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LETTERS TO THE EDITORS

Don't forget about geography

Dear Editors,

Geography has lost her way. When I tell people that I'm a geographer, they ask me what the capitol of Kansas is. After I explain that I'm an expert in GIS, they mention a distant cousin who also spends an inordinate amount of time in front of a computer screen. Maps are a fundamental form of human communication, and for millennia geographers have created maps that measure and describe features and phenomena on the Earth's surface. Yet since the 'quantitative revolution' of the 1960s, the ancient scientific discipline of geography has become increasingly devalued within the academe [4] and misunderstood by the general public [9].

Perhaps the editors, authors, and readership of the *Journal of Spatial Information Science* have little use for 'geography'. 'Spatial Data Science' has clearly become the *nom du jour* for research that previously fell under the purview of 'Geographic Information Science' or 'Spatial Analysis'. A review of the academic affiliations and job titles of the esteemed authors from the JOSIS 10th anniversary edition contributes further to this semantic smorgasbord, with 'geographical science', 'geospatial science', 'geoinformation', and 'geoinformatics' all making an appearance. While a previous letter to the editors of this journal has argued for adding a new dish to this all-you-can-geo-buffet [10], I shall argue just the opposite. To all of my colleagues who are focused on measuring and describing features and phenomena on the Earth's surface: let us put 'geography' back on the map.

Geography has devolved from once being considered the "mother of the sciences" [2] to become an afterthought in the dusty halls of the academe. Unfortunately this is largely a result of self-sabotage. The constant rebranding and renaming of geography has resulted in fragmentation of the discipline. Raubal [13] argues that interdisciplinary appeal is the central value proposition for 'Spatial Data Science'. While collaborating with astronomers and the neurosciences [15] is a worthy pursuit, defining a new discipline that draws heavily from geography risks exacerbating our current state of (geo)spatial scattering. There is an inherent breadth in geography. Geographers have been valued for our ability to address complex problems and create maps that cross scientific boundaries since antiquity. We can reclaim a position of centrality within the academe and the minds of public by explicitly stating exactly what geographers do: we measure and describe features and phenomena on the Earth's surface. Furthermore, we must be unequivocal that the central value proposition for geography is the fundamental form of human communication that geographers can truly claim as their own: the map. Below, I

present a series of theses to support my argument for the map as the unifying force in the fragmented universe of geography.

Thesis I: The separation of quantitative geography from qualitative geography is artificial.

Numerical measurements are meaningless without context, just as descriptive prose can be easily quantified using modern analysis techniques such as natural language processing. Most geographers learn very early that cartography is both an art and a science. Creating maps is what unifies the discipline, giving geographers who describe economic inequality and those who measure electromagnetic radiation a common language to communicate with.

Thesis II: There is a false dichotomy between human geography and physical geography.

Human activities have always impacted physical features on the surface of the Earth, just as natural phenomena have always shaped human behavior. In the Anthropocene it's more important than ever for geographers to recognize our unique ability to measure, describe, and predict the complex interrelationships between humans and nature using maps.

Thesis III: The 'quantitative revolution' in 1960s geography was not revolutionary.

It is broadly accepted within the academic geography community that a 'quantitative revolution' occurred in the 1960s. During this time, computers and satellite-based remote sensing enabled geographers to measure and describe features and phenomena at unprecedented spatial, spectral, and temporal resolution. While this era can certainly be characterized by rapid advances in scientific knowledge and analytical capabilities, the end product of most geographic research remained identical to the millennia that precede it: a map.

Thesis IV: The center of geography is the map.

GPS technology has enabled the greatest achievement in geography since the advent of the Mercator projection: a global map that knows exactly where its users are anywhere on the surface of the earth. When considered within the rich history of map design, Google Maps can be easily dismissed as a sterile, unaesthetic cartographic product designed primarily to generate advertising revenue. Yet in perhaps the greatest testament to the centrality of geography and maps, there are more than one billion monthly active users of Google Maps [7], making it one of the most widely used smartphone applications in the world.

