Article

The promises and perils of a digital geohumanities

cultural geographies
2015, Vol. 22(2) 351–360

DOI: 10.1177/1474474015572303
cgj.sagepub.com
SAGE

Mike Crang
Durham University, UK

Abstract
This intervention asks to what extent developments of digital media offer new objects that demand new methods and to what extent they create new methods that might be applied to older cultural fields creating a digital geohumanities. It argues that digital media sometimes reanimate older debates and issues not only in what we study but how we do so, and their significance may be less in new techniques than altering the general tools of our trade in cultural geography. This article looks at both new digital cultures, such as gaming and new converging media, and new methods, be they analysing the data exhaust of digitally mediated social lives or using new software in literary analysis. Profound tensions exist between quantitative imaginaries of a massive stock of texts yielding determinate meanings and deconstructive visions of texts yielding indeterminate and proliferating meanings. Big data sit uneasily with big interpretation. This article suggests a materialist semiosis is needed to attend to the permutations where new digital techniques may form affective technologies conveying meanings as much as effective analytical tools.

Keywords
digital humanities, literary geography, methods, new media

Introduction

There has never been a shortage of hyperbole regarding digital media's always imminent, somehow never arriving, effects on society and the academy, be they from cheerleaders or prophets of doom. And yet, there is a remarkable sensation I sometimes feel about the relationship of research and digital devices that everything has changed and nothing has changed. There was a moment doing fieldwork in 2004 for me when I looked at the back seat of a hire car and realised there were two digital cameras, one digital camcorder, a voice recorder and a laptop. They were all making digital files which I would process and link with a bibliographic database package that in turn linked increasingly either digital versions of papers or my own notes on publications stored as digital files. I had perhaps consequently chosen a Moleskine notebook for my fieldnotes as something of a retro affectation. This short intervention seeks to unsettle the continuity of methods in a world

Corresponding author:
Mike Crang, Department of Geography, Durham University, Lower Mountjoy, Durham DH1 3LE, UK.
Email: m.a.crang@durham.ac.uk

whose cultures are increasingly lived through digital media, while probing some of the claims of new 'digital' methods that seem to promise miraculous solutions to well-worn problems.

This commentary draws on materialist media studies that point to the effects of technologies of media on how we think as well as the effect of their content on what we think about. They refuse to divide 'container' and 'content' or 'atoms' and 'bits'. All media have complex materialities and are not dematerialised information. Like Johanna Drucker, I want to resist the 'pixel-plagued bit-weary' investment in a form of materiality that creates a false binary of 'the matter of the real' in opposition to an immateriality attributed to the 'virtual'.[1] To exemplify this, it is perhaps salutary to return to an old technology when it was new. At some point in 1882, Friedrich Nietzsche bought a typewriter. He bought it since his failing eyesight meant staring at the page while writing brought on terrible headaches. Typing by touch, he could write with his eyes closed. But it also began to inflect *what* Nietzsche wrote. Friedrich Kittler notes that Nietzsche's prose 'changed from arguments to aphorisms, from thoughts to puns, from rhetoric to telegram style'.[2] Nietzsche himself recognised that 'our writing equipment takes part in the forming of our thoughts', suggesting we all need to think about the tools of our trade. Nor can we opt out of new technologies, not even by using a retro notebook. We are all now digital scholars – even if it is 'digital lite' in terms of using various forms of digital mediation in various aspects of our work. This general engagement should not be overlooked, when the banal technologies of storing, filing and writing form the scaffolds for our practice. As Katherine Hayles notes, for contemporary thinking,

> the keyboard comes to seem an extension of one's thoughts rather than an external device on which one types. Embodiment then takes the form of extended cognition, in which human agency and thought are enmeshed within larger networks that extend beyond the desktop computer into the environment.[3]

The impact of new media is not just on what we study but how we think. There is then no opting out of digital scholarship. As Kittler reminds us, Heidegger highlighted that

