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- THE SHORT LIST: THE NEXT BIG THING

The Cutting Edge in Geography, Math, Information Technologies, Criticism ...

Mark S. Monmonier, *professor of geography at Syracuse University and author of Spying With Maps: Surveillance Technologies and the Future of Privacy (University of Chicago Press, 2002):*

Forced to choose just one "big thing" **for geography, I'd nominate the security, public access, and privacy issues surrounding geospatial technologies.** This is an easy choice because geography's current "big thing" is the geographic information system (GIS), defined as the use of electronic technology for capturing, storing, retrieving, analyzing, and displaying geospatial data.

Increasing numbers of geographers are looking beyond information and analysis to issues of impact. The attacks of September 11 didn't just highlight the value of GIS in emergency planning and response; they also raised issues of homeland security and public access when bureaucrats placed restrictions on Web sites offering ready access to massive amounts of geospatial data to anyone -- including terrorists. These restrictions then led to questions about the value of geographic information to business, science, and private citizens, and drew attention to the broader implications of data integration, high-resolution remote sensing, satellite tracking, and location privacy. Equally important are such basic academic issues as the ethics of "public data" and personal tracking, the geography of vulnerability and fear, the emergence of terrorism as a new hazard with geopolitical dimensions, and the extent to which geographic skill and knowledge affect historical development.

John Ewing, *executive director of the American Mathematical Society and editor of Toward Excellence: Leading a Doctoral Mathematics Department in the 21st Century (American Mathematical Society, 1999):*

The next big thing in mathematics? Biology. As biologists discovered the value of mathematics for decoding the genome, mathematicians in turn rediscovered that some of the most interesting parts of their subject have roots in the real world. The mathematics involved in studying the genome and the folding of proteins is deep, elegant, and beautiful -- all words that often were reserved only for pure mathematics in the past century. The sophisticated blending of mathematics and biology already is a spectacular new

area of research that is certain to grow enormously in the next 10 years.

Will pure mathematics wane? Not likely. Mathematics has always had its roots in applications, but the ensuing research quickly outpaced those roots. Pure mathematics was the result. Research in pure mathematics sometimes finds application 25 or 50 years in the future, and philosophers have occasionally been surprised at the "unreasonable effectiveness" of that research. Given its roots, they shouldn't be.

During the coming decades, scientists and mathematicians will come to see the false distinctions between pure and applied mathematics. Already in the past 25 years, applications of mathematics to information science have shown that mathematics recently viewed as pure is in fact applied, and vice versa. More and more, mathematicians will see their subject as underlying all science and social science -- not as a humble servant but as an essential companion.

Saskia Sassen, *professor of sociology at the University of Chicago and editor of Global Networks, Linked Cities (Routledge, 2002):*

The next big thing in two of the subjects I work on -- globalization and the new information technologies -- is the effort to go beyond the framing of research agendas in terms of independent and dependent variables, the typical approach in the social sciences to most subjects. That is to say, **to move beyond a focus on the impacts of globalization or of information technologies on the various domains that have been constructed as objects of study in the social sciences.**

The emerging agenda for research and theorization is to recognize that both globalization and the new technologies can be profoundly transformative and can constitute whole new domains of the social, ones marked by profound and complex imbrications of the new and the old. These domains need in turn to be constructed as objects for research and theorization. This entails at least a partial move toward seeing globalization and technology not only as causing changes in existing domains but also as constituting new types of social domains.

There are several exciting new efforts around these agendas. Let me mention two that I know firsthand. One is the National Academy of Sciences panel on cities that seeks to establish what types of data we will need in the future given the growing concentration of key social processes in cities and the weakened role of the national state in a context of devolution and globalization. The second is a new committee of the Social Science Research Council charged with developing research agendas focused on how the new technologies are reshaping the world of cross-border relations.

Jeffrey J. Williams, *professor of English at the University of Missouri at Columbia and editor of The Institution of Literature (State University of New York, 2002):*

In theory, one change I think is curious or interesting is that we've turned to look toward our job

conditions and to the university. There's been a lot written on the university, but I think there'll be a lot more. Just in the past five years, this has become a major subfield in what could be called theory. Some of it is more theoretical, and some of it is rants -- well, not rants, but part of it is more emotive. It's important that people are starting to pay attention to it.

To put it another way, if theory was such a great, hot field in the '80s -- and theory was certainly a high-powered intellectual pursuit -- why did they let the job market go like this? Why couldn't all of these sophisticated people, some of whom were Marxists, figure it out? But it seems like it passed everyone by, and it wasn't till the '90s that the university job-market troubles became such a pressing issue -- the dominant issue -- in criticism and theory.

We've effectively been de-tenured -- the work force is only 45 percent permanent faculty, when once it was almost 90 percent tenured faculty. **In criticism we have turned to our own workplaces as a subject, from the job market to the university as a whole. It's made us think about departments** and what they're for, and the university and its functions, its role in the public and the welfare state. It's similar in kind to any other institution that used to be better-funded and considered a staple -- like health-care services. They're all being scaled down and privatized.

