for grantedness can be read in this tradition, both in his own criticism of the stress caused by reciprocal expectations of always-on mobile availability (Abeele et al., 2018; Ling, 2012), and also inasmuch as it inspired, for instance, concern with taken for grantedness in news consumption (Westlund and Ekström, 2018), or managerial research on how banning cell phones at work can foster more precarious boss-employee relations (Stephens et al., 2016). Arul Chib et al. (2021), moreover, have considered the ways that intentional *non-use* of mobile communication technologies can itself be an agential way to evade the precarity that comes with using them. Mirca Madianou (2015, 2020); has written about the ways digital technologies trap people already facing precarious lives into "second-order disasters" that make

things worse. Valuable research has considered the precarious use of mobile phones among women in China (Wallis, 2013), among the poor in Ghana (Sey, 2011), and among other sites of exclusion. Similar work has studied the creative ways people overcome their limited access to mobile communication in Brazilian favelas (Nemer, 2022) and Indian slums (Rai, 2019), as well as attended to the precarity associated with mobile communication across the Global South even as those technologies become more inclusive there (Donner, 2015). Maybe most broadly, the Precarity Lab (2020) at University of Michigan has formed a whole network of scholars to address the "technoprecarious" nature of digital media across a diverse range of global sites and cultural practices.

One insight of this research is to show that, while precarity is in some sense universal, it is by no means the case that all people are precarious in the same ways or to the same degree. To the contrary, attending to precarity in mobile media research requires acknowledging what Anna Tsing (2015) would call its "patchiness": that is, the ways precarity functions differently and disproportionately both across and within disparate contexts and communities. Because this patchiness presents in manifold and modulated ways, a provisional framework to make some sense of it might help mobile communication scholars begin to treat such precarity with more critical care. The remainder of this article introduces that framework in three parts, using the context of TikTok as their thru-line, before concluding with some thoughts about the framework's utility for mobile communication research going forward.

Precarious subjects

When precarity is expressed principally in those individuals privileged enough to take mobile media for granted, then we are dealing with subject precarity. To be a "subject" in this context means to be *subjected to* some measure of insecurity by virtue of relying on certain mobile technologies and the subsidiary dependencies on which they themselves rely. One way to understand subject precarity is by contrasting German notions of *gemeinschaft* (a term associated with kinship, neighborhood, friendship, and social cohesion) and *gesellschaft* (a term associated with competitive logistical, formal, and commercial relations). Ling (2012) draws upon these notions when examining the taken for grantedness of mobile phones. While he expresses some concern that the more intimate social relations of *gemeinschaft* are being replaced over time with the individualistic, self-interested, and commercial orientation of *gesellschaft*, he contends that mobile phones cultivate both types of orientation to sociality. For example, mobile devices are instruments of global commerce, but also function to connect users to a relatively limited social circle both geographically and socially (Ling, 2012). Consequently, from the standpoint of individuals, mobile devices allow people to maintain the relations of *gemeinschaft* in their social circles despite the overriding investment in *gesellschaft* from the standpoint of the corporations creating the apps, platforms, and supporting infrastructures. The superposition of supporting both social cohesion and commodification at once, despite these seeming to be at odds, underscores not only how the power of mobile sociation can become a taken for granted expectation, but how its very taken for grantedness is born, as it were, already steeped in precarity—a kind we call subject precarity.

Both *gemeinschaft* and *gesellschaft* are relevant to TikTok in that the platform has potential to facilitate closer ties of social cohesion *and* new forms of self-interested commodification. This spectrum of outcomes is, perhaps, why the developing body of academic literature on TikTok (as well as popular press and think-piece discussions about the value of new social media platforms) provides little in terms of agreement. Certainly, TikTok, like Facebook, Instagram, Twitter, and other mobile social technologies, can empower arrangements that bring people together to share information and work toward a better world. But TikTok videos can also lead to the proliferation of ugly, damaging, insensitive, and misinformed content, all while generating profit for both corporate interests and individuals. Or, TikTok can contribute to something in-between these two poles. In short, TikTok's relationships to a diverse array of cultural forms, evolving economic arrangements, the proliferation of information and entertainment, and its possibilities for political engagement, are reminders that technologies do not determine cultural outcomes, but are instead bound up in complex compositions of users, devices, infrastructures, servers, tech companies, algorithms, and so forth. These complex, macro-level dynamics are intrinsically bound-up with the vulnerability wrought by any individual person's reliance on mobile media.

TikTok, in other words, demonstrates how social media platforms can rapidly become embedded into everyday life to such a degree that these mobile arrangements become taken for granted, despite the vulnerability that these platforms thrive in large part by hiding and exploiting. The stakes become clearer after realizing the extent to which social media have become ubiquitous. At least 72% of US adults report some form of social media use—a massive increase from a mere 5% in 2005 (Pew Research Center, 2021). Aforementioned research shows that how individuals engage with social networks generally, and short-form streaming specifically, is far more likely to occur via mobile devices than on "desktop" or "fixed" media devices. In turn, the process of viewing short-form mobile content via TikTok or similar platforms becomes a habituated part of social and media ecosystems, begetting more reliance upon them—and hence more entrenched precarity. In this light, TikTok's various ways of inculcating habituated social practices reveal that both *gemeinschaft* and *gesellschaft* have become entangled in mobile interactivity, such that it is now more or less taken for granted that social cohesion and commodification operate together.

At the same time, the governance of a given platform's communicative possibilities is dictated to a large degree by the ways in which each platform moderates the content that its users contribute (Gillespie, 2018). For instance, analysis of TikTok's innerworkings found that there exist two versions of the app: one available in East and Southeast Asia, the other in the remaining countries (Lin, 2021). It is speculated that multiple versions allow the parent company ByteDance to adjust interfaces and settings tailored to targeted regions—including the ability to conform to requirements like the European Unions' European General Data Protection Regulation (Lin, 2021). Although content can be moderated differently to comply with a country's local regulations, that is neither possible without the built-in ability to locate where an app is being used, nor does it account for ways that any local context might well accommodate and welcome its own communicative practices that subjugate certain people and groups as precarious subjects.

