

## **Event Summary: The Next Generation of Earth System Education**

On Earth Day 2013, **Monday, April 22<sup>nd</sup>**, a panel of Geo-science, technology, engineering and mathematics Master Teachers convened at the Wilson Center to discuss several innovative endeavors to engage teachers and students in Earth science studies using state-of-the art technologies and education resources. The event was co-hosted by the Program on America and the Global Economy (PAGE) and the Global Sustainability and Resilience Program. The event was moderated by Kent Hughes, Director of PAGE.

**John Moore**, Director of Geo-science STEM Education at Palmyra Cove Nature Park and Environmental Discovery Center in New Jersey, former Albert Einstein Distinguished Education Fellow, and Executive Director for the American Council of STEM Teachers opened the panel discussion by pointing out two very important and influential opportunities for reform in STEM education: the PCAST Report to the President on plans for improvements in K-12 STEM education released on September 15, 2010 and the recently released Next Generation Science Standards (NGSS) report which outlines the new voluntary, rigorous, and internationally benchmarked standards for K-12 science education. Moore emphasized the importance of, “developing the teachers’ voice,” providing several examples of projects for leadership and professional development of teachers such as the DataStreme Project, a distance learning course designed by the American Meteorological Society, and Global Learning and Observation to Benefit the Environment (GLOBE), a worldwide network for sharing resources for primary and secondary earth science education.

**Marcia Barton** spoke next about the opportunities and challenges for STEM educators. She agreed that the NGSS report provided an opportunity to transform science in the United States by integrating the sciences instead of using current standards of teaching the sciences separately. The NGSS report also elevated earth and space science, including them more in the proposed curriculum. The challenges for geo-science, according to Barton, were taking advantage of this increased focus and engaging the students in this material, and training the next generation of teachers. She proposed starting an academy for innovation and sustainability to engage students in geo-science and engineering, especially with the increase in job opportunities for geoscientists. Based on President Obama’s initiative to prepare 100,000 new STEM teachers in the next decade, Barton suggested making 30,000 of those earth and space system science teachers.

**Vicky Gorman** discussed efforts to promote geo-science education in her community with the Citizen Science Education Program (CSEP). CSEP was designed by middle school students and tailored for their own community. The program seeks to increase scientific literacy within the community and is part of the Weather Ready Nation network, a NOAA initiative. Gorman stressed the importance of communication and leadership skills within students to prepare them for the workforce, with development of those skills starting in middle school. She stated, “Unless students are marketable, all their education goes to waste.” Gorman emphasized the importance of geo-science education as it

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encompasses chemistry, physics, and biology and applies to real-life situations and the global economy and where our workforce needs to be.

**Peter Dorofy** commented on the technology challenges of teaching earth science. Traditionally, earth science is a non-lab course but with increasing technological advances such as GPS, GIS, remote sensing, and real-time data, that is changing. He spoke of the challenges at his technical college in New Jersey, such as budget cuts and shifting programs, and how to make earth science relevant to students who have already chosen a career. Dorofy stated it was key to identify real-life situations in which earth science can be applied and to take advantage of all the technology in the field to excite students.

**John Moore** recapped the first part of the panel and reiterated that teachers have a unique opportunity to push earth science. The problem is in implementation. Moore stated that in many schools the 1996 NGS Standards are barely implemented today, therefore, the responsibility will lie with the next generation of teachers to ensure that these new standards are realized.

**Kevin Simmons** and **Jin Kang** explained new technology in the geoSTEM field: cubesats, microsatellites, which are powerful, interