GET21: Geoinformatics Training and Education for the 21st Century Geoscience Workforce

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The integration of advanced information technologies (referred to as cyberinfrastructure) into scientific research and education creates a synergistic situation. On the one hand, science begins to move at the speed of information technology, with science applications having to move rapidly to keep apace with the latest innovations in hardware and software. On the other hand, information technology moves at the pace of science, requiring rapid prototyping and rapid development of software and systems to serve the immediate needs of the application. The 21st century geoscience workforce must be adept at both sides of this equation to be able to make the best use of the available cyber-tools for their science and education endeavors.

To reach different segments of the broad geosciences community, an education program in geoinformatics must be multi-faceted, ranging from areas dealing with modeling, computational science, and high performance computing, to those dealing with data collection, data science, and data-intensive computing. Based on our experience in geoinformatics and data science education, we propose a multi-pronged approach with a number of different components, including summer institutes typically aimed at graduate students, postdocs and researchers; graduate and undergraduate curriculum development in geoinformatics; development of online course materials to facilitate asynchronous learning, especially for geoscience professionals in the field; provision of internship at geoinformatics-related facilities for graduate students, so that they can observe and participate in geoinformatics "in action"; creation of online communities and networks to facilitate planned as well as serendipitous collaborations and for linking users with experts in the different areas of geoscience and geoinformatics.

We will describe some of our experiences and the lessons learned over the years from the Cyberinfrastructure Summer Institute for Geoscientists (CSIG), which is a 1-week institute that has been held each summer (August) at the San Diego Supercomputer Center, University of California, San Diego, since 2005. We will also discuss these opportunities for GET21 and geoinformatics education in the context of the newly launched EarthCube initiative at the US National Science Foundation.