Subject precarity is not just cultivated by geolocation, however, but also by the connective yet patchy social networks that help to spread it. For example, a London-based study of over 1000 TikTok videos found that a full 30% of them promoted White supremacy, and 24% promoted extremism and terrorism (O'Connor, 2021). Such findings illustrate that, like many social media platforms, TikTok is a harbor for hatred and a means of recruiting people to hateful causes. The digital divides of limited access or fluency, in this instance, aren't the issue. The subject precarity rather stems from those who have access but, because of their identity or predilections, are offended or threatened by White supremacy. Insofar as precarity is a semi-stable form of insecurity, such people on the site are precarious subjects: made vulnerable emotionally, perhaps even physically, in a non-reciprocal way. To take another example, American journalists have also noted that TikTok is a hotbed of anti-Black racism, specifically in the form of "digital blackface" (Parham, 2020). In an American context where Black style and music have long been appropriated by a predominately White popular culture, an app that encourages stylized song and dance is rampant with blatant forms of racialized appropriation and exploitation. Far from respectful celebrations of Black culture, then, TikTok in America can function as a zone of exclusion, whereby Black creators may well be "privileged" enough to be there, but in doing so face in-app harassment, muted posts, disproportionate censure, and evidence of less visibility in the platform's sorting algorithms (Parham, 2020).

Given the intersectional nature of identities, the range of conceivable subject precarities are too multiple and changing to offer a comprehensive account. Race, after all, is just one of the prominent "patches" that might make some people subject to more vulnerability. There are many others, and multiple at work at once. Some other forms of "patchiness" identified in mobile media research involve those impacted by ableist interface accessibility issues (Goggin, 2016), far-right extremism (Weimann and Masri, 2020), anti-Asian racism (Zhao and Abdin, 2021), body image shaming (Liu, 2021), and the challenges of making a living from on-demand platform work (Kahancová et al., 2020), among many others. Not all of these problems can be explained by a platform's poor moderation of hateful speech, but some of it can. Assessment of censorship specific to TikTok's app functionality has been inconclusive, but it is known that Douyin, its Chinese counterpart, does restrict some political terms in searches (Lin, 2021). To the extent that such restrictions are automated algorithmically, they can be understood as constitutive of the app's functionality—not just ancillary or situational.

Content shown on both TikTok and Douyin is governed by an algorithmic recommendation system. Due to bad press surrounding the app, TikTok has launched transparency centers aimed at assuaging fears and deflecting official regulation (Grandinetti, 2021; Gray, 2021). While it can be easy to "blame the algorithm," there remains a largely hidden amount of human labor that goes into platform moderation, known as "ghost work" (Gray and Suri, 2019). Specific to TikTok, leaked documents from 2019 show that moderators engaged in such ghost work were told to remove content of users who appear to have "abnormal body shape," "ugly facial looks," "facial deformities," or those who seem to be "chubby," "obese or too thin," "senior people with too many wrinkles," or who are shooting video in an environment that is "shabby," "dilapidated," or in "slums" or "rural fields" (Grandinetti, 2021). Among other academic examinations, scholars have

found that identity and body images that *do* get to circulate on TikTok are rather narrow in promoting a commodified, neoliberal, and postfeminist ideal of girlhood, for instance (Kennedy, 2020). There are always challenges and ambiguities when attempting to open the black box of algorithmic systems, but what is known about TikTok is that not all content or content creators are permitted to circulate evenly.

Whether it is TikTok or another platform, however, algorithms are not "neutral," but rather subject to problematic and biased output (Eubanks, 2018; Noble, 2018; O'Neil, 2016). Indeed, the inability to make that distinction points precisely to the stakes of the precarity at hand. It is impossible fully to disentangle the concatenated array forces in play that contribute to patchy forms of subject precarity. The forces are both distant, hence to some degree invisible abstractions from a larger geopolitical context, and also unavoidably immediate, hence sometimes experienced in everyday networked interactions as personal and threatening. The felt shortcomings that plague many corners of digital culture may be irreconcilable with that very culture's simultaneous ability to provide dependable meaning and convenience in peoples' lives. Efforts to identify a categorical first cause for the precarity posed by TikTok—perhaps in China's boldness, or in racist individuals instead of racist policies—are futile and miss the point. In mobile media, as elsewhere, the global is never inextricable from the local, just as materiality is never fully separable from discursivity, or sociality from commodification.

In sum, subject precarity can involve the ways in which certain people or groups are commodified or appropriated on a given platform; the ways they are disproportionately foreclosed the ability to participate in a platform's social affordances; how they are subjected to incivility, hostility, or appropriation on that platform; and the ramifications of all this for their personal, cultural, and financial affairs, including the possibility of lost access to the platform altogether. Content moderation policies, ranking algorithms, and distant geopolitical factors can all contribute to inculcating such subject precarity even in situations where bare material access to technologies, or fluency in their use, aren't at issue. While gaining basic access to digital platforms undoubtedly remains of great concern, subject precarity offers a way to acknowledge and critically address those precarities that, in a sense, pass such baseline levels of privilege and therefore merit a different type of analysis.

Precarious objects

Precarious objects are an expression of precarity that involve the potential loss, disruption, or radical change in relied-upon mobile communication technologies, platforms, or the infrastructures needed to support them. Such precarity of course stands to impact the individuals who rely upon these things, but not in the same manner as subject precarity, which impedes the prerogatives and security of specific groups or individuals directly through their media use. Object precarity involves the insecurity that derives not merely from *using* such taken for granted objects, but from their ongoing potential to be taken away. After all, if everyone could rely on these things, doing so would not be a privilege. If no one relied on them, they would not be a source of precarity. While digital divide thinking would position precarity among those who would supposedly like to take mobile communication for granted but cannot, by starting instead from the privilege of taken for

grantedness, it is possible to see that precarity can be expressed not only in terms of foreclosed gains, but also in terms of potential losses.

To illustrate as much, it can be helpful to distinguish some differences between what most of the world knows as TikTok—and Douyin, the original Chinese version of the app, first launched by ByteDance in 2016. Perhaps the most salient such difference is China's own massively restricted Internet sphere, known as the "Great Firewall" (Kaye et al., 2021). The array of countries that have considered or instituted a TikTok ban based on geopolitical tensions with the Communist Party of China attests not just to xenophobic attitudes or comparative positions of vulnerability to Chinese surveillance, but also to the precarity that any platform potentially poses for those who use and come to depend on it against their country's limits on acceptable channels of social mediation. In Russia, for instance, protests coordinated against President Vladimir Putin in 2021 led the country to fine multiple social media platforms, including TikTok, for failing to remove what was deemed "inappropriate" political content (Leo and Lunden, 2021). Research into Internet blocking as a measure of policy alignment between countries shows that, while Internet governance does not always correlate consistently with trade alliances, military alliances, personal or press freedom, and cultural or historical ties, the "digital layer does not float freely from political realities, nor does it undermine traditional patterns in international relations. Instead, it either reflects or reinforces these patterns; or most likely, a bit of both" (Merrill and Weber, 2020). That is, Internet governance and freedom of access (or lack thereof) are based on complex—and always a bit precarious—geopolitical relations.

In August 2020, America's former Trump administration issued executive orders to ban TikTok and WeChat from operating in the United States if ownership in the platforms was not sold by Chinese-owned ByteDance (EO 13942; EO 13943). The Trump team contended that TikTok "automatically captures vast swaths of information from its users" which "threatens to allow the Chinese Communist Party access to Americans' personal and proprietary information" (EO 13942). This proposed ban never went into effect: TikTok filed a petition in the US Court of Appeals and President Trump lost re-election, though even before the change in presidential administration, the deadline for TikTok to divest from ByteDance came and went without any action by the American government (Byford, 2020). The proposed US ban received substantial attention, but a number of other governments, including those in Pakistan, Japan, Indonesia, and Australia, debated a TikTok ban as well. Meanwhile, India's ban of TikTok has been in effect since mid-2020 (Gray, 2021). Compounding matters is that although TikTok executives have, under sworn testimony, explained that flows of international data cannot be accessed in China, recent leaked audio tapes from TikTok's internal meetings contradict these claims (Baker-White, 2022). What is clear is that the nexus of data collection and security can be seen as a critical issue surrounding TikTok in a geopolitical context that regards the Chinese Communist Party as a potential threat.

Even if they aren't valid concerns, however, perceptions of a threat posed by TikTok—namely, that a Chinese-owned platform can collect granular data from millions of foreigners across international borders and use it to nefarious domestic advantage—exemplify the precarity that TikTok engenders at a global scale. In other words, while data collection may threaten individual TikTokkers with the subject precarity of targeting them as

sources of additional capital (*gesellschaft*), it also threatens the security and stability of foreign nations as a whole by intervening in the subtle algorithmic control of social cohesion among those citizens who use the platform for social interaction (*gemeinschaft*). In this context, to understand the privilege of taken for grantedness as a kind of precarity does not necessarily mean a life or livelihood is being immediately threatened, as in subject precarity. To the contrary, the privilege of being able to take a social media platform like TikTok for granted is based upon the hypothetical and nonlocal threats the service might pose. This is not the subject precarity of temporary labor, of persistent hunger, of being unhomed, or many other life-threatening kinds, but the privilege of its being easily ignorable does not mean it isn't still a kind of precarity—especially for those who monetize their TikTok presence.

Indeed, the multiple examples we have of what happens when mobile media platforms go offline only underscore just how infrastructurally entangled subject precarity and object precarity can be. For instance, when a mere 5-hour outage of Facebook, Instagram, and WhatsApp struck unexpectedly in October 2021, many people in America found it to be a major inconvenience. But those dependent on such services for their livelihood, in the Global South especially, were impacted in ways that far exceeded being bothersome. Suddenly, millions of individuals were shut out from the income they counted on as influencers, side-hustlers, or small-business owners. Migrants and refugees lost the ability to communicate with their allies and families, risking being stranded or hurt. Even larger businesses and websites that didn't directly use the social features of Facebook, Instagram, or WhatsApp suffered, because they relied upon Facebook's advertising network, and that went down too. As *The Guardian* of London reported at the time, "The outage affected potentially tens of millions of users, organizations and businesses, highlighting the widespread global dependency on Facebook and its platforms" (Milmo and Anguiano, 2021). In the same way that infrastructures become visible when they break down, the taken for grantedness of communication media becomes identifiable *as* a privilege when it is taken away. What is left are precarious human subjects dealing with the aftermath of losing the precarious infrastructural objects on which they'd come to rely.

The Indian ban of TikTok in late June 2020—and the making permanent of that ban along with 58 other Chinese apps in late January 2021—is another case in point. In a country where those in poverty have long relied on the creative, resilient, "jugaad" resourcefulness to hack or repurpose the affordances of mobile phones for profitable and functional ends (Rai, 2019), many have long known that there is only so much to take for granted. Yet, while millions of Indians might rely upon a complex ecology of everyday mobile phone hacking to counteract their precarity as subjects of the Global South, doing so itself exposes that Ling was right about how socially embedded and taken for granted mobile phones have become, which of course means such devices and their apps are precarious objects as well. At the same time, far away from the streets, when those in the halls of power change policy to avoid the geopolitical risks of harboring foreign platforms and apps whose surveillance could potentially gather valuable data from their citizens, the very ability for those in the streets to "jugaad" a workaround becomes attenuated. The result is human subjects made precarious by taking for granted precarious objects.

Of course, TikTok's privacy and data-collection concerns remain subject to debate. For example, research shows that while ByteDance-owned app Baidu has unsatisfactory

privacy and data protection measures, the company's other apps, including TikTok and Douyin "are more attentive to users from different geographical regions by designating jurisdiction-specific privacy policies and terms of service" (Jia and Ruan, 2020). Other forensic breakdowns of TikTok's functionality similarly show some concerns for data ownership, management, privacy, and security, enough so to be worthy of user attention even though the app's safeguards and policies "seem to cover enough ground for a user" (Neyaz et al., 2020: 56). Echoing earlier work by Daubs and Manzerolle (2016) on the power of both Google and Apple as mobile app gatekeepers in control of the Android and iOS marketplaces, respectively, Jia and Ruan (2020) highlight the influence of these US-based companies in mandating app standards for greater privacy and transparency for users. The mobile gatekeeping power of both Apple and Google should ideally concern both users and governments, not least considering that the iOS (Apple) and Android (Google) stores operate as a duopoly in the mobile market, all the while taking a 30% cut of in-app purchases (Daubs and Manzerolle, 2016). The relative invisibility of domestic tech giants like Apple and Google compared with the visibility of ByteDance demonstrates just how complex taken for grantedness is when it comes to mobile media.

What is more, TikTok does not appear to collect any more meaningful data than established social media platforms like Facebook, though such a defense should not exactly serve as an endorsement of social media platforms at large. It should come as no surprise, then, that proposed bans of TikTok have been characterized as hypocritical: the potential for large tech companies to collect user data and deliver it to government agencies is an issue that deserves public attention, regardless of a platform's country of origin (Panday, 2020). Put differently, issues raised by data collection via embedded and everyday interactions occurring on mobile devices and social media platforms *should* concern their users, regardless of one's location or a platform's country of origin. But how users engage with apps like TikTok and Douyin (and in some countries, whether users can experience these apps at all) is dependent, in part, on geography and location, which are, in turn, massively important to the taken for grantedness of TikTok and its equivalents.

Emphasis on space, place, and location has long been a major trajectory for scholarship on the web and mobile media. The early commercial web was accompanied by prognostications of the "death of geography" (Bates, 1996) and the "erasure of the local." Yet, these narratives have been challenged by scholarship emphasizing the complex and interrelated nature of space and place (Massey, 2004); the fluidity of urban geography in an Internet era (Couclelis, 2007); and the hybridity of space through web-connected mobile devices (de Souza e Silva, 2006; Gordon and de Souza e Silva, 2011). Over time, a mobile media landscape of pervasive data collection, via apps created by platforms and intended for use on mobile devices, has only served to emphasize the importance of geolocation and spatial tracking. For example, Douyin disallows browser access, which, in turn, requires that users access the platform via the mobile app (Kaye et al., 2021). But location also matters in terms of infrastructural digital divides, as well as in regulations of what individuals are able to access on the web. Similar to early predictions of the death of geography, the commercial web was also heavily connected to freedom of information, globalization, and democratization (O'Reilly, 2007). Sadly, the contemporary web has not only become more commodified, but also more fragmented and precarious based on location, country, and government. These complex and unstable variables

underscore the privileged underside of taken for grantedness, in which the technologies and services many people count on can be threatened.

The controversy surrounding TikTok on a global scale, as Joanne Gray (2021) has argued, is inexorably intertwined with geopolitical proxy battles—most notably the hegemonic tug-of-war between America and China. When the US government and others threatened bans of the app with hopes of forcing the sale of a private company, the Chinese government accused the United States of politicizing economic and trade issues (Gray, 2021). Amidst this backdrop, Gray contends that it is the consumer who suffers from an increasingly consolidated landscape of Big Tech. This consolidation—evident, too, for example, in the rapacious acquisitions of Alphabet or Meta (the parent companies of Google and Facebook, respectively)—only serves to inculcate more precarity among those who rely on large corporations to provide a growing range of the services that they use on a daily basis. It is not difficult to imagine how such embedded reliance on a single platform provider can create an intensified object precarity, at once making the prospect of abandoning their services by choice seem unreasonable—and making the possibility of their involuntarily being taken away seem devastating.

In sum, object precarity is expressed in the instability and uncontrollability of those technical objects that constitute "technologies of social mediation" in Ling's sense, particularly in their mobile forms. Active or brewing international disputes over censorship policies, data collection rights, and the uses of that data for profit or for geopolitical gamesmanship all generate forms of object precarity. But more basic, material forms of object precarity hit closer to home, for instance, when quarterly market demands lead to frequent release-cycles of new phones, computers, or operating systems such that the commercial motivations of Big Tech seem to produce technologies destined for planned obsolescence. Whether planned or not, the shark's-gotta-keep-moving logic of neoliberal wealth accumulation certainly imbues the mobile media technologies developed and produced under its auspices with a *constitutive* precarity. Geopolitical concerns aside, they cannot be counted on for long. It is increasingly tenuous to imagine that Google or Amazon, TikTok or Facebook, the iPhone or Surface tablet, or any of their counterparts will indefinitely exist in the same form as they do now. This is a matter of object precarity. Of course, the objects at stake are also dependent on depletable earthly materials needed for them to exist in the first place.

Precarious planet

It should come as no surprise in the 2020s that a discussion of taken for grantedness as a privilege should lead to the ultimate precarity of a planet in peril. For such is the direction that taking things for granted terminally leads. Mobile communication technology, like just about everything in human culture, owes its existence to the finite and elemental media of planet Earth. Mobile phones themselves, in this light, from the pristine techno-material devices that come in boxes to the inert bricks that no longer work, always exhibit their own more-than-human precarity. This is planetary precarity: the telos of subject and object precarity alike, hence the largest specter on the horizon of all mobile communication research.

Over the past decade or so, major media studies scholars such as Jussi Parikka (2014, 2015, 2016), Sean Cubitt (2016), and others have brought attention to the ways in which digital technologies exist at the cost of exploiting finite planetary resources and the people used to extract them for the profit of others. TikTok is not immune. According to data from Statista (2021) taken in France, TikTok emits the most CO_2 per minute of any major social media app: more than Reddit, Pinterest, Snapchat, Instagram, Twitch, Twitter, LinkedIn, Facebook, and YouTube (in that order). In fact, data show that TikTok's carbon footprint from streaming is nearly eight times greater than YouTube's, and its massive daily user-base is only a part of the reason. Another is that TikTok is exclusively a platform for creating and sharing videos, and that it operates by preloading these videos on its newsfeed. This need not be the case, but is an operational choice that TikTok makes, presumably without prioritizing its environmental costs.

These costs have been exacerbated by the coinciding of TikTok's global rise in popularity with the COVID-19 pandemic, which found more people than ever before spending more time than ever before online. Research on this surge in Internet usage shows an overlooked environmental footprint caused largely by the prevalence of streaming video over social media (Obringer et al., 2021). At the same time, it is not just the abundance or method of TikTok's video streams that contribute to its heavy environmental footprint, but to some degree the very content of many videos does as well. Insofar as one of the more prominent TikTok genres involves showcasing affordable fashion, one could argue that the promotion of affordable brands also encourages attitudes of disposability toward clothing, or a tacit sanctioning of using toxic chemicals in their production. To be sure, evidence for the carbon footprint of streaming videos may be exaggerated (Kamiya, 2020), and there are plenty of creators on the platform who promote sustainable lifestyles instead of the opposite. Nevertheless, the very existence of wireless mobile communication—regardless of what apps or platforms it might accommodate—is inseparable from the material and infrastructural resources needed to support them.

Smartphones, after all, are reliant on, among other things, batteries that make their uncorded mobility possible. The typical smartphone battery in the early 2020s, like those of electric vehicles, is a lithium-ion battery. Lithium-ion batteries rely primarily on cobalt, a metallic element with a brittle texture and blue-gray shine. Most cobalt is obtained not in dig-and-find operations for chunks of cobalt minerals, but as a by-product of refining nickel. Although it can be found in many countries, over 70% of global production happens in the Democratic Republic of Congo. As much as 30% of *that* production happens through artisanal and small-scale mining operations, which evade regulatory oversight (World Economic Forum, 2020). In other words, the very infrastructure of mobile communication begins in those systems and facilities needed to source and process its material components.

In the best-case scenario, cobalt recovery is an environmental disaster because most mine sites contain sulfur, which generates sulfuric acid when inevitably exposed to air and water. The resultant "acid mine drainage" wreaks irremediable havoc on aquatic ecosystems for hundreds of years. Artisanal mining operations tend to dodge any precautions that might minimize this damage. What is more, these operations are also exploiting and jeopardizing those locals doing the labor. And this labor force is already a precarious demographic: poor and Black, and often composed of people, including

children, fleeing civil war or facing so few opportunities that they accept unimaginable working conditions (Tsing, 2015: 134). A study by UNICEF (2014) estimates that approximately 40,000 children, some as young as 7 years old, work in such mines. They would all be exposed, like everyone in the mines, to damaging skin contact and airborne cobalt-dust associated with lung disease. Add to this the reality that the larger cobalt mining operations are often owned and managed by foreign outfits—from Switzerland or China, for instance, who sell the cobalt to other foreign interests, many of them in digital tech—and the whole business has colonialist overtones like some horror out of *Heart of Darkness*.

In sum, planetary precarity is an expression of the precarity posed by what, for the time being, is a necessary condition for all digital information and mobile communication technologies to exist. This type of precarity is evident in the rare earth minerals extracted from the planet to produce our devices, as well as in the infrastructure required upstream from there, from cellular signals to the carbon costs of operating mobile streaming platforms to cooling the servers needed to store so much data. All contribute to the planet's own precarious teetering toward collapse, which of course would mean the end of our technical objects and, ultimately, perhaps, of humanity itself. In that sense, subject, object, and planetary precarity are inextricably bound up with one another.

Promising futures

If taking things for granted is acknowledged for the privilege it always is, we can begin to build more sustainable and endurable ways of living amid the ongoing precarities that are privilege's price. Ling provides a scholarly groundwork that has been critical in making visible the invisible, shining light on how technologies become so embedded that they orient and organize, provide efficiency and utility, and set norms for vast amounts of the population. While Ling's own work is largely about mobile phones, similar accounts might instead highlight the invisible scaffolding of everyday relations through attention to infrastructures. As noted previously, TikTok is neither a mobile phone (though the app is predominately accessed through mobile devices) nor an infrastructure (though platforms increasingly take on infrastructural dimensions). TikTok has been the subject of criticism for the type of content circulating on the app—a question of who can benefit from the platform. TikTok's meteoric rise as a global challenger to a social media marketplace largely dominated by US-based platforms has, in turn, entangled the platform in geopolitical proxy battles. And, due to its entanglement with both mobile devices and infrastructures, TikTok is invariably connected to global resource-use and processes of production. We do not wish to claim that our research mapping these relations in order to tell a better story about the uneven privilege of taking TikTok for granted is a wholly new direction for the study of mobile media. Scholars have been addressing the complex interconnectedness of sociotechnical relations for some time. Yet, by taking inspiration from Ling and others, we have tried to emphasize the growing importance of considering mobile media within the wider global morass that can just as quickly enable taken for grantedness as it can take it away.

By tracing a basic framework for different types of precarity associated with such privilege, we hope to have offered some productive foci for the sorts of critical analysis

that might benefit future research in mobile communication. Of course, despite how we presented that framework, a full separation of subject, object, and planetary precarity would be a false one. The point is not to identify and ask after the problems and causes of one or the other but, rather, to interrogate their interrelation in ways that build semi-stable understandings of how that reliance on mobile communication technologies inevitably entails both privileges *and* perils. In doing so, we might learn to address our built-dependencies and organize a more equitable and sustainable relationship with them, because we will also have had to acknowledge in the process that there are no sides of a "divide" that don't have some precarity to navigate. Choosing which precarities to tolerate and which to resist accordingly becomes an ethical project of cultivating new and less presumptive figures of thought to describe being on two sides of a divide at once.

Although there are limits to TikTok as a model for such work, it is also metonymic of the larger mobile communication scene a couple decades into the millennium: flashy, playful, monetized, fun, dangerous, global, social, and so much more. Our aim has not been to critique global capitalism or to call all hands to the deck for environmental and social justice, though such work is important. Instead, we have tried to show that precarity is a crucial and generative framework through which to understand the layered and vulnerable nature of mobile media. This precarity operates in patches and on multiple scales, only the most minor of which shows up when your cell phone dies and you can't use it to Instagram your Bánh mi. The precarity of mobile technologies is constitutive of their very existence and role in society. In other words, both the precarities of and created by mobile media are connected fundamentally to the precarity of the planet, to every living being on it, and to the systems and mechanisms that maintain this precarity without mentioning that taken for grantedness is a privilege that comes with hideous costs and abundant facilities. Attending to this privilege and the precarities it hides will be a worthy project for mobile media research as it moves into the future.

Funding

ORCID iDs

Chris Ingraham (iD) https://orcid.org/0000-0001-9093-340X
Justin Grandinetti (iD) https://orcid.org/0000-0002-3247-8733

References

Abeele MV, De Wolf R and Ling R (2018) Mobile media and social space: how anytime, anyplace connectivity structures everyday life. *Media and Communication* 6(2): 5–14.
Alton L (2021) How video is reshaping digital advertising. Available at: https://business.twitter.com/en/blog/how-video-is-reshaping-digital-advertising.html (accessed 14 April 2021).
Baker-White E (2022) Leaked audio from 80 internal TikTok meetings shows that US user data has been repeatedly accessed from China. Available at: https://www.buzzfeednews.com/article/emilybakerwhite/tiktok-tapes-us-user-data-china-bytedance-access (accessed 15 July 2022).

Bates S (1996) The death of geography, the rise of anonymity, and the Internet. *American Enterprises* 7(2): 50–52.

Byford S (2020) TikTok says the Trump administration has forgotten about trying to ban it, would like to know what's up. Available at: https://www.theverge.com/2020/11/10/21559677/tik-tok-cfius-court-petition-ban-deadline (accessed 14 April 2021).

Chib A, Ang M, Ibasco G, et al. (2021) Mobile media (non-)use as expression of agency. *Mass Communication and Society* 24(6): 818–842.

Coleman D (2019) Digital colonialism: the 21st century scramble for Africa through the extraction and control of user data and the limitations of data protection laws. *Michigan Journal of Race & Law* 24: 417–439.

Couclelis H (2007) Misses, near-misses and surprises in forecasting the informational city. In: Miller HJ (ed.) *Societies and Cities in the Age of Instant Access*. Dordrecht: Springer, pp. 70–83.

Cubitt S (2016) *Finite Media: Environmental Implications of Digital Technologies*. Durham, NC: Duke University Press.

Cumiskey K and Ling R (2015) The social psychology of mobile communication. In: Shyam Sundar S (ed.) *The Handbook of the Psychology of Communication Technology*. New York: John Wiley & Sons, pp. 228–246.

Daubs MS and Manzerolle VR (2016) App-centric mobile media and commoditization: implications for the future of the open Web. *Mobile Media & Communication* 4(1): 52–68.

De Souza e Silva A (2006) From cyber to hybrid: mobile technologies as interfaces of hybrid spaces. *Space and Culture* 9(3): 261–278.

De Souza e Silva A, Sutko D, Salis F, et al. (2011) Mobile phone appropriation in the favelas of Rio de Janeiro, Brazil. *New Media & Society* 13(3): 411–426.

Donner J (2015) *After Access: Inclusion, Development, and a More Mobile Internet*. Cambridge, MA: MIT Press.

Eubanks V (2018) *Automating Inequality*. New York: Picador.

Executive Order 13942. 3 C.F.R. Addressing the threat posed by TikTok, and taking additional steps to address the national emergency with respect to the information and communications technology and services supply chain. 48637–48639. 6 August 2020.

Executive Order 13943. 3 C.F.R. Addressing the threat posed by WeChat, and taking additional steps to address the national emergency with respect to the information and communications technology and services supply chain. 48641–48643. 6 August 2020.

Gillespie T (2018) *Custodians of the Internet*. New Haven, CT: Yale University Press.

Goggin G (2016) Disability and mobilities: evening up social futures. *Mobilities* 11(4): 533–541.

Gordon E and de Souza e Silva A (2011) *Net Locality: Why Location Matters in a Networked World*. Malden, MA: Wiley Blackwell.

Grandinetti J (2021) Examining embedded apparatuses of AI in Facebook and TikTok. *AI & Society*. Epub ahead of print 12 September. DOI: 10.1007/s00146-021-01270-5.

