

Revisiting critical GIS

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Introduction

From late afternoon, 17 October 2014, until early on the 20th, 30 researchers met at the University of Washington's Friday Harbor Laboratories to revisit the spirit of 'critical GIS' in approaching questions both emerging and enduring around the intersection of the spatial and the digital. While the 1993 gathering at Friday Harbor, like much early work in critical

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GIS, can be read as ‘peace talks’ brokered between warring factions, with wary GIScientists and cautious Human Geographers on opposite sides of the table (Schuurman, 2000), more than a decade into the 21st-century, our meeting drew an open field of scholar-practitioners bursting with questions, varied experiences, and profound concerns.

Even as the meeting ‘revisited’ critical GIS, it offered neither recapitulation nor reification of a fixed field, but repetition with difference. Neither at the meeting nor here do we aspire to write histories of critical GIS, which have been taken up elsewhere.¹ In the strictest sense, one might define GIS as a set of tools and technologies through which spatial data are encoded, analyzed, and communicated. Yet any strict definition of GIS, critical or otherwise, is necessarily delimiting, carving out ontologically privileged status that necessarily silences one set of voices in favor of another. Instead, we suggest that both ‘critical’ and ‘GIS’ evolve in unresolved tension, as geospatial technology and information becomes ever more present in daily life (Dourish and Bell, 2011; Greenfield, 2006; Kitchin and Dodge, 2011), as new fields both claim and extend spatial inquiry and visualization (Drucker, 2009), and as the academy itself grapples with its role in a neoliberalized world (Wyly, 2015). Critical GIS offers trading zones (Barnes and Sheppard, 2010) for discussion of these and other issues, for building alliances and interrogating tensions, and for a constant dialectical process of critique and renewal.

Notwithstanding the contemporary ubiquity of digital maps, “I want to be a GIS researcher when I grow up,” remains a rare aspiration, rarer still when the qualifier ‘critical’ is added. But, what *critical* means, how it might itself be critiqued, and what work it enables depends on the disciplinary background of individual scholars. For some, predominantly from earth science backgrounds, the groundwork for critical GIS is found in practitioners using the geospatial toolkit not only to inventory the natural world in quantitative terms but also to spatially document its qualitative features. For others, mathematical models and economic analyses that engage critical social theory while retaining a focus on the spatial organization of the world define critical GIS (Sheppard and Barnes, 1990). Still others produce critical GIS work through engagements with critical cartography (Crampton 2010), science and technology studies (Harvey and Chrisman, 1998), a politics of reflexivity (Dunn, 2007; Schuurman and Pratt, 2002), and increasingly, the digital humanities (Drucker, 2012).

As such, this commentary is meant as much for those who self-identify as critical GIS practitioners as it is for GIScientists; it is meant for those in the digital humanities, those in physical geography, and more. It is a constant tacking between old and new, between expert and novice, as we seek new allies to ask new questions. As spatial data and its analysis seeps into ever more facets of modern life, we ‘revisit’ critical GIS seeking new connections, new concerns, and new paths forward. In this commentary, we sketch some of those uncovered at our meeting. ‘Critical GIS’ operates as an affiliation, one with a variety of resonances and tensions to be explored, rather than resolved. One tension revolves around how the spatial and digital function in relation to issues of social justice. Another around ‘hybrid’ strategies, such as critical quantification and the digital humanities, and their relationship to critical GIS. Despite some progress, particularly around geospatial data, we find that a political economy of geospatial technologies remains largely undeveloped. We thus revisit critical GIS not as a historical body of scholarship but as a set of living, diverse, dynamic endeavors necessary in the present and invested in transforming the future.

