**Prospects for space-time GIS**

Why might a single, overarching STGIS framework be unlikely to emerge in the near future, and why is this framed as a bad thing? For me, it seems like a given that an interdisciplinary field like geography would require interdisciplinary methods.

The author argues that geography's key role is in exploring "a science of integration" through computational systems and formal frameworks. How might the development of AI help integrate knowledge across disciplines? What are the risks?

Goodchild states that “It has nevertheless proven very difficult to move beyond the metaphor of the map as the conceptual framework for GIS… One casualty of the persistent map metaphor has been time, as maps have always favored the relatively static features of the Earth’s surface, in the interests of ensuring the longest possible validity”. Do you agree with his assessment that maps are unable to show change over time, or time-dependent aspects of the world?

Goodchild concludes that it is unlikely that the various methods of collecting spatial-temporal will ever be coalesced into a single software environment, which he refers to as STGIS (space-time GIS). However, considering that many of the seven forms of space-time data he discusses can already be integrated into GIS software, is it really necessary to create a different software for integrating these data, or would time and effort be better spent perfecting the integration of spatial-temporal data into already-existing GIS platforms?

What would a single "Single STGIS... that can "capture, store, analyze, visualize, model and archive space-time data" look like as opposed to having distinct forms of STGIS?

As ESRI and other GIS software companies have so far been unsuccessful in equipping their softwares with comprehensive STGIS capabilities, will new GIS software companies focused solely on STGIS develop to fill this void or will STGIS remain an "isolated and specialized extension of existing GIS"?

Do you agree with the author that a single, unified STGIS is not the most likely outcome for the future due to the diversity of space-time data?

This paper was published in 2013, what has changed in regards to these topics in the last 10 years?

Goodchild mentions how research, especially in university settings, is often performed in “stovepipes,” meaning there is a lack of collaboration between different disciplines, resulting in a more narrow point of view. Do you agree with his assertion that integration, especially between academic fields, necessitates the use of a broader spatial perspective, and how would GIS achieve this spatial perspective?

One point made by Goodchild in his argument is that GIS is “presented as a computerized container of maps,” which has a tendency to lean towards maps with more static features rather than comprehensive maps with elements of time. Have you experienced this map metaphor when discussing GIS with people who are not in the field, and which of the “Functions of a Space-Time GIS” do you think would be the most informative in emphasizing the possibilities of temporally focused GIS?

While it is tempting to wish for a unified Space-Time GIS, it may not be a realistic goal. As the paper points out, there are many different models for analyzing temporal aspects of geographic information - none of which would seem to be invalid. Perhaps it is just that some models of temporal analysis are better suited to dealing with certain questions than others are. Do we need an integrated STGIS, or simply a GIS which is better suited to a variety of approaches to temporal analytic questions? Or, for that matter, is there a difference between those two things?

While this paper mostly considers the question of STGIS in the context of professional researchers, the process of reading the two papers in combination makes me think about the ways in which many methods of displaying temporal/geographic information are not so effective in communicating with the general public. For example, are three dimensional style diagrams (where the z-axis represents time and x & y represent space) really all that useful to members of the general public, who may not have the time or interest in the subject to spend a moment reading the explanatory notes in order to try to understand what the diagram is meant to show? I think they often do not.

And, as a bit of an aside, I will note that it was interesting to look at the various maps that were submitted for the GIS Day Map Competition last fall (though most of them did not have a temporal component). Many of the maps submitted were difficult to interpret at a glance. Quite a few of them were poorly labeled (e.g. let's not assume that everyone knows a priori what a 'CAFO' is). Many others lacked a meaningful title (which would clue us in to what the cartographer was attempting to communicate or investigate). And still others lacked any readily comprehensible legend (e.g. red = 1 to 10, but 1 to 10 what?) While these oversights are forgivable for students of geography, their shortcomings are relevant here in that, for example, many of the same problems exist with the very clever mapping technique used in some of the illustrations in the article on Space Time Visual Analytics. The map of shipping activities in the Baltic region is very cool, but it demands a good bit of our attention in order to really understand what it is showing us. No problem for communicating with academics who are interested in the subject, but of little use to the general public.

Do you feel that being tracked without your consent is a worthwhile trade-off for having fast, reliable, free GPS services at all times?

In what ways is the comparison of GIS software, such as ArcGIS, to word processing software suites, such as Microsoft Word, valid? In what ways is it invalid?

Is the use of GIS and satellites for tracking human movement ethical? Where is the line between using data for scientific discovery and invading personal privacy?

Where do you see the future of GIScience moving? What other fields might GIS be a useful skill to incorporate for data analysis?

1. Michael Goodchild discusses moving beyond the map metaphor in GIS. How might this impact the representation of dynamic, time-dependent aspects of geographic events, and what implications does it have for GIS as a tool for integrated science?

Goodchild’s challenge brings attention to the representations of dynamic, time-dependent aspects of geographic events when relying on the map metaphor. This reliance may limit GIS when trying to capture the temporal dimension of geographic events. Maps show static snapshots of spatial information and extending this to dynamic events would show the inability to represent temporal dynamics that would limit  comprehensive analysis and decision-making processes.

The author suggests creating Space–Time GIS (STGIS) for space–time data. What potential benefits and drawbacks exist, and how could it influence the advancement of spatial science?