Meredith Francesca Small, *professor of anthropology at Cornell University and author of Kids: How Biology and Culture Shape the Way We Raise Our Children (Doubleday, 2001):*

The cutting edge of anthropology these days is actually one with a long history: the nature-nurture controversy. Ever since humans gained consciousness, they have been intrigued by their own behavior. Why do we behave as we do? Anthropology, since its inception in the late 1800s, has always wallowed in this question, because it is fundamental to figuring out what humans are and how they operate. Our discipline, unfortunately, is also positioned for some infighting on this question; cultural anthropologists believe that culture is the driving force behind human behavior, while biological anthropologists look for the evolutionary -- that is, biological -- roots to behavior. But lately, the two sides have been presented with a number of tools to reconcile their differences.

Advances in molecular biology, hormone analysis, and various medical technologies are providing anthropologists with sophisticated ways to really look at human behavior. We can now not only watch what people do, we can really understand how they process a behavior -- neurologically and hormonally. Soon, we may even be able to understand the role of genes in behavior.

Some of the best work I know, what I consider the cutting edge, combines old-style ethnography with modern techniques. As the world's most self-absorbed species, we are getting ever closer to understanding why we are so interested in ourselves.

William E. Becker, *professor of economics at Indiana University at Bloomington, adjunct professor of international business at the University of South Australia, and an editor of Teaching Economics to*

Undergraduates: Alternatives to Chalk and Talk (*E. Elgar, 2000*):

Prospective economists are seldom taught, and possibly as a result few economists think seriously about the differences and similarities among objective and subjective probabilities, uncertainty, ambiguity, chance, and risk.

The Ellsberg Paradox makes apparent the distinction between risk, defined in terms of probability, and ambiguous uncertainty. A version of the paradox has a player (gambler or investor) facing two bins, each with 100 balls. The first bin contains 50 red and 50 blue balls, but the distribution of red and blue balls in the second bin is unknown. The objective probability of blindly drawing a red (or blue) from the first bin is 0.5, and in the absence of additional information, the subjective probability of a red (or blue) ball from the second bin is likewise 0.5. Although players should be indifferent to a choice of bin when betting on the draw of a red (or blue) ball, players typically select the first bin, which is inconsistent with the notion of probability used in expected-utility theory -- the backbone of economic and financial theory.

Schooling versus work decisions, whether to consume or save, and portfolio allocations are qualitatively different events than which bet to accept on the outcome of a coin flip or dice roll. The former choices involve ambiguities but not well-defined probability distributions. The latter choices involve standard probability measures of risk. The Ellsberg Paradox is but one example that demonstrates that preferences in these two different types of situations need not be the same.

Economists are formulating models of decision making that attempt to capture the sources of ambiguities without imposing explicit probability distributions on uncertainties. The mathematics of this approach is challenging for graduate students, but even first-year undergraduates can be engaged in the paradoxes of human behavior on which leading economists are now working.

Lisa Gitelman, *director of the media-studies program at Catholic University and author of Scripts, Grooves, and Writing Machines: Representing Technology in the Edison Era (Stanford University Press, 1999)*:

I'd say that the next big thing in media studies *is* media studies. That is, **the thing that's happening in the study of media is the birth and growth of media studies as a humanistic interdisciplinary** within the academy.

There are lots of new graduate programs (MIT and Brown, for example) and new undergraduate programs (Virginia and Oberlin) in the works. Part of this is probably the result of a growing awareness that film or cinema studies may be weirdly insufficient. And part must be an equally timely realization that all humanistic inquiry -- whether in a newer field like cultural studies or in more traditional fields like English or history -- involves media. There is always already a medium, when we frame our questions, collect our sources, identify our texts as texts. Media shape our inquiries, in the same way they so evidently help to shape our sense of what's going on in the world around us.

Michael S. Speirs, *instructor in the department of anatomy at Temple University's School of Medicine:*

While paleoanthropology traces its roots to the integration of Darwinian evolutionary theory and the study of the fossil record in the 1860s, and though the discoveries of australopithecines in Africa and early *Homo* in Eurasia rank among the greatest scientific achievements of the 20th century, the fact is that the study of the hominid fossil record lost some of its luster over the last 15 years. The spotlight in the study of human evolution has clearly shifted from the skeleton to the genome.

Particularly following the 1987 publication of the "mitochondrial Eve" hypothesis, geneticists and molecular biologists moved to the forefront in the debate over the nature of the subsequent emergence of modern *Homo sapiens*. By the late '90s, such enthusiasm greeted the recovery of fragments of ancient DNA from Neanderthal fossils that it began to seem as if the resolution of critical questions of hominid phylogeny no longer required the traditional analyses of fossilized teeth and bones upon which the discipline had been established.

However, **the importance of the fossil record to the study of human evolution has been firmly reasserted with the recent publications of the discovery of surprising new hominid fossils from Chad and Georgia.** Most notably, the late Miocene *Sahelanthropus tchadensis* specimens described in the July 11 issue of *Nature* have astonished paleoanthropologists with their age (estimated at between 6 and 7 million years), their provenience (central West Africa as opposed to the East African rift and its fringes) and their unanticipated morphology.

Despite the eloquence of the genome in studying aspects of human evolution, only petrified bones and teeth can recount the tales of these ancestors and distant cousins.

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