Sprawling and powerful 'community models' shaping future of regional and global science

February 18 2012

Since the dawn of science, scientists have been using models to visualize and explain the workings of the world. But where the earliest ideas might have been conveyed in something as simple as a cave painting, modern-day scientists are wrestling with phenomena as big and complicated as intercontinental air pollution, desertification and global warming.

The scale of such inquiries recently set Howard Grimes to thinking, well, big.

"How do we use global scientific networks to devise solutions to these problems that we face across the globe?" asked Grimes, Washington State University vice president for research.

Grimes and a panel of experts drawn from WSU and elsewhere will tackle the question in a panel this Friday at the annual meeting of the American Association for the Advancement of Science in Vancouver, British Columbia. Their discussion will be in keeping with this year's theme, "Flattening the World: Building a Global Knowledge Society."

The term on most panelists lips will be "community modeling," which can have teams of researchers pooling data and ideas in a far-reaching, ever-changing collaborative process.

"Think: Linux," says Grimes, referring to the open-source computer operating system that can be used, changed and shared across not one but several communities.

Until recently, researchers have tended to work alone or in small groups, gathering data, building models and getting feedback after publishing their work. Community modeling is bigger, more powerful and more interdisciplinary while retaining the peer-review process essential for rigorous science.

"It's an iterative process that is globally based," says Grimes.

"Science needs to be relevant for decision making, and community modeling efforts can get us there through the creative efforts of a large multi-disciplinary group of people," says Jennifer Adam, assistant professor of Civil and Environmental Engineering. Adam has helped develop the BioEarth model, which aims to improve our understanding of how carbon, nitrogen and water interact in global climate change. The model can incorporate models of water, land and air, as well as models from different disciplines.

"Groups developing and applying these models need to span a much larger depth of disciplines than ever before," says Adam, "including psychologists, anthropologists, communication researchers, and not just the traditional social scientists that we typically work with, like economists."

Joining Adam in Friday's discussion will be Claudio Stockle, who will discuss how models can address problems relating to agricultural production and the sustainable use of land and water resources.

Agriculture and natural resource concerns in the Pacific Northwest are increasingly interconnected, he says, as demands for food, water and energy grow while facing pressures from climate change, increasing world population, and the hungry markets of emerging economies.

"We need to understand how the region will fare under projected future

scenarios," he says, "and how to adapt or mitigate potential consequences." Using models to address such issues, he added, "is almost unavoidable."

Provided by Washington State University