Potential benefits of STGIS would be that STGIS offers a standardized framework for integrating space–time information, promoting consistency, and enhancing collaboration. The drawbacks of STGIS could include technical complexities, potential information loss or distortion during integration, and the need for continuous updates to accommodate evolving data formats and sources.

what would it look like if one of these approaches treated tracking data within a larger, comprehensive framework that includes other forms of space-time data? What questions would it answer that current GIS could not?  
  
Where do maps such as interactive maps fall in this scheme? do they count as space-time GIS?

The article mentions that iPhone tracks are being captured by Apple. The emergence of a single STGIS may increase the use of tracking as a way to collect information. How may this cause issues regarding privacy concerns when collecting human data?

The article claims that a unified STGIS platform would facilitate interdisciplinary collaboration. What are some collaborations that would benefit from this platform?

In the case that a unified STGIS platform is created, what barriers might get in the way of implementing this platform on a large scale and among different disciplines?

The author of *Prospects for a Space-Time GIS* does not believe that we will achieve “a generic STGIS that unifies the functions needed to capture, store, analyze, visualize, model and archive space-time data.” Do you agree with the author; why? If not, what form(s) of current space-time data do you think has the best potential to progress to a generic STGIS; why?

In your opinion, what version(s) of space-time data is best for visualizing the integration of humanities and natural sciences, without sacrificing temporal aspects of the data? (For example, what version is best for visualizing the economic impacts of hurricanes in North Carolina throughout time?)

In section 3.2.2 of Prospects for a Space-Time GIS, I found the part about patterns and relationships discerned on one scale may not be detected on another scale. What are some cases where scale is crucial to data analysis in GIS? Why is scale so important when observing change over time?

Section 4.3 of Prospects for a Space-Time GIS talks about dealing with large data sets. How do you gauge when a data set is too large to be modelled effectively? When is aggregation appropriate or inappropriate? Do you think that data aggregation can lead to misconceptions about the data?

"A geographer in this context is too easily dismissed as Jack or Jill of both worlds but a master or mistress of neither" Can you think of real-world professions that would benefit from spatially-based analysis?

How might the application of cellular automata in geography, particularly in modeling land-use transitions during urban growth, help us understand change over time?

This article was written in 2013 - how do you think the landscape of GIS and the prospects of GIS and what we are capable of simulating has changed in the 11 years since this article was published? How do you think this will change in the near future?

Consider the 7 issues put forth by Goodchild. Are they still relevant problems today?

"It could address some of the long-standing critiques of GIS…that [it] is more concerned with geographic fact than with geographic knowledge."

* What elements might a GIS concerned with geographic knowledge as opposed to fact incorporate?

“Geography is a most Newtonian discipline, rigidly framed in space and time…Everything of relevance to geography occurs somewhere, at some time, within this rigid frame.”

* I think it is important & interesting to think about this point of the rigidity of the ‘space’ and ‘time’ geographers work with (and the general argument across both pieces for a greater incorporation of temporal considerations) alongside an awareness of there also existing a multitude of ways to conceive of space beyond just the visual world. I think more of this recognition of plurality is occurring with regards to temporality in ways that perhaps don't do justice to the spatial aspect as well.

The reading calls GIS a science of integration because of its concern with multiple disciplines. I’m wondering what other people in the class are interested in, whether that be ecology or political science, and how they plan to integrate that into geography

Considering the claim that a space–time GIS is unlikely in the near future, what specific technological, methodological, or collaborative advancements or breakthroughs are required to tackle the obstacles in integrating environmental and social processes into a unified computational system? How can these advancements be best facilitated? What potential societal benefits and solutions to critical issues could arise from the implementation of a space-time GIS?

Considering the heightened use of tracking technologies like GPS and surveillance cameras in GIS to analyze detailed behavior patterns, what are the ethical and legal considerations surrounding the utilization of such data? How can these concerns be effectively addressed to guarantee responsible and equitable use of this technology, especially in the context of privacy issues and the potential for misuse?

This article is great, but seems focused solely on the wealthy Western context. How might visual analytical tools be made accessible in poorer countries with less access to technology? 

Although subjectivity is often attempted to be minimized or eliminated in quantitative research, how might we make subjective data (which is often more participatory and democratic) more of an asset? How can we place a greater value on the experiences of people? Is human experience not fact?

A majority of the passage discusses a collaboration between environmental and social aspects of geography: how could this collaboration possibly vary over different regions/ throughout different cultures?

How could the integration of social and environmental sciences with geography impact the boundaries of how we visualize interdisciplinary boundaries: ie, what types of issues could arise?

-While visualizations for change over Space and Time help us see new patters and predict events, might these tools make decision makers overconfident? In what ways can uncertainty be represented in interactive maps? How do we visually depict assumptions?

-How do the computers, especially computer code, influence the way we must think about and organize time to represent it visually?

Why do we need to keep scale in mind when conducting spatio-temporal analyses?

What are some of the main challenges we come across when integrating time with spatial data?

What does the author mean by geography being an "integrating discipline"?

What are some similarities and differences between the seven types of space-time data and analysis questions, in terms of data models and techniques?

Does it seem feasible for a common form of space-time GIS to be formulated?