11 Synergizing Geoweb and Digital Humanitarian Research

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Humanitarian work is increasingly incorporating diverse sources of information and labor. This trend represents a shift that has significant repercussions for social, political, and economic relations. Exemplified by websites and communities such as Ushahidi, the Humanitarian OpenStreetMap Team, and the Standby Task Force, this development, commonly called "digital humanitarianism," sits at the juncture of new socio-technical practices, new epistemologies, and new institutional relationships.[1] Digital humanitarianism involves formal humanitarian organizations tasking a large, unrestricted number of laypeople, often volunteers, with work related to gathering, producing, processing, publicizing, and mapping humanitarian data. For example, the Standby Task Force community members and Ushahidi users might be involved in collecting public information from social media and journalism sources, translating and processing that information, and visualizing it in a cartographic product to be used by formal responding agencies.[2] The Humanitarian OpenStreetMap Team normally produces spatial data in crisis-affected areas by tracing new vector-based data over remotely sensed images of crisis areas, in the Open-StreetMap platform. These data can include infrastructure, expressions of need, or reports of security threats. Digital humanitarians contribute to the production, processing, and visualization of spatial data based on the assumption that these kinds of data, in their platforms, are needed by formal responders to more effectively deliver aid and that volunteers—usually scattered across the globe—are able to deliver such data. Recent research on digital humanitarianism has focused on understanding and

214

processing social media and mobile phone records as additional sources of data.[3] Digital humanitarianism thus encapsulates elements of the geoweb, crowdsourcing, crisis mapping, big data, and mass collaboration.[4]

Both digital humanitarian researchers and practitioners are increasingly foregrounding big data in their work, yet through narrow analytic lenses. These nascent conversations are often technical in nature, for instance, in determining a quantitative measure of reliability for social media data. At other times they grapple with the policy potentials and hindrances associated with integrating big data into formal humanitarian and emergency management workflows. Researchers and practitioners are actively involved in advancing and advocating for these technologies. With this applied focus under way, recent research has begun theorizing big data digital humanitarianism as a set of socio-technical practices and relations, seeking synergies with critical data and technology studies.[5]

Digital humanitarianism uses spatial technologies to establish relations between geographically distant populations. Despite this inherent spatiality, to date geographers have researched little about the field. In this chapter I explore ways geographers interested in big data can engage the field of digital humanitarianism to build empirical and theoretical connections with geoweb research. My primary goal is to draw on theoretical frameworks within geoweb research in order to highlight resonances with digital humanitarianism. I illuminate connections between existing big data, digital humanitarianism, and geoweb research but am primarily concerned with new, pressing questions and key linkages with existing research. Research on spatial technologies' social and political transformations provides the most compelling tools for conceiving of digital humanitarianism as a set of socio-technical practices and political-economic relations.

I begin by reviewing current research on digital humanitarianism. While more research is taking place outside geography's disciplinary boundaries, geographers are uniquely well positioned to theorize the social, political, and economic impacts of digital humanitarianism. I then detail three connections between digital humanitarianism and geoweb research: digital humanitarianism's spatialities, political economy, and knowledge politics. I conclude by drawing out larger implications of these connections.

Current Research on Big Data Digital Humanitarianism

Extant research on digital humanitarianism is predominantly descriptive and technical in nature. Conversations have revolved around determining data accuracy and credibility, changing operational roles of emergency managers, solutions to technical problems, and streamlining its integration into policy and operations.[6] An oft-given explanation for the nonadoption of such technologies by the formal humanitarian sector is a lack of confidence in the reliability and actionability of digital humanitarian data.[7] That is, the formal humanitarian sector often sees digital humanitarian data as either low in quality or of a nature that cannot inform established workflows and practices. Big data factors prominently into these discussions as constitutive of new data sources and forms, with varying levels of accuracy.[8] To these ends, current research seeks to improve data accuracy or to assign numerical values representing the given accuracy of the data.[9] In many cases research explicitly seeks to control false or misleading social media data.[10]

The emergence of big data has instigated new roles and responsibilities for formal humanitarian actors.[11] In particular the role of emergency managers is shifting to include monitoring and utilizing social media in crises.[12] As increasing numbers of laypeople contribute to crowdsourced data production (either wittingly or without informed consent), emergency and humanitarian managers are working to incorporate larger and more diverse data sources, displacing the formal sector from the role of being primary producers of data.[13]

Digital humanitarian operations face technological obstacles due to changing social and geographic contexts of implementation, evolving socio-technical practices, and emergent software platforms. As digital humanitarian technologies are mobilized in diverse places around the world, they require unique approaches and understandings of technology use.[14] This means adapting tools to local contexts in order to foster wide adoption and efficacious uses.[15] Some research has focused on digital humanitarian interventions in political conflict zones.[16] However, digital humanitarian research is largely aspatial, with "solutions" to problems framed as universal rather than geographically contingent.

The narrow digital humanitarian research focus on technical descriptions can be partly explained by recent technological advances and the resulting shift in social uses of technologies. Digital humanitarians are developing new technologies to cope with big data, including evolving security threats, unmanned aerial vehicles (UAVs, including the class of UAVs commonly called drones), and automating work currently undertaken by contributors.[17]

Formal-sector adoption of big data digital humanitarian technologies has been uneven in two senses. First, some institutions advocate for their adoption far more than others, with early adopters, including the United Nations' Office for the Coordination of Humanitarian Affairs (OCHA), the U.S. Federal Emergency Management Agency (FEMA), and the American Red Cross, taking prominent roles.[18] Agencies tend to adopt technologies directly related to their existing workflows and practices, rather than seeking to shift their practices and workflows, a tendency that tempers adoption.[19] Another common reason given for a lack of widespread adoption is that existing policies and workflows hinder the changes required to efficiently utilize digital humanitarian technologies; in many cases emergency managers perceive policy hurdles to be insurmountable.[20] Some researchers have conducted analyses and provided recommendations regarding how to navigate legal and policy issues of big data digital humanitarian technologies.[21]

Geographic Research

Despite the spatial nature of humanitarianism and the rich body of geographic literature critiquing it, geographers have to date not contributed much to a theorization of digital humanitarianism. Early research has sought to position digital humanitarian technologies and practices alongside the geoweb. For instance, Goodchild and Glennon draw lines of resonance between social media, crisis mapping, and volunteered geographic information (VGI), suggesting that data produced in digital humanitarian technologies must undergo veracity tests similar to those used for traditional data.[22] Goodchild and Glennon are concerned primarily with this question of the *accuracy* of VGI, with accuracy being conceptualized as a

measure of difference between an observed phenomenon's location on the earth and the location of its representation in geographic software, that is, a conceptualization reflecting much of digital humanitarian research outside disciplinary geography. Goodchild and Glennon implicitly posit that VGI comprises observable, material phenomena having a Cartesian (latitudinal and longitudinal) positionality, and *accuracy* is the measure of difference between this position and its representation. This is at odds with other potential understandings of knowledge representations, for instance, the notion that knowledges can be interpersonal, emotional, performative, tactical, and associated with individual and collective memory—in a word, non-Cartesian.[23] Additionally, while digital humanitarianism introduces new big data information flows to emergency management, these data are couched within relations, behaviors, and norms.[24] All of these attributes affect the data and the practices of data producers and emergency managers. In other words, a limited conception of big data digital humanitarianism would treat it as merely data.

Some researchers claim that big data, regardless of its accuracy, influences emergency managers' operations and decision-making practices. According to these views, mapping activities collect knowledge of *where* emergencies are occurring and presumably *where* aid and support should thus be distributed.[25] For instance, Roche et al. describe the ways new information flow structures embedded in the geoweb have begun shaping emergency management practices, arguing that the geoweb entails "key tools for crisis management and communication by all stakeholders: local authorities, emergency respondents, NGOs and the general public."[26] For Roche et al. digital humanitarian technologies primarily contribute new information sources and communication channels, which potentially shape the ways in which the emergency management sector responds to crises. Related research into formal-sector integration of digital humanitarian technologies has made similar claims, tacitly accepting that the *presence* of digital humanitarian technologies means the formal sector is indeed *engaging* them in some way.[27]

Recently some researchers have begun proposing theoretical frameworks to explain the social and political implications of digital humanitar-

ianism. Burns has argued that the digital humanitarian case suggests big data should be conceptualized as a new set of practices, epistemologies, and socio-political relations.[28] This stands in contrast with much extant research on big data in digital humanitarianism, which often in its framings disproportionately characterizes the integration as democratizing, empowering, and efficient. Instead this approach highlights the modalities, variegations, and spatial situatedness of big data digital humanitarianism. Further, it indicates many potential further linkages with critical geographic theory, in particular from critical, participatory, and feminist GIS. Bittner et al. suggest combining actor-network theory with critical attention to hegemonic power relations to analyze the social nature of digital humanitarian technologies.[29] They make the important argument that the politics of digital humanitarian technology resides not just in the visual representation of data but also in software code, the positionality of digital humanitarians themselves, and the technological artifacts produced, such as platforms and application program interfaces (APIs). This point is likewise taken up by Burns, who demonstrates ways in which knowledge is politicized, contested, and represented through "moments of closure" in digital humanitarianism.[30] Borrowing from feminist theories of technology, Burns argues that digital humanitarian technologies embody social and political relations that become temporarily solidified in technological artifacts.

The rest of this chapter develops these linkages. In the section that follows, I draw on the research discussed above to suggest ways the empirical phenomenon of big data digital humanitarianism may contribute to broad areas of interest in geoweb research. I show that geoweb research can be enriched and challenged by the particular case of digital humanitarianism, and geoweb scholars could use this case to refine theories of the geoweb. Within literature on the geoweb, I focus primarily on research into its social, political, and economic implications, as this area is imperative for the context of the humanitarian enterprise.

Digital Humanitarianism and the Geoweb

In this section I develop four linkages between big data digital humanitarianism and geoweb research. Above I argued that scholars have not yet

fully elucidated the ways these topics manifest in digital humanitarianism, yet I posit that exploring these topics would extend and help refine theorizations of the geoweb. Implicit in this argument is the assumption that geographers are uniquely well positioned to build a theorization of digital humanitarianism.[31] I specifically discuss digital humanitarianism's spatialities, political economy, and knowledge politics.

The Spatialities of Big Data Digital Humanitarianism

Much like humanitarianism writ large, digital humanitarianism involves (re)producing spatial relationships between those who *need* help and those who *deliver* it.[32] It is particularly imperative to examine digital humanitarianism in this regard, since the spatial relationship is extended to include those contributing from afar. Collaborators on humanitarian projects no longer need be near the site of the crisis or in the management offices and headquarters; individuals may instead produce, process, and represent data while being located anywhere with an Internet connection. This is accomplished through the mobilization of spaces specific to digital humanitarianism, including its software platforms, lines of code, data models, and data representations. These are distinctive material spaces, both in the sense that their lines of code affect absolute geographies through the distribution of aid and resources and in the sense that they cannot function independent of the fiber optic cables, servers, and real bodies that drive them.[33]

The potential for dispersed digital humanitarianism, however, raises empirical questions regarding who *actually* contributes to these efforts. If big data digital humanitarianism reflects the unevenness of data production observable in other user-generated information efforts, such as Wikipedia, more research will be needed to address the implications of this unevenness.[34] At least one prominent digital humanitarian tool, Ushahidi, originated in the Global South, but its origin says little about current usage, and to date research has not examined the geographic origin of current digital humanitarian contributors.[35] This could be of particular concern if, for instance, remote contributors have little understanding

Burns

of the roots of the crisis at hand, have little stake in the "success" of the intervention, or have reflected sparsely on how their labor contributes.