Social justice and GIS

One such unresolved tension running through critical GIS is the contradictory role GIS has played in addressing questions of social justice (Warren, 2004). On the one hand, critics have

questioned the complicity of geospatial technologies, and mapping more generally, in supporting the interests of corporate and governmental power, not to mention the military applications of GIS and its role as part of the broader apparatus of geosurveillance (Crampton, 2008; Pickles, 1995, 2004; Smith, 1992). On the other, a growing body of literature draws on GIS techniques to document systematic patterns of spatial inequity, such as the disproportionate risks that socially marginalized groups face in exposure to air pollution and toxic waste (Buzzelli et al., 2003; Higgs and Langford 2009; Margai, 2001; Raddatz and Mennis 2013). In some cases, GIS use has been instrumental in legal decisions resulting in millions of dollars in damages being paid to affected residents (e.g. *Kennedy v. City of Zanesville*; see Monger, 2010; Parnell, 2008). The strategy of using GIS mapping and spatial analysis as part of a legal defense shows some promise in challenging social and environmental injustices via law and due process. However, critical GIS must also ask whether social and environmental justice is reducible to 'justice' as conceived by juridical systems alone, particularly in the context of settler societies where the colonial state has been one of the primary agents of oppression and the dispossession of indigenous lands.

How GIS has been used to reinforce or challenge social injustices demands serious theoretical and empirical consideration, often as *questions needing to be posed*, not as foregone conclusions. Such questions might include: How should we conceptualize the notion of 'justice,' in procedural, distributional, or other terms? Are we drawing on 'passive' or 'active' conceptions of equality (May, 2008), as we theorize the role of GIS in exposing and challenging social and environmental injustices? Has the analysis of some spatial inequities been privileged over others? To what extent does the availability of particular types of data influence which injustices are addressed? How can marginalized populations be digitally empowered in the contemporary geoweb era? What tools and theories are most relevant to our work and with what political commitments do they come?

Additionally, what mechanisms of inclusion and exclusion are at work in geospatial communities? Critical GIS must not only pose these questions of others but also continue to be reflexive in proactively questioning its own inclusivity, especially given the centrality of feminist interventions in constituting critical GIS (Cope and Elwood, 2009; Kwan, 2002; Leszczynski and Elwood, 2014; Schuurman, 2000). One approach involves continually asking, "Who is missing? How would their presence alter not only our internal conversations but also the social roles of critical GIS?" By posing such questions, we seek to broaden the scope of what a 'social justice and GIS' research agenda might entail by reconsidering how critical engagements with political theories of justice and equality can enrich our critiques of GIS as a political technology as well as how GIS itself can more productively be employed as a means of intervening *within* struggles for social justice.

Two hybrid strategies, among others:

Critical quantifications and digital humanities

As an affinity always becoming and engaging others, critical GIS is necessarily hybrid. In this section, we briefly explore critical quantification and the digital humanities as two hybrid approaches—one historically more associated with critical GIS practitioners and one just entering into conversation with them—and suggest they offer productive paths cognizant of critiques of mainstream computation and positivist quantification. In these mindful transgressions of what are often seen as epistemological and ontological barriers between the qualitative and the quantitative, or between the social-theoretic and the mathematical, we suggest there are lessons that critical GIS is well positioned to articulate, that offer insight into how and when critical hybridities may emerge and become productive.

‘Critical quantification’ suggests a variety of stances and practices. Given that scholars generally aspire to think critically, it can seem unproductive to distinguish a specifically ‘critical’ quantification of objects and phenomena. Nevertheless, it is important to recognize the particular intellectual charge of efforts to re-appropriate and refashion mathematical, statistical, and computational practices using theoretical insights stemming from a serious engagement with the methodological, ontological, and political commitments of social and cultural theory. Geographers have pursued a variety of ‘mixed’ method approaches including interweaving of narrative and simulation practices (Bergmann et al., 2009; Millington et al., 2012). As the explosion in the construction and commodification of spatial data continues, with upwards of 60% of all data now containing a spatial component (Hahmann and Burghardt 2013), scholars have begun to highlight moments of resistance and explore alternatives to capitalist quantification (Thatcher, forthcoming; Wilson, 2015; further elaborated upon below). Qualitative methods are being increasingly integrated into GIS practice (Cope and Elwood, 2009; Knigge and Cope, 2009), supporting arguments that the qualitative-quantitative ‘divide’ was a contingent construct, especially in the social sciences (Wyly, 2009). Such engagements suggest the value of an engaged pluralism among GIS and non-GIS approaches (Barnes and Sheppard, 2010).

