

## **How to involve students in BDEI projects**

Steve Abercrombie, Hiroshi Sato, and Gigi Sanchez

Eco-informatics is an application that has the potential to improve ecological and resource management decision making by integrating empirical data and making it accessible to a spectrum of users. Tools, models, and indicators, derived from eco-informatics, synthesize and integrate large complex datasets across academic and professional disciplines, and agency boundaries. The multidisciplinary approach of eco-informatics introduces additional complexity to existing academic paradigms. Encouraging eco-informatics researchers to involve students and use their research as a teaching tool requires trans-disciplinary communication, the development of new methods for collaboration, defining an integrated language, information dissemination and the development of eco-informatics educational materials

Eco-informatics researchers can take direct and indirect approaches to involve students. One direct approach is to engage students from various disciplines in the social sciences, natural sciences, and computer sciences in eco-informatics research teams. This type of involvement would be best suited to graduate and upper-level undergraduate students. Attracting students from different disciplines could be accomplished through presentations in various social and natural science classes. Students in the computer sciences can be presented with the application of computer technologies in ecological and resource management. In addition they should be taught about the social and ethical implications that arise when designing and using tools that house large data repositories and are used for decision-making. Students in the social and political sciences should be introduced to new alternatives for decision-making presented by eco-informatics.

A less direct approach to involving students is disseminating the significance of eco-informatics through media targeted at students. The creation of interactive media that can allow student access to eco-informatics tools, visualizations, models, and data sets, is an ideal approach. Providing a portal housing eco-informatics case studies that highlight actual problem solving promises to be effective. This portal should provide tools that are accessible to students and faculty that do not require a significant investment of time or computational resources to install and manipulate. Such a design can be particularly useful for students and teachers at the K-12 level. One suggestion that arose from the modeling breakout session at the conference was to encourage NSF grant recipients to make their models accessible through a standard web services interface.

Another theme repeated throughout the conference that could involve students is a collaborative open-source environment for eco-informatics tool and model development. A mature environment would offer two opportunities for student involvement: students could participate in aspects of development by participating in

the open-source community and they could use the available tools in the classroom or for independent projects.

In order to engage students, materials appropriate for classroom use must be developed. An important component of this development is a set of definitions of critical eco-informatics terms. It was obvious at this conference that researchers and practitioners hold different definitions for terms such as ontologies, semantics, and nodes, the lack of clarity in terms is compounded by age of the field and its interdisciplinary nature.

A final suggestion for how NSF can encourage student participation in eco-informatics research is by funding or partnering with agencies that support student research or design competitions. A team of 7 Master of Environmental Science students at The Evergreen State College is working on a software design of a decision-making package supported by the EPA's P3 Student Design Competition. This package is intended to assist procurers in evaluating the ecological services provided by extensive "living" or "green" roof systems.