Regardless of how geographically dispersed digital humanitarians are, several theoretical questions emerge regarding these spatialities. First, what can be known by those who are remote from the site of the intervention? What does that mean for the types of needs and knowledges that are mapped? In humanitarian crises there must be a relation between distance and the knowledge that one can have of that crisis. This question seeks the epistemic limit of big data digital humanitarianism. Second, what conceptual shifts regarding humanitarianism occur when geographically dispersed laypeople—those with no expert knowledge of how humanitarianism operates—contribute to humanitarian interventions? This may be especially pertinent when big data digital humanitarian projects occur outside sanctioned contexts, as was the case with Mission 4636 in the 2010 Haiti earthquake response, and in ongoing CrowdMap platforms established in the wake of disasters and crises around the globe. Third, what kinds of assumptions about who *has* resources and who is *able to deliver* them motivate digital humanitarian activities? In other words, what must individuals assume about their spatial relationship to those they help, prior to contributing to digital humanitarianism?

These questions resonate with emerging geoweb research exploring the unevenness of user-generated data production. Geoweb research has shown that big data is produced by—and about—the Global North; such data usually reflect and reproduce extant gender relations, as well as influence geographies of consumption.[36] Exploring the spatialities of digital humanitarianism answers Crampton et al.'s call to explore spatialities "beyond the proximate" to understand how humanitarian big data production occurs across diverse spatial scales and relational distances.[37]

The Political Economy of Big Data Digital Humanitarianism
Big data digital humanitarianism is emerging alongside significant political-economic shifts that remain to be explored. These shifts are largely both the result of as well as harbingers of two parallel processes. First, big data

digital humanitarianism is often offered as the innovation that can allow the formal humanitarian sector to operate in the context of increased pressures to work more efficiently and effectively.[38] Big data has become prominent within humanitarianism because proponents suggest it will allow humanitarians to fulfill this need, and big data has thus emerged here as the result of political-economic processes within humanitarianism. Second, the private sector has come to play a prominent role in big data digital humanitarianism, as private firms develop many of the technologies needed to produce and effectively leverage big data.[39] Examples of private companies involved in such big data processes include Twitter and Instagram through alert systems, Google Crisis Response in its development of crisis mapping platforms, and Esri in developing emergency management software incorporating digital humanitarian data. Eric Rasmussen, a prominent actant in the digital humanitarian community and ceo of the private business Infinitum Humanitarian Systems, said at a digital humanitarian workshop in 2012, "In these discussions, please let the private sector take care of this. We will address this problem for you, we will take the research, we will commercialize it, and we'll sell it back to you for cheap."[40]

These political-economic processes often go hand-in-hand with a reconceptualization of data vis-à-vis big data. One of the clearest examples comes from Robert Kirkpatrick, director of the un's Global Pulse program, which seeks to harvest big data for development and humanitarianism. Kirkpatrick has offered a new conceptualization of big data *as aid*.[41] According to this conceptualization, data do not merely capture information about a crisis but also carry material value. In this sense, needs of crisis victims can be met when humanitarian actors circulate big data quickly and efficiently enough.[42] Through this reconceptualization big data becomes a circulating unit of value similar to other commodities, one that can and should be delivered in zones of humanitarian crisis. This therefore constitutes a new locus of political-economic relations and processes that bears critical exploration.