To prevent yet another map-less treatise lamenting the state of geography from being published [12, 3, 14, 11] I present the map below (Figure 1). This map shows how the many sub-disciplines of geography have grown from cartography, and if they are generally focused on the measurement/physical geography tradition or the description/human geography tradition. While this list of sub-disciplines is not comprehensive and the categories are fluid and overlapping, the important unifying factor is that these sub-disciplines are all focused measuring and describing features and phenomena on the Earth's surface. Fields

that evolved from geography but are not limited to the Earth's surface such as physics and psychology are also listed, but are not located on the map.

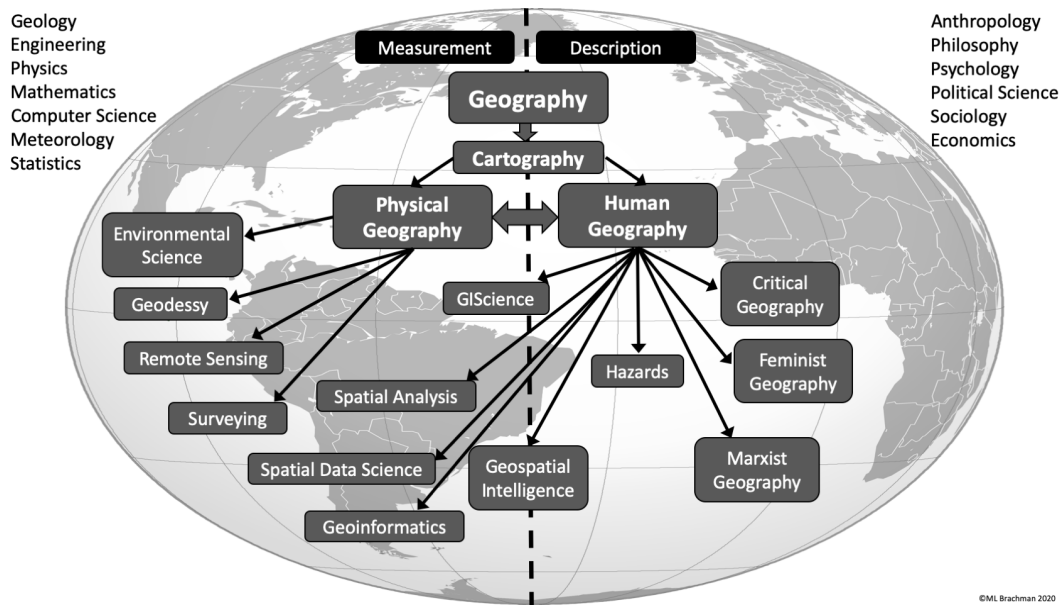


Figure 1: A map showing the relationships between geography, cartography, and some of the numerous sub-disciplines of geography.

Cross-disciplinary journals such as *JOSIS* provide an important outlet for research that is focused on the *spatial* but not necessarily on the *geo-*. Computer scientists have made valuable contributions to this journal and many others across the scientific community, while increasing the recognition and prestige of their discipline. Just as computer scientists are the acknowledged experts in all aspects of computer systems and computational processes, geographers must reassert our position as the experts in all aspects of cartography and maps. While there is certainly a cross-disciplinary flavor for terms like 'Spatial Data Science' (not to be confused with 'Spatial Information Science'), other terms like 'Geographic Data Science' [1] primarily conflate geography and computer science. While the technologies of the information age have clearly transformed geography, they don't warrant a complete rebranding of the discipline. Did 'Physics' become 'Computational Cosmology' when physicists started using computers?

The continuing power and importance of maps as a trusted form of communication has become even more salient during the COVID-19 pandemic [8]. Geographers have the knowledge and skills to create trustworthy maps that communicate effectively, as well a robust understanding of the inherent uncertainty associated with geographic data [6]. It becomes increasingly difficult to explain the value proposition of geography and geographers when our job titles and academic affiliations are spread across an ever-expanding set of amalgamations of *geo-* and *spatial*. Many of my undergraduate students have heard of Geographic Information Systems (GIS) and are interested in learning more about using a computer to create maps. But when tell them that GIS also stands for

“Geographical Information Science” [5] and attempt to explain how ‘GIScience’ is different than geography, they quickly become confused. Words matter. The discipline of geography has evolved, but the name should not.

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