> whether or not we personally ever use the typewriter is not important. What is important is that all of us are thrown into the age of typewriting, whether we like it or not. Of course, Heidegger himself preferred to continue his work in his own handwriting.[4]

But we do not need to rely on the slightly romantic and anti-technological bent of a thinker like Heidegger. Walter Benjamin was similarly intrigued by the way technologies for storing, processing and presenting information shaped our thinking. As he put it looking at the desk of the 1930s,

> The card index marks the conquest of three-dimensional writing, and so presents an astonishing counterpoint to the three-dimensionality of script in its original form as rune or knot notation. And today the book is already, as the present mode of scholarly production demonstrates, an outdated mediation between two different filing systems. For everything that matters is to be found in the card box of the researcher who wrote it, and the scholar studying it assimilates it into his own card index.[5]

It is well known, then, that he attempted to create a form of writing that enabled such a three-dimensionality through 'files' of examples rather than linear prose. All underpinned by the humble technology of filing, indexing and referencing. It is a reminder that the database has a longer pedigree in academic work than its digital form. In the 1990s, there was a rash of work heralding the new possibilities and forms of electronic writing as a hyperlinked database, pointing to the almost embarrassingly literal enactment of deconstructive theory's destabilisation of the text.[6] And yet, as Jacques Derrida reflected, the texts of his that were 'most disobedient to tenets of linear writing',

he wrote before computers enabled dislocations and grafts, in fact *Glas* was written with an Olivetti typewriter:

> It was theorized and it was done – yesterday. The path of these new typographies, which have become common today, was blazed in an experimental fashion a long time ago. It's thus necessary to invent other 'disorders', more discreet, less jubilatory and exhibitionist ones which this time would be contemporary with the computer.[7]

This intervention will seek those modest disruptions in arenas of cultural geography both where the object of our study has become digital and where our mode of study now uses digital media. I use that as a heuristic conscious it risks restaging the dualism of field and academy, things and thought, *res extensa* and *res cogitans*, which material media analysis debunks.[8] Within these two broad areas, I want to make a further subdivision between the 'migration of our cultural legacy into digital form and the creation of new, born-digital materials'.[9] I will, first and most briefly, look at new digital objects of study and, second, the ways the prevalence of digital media renders the social perceptible in new ways. Likewise, I divide the effects of digital media on academic practice into, first, converging forms of knowledge as they become digital and, second, the application of new digital and computational techniques to old issues – exemplified by new approaches to literary geographies.

In doing this, I cut across the terrain staked out as a project of geohumanities and that of a digital humanities. Ketchum, Luria, Dear and Richardson's recent text speaks, then, of four dimensions of geohumanities: 'geocreativity (creative places), geotexts (spatial literacies), geoimagery (visual geographies) and geohistories (spatial histories)'.[10] This intervention stresses the challenge of new media to the first three with the creation of new kinds of place and modes of interacting, with new textual and visual apparatus. It comes back to the 'spatial humanities' which they bracket as one and same as 'the digital humanities' which is described as 'the absorption of methods of geographical information science into humanities scholarship'. That constricted definition of the digital humanities is not one many who identify as practitioners would accept – even if they acknowledge the rise of spatial databases and spatialised presentations of data. I want to hold to Katherine Hayles' expansive set of possible outcomes.[11] To do this means seeing the digital geohumanities as being an oscillation between using digital technologies in studying traditional objects and also humanities methods in studying digital objects.[12]

Digital cultures and born-digital objects

There are new cultural forms and practices created through digital media that would seem at first blush to beckon for newly digital modes of analysis. And yet on probing, these born-digital cultural artefacts – like computer games – turn out to be 'remediating' previous media structures.[13] We need to ask what are the continuities and what are the changes, for instance, attending to how game aesthetics remediate landscape. There is little novel in the ideological content of, say, many video games' depiction of racialised Others. The long running franchise of *Grand Theft Auto* plays on an American urban imaginary taken from TV and film. It also trades on racialised and sexualised stereotypes to animate urban spaces.[14] We might see a not so crypto-Orientalism in the conversion of Middle Eastern cities into backdrops and theatres of action, people into targets and victims for 'first-person shooter' games positioning the player as a Western soldier. However, games such as *Full Spectrum Warrior: Ten hammers* remediate that by using simulated contemporary CNN style news media coverage as framing devices.[15] In contrast to first person view games, some, such as *Age of Empire*, use map views deploying the cartographic device of a slow map reveal in the corner

of the screen and play around the different spatial knowledges and forms of representing travel and mapping.[16]