Geoweb scholars have recently begun elucidating the political-economic relations in which the geoweb should be situated. In particular Leszczynski has argued that the geoweb should be understood as signaling both the

state stepping back from mapping roles and responsibilities formerly within its purview and as the state stepping forward, in the form of new regulations, frameworks, and markets for the private sector.[43] According to Leszczynski, the geoweb has been made possible by the state handing over its duties to individuals and private sector companies. Much remains to be explored in this area of geoweb research, and big data digital humanitarianism provides a unique case due to its potentially stark consequences. For example, Internet researchers have theorized digital labor in relation to generating surplus value.[44] However, questions remain regarding the reasons private companies are funding many digital humanitarian activities while simultaneously relying on volunteered labor. For what purposes is the private sector entering humanitarianism via digital humanitarianism? What impacts do remote volunteer projects have on local community economies, where in many cases local people are in need of paid work? The case of big data digital humanitarianism raises several questions that could contribute to geoweb scholars' efforts to understand the political economy of the geoweb.

The Knowledge Politics of Big Data Digital Humanitarianism

As in the social sciences more broadly, within digital humanitarianism big data signals new forms of contestation around knowledge legitimacy and differing amounts of weight given to various kinds of claims.[45] In digital humanitarianism these "knowledge politics" take the form of deliberations over what kinds of knowledges to include, how to include them, and the terms on which they should be included.[46] These knowledge politics in digital humanitarianism have implications for how the technologies are engaged by the formal sector and therefore how shifts in aid distribution are to take place. In other words the ways in which digital humanitarian technologies collect, process, and represent big data have implications for how material needs are met.[47]

Much of big data digital humanitarian research has assumed big data contains a degree of representativeness, even if it is simply representative of the small sample of the population producing social media data.[48] Most humanitarian agencies recognize that the knowledges represented in big

data are not representative of the population at large.[49] Nevertheless these organizations consider data to be representative of the population that produces it. This view contrasts with recent scholarship showing the *performative* nature of knowledge produced through social media; much recent work has argued that social media data are produced as a way of presenting a desirable image of oneself.[50] Big data within digital humanitarianism could thus be seen not as an objective and situated recording of a reality but rather as a mediated presentation of the image one wants others to have of them. The difference here is between seeing big data as both a source of information to guide the dispersal of resources on the one hand and as a murky lens through which to view a limited number of perspectives of a crisis.

Research into the knowledge politics of the geoweb has shown this to be a fruitful area. While such research has shed light on the uneven representation and contribution of knowledges encoded by data, less is known about the particular ways this has factored into knowledge of the world. Current geoweb research is addressing this question, and digital humanitarianism is an imperative case to consider, as it mobilizes relations that rely explicitly on knowledge of other places. In humanitarian contexts it may be empowering and may assist in recovery and future mitigation efforts for representational technologies to incorporate local knowledges and ways of knowing, rather than to have a structure of knowledge (e.g., prefabricated databases, Cartesian representations) foisted upon local communities. Big data in the form of social media may contribute to this goal, insofar as it allows a degree of flexibility of expression not seen in previous data forms. In this way digital humanitarianism presents unique challenges and ethical questions to knowledge politics in geoweb research. Specific questions remain. Who can—and who *does*—represent places in digital humanitarian contexts? What kinds of marginalizations arise because of these asymmetries? How is knowledge about individual crises, as well as crisis writ large, shaped by digital humanitarian technologies? What kinds of struggles are undertaken by "victims" of humanitarian crises in order to make their knowledges visible—or in some cases to keep their knowledges *in*visible?[51]

Conclusion

In this chapter I have argued that geographers studying the geoweb have not sufficiently considered the case of digital humanitarianism and that doing so would lend unique and productive insights. I have reflected on potential contributions, focusing on the social and political implications of digital humanitarianism. I looked specifically at current theorizations of the geoweb's spatialities, political economy, and knowledge politics, drawing lines of productive resonance with digital humanitarianism.