Critical quantification has been closely associated with critical GIS, whether interacting within the same project or co-existing within the oeuvres of scholars (Bergmann, 2013; O’Sullivan, 2006; Schwanen and Kwan 2009; Sheppard, 2001, 2005). Such a description of the relationship between the digital humanities and critical GIS might be premature, although there is considerable potential for synergies (Bodenhamer et al., 2010). While examples retrospectively understood as digital humanities stretch back decades or even centuries, to the work of those such as Roberto Busa and Ada Lovelace, it is only in recent years that digital scholarship has become widespread in the humanities and recognized more broadly. Whereas the digital humanities are even more open-ended in their remit than critical GIS and also involve many researchers who see less relevance in the theoretical humanities for their work than most critical GIS scholars find in social-theoretic and critical geography, considerable intersections and opportunities for cross-fertilization exist.

Of particular interest to critical GIS, the digital humanities have grappled directly with the contradictions between interpretative approaches to scholarship that characterize many humanistic ways of knowing, and analytical computing paradigms largely designed by engineers to serve the interests of capital accumulation and state power. Projects in ‘speculative computing’ have attempted to rework visualization, data, interfaces, and analysis for the theoretical commitments of humanistic scholarship (Burdick et al., 2012; Drucker, 2009, 2012). In this, they have much in common with efforts in critical GIS to theoretically reconstruct geospatial practices (from software to concepts to applications) to be in greater sympathy with the commitments of social-theoretic and critical geography (Cope and Elwood, 2009; Curry, 1998; Kwan, 2002; Sheppard, 2005; Sieber, 2004). Bringing critical GIS and the digital humanities into conversation around the efforts of both in ‘speculative computing’ holds great promise—not only for critical GIS but also for the digital humanities, where critical geographical perspectives on absolute and relative spaces as well as on cartography have much to offer.

The political economy of GIS

A decade ago, O’Sullivan (2006) noted the incomplete and partial nature of studies charting the political economy of spatial technologies. While recent work has explored the political

economy of new spatial and mapping technologies, situating them within a larger framework of neoliberalism (Leszczynski, 2012) or as ‘fixes’ for capital as loci for speculative investment (Wilson, 2012), a comprehensive political economy of spatial technologies remains distant. We see several avenues for furthering such research along lines we designate as questions of scope, historical pathways, and expanding reach.

The title of this section points to a political economy of GIS, but the previous paragraph refers to “new spatial and mapping technologies.” This slippage is not a mistake, but rather the crux of an ongoing debate: What exactly is the scope for critical GIS? Should we, as scholars, dedicate our inquiry towards a political economy of GIS, of spatial technologies more broadly, or of an entirely different set of questions? What can an interrogation of GIS tell us about broader political economies? Accompanying each of these terms is a particular commingling of state, economy, society, and specific pathways of technological development. The answers to such questions feed into any political economy of GIS and into how the development of a diverse set of spatial technologies is shaping economic and societal futures at multiple scales.

Against mythic accounts of the *sui generis* technical solutions offered by new spatial technologies, a means of justifying their value in and of itself (Leszczynski, 2014), critical GIS must situate these new technologies in the older traditions from which they emerged. This involves parsing the long histories behind where, when, and how specific geospatial technologies were produced. We must chart the paths that have shaped and continue to shape this technological form and its role in the world, paying attention to where, how, and when actors such as the state, and in particular, the military-industrial complex, have influenced their development. We must continue the work begun by scholars like Clarke and Cloud (2000) that foregrounds the relationship between GIS and the military, but we must also push further. We must recognize the recursive relations between ideology and technology, discussing how any technological orientation both results from and shapes subsequent epistemological and ontological orientations to the world. Work by Barnes and Wilson (2014) and Dalton and Thatcher (2015) attends to this historical excavation, tying the present myth of ‘big data’ to earlier movements in social physics and geodemographics, respectively; however, these concerns extend well beyond ‘big data.’ A critical spatial history of GIS must also pay heed to other processes of governmentality that have implicated spatial rationalities and political technologies in the reconfiguration of geographical spaces (Rose-Redwood, 2012).

