Informatics

How does knowledge emerge from data?
What new tools are available to manipulate and interpret data?

Synonymous with "computer science" in many languages, "informatics" in English refers to the study of the structure of information itself, rather than what the information conveys. The trend toward this kind of meta-analysis has spilled into a variety of fields, giving rise to everything from bioinformatics to legal informatics. Although Microsoft Research's recent report "Toward Science 2020" argues that in the future informatics will be at the heart of hypothesis generation, we are not there yet. Computer analysis of information is still immature; it functions as a tool rather than a driver of science. Most people have seen some of the visualizations informatics have generated, but the field isn't just pictures: It's providing scientists with new ways to collaborate, chart the shape of knowledge, and connect dots in their thinking. The stakes couldn't be higher. As informaticist Katy Börner puts it, "Those who know how to pick the most promising items to read, work on, and work with—those will rise up to be the star scientists."

THE SEED INDEX

Is technology changing the ways scientists communicate for the better?

80%

of scientists said **YES**

PG. 66

PRIMARY SOURCE

BUILDING A MACROSCOPE

Katy Börner, associate professor of Information Science and head of the Information Visualization Laboratory at Indiana University

WHY IS INFORMATICS IMPORTANT FOR SCIENCE AND INNOVATION?

Informatics supports decision-making. In many cases people have to deal with vast amounts of information, streaming toward them in real time. They have to pick the most promising elements, interconnect them, and contribute back to this stream of knowledge and innovation. Informatics research is ultimately the study of interfaces to databases. It helps scientists analyze and communicate raw data. Information science is also integral to how we build the economy which is now more and more knowledge-oriented and innovation-driven.

COULD THE TOOLS OF INFORMATICS AND VISUALIZATION SUPPLANT OLD METHODS OF ANALYSIS?

The new field of data mining or network science is far away from the rigor and maturity of statistics. I don't know how many in my field truly understand the tools they use. Nobody except the inventors for many of these tools—such as Google's search system—knows the exact algorithm used. But how these tools work, how we access all that we collectively know, will impact our thinking and how we use knowledge. It's mysterious, yet we all still use it. As for visualization, some people take the time to understand what it's doing; they can understand vastly new ways of manipulating and depicting information.

WHAT ARE THE MAJOR CHALLENGES FACING YOUR FIELD?

For the mapping of science specifically, I think we need more standards. It would be good to create an infrastructure confederating different databases, with commonly agreed-upon algorithms and tools to be used across the field. Proprietary data and proprietary tools make it very hard to compare different efforts. For the field of network science or data visualization, we should try to create a "macroscope." We need a powerful tool to reveal patterns, trends, and outliers in the streams of data flooding us, a tool to help us gain insight into the data. Because for computer science and informatics in general, there is the human element. In many cases, we build hardware and software and believe people will use it—if we have built it, they will come—but I think in many cases you really have to first do some major social-technical engineering, which is a major challenge. —*Interviewed by TJ Kelleher*