Studies have looked at the socialities (and less often spatialities) of online worlds as new creative places for either simulated social encounter (as in Virtual Worlds) or collaborative quest-based games (Massively Multiplayer Online Roleplaying Games (MMPORGs)). The coming together in a simulated place by distributed actors challenges the embodied copresence in participant observation manuals. And yet, as illustrated by Longan's piece in this issue[17], research practice on virtual places seems a very familiar ethnographic one at heart. So we have new forms, recycling formats, being analysed by methods that fuse old techniques with new practices.

Digital lives: rendering culture perceptible

The percolation of new media into everyday life suggests that separations of real and virtual, material and cyberspace are misconceived. This is not the place to explore the transformations this enables in the organisation of culture, society, economy and urban life; my concern here is more with the methods it enables to study these. Suffice to say initial prophecies of placeless or dematerialised living have now been replaced by an attention on how, for instance, media enable local life to function.[18] Beyond that far from there just being social networks, there has been a proliferation of location-based social networks,[19] and far from virtual games, there are 'hybrid' digital games that embed themselves into places – with simulated zombie attacks in real-life streets or playing around and against other nearby participants.[20] Moreover, art works increasingly annotate spaces and layer digital content onto places or use places to inform media content.[21] For instance, the work of Janet Cardiff has been followed by a variety of geowebbed media that are now also conveying stories in situ and repopulating urban settings with past soundscapes or artistic interventions.[22] Others mash multiple different forms of data together to alter the experience of the spaces and add possibilities for popular archiving. Here, then, new media are allied with a distributed archive imbricated in spatial practices. Of course, popular archiving and authorship then (as ever) reflect the multiple dimensions of power in this case mediated through new technology, about who gets to author what. It is at this point possible to analyse the layering of different signifiers in different variants of media onto places – to look at either a palimpsest or indeed competing media and their differing constituencies of users trying to create hegemonic meanings for places.[23] We have, then, a very literal enactment of long-established arguments about contested and polysemic landscapes. But here, for cultural geography are new tools for intervention, where we might add public archival annotation via geotagging to existing techniques.

Social media render the back and forth of social life perceptible to analysis (be that by academics, governments or more often corporations) through the digital traces – the data exhaust – they leave. Our banal social lives become digitally mediated and can be subject to quantitative encapsulation through lexical analysis. For instance, Alan Mislove and colleagues applied a word-rating system – scoring positive and negative connotations – to US-based geolocated tweets to produce stunning time lapse maps of the 'mood of the nation'.[24] Similar approaches have correlated postings with stock market movements,[25] and yet so far the conclusions have been banal. The poetics and affective power of the visualisation have often been more powerful than the supposed 'result'. One result that is clear is the institution of the social media used as 'evidential' and media researchers who use it are 'not mere observers or utilisers of social media content but are promoters of this infrastructure' who by framing an issue via a specific media platform risk reproducing how that media frames the issue.[26]