Further research is needed at the juncture of the geoweb and digital humanitarianism to expand geographers' understanding of the shifting socio-technical practices observed in the world today. Such research would contribute deeper understanding of digital humanitarianism but would also nuance current conceptualizations of the geoweb. As an umbrella term for shifting data and socio-technical phenomena, the "geoweb" currently does not adequately account for the range of contexts in which new data and socio-technical practices occur. Digital humanitarianism enrolls unique institutional, social, and political-economic relations that are distinct from—and therefore stand to refine—what is typically considered the geoweb.

Additionally, greater understanding of digital humanitarianism is imperative due to the significant impact that humanitarianism has on current global social and political relations. The last several decades have witnessed the emergence of a general sense of cosmopolitan responsibility, with appeals to humanitarian and moral sentiments becoming the most likely to generate support for humanitarian intervention.[52] "Humanitarian reason" is thus becoming an increasingly powerful force in the world, and more research is needed to understand the impacts incurred by the incorporation of big data and digital humanitarian technologies.[53] Geoweb scholars are well positioned to address these questions.

Notes

1. Burns, "Rethinking Big Data"; Crawford and Finn, "Limits of Crisis Data."
2. One documented use of this process is found in Standby Task Force, *Nepal Earthquake 2015.*

3. UN OCHA, *Humanitarianism in the Network Age*; Meier, "What Is Big (Crisis) Data?"; Taylor and Schroeder, "Is Bigger Better?"

4. Scharl and Tochtermann, *Geospatial Web*; Leszczynski and Wilson, "Theorizing the Geoweb"; Howe, "Rise of Crowdsourcing"; Ziemke, "Crisis Mapping"; Mayer-Schönberger and Cukier, *Big Data*; Olafsson, *Humanitarian Response*.

5. Crawford and Finn, "Limits of Crisis Data"; Dalton and Thatcher, "Critical Data Studies"; Sandvik et al., "Humanitarian Technology."

6. Goodchild and Glennon, "Crowdsourcing Geographic Information"; Haworth and Bruce, "Review of Volunteered Geographic Information"; Li and Goodchild, "Role of Social Networks in EM"; Hughes and Palen, "Evolving Role"; Starbird and Palen, "Working and Sustaining"; Al-Akkad and Raffelsberger, "How Do I Get This App?"; Hiltz, Kushma, and Plotnick, "Use of Social Media"; Van Gorp, "Integration of Volunteer and Technical Communities."

7. Burns and Shanley, *Connecting Grassroots to Government*; Hiltz, Kushma, and Plotnick, "Use of Social Media"; Shanley et al., "Tweeting Up a Storm."

8. Meier, "Debating the Value of Tweets"; Meier, "What Was Novel?"

9. Gupta and Kumaraguru, "Credibility Ranking of Tweets"; Vieweg, "Situational Awareness"; Castillo, Mendoza, and Poblete, "Predicting Information Credibility."

10. Cohen, "Sandy Marked Shift."

11. Crowley and Chan, *Disaster Relief 2.0*; Burns, "Rethinking Big Data."

12. Palen, Vieweg, and Anderson, "Supporting 'Everyday Analysts'"; Hughes and Palen, "Evolving Role."

13. F. Harvey, "To Volunteer or to Contribute?"; Schroeder, "Big Data"; Liu et al., "How Disaster Information"; Starbird and Palen, "Working and Sustaining."

14. Acar and Muraki, "Twitter for Crisis Communication"; Verity, *OCHA's Lessons Learned*.

15. Corbett and Keller, "Using Community Information."

16. Bott, Gigler, and Young, *Role of Crowdsourcing*; Stottlemyre and Stottlemyre, "Crisis Mapping Intelligence."

17. Chamales and Baker, *Securing Crisis Maps*; Chamales, *Towards Trustworthy Social Media*; Goolsby, *On Cybersecurity, Crowdsourcing*; Meier, "Humanitarians in the Sky"; Sandvik and Lohne, "Rise of the Humanitarian Drone"; Burns and Shanley, *Connecting Grassroots to Government*.

