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## **Position Paper for Workshop on Cyberinfrastructure for Geographic Information Science**

My interest in this workshop stems from a confluence of research interests and a growing concern over certain directions [not] pursued in current cyberinfrastructure efforts within geographic information science.

Most of my own research has been positioned at the intersection of geography, cartography, and information science. This has involved geographic metaphors (e.g., landscapes, regions, scale), traditional cartographic design, GIS technology, and frequently combinations of methods stemming from information science. Examples have included  $n$ -dimensional text modeling to produce map-like visualizations of document spaces. In the pursuit of this research, the development of multidisciplinary linkages has been essential, particularly with computer science and information science, and has led to publications in such outlets as the *Proceedings of the National Academy of Sciences*.

For almost four years I have been serving on the advisory board of an interdisciplinary exhibition project called *Places & Spaces: Mapping Science* (<http://scimaps.org/>). It features ongoing efforts to visualize scientific knowledge. With a new iteration developed every year, *Places & Spaces* has already been shown at dozens of venues on three continents (e.g., NSF, NIH, American Museum of Science and Energy, New York Hall of Science).

Other CI-related projects have included an extension of geographic space-time paths to  $n$ -dimensional attribute space and experiments involving high-resolution artificial neural networks consisting of several hundred thousand neurons.

One characteristic of my work in particular need of cyberinfrastructure solutions concerns the inherent tension between the real-time mining of very high-dimensional data and interactive visual exploration. Another ongoing challenge – and an area of much promise – is the combination of conceptualizations and algorithmic and interface solutions stemming from very different disciplinary traditions (e.g., geography, linguistics, and information science). In this interdisciplinary context, the transparent sharing of expertise and resources becomes more important than ever, including reusable software code, best practices, and so forth. Cyberinfrastructure has a key role to play in this.

However, in order to fulfill that promise we must be cautious about unduly limiting the intellectual venture that CI for GIScience is embarking on. Take for example the – in my view – utterly unfortunate label “geospatial.” Let me be clear about this: my objections are not about staking disciplinary claims. Instead, I have grown increasingly concerned that avoiding the term “geographic” has led to an impoverished vision of the intellectual scope of the CI venture. One of the results has been a worrisome ignorance with respect to decades-old conceptualizations and analytical approaches. In any interdisciplinary venture, every participating discipline (whether it be computer science, geography, or psychology) has a responsibility to contribute to its full intellectual potential. The alternative is wasteful duplication and reinvention, as currently observed in many efforts under the heading of “geospatial.” Other, related areas of concern include the narrow focus on georeferenced data (instead of the broader, more general and integrative view of *spaces*, to which geographic conceptualizations and epistemologies may apply) to the dominant approach of domain-specific, object-based ontologies (which ignores domain-independent, field-based conceptualizations).