Such analyses render apparent the centrality of the transmission of affects and feelings to the going on of social life.[27] And yet, this is done via quantification, whereas so much work on

emotions or affects has started from postulating them as unquantifiable. Latour and Lepinay turned to Gabriel Tarde, who saw the economy and the social as a series of quantifiable intensities, in response. At the start of the 20th century, he argued that the problem of scientific study of society was not that it quantified, but that its metric was wrong. He wondered about the possibilities of developing metrics for fame, charisma, happiness by creating 'valuemeters' or 'glorimeters'. They note, we should nowadays 'have no difficulty understanding what digitization has done to the calculation of authority, the mapping of credibility and the quantification of glory'.[28] However, enthusiasm for alternate metrics rather underplays possible alienation by any and all metrics. So, to take an example close to home, the concatenation of student evaluations, national research evaluations, league tables, citation analyses, Twitter buzz (where the circulation of academic work on social media is logged by initiatives like altmetrics[29]) and so forth that increasingly govern academic life do not seem to promote positive affects.[30] These metrics do not simply report the world, but rather format it in their own image. Rendering cultural life more perceptible, and thus amenable to action by different groups, highlights what Kittler called 'institutions of selection' which attribute significance.[31] It is also the case, then, that such data by replicating current patterns of interaction tend to be conservative both in repeating what is currently dominant and in restaging a simplistic monism.[32]

Digital convergence

If new media are recording traces of cultural life, so too are the old media being transformed. Cultural geography has tended to focus on the meaning rather than the substance of media, saying much more about the dematerialised 'text' than the 'book'. As Keighren and Withers note, most work in geography focuses on the content of printed narratives to the neglect of epistolary conventions.[33] We have been (too) eager to read artefacts like texts, and rather less adept at seeing texts as artefacts.[34] As Kittler argues, media are 'material devices for producing, processing, transmitting and storing information'.[35] What is underway with the increasing use of digital media is a mnemotechnical shift from the library to the database.[36] Roger Chartier suggests that the result is a dedifferentiation of discourses that were previously held apart by material differences and associated conventions. Chartier is led to speculate that 'in the digital world all textual entities are like databases that offer fragments, the reading of which in no way implies the perception of the work or the body of works from which they come'.[37] The question is whether the database is antithetical to narrative, as argued by Lev Manovich, or symbiotic with it as Katherine Hayles would have it.[38]

This suggests attending rather more to the conventions and modes of information presentation. Drucker argues it highlights the spatial organisation of texts and how those structure semantic relations.[39] In this, she raises two approaches that become possible: the first she calls speculative computing and the second a digital humanities where there is a scientific attachment to objective data. The first kind of vision draws on the power of visualisation to produce an affective response, and Drucker calls for 'diagrammatology' where the compositional possibilities and distribution of materials perform relations.[40] The latter approach of digital humanities mines the universe of digital textual objects to reveal patterns of relations through data visualisation or 'InfoVis' techniques:

> Infovis uses graphical primitives such as points, strait lines, curves, and simple geometric shapes to stand in for objects and relations between them – regardless of whether these are people, their social relations, stock prices, income of nations, unemployment statistics, or anything else . . . This reductionism becomes the default 'meta-paradigm' of modern science and it continues to rule scientific research today.[41]

Therefore, this approach may well unnerve many for it is not only radically quantitative but also informed by a reductionist sensibility:

> in the sciences, theory distils from experience a few underlying regularities, thus reducing a seemingly infinite number of particularities into a parsimonious few. The more instances that can be reduced, the more powerful the theory is meant to be [. . .]. Reduction is good, proliferation is bad.[42]

This reductive digital humanities is exemplified in 'culturomics'[43] that mines the digitised books available through Google to chart, for instance, the frequency of emotive terms over time and between countries or look at the rise and fall of key terms about climate change.[44] However, looking for cultural markers as metonyms of larger cultural units is something that has rather gone out of fashion in cultural geography. By contrast, when social media are mined, what is being traced are performative flows rather than markers of specific cultures. I share DeLyser and Sui's concern that 'culturomics' might submerge traditional interpretative scholarship with superficial number crunching that does not situate the object or process of analysis.[45] Mays argues powerfully that deconstructive and quantified approaches view texts in contrasting ways. Deconstruction tends to focus on a specific work to show its meaning is indeterminate, open to proliferation and contested interpretation, while quantitative methods grasp the proliferation of texts assigning them determinate meanings.[46]