18. Capelo, Chang, and Verity, *Guidance for Collaborating*; Waldman, Verity, and Roberts, *Guidance for Collaborating*; Virtual Social Media Working Group and DHS First Responders Group, *Lessons Learned*.

19. Burns, "Rethinking Big Data."

20. Burns and Shanley, *Connecting Grassroots to Government*; Shanley, "Opportunities and Challenges"; Su, Wardell, and Thorkildsen, *Social Media in Emergency Management*; Woodrow Wilson Center, *Legal and Policy Issues.*

21. Robson, *Responding to Liability*; Reidenberg et al., "Privacy and Missing Persons"; Young et al., *Transforming Earthquake Detection.*

22. Goodchild and Glennon, "Crowdsourcing Geographic Information."

23. Elwood and Mitchell, "Another Politics Is Possible"; Kinsley, "Beyond the Screen"; Kinsley, "Matter of 'Virtual' Geographies"; W. Lin, "Situating Performative Neogeography."

24. Bowker, *Memory Practices*; Boyd and Crawford, "Critical Questions for Big Data"; Dalton and Thatcher, "Critical Data Studies."

25. Zook et al., "Volunteered Geographic Information and Crowdsourcing."

26. Roche et al., "GeoWeb and Crisis Management," 17.

27. Liu and Pale, "New Cartographers"; Liu, Fraustino, and Jin, "How Disaster Information"; Meier, *Digital Humanitarians.*

28. Burns, "Rethinking Big Data."

29. Bittner et al., "Tracing Contingencies."

30. Burns, "Moments of Closure."

31. Similar arguments for geography and big data may be found in Farmer and Pozdnoukhov, "Building Streaming GIScience."

32. Fassin, *Humanitarian Reason.*

33. Kitchin and Dodge, *Code/Space*; Kinsley, "Matter of 'Virtual' Geographies."

34. Suggesting that big data digital humanitarianism reflects the unevenness of data production are M. Graham, Hale, and Stephens, *Geographies of World's Knowledge*; and M. Graham et al., "Uneven Geographies."

35. Okolloh, "Ushahidi or 'Testimony.'"

36. Haklay, "Neogeography and Delusion"; M. Graham et al., "Uneven Geographies"; Stephens, "Gender and Geoweb"; Leszczynski and Elwood, "Feminist Geographies"; M. Graham, "Neogeography and Palimpsests"; Thatcher, "Avoiding the Ghetto."

37. Crampton et al., "Beyond the Geotag."

38. Kirkpatrick, "Data Philanthropy"; Letouzé, "Big Data for Development"; Letouzé, "Big Data from Cellphones"; UN OCHA, *Humanitarianism in the Network Age.*

39. Burns and Shanley, *Connecting Grassroots to Government.*

40. Quoted in Woodrow Wilson Center, *Research Challenges*. To be sure, Rasmussen's statement was paraphrasing another person's words, but it was in affirmation of those words.

41. Kirkpatrick, "Data Philanthropy."
42. Decker, "Big Data for Humanitarian Assistance"; Meier, "What Was Novel?"
43. Leszczynski, "Situating the Geoweb."
44. Fuchs and Sevignani, "What Is Digital Labour?"
45. Elwood and Mitchell, "Another Politics Is Possible."
46. Burns, "Moments of Closure."
47. Burns, "Rethinking Big Data."
48. Letouzé, "Big Data for Development"; Meier, "What Is Big (Crisis) Data?"; un
    ocha, *Humanitarianism in the Network Age*.
49. Meier, "Debating the Value of Tweets."
50. Kinsley, "Beyond the Screen"; W. Lin, "Situating Performative Neogeography."
51. Burns, "Moments of Closure"; Young and Gilmore, "Subaltern Empowerment."
52. Calhoun, "World of Emergencies"; Roy, *Poverty Capital*; Fassin, *Humanitarian
    Reason*.
53. Calhoun, "World of Emergencies"; Crawford and Finn, "Limits of Crisis Data."