A political economy of GIS should be cognizant of the slippage between traditional GIS and spatial information more broadly. Leaving behind the desktops of state workers, academic researchers, and private sector analysts, the tools of GIS—of spatial information, visualization, and analysis—have become prime sites of speculative investment (Wilson, 2012) and a core means by which individuals navigate and understand the world around them (Sui, 2008; Elwood, et al., 2012; Leszczynski and Wilson 2013; Thatcher, 2013). Just as the move from mainframe to desktops in GIS raised concerns over a “hidden technocracy” (Obermeyer, 1995), similar concerns must be raised concerning the advent of ‘big’ spatial information and analysis. A political economy of GIS should be forward looking, examining not only the historical paths that led to the present moment (see, e.g. McHaffie, 2002) but also those paths opened and foreclosed toward possible futures (Sheppard, 1995). Critical GIS must remain attentive to the specific functions of traditional GIS within society, but engaged scholars must also not lose sight of the widening import of ‘big’ spatial information. From the vantage point of 2016, this includes growing economies of surveillance, consumer location-based services, data speculation, and other economies of control (Dalton and Thatcher, 2014).

Repetition with difference: Future directions, present entanglements

In this commentary, we have attempted to outline a critical GIS of unresolved tensions and of hopeful affiliations. Stemming from conversations and dialogues that took place at the 'Revisiting Critical GIS' meeting, these suggestions can only reflect diversity of a particular kind, those already interested in identifying with critical GIS. Whereas the original Friday Harbor meeting in 1993 has been portrayed as an important moment of *detente* in a previously uncomfortable relationship between 'GISers' and more skeptical human geographers (Schuurman, 2000), it would be impossible to put such a spin on the 2014 meeting. With few exceptions, *both* mainstream GIS (or should that be GIScience?) *and* important strands in contemporary human geography were notable by their *absence* from this meeting. This is a concern.

First, it suggests that GIScience might now be beyond the reach of skeptical questioning, even as, only a few years ago (10 years on from Pickles's [1995] *Ground Truth*), Mike Goodchild suggested that "GIScience would never again be quite the comfortable retreat for the technically minded that it had been in the past" (2006: 687). If that claim was true then, it seems less so now, as monolithic desktop GIS mutates into a much more varied array of spatial technologies well beyond geography's purview, and as what was once 'academic GIS' has become 'GIScience.' Second, it highlights what appears to be a neglect by critical human geographers more widely to seriously interrogate geospatial technologies and their implications following up on significant works from the 1990s (although, see Rose-Redwood, 2006, 2012; Sheppard, 2005; Wilson, 2011, 2015).

'Critical GIS,' in the form of intricately interwoven affinities advocated above, can help us constructively engage *not only* mainstream GIScience and the ever-proliferating intersections of computation with space and place *but also* critical human geography. Despite the scale of that challenge, our mood is one of optimism. We regard critical GIS as less of a field and fixed basis for identity and more as a multitude of intellectual banners, lacking fixed essence, raised through calls that repeat with difference, ever rediscovered and reclaimed. As intersections of the geographical, the technological, and the digital proliferate and raise new questions, we will offer many responses. We are continually revisiting critical GIS. Join us.

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1. See O'Sullivan (2006); Poiker (1995); Schuurman (2000); Sheppard (2005); and Wilson (2009) for overviews. Other points of entry into critical GIS and critical cartography, *inter alia*, may also be found: Cope and Elwood (2009); Crampton and Krygier (2005); Curry (1998); Goodchild (2006); Harvey and Chrisman (1998); Harvey et al. (2005); Kwan (2002); Pickles (1995, 2004); and Rose-Redwood (2015).

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