Quantifying the aesthetic or the aesthetics of quantification? Digital mapping and literary geographies

In this context, we might revisit the notion of mapping texts inspired by authors such as Franco Moretti:

> What do literary maps allow us to see? Two things basically. First, they highlight the *ortgebunden*, place-bound nature of literary forms, each of them with its peculiar geometry, its boundaries, its spatial taboos and favourite routes. And then, maps bring to light the internal logic of narrative: the semiotic domain around which a plot coalesces and self-organises.[47]

The rise of geographic information systems (GIS) has eased the literal mapping of all the places mentioned or where scenes occur in books, but mostly follow the relatively inert idea of space in Moretti. The restricted spatiality may stem from a sometimes shallow engagement of GIS work with other work on literary geography. For instance, Piatti et al. imagine themselves viewing 'the horizon of a promising interdisciplinary research field – a *future literary geography*'.[48] According to the 'literary geographies' blog,[49] some 369 works on place, space and literature had already been published that decade. The spatio-temporal forms, relations and analyses worked through in those offer rather richer concepts than typologising types of spaces (visited by characters, scenes of action, imagined or spoken of, or routeways) and their frequency of occurrence.

One can mine William Wordsworth's poems[50] or Joyce's *Ulysses* for place names, but it is less clear how that gets us very far in understanding ideas of the natural in the former or, say, the influence of Vico's geopoetic theory of scalar recapitulation in the latter.[51] Indeed, when Travis uses Vico's recapitulative time to understand 1930s Dublin in O'Brien's *At Swim-Two-Birds*, he ends up moving away from what he terms a scientific metonymic GIS to a metaphorical GIS. The former can trace timespace paths of O'Brien's narrator, but to include Vico-inspired temporality, he has to employ metaphorically separated layers. The result is less an analytical map than an evocative visualisation – less digital humanities than speculative computing in Drucker's

terms.[52] There is also traffic the other way, where literary material is infusing mapping. So now there are geowebbed applications that say transpose the places of Ulysses back onto Dublin, or, more in the spirit of diagrammatology, take the relations between places and transpose them onto entirely different cities.

Agendas

I finish then not with conclusions but issues developing or challenging both to digital approaches and to non-digital techniques. It seems to me that it is impossible to ignore these challenges to how cultural geographies approach their objects of study. Equally, it seems unproven that some of the new techniques lead to much conceptual advance. Four points do emerge across the range of approaches presented here. First, many of these approaches serve to mobilise texts and destabilise the relationship with people. Texts are made much more strongly performative than representational, and people are no longer 'autonomous' actors. Moreover, digital media shift attention from stocks of information (in archives and libraries which people may choose to visit) to flows of information (even if people try and ignore them). As Kittler puts it, 'persons are not objects but addresses which make possible the assessment of further communications'.[53]

Second, this seems to decentre the agency of the human actors or, as Kittler puts it, the hylomorphism of media as matter and content as spirit, where 'living spirit' is opposed to 'the dead letter'.[54] Third, there is a challenge from digital geohumanities to reconcile the elaboration of meaning from a specific body of material and the reduction of a massive corpus to a pattern. Here, then, we must ask about the desire behind analysing big data and how it throws into relief cultural geographers' taste for 'big interpretation'. Forms of monism may have made something of a comeback in cultural geography, but not the reductive forms of social physics sometimes underpinning calculative analysis.[55] Fourth, digital media affect all our research not just by creating new 'objects of study in new formats', but by shifting 'the critical ground on which we conceptualize our activity'.[56]

Acknowledgements

I would like to thank Dydia DeLyser for her forbearance and her engagement which, along with the comments of three referees, improved this immeasurably.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Notes