Gray J (2021) The geopolitics of 'platforms': the TikTok challenge. *Internet Policy Review* 10(2): 1–26.

Gray ML and Suri S (2019) *Ghost Work: How to Stop Silicon Valley from Building a New Global Underclass*. Houghton, MI: Mifflin Harcourt.

Hartmann M (2018) Circuit(s) of affective infrastructuring: Smartphones and electricity. In: Vincent J and Haddon L (eds) *Smartphone Cultures*. London: Routledge, pp. 11–24.

Hjorth L and Lim S (2012) Mobile intimacy in an age of affective mobile media. *Feminist Media Studies* 12(4): 477–484.

Jia L and Ruan L (2020) Going global: comparing Chinese mobile applications' data and user privacy governance at home and abroad. *Internet Policy Review*. Epub ahead of print 16 September. DOI: 10.14763/2020.3.1502.

Kahancová M, Meszmann T and Sedláková M (2020) Precarization via digitalization? Work arrangements in the on-demand platform economy in Hungary and Slovakia. *Frontiers in Sociology* 5(3): 1–11.

Kamiya G (2020) The carbon footprint of streaming video: fact-checking the headlines. *The International Energy Agency*. Available at: https://www.iea.org/commentaries/the-carbon-footprint-of-streaming-video-fact-checking-the-headlines (accessed 1 October 2021).

Kaye DBV, Chen X and Zeng J (2021) The co-evolution of two Chinese mobile short video apps: parallel platformization of Douyin and TikTok. *Mobile Media & Communication* 9(2): 229–253.

Kennedy M (2020) 'If the rise of the TikTok dance and e-girl aesthetic has taught us anything, it's that teenage girls rule the internet right now': TikTok celebrity, girls and the Coronavirus crisis. *European Journal of Cultural Studies* 23(6): 1069–1076.

Kwet M (2019) Digital colonialism: US empire and the new imperialism in the global south. *Race & Class* 60(4): 3–26.

Lasen A (2004) Affective technologies—emotions and mobile phones. Receiver Vol 11. Available at: https://www.academia.edu/472410/Affective_Technologies_Emotions_and_Mobile_Phones

Leo H and Lunden I (2021) TikTok emerges as a political battleground in Navalny-stirred Russia. Available at: https://techcrunch.com/2021/02/11/tiktok-emerges-as-a-political-battleground-in-navalny-stirred-russia/ (accessed 14 April 2021).

Lin P (2021) TikTok vs Douyin: a security and privacy analysis. Available at: https://citizenlab.ca/2021/03/tiktok-vs-douyin-security-privacy-analysis/ (accessed 14 April 2021).

Ling R (2008) *New Tech, New Ties: How Mobile Communication Is Reshaping Social Cohesion*. Cambridge, MA: MIT Press.

Ling R (2012) *Taken for Grantedness*. Cambridge, MA: MIT Press.

Ling R (2017) A brief history of individual addressability: The role of mobile communication in being permanently connected. In: Vorderer P, Hefner D, Reinecke L, et al. (eds) *Permanently Online, Permanently Connected*. London: Routledge, pp. 10–17.

Liu J (2021) The influence of the body image presented through TikTok trend-videos and its possible reasons. In: *Proceedings of the 2nd international conference on language, art and cultural exchange (ICLACE 2021)*. Dordrecht, Atlantis Press, pp. 359–363. Available at: https://doi.org/10.2991/assehr.k.210609.072

Loh Y and Chib A (2022) Reconsidering the digital divide: an analytical framework from access to appropriation. *Information Technology & People* 35(2): 647–676.

Madianou M (2015) Digital inequality and second-order disasters: social media in the typhoon Haiyan recovery. *Social Media + Society* 1(2): 1–11.

Madianou M (2020) A second-order disaster? Digital technologies during the covid-19 pandemic. *Social Media + Society* 6(3): 1–5.

Massey D (2004) Geographies of responsibility. *Geografiska Annaler: Series B, Human Geography* 86(1): 5–18.

Merrill N and Weber S (2020) Web site blocking as a proxy of policy alignment. *First Monday* 26(1). Available at: https://doi.org/10.5210/fm.v26i1.11415

Milmo D and Anguiano D (2021) Facebook, Instagram and WhatsApp working again after global outage took down platforms. *The Guardian*, 4 October. https://www.theguardian.com/technology/2021/oct/04/facebook-instagram-and-whatsapp-hit-by-outage

Nemer D (2022) *Technology of the Oppressed: Iniquity and the Digital Mundane in the Favelas of Brazil*. Cambridge, MA: MIT Press.

Neyaz A, Kumar A, Krishnan S, et al. (2020) Security, privacy and steganographic analysis of FaceApp and TikTok. *International Journal of Computer Science and Security* 14(2): 38–59.

Noble S (2018) *Algorithms of Oppression*. New York: New York University Press.

Obringer R, Rachunok B, Maia-Silva D, et al. (2021) The overlooked environmental footprint of increasing internet use. *Resources, Conservation and Recycling* 167: 1–4.

O'Connor C (2021) *Hatescape: An In-Depth Analysis of Extremism and Hate Speech on TikTok*. London: Institute for Strategic Dialogue. Available at: https://www.isdglobal.org/wp-content/uploads/2021/08/HateScape_v5.pdf

Ohman C and Aggrawal N (2019) What if Facebook goes down? Ethical and legal considerations for the demise of big tech. *Internet Policy Review* 9(3). DOI: 10.14763/2020.3.1488.

O'Neil C (2016) *Weapons of Math Destruction*. New York: Crown Books.

O'Reilly T (2007) What is Web 2.0: design patterns and business models for the next generation of software. *Communications and Strategies* 65: 17–37.

Panday J (2020) The hypocrisy of a U.S., TikTok ban. Available at: https://www.internetgovernance.org/2020/07/28/the-hypocrisy-of-a-u-s-tiktok-ban/ (accessed 14 April 2021).

Parham J (2020) TikTok and the evolution of digital blackface. *WIRED*, 4 August. Available at: https://www.wired.com/story/tiktok-evolution-digital-blackface/

Parikka J (2014) *The Anthrobscene*. Minneapolis, MN: University of Minnesota Press.

Parikka J (2015) *A Geology of Media*. Minneapolis, MN: University of Minnesota Press.

Parikka J (2016) *A Slow Contemporary Violence: Damaged Environments of Technological Culture*. London: Sternberg Press.

Parks L (2015) 'Stuff you can kick': toward a theory of media infrastructures. In: Svensson P and Goldberg DT (eds) *Between Humanities and the Digital*. Cambridge, MA; London, MIT Press, pp. 355–374.

Pew Research Center (2021) Social media fact sheet. Available at: https://www.pewresearch.org/internet/fact-sheet/social-media/ (accessed 14 April 2021).

Plantin J, Lagoze C, Edwards P, et al. (2018) Infrastructure studies meet platform studies in the age of Google and Facebook. *New Media & Society* 20(1): 293–310.

Precarity Lab (2020) *Technoprecarious*. Cambridge, MA: MIT Press.

Rai A (2019) *Jugaad Time: Ecologies of Everyday Hacking in India*. Durham, NC: Duke University Press.

Ross MQ and Campbell SW (2021) Thinking and feeling through mobile media and communication: a review of cognitive and affective implications. *Review of Communication Research* 9: 147–166.

Sassi S (2005) Cultural differentiation or social segregation? Four approaches to the digital divide. *New Media & Society* 7(5): 684–700.

Selwyn N (2004) Reconsidering political and popular understandings of the digital divide. *New Media & Society* 6(3): 341–362.

Sey A (2011) 'We use it different, different': making sense of trends in mobile phone use in Ghana. *New Media & Society* 13(3): 375–390.

Sey A (2014) All work and no play? All work and no play? Judging the uses of mobile phones in developing countries. *Information Technologies and International Development* 10(3): 1–17.

Star SL and Bowker GC (2002) How to infrastructure. In: Lievrouw LA and Livingstone S (eds) *Handbook of New Media—Social Shaping and Consequences of ICTs*. London: SAGE, pp. 151–162.

Starosielski N (2015) *The Undersea Network*. Durham, NC: Duke University Press.

Statista (2021) Most popular social media apps in the U.S. 2019, by engagement. Available at: https://www.statista.com/statistics/579358/most-popular-us-social-networking-apps-ranked-by-engagement/ (accessed 14 April 2021).

Stephens K and Ford (2016) Unintended consequences of a strategically ambiguous organizational policy selectively restricting mobile device use at work. *Mobile Media & Communication* 42: 186–204.

Tankovska H (2021) Facebook access penetration 2021, by device. Available at: https://www. statista.com/statistics/377808/distribution-of-facebook-users-by-device/ (accessed 14 April 2021).

Tsing A (2015) *The Mushroom at the End of the World: On the Possibilities of Life in Capitalist Ruins*. Princeton, NJ: Princeton University Press.

UNICEF (2014) *Child Labour and UNICEF in Action: Children at the Centre*. New York: UNICEF.

Van Dijk J (2020) *The Digital Divide*. Malden, MA: Polity Press.

Vincent J (2005) Emotional attachment and mobile phones. In: Glotz P, Bertschi S and Locke C (eds) *Thumb Culture: The Meaning of Mobile Phones for Society*. London: Transaction Publishers, pp. 117–122.

Vincent J and Fortunati L (eds) (2009) *Electronic Emotions: The Mediation of Emotion Via Information and Communication Technologies*. Oxford: Peter Lang.

Wallis C (2013) *Technomobility in China: Young Migrant Women and Mobile Phones*. New York: New York University Press.

Weimann G and Masri N (2020) Research note: spreading hate on TikTok. *Studies in Conflict and Terrorism*. Epub ahead of print 19 June. DOI: 10.1080/1057610X.2020.1780027.

Westlund O and Ekström M (2018) News and participation through and beyond proprietary platforms in an age of social media. *Media and Communication* 6(4): 1–10.

World Economic Forum (2020) Making mining safe and fair: Artisanal Cobalt extraction in the democratic republic of the Congo. White Paper. Available at: http://www3.weforum.org/docs/WEF_Making_Mining_Safe_2020.pdf (accessed 28 April 2021).

YouTube (2021) YouTube in numbers. Available at: https://www.youtube.com/intl/en-GB/about/press/ (accessed 14 April 2021).

Zhao X and Abdin C (2021) TikTok's "Fox Eye" trend and everyday activism: Gen Z Agency in an audiovisual narrative case study. In: *Paper presented at AoIR 2021: The 22nd annual conference of the association of internet researchers*. Available at: https://doi.org/10.5210/spir.v2021i0.12267

Author biographies

Chris Ingraham is an Associate Professor of Communication at the University of Utah and core faculty in Environmental Humanities. Among numerous journal articles, he is the author of *Gestures of Concern* (Duke University Press, 2020), and co-editor of *LEGOfied: Building Blocks as Media* (Bloomsbury, 2020). For information or to contact Chris, please visit www.chrisingraham.net.

Justin Grandinetti is an Assistant Professor in teh Department of Communication Studies and affiliate faculty in teh Schoo. of Data Science at the University of North Carolina Charlotte. His research interests are at the intersection of mobile media, streaming media, big data, and artificial intelligence. Justin's work has appeared in *AI & Society, Information*, *Communication & Society*, *Critical Studies in Media Communication*, *and Surveillance and Society*. For information or to contact Justin, please visit www.justingrandinetti.com.