1. J.Drucker, 'Entity to Event: From Literal, Mechanistic Materiality to Probabilistic Materiality', *Parallax*, 15, 2009, pp. 7–17.
2. F.Kittler, *Discourse Networks 1800/1900* (Stanford: Stanford University Press, 1990), p. 195.
3. N.K.Hayles, *How We Think: Digital Media and Contemporary Technogenesis* (Chicago: University of Chicago Press, 2012), pp. 2–3.
4. J.Armitage, 'From Discourse Networks to Cultural Mathematics: An Interview with Friedrich A. Kittler', *Theory, Culture & Society*, 23, 2006, p. 29.
5. W.Benjamin, *One Way Street & Other Writings* (London: Verso, 1990), p. 62.
6. G.Landow, *Hypertext: The Convergence of Contemporary Critical Theory and Technology* (Baltimore: Johns Hopkins University Press, 1992); J.D.Bolter, *Writing Space: The Computer, Hypertext and the History of Writing* (Hillsdale: Lawrence Erlbaum, 1991).
7. J.Derrida, 'Word Processing', *Oxford Literary Review*, 21, 1999, p. 10.

8. M.Crang, 'Telling Materials', in M.Pryke, G.Rose and S.Whatmore (eds), *Using Social Theory* (London: SAGE, 2003), pp. 127–44.
9. J.Drucker cited in S.Mays, 'Literary Digital Humanities and the Politics of the Infinite', *New Formations*, 78, 2013, p. 117.
10. J.Ketchum, S.Luria, M.Dear and D.Richardson, 'Geohumanities Symposium: Editors Response 1', *Progress in Human Geography*, 37, 2013, pp. 313–5.
11. Hayles, *How We Think*.
12. K.Fitzpatrick, 'The Humanities, Done Digitally', in M.K.Gold (ed.), *Debates in the Digital Humanities* (Minneapolis: University of Minnesota Press, 2012), p. 13.
13. J.D.Bolter and R.Grusin, 'Remediation', *Configurations*, 4, 1996, p. 339; J.D.Bolter and R.Grusin, *Remediation: Understanding New Media* (Cambridge: MIT Press, 1999).
14. R.Atkinson and P.Willis, 'Charting the Ludodrome: The Mediation of Urban and Simulated Space and Rise of the *flaneur electronique*', *Information, Communication & Society*, 10, 2007, pp. 818–45.
15. J.Höglund, 'Electronic Empire: Orientalism Revisited in the Military Shooter', *Game Studies*, 8, 2008, n.p.; N.Poor, 'Digital Elves as a Racial Other in Video Games', *Games and Culture*, 7, 2012, pp. 375–96.
16. S.Lammes, 'Playing the World: Computer Games, Cartography, Spatial Stories', *Aether: The Journal of Media Geography*, 3, 2008, pp. 84–96; S.Lammes, 'Spatial Regimes of the Digital Playground: Cultural Functions of Spatial Practices in Computer Games', *Space and Culture*, 11, 2008, pp. 260–72; S.Lammes, 'Terra Incognita: Computer Games, Cartography and Spatial Stories', in M.van den Boomen, S.Lammes, A.-S.Lehmann, J.Raessens and M.T.Schäfer (eds), *Digital Material: Tracing New Media in Everyday Life and Technology* (Amsterdam: Amsterdam University Press, 2009), pp. 223–38; M.Longan, 'Playing with Landscapes: Social Processes and Spatial Forms in Video Games', *Aether: The Journal of Media Geography*, 2, 2008, pp. 23–40.
17. Longan, M. W. Cybergeography IRL. *Cultural Geographies*, 22(2), 2015, pp. 217–229.
18. E.Gordon and A.de Souza e Silva, *Net Locality: Why Location Matters in a Networked World* (Oxford: John Wiley & Sons, 2011); M.Crang, T.Crosbie and S.Graham, 'Technology, Timespace and the Remediation of Neighbourhood Life', *Environment and Planning A*, 39, 2007, pp. 2405–22.
19. A.de Souza e Silva and J.Frith, 'Locative Mobile Social Networks: Mapping Communication and Location in Urban Spaces', *Mobilities*, 5(4), 2010, pp. 485–505.
20. A.de Souza e Silva and L. Hjorth, 'Playful Urban Spaces', *Simulation & Gaming*, 40(5), 2009, pp. 602–25; C.Licoppe and Y.Inada, 'Geolocalized Technologies, Location-Aware Communities, and Personal Territories: The Mogi Case', *Journal of Urban Technology*, 15(3), 2008, pp. 5–24.
21. M.Berry, M.Hamilton and D.Keep, 'Transmesh: A Locative Media System', *Leonardo*, 44(2), 2011, pp. 162–3; M.Berry and O.Goodwin, 'Poetry 4 U: Pinning Poems under/over/through the Streets', *New Media & Society*, 15(6), 2013, pp. 909–29; F.Timeto, 'Redefining the City through Social Software: Two Examples of Open Source Locative Art in Italian Urban Space, *First Monday*, 18(11), 2013 <http://www.firstmonday.dk/ojs/index.php/fm/article/view/4952/3783>; A.Kraan, 'To Act in Public through Geo-Annotation: Social Encounters through Locative Media Art', *Open*, 11, 2006, pp. 38–49.
22. S.Barns, 'Street Haunting: Sounding the Invisible City', in M.Foth, L.Forlano and C.Satchell (eds), *From Social Butterfly to Engaged Citizen: Urban Informatics, Social Media, Ubiquitous Computing, and Mobile Technology to Support Citizen Engagement* (Cambridge: MIT Press, 2011), pp. 203–16; Berry and Goodwin, 'Poetry 4 U'; D.Pinder, 'Ghostly Footsteps: Voices, Memories and Walks in the City', *Ecumene*, 8, 2001, pp. 1–19.
23. M.Graham, M.Zook and A.Boulton, 'Augmented Reality in Urban Places: Contested Content and the Duplicity of Code', *Transactions of the Institute of British Geographers*, 38, 2013, pp. 464–79; M.Graham, 'Neogeography and the Palimpsests of Place: web 2.0 and the Construction of a Virtual Earth', *Tijdschrift voor Economische en Sociale Geografie*, 101, 2010, pp. 422–36.
24. A.Mislove, S.Lehmann, Y.-Y.Ahn, J.-P.Onnela and J.Rosenquis, 'Visualisation of the Twitter Pulse of the Nation', <http://www.ccs.neu.edu/home/amislove/twittermood/>
25. J.Bollen, H.Mao and X.Zeng, 'Twitter Mood Predicts the Stock Market', *Journal of Computational Science*, 2, 2011, pp. 1–8.

26. M.W.Wilson, 'Morgan Freeman Is Dead and Other Big Data Stories', *Cultural Geographies*, Epub ahead of print 28 February 2014. DOI: 10.1177/1474474014525055.
27. As in the travels of a football related fracas far from its origin, see J.W.Crampton, M.Graham, A.Poorthuis, T.Shelton, M.Stephens, M.W.Wilson and M.Zook, 'Beyond the Geotag: Situating "Big Data" and Leveraging the Potential of the Geoweb', *Cartography and Geographic Information Science*, 40, 2013, pp. 130–9.
28. B.Latour and V.A.Lépinay, *The Science of Passionate Interests: An Introduction to Gabriel Tarde's Economic Anthropology* (Chicago: Pricky Paradigm Press, 2009), p. 29.
29. The project seeks to use Twitter and social bibliography notes, on services like Mendeley or CiteULike, to record the equivalent of corridor conversations to reveal the travel and influence of work. See <http://altmetrics.org/manifesto/>
30. R.Burrows, 'Living with the h-Index? Metric Assemblages in the Contemporary Academy', *The Sociological Review*, 60, 2012, pp. 355–72.
31. In J.Armitage, 'From Discourse Networks to Cultural Mathematics', p. 18.
32. T.J.Barnes, 'Big Data, Little History', *Dialogues in Human Geography*, 3, 2013, pp. 297–302; T.J.Barnes and M.W.Wilson, 'Big Data, Social Physics, and Spatial Analysis: The Early Years', *Big Data & Society*, 1, 2014, pp. 1–14.
33. I.M.Keighren and C.W.J.Withers, 'Questions of Inscription and Epistemology in British Travelers' Accounts of Early Nineteenth-Century South America', *Annals of the Association of American Geographers*, 101, 2011, p. 1332.
34. N.K.Hayles, *Writing Machines* (Boston: MIT Press, 2002), p. 19.
35. N.Gane, 'Radical Post-Humanism: Friedrich Kittler and the Primacy of Technology', *Theory, Culture & Society*, 22, 2005, p. 31.
36. Mays, 'Literary Digital Humanities'.
37. R.Chartier, 'Languages, Books, and Reading from the Printed Word to the Digital Text', *Critical Inquiry*, 31, 2004, p. 142.
38. Hayles, *How We Think*.
39. J.Drucker, 'Diagrammatic Writing', *New Formations*, 78, 2013, p. 88.
40. Hayles, *Writing Machines*.
41. L.Manovich, 'What Is visualization?', *paj: The Journal of the Initiative for Digital Humanities, Media, and Culture*, 2, 2010, n.p.
42. Hayles, *Writing Machines*, p. 104.
43. D.DeLyser and D.Sui, 'Crossing the Qualitative-Quantitative Divide II: Inventive Approaches to Big Data, Mobile Methods, and Rhythmanalysis', *Progress in Human Geography*, 37, 2013, pp. 296–7.
44. A.Acerbi, V.Lampos, P.Garnett and R.A.Bentley, The Expression of Emotions in 20th Century Books', *PLoS ONE*, 8, 2013, e59030; R.A.Bentley, P.Garnett, M.J.O'Brien and W.A.Brock, 'Word Diffusion and Climate Science', *PLoS ONE*, 7, 2012, e47966.
45. DeLyser and Sui, 'Crossing Divides II', p. 295.
46. Mays, 'Literary Digital Humanities', pp. 118–9.
47. F.Moretti, *Atlas of the European Novel 1800-1900* (London: Verso, 1998), p. 68.
48. B.Piatti, H.R.Bär, A.-K.Reuschel, L.Hurni and W.Cartwright, 'Mapping Literature: Towards a Geography of Fiction', in W.Cartwright, G.Gartner and A.Lehn (eds), *Cartography and Art* (Berlin and Heidelberg: Springer, 2009), p. 177, emphasis added.
49. <http://literarygeographies.wordpress.com/>
50. D.Cooper and I.N.Gregory, 'Mapping the English Lake District: A Literary GIS', *Transactions of the Institute of British Geographers*, 36, 2011, pp. 89–108.
51. M.Crang, 'Placing Stories, Performing Places: Spatiality in Joyce and Austen', *Anglia: Zeitschrift für englische Philologie*, 126, 2008, p. 321.
52. C.Travis, 'Transcending the Cube: Translating GIScience Time and Space Perspectives in a Humanities GIS', *International Journal of Geographical Information Science*, 28, 2013, pp. 1–16.
53. F.Kittler, 'The History of Communication Media', *CTheory*, 1996, <http://www.ctheory.net/articles.aspx?id=45>.

54. F.Kittler, ‘Number and Numeral’, *Theory, Culture & Society*, 23, 2006, p. 55; Mays, ‘Literary Digital Humanities’, p. 121.
55. T.J.Barnes and M.W.Wilson, *A Brief History*. T.J.Barnes and M.W.Wilson, ‘Big Data, Social Physics, and Spatial Analysis: The Early Years’, Big Data & Society, 1, 2014, pp. 1–14.
56. J.Drucker, *Writing*, p. 432. J.Drucker, ‘Diagrammatic Writing’, New Formations, 78, 2013,

Author biography

Mike Crang (Durham University) edited the anthology *Virtual Geographies* more than 15 years ago (when it seemed they might be), and he has since done projects and published on digital divides, digital cultures, and urban spaces and on the mediation of tourism landscapes. Other work has addressed literary geographies and the values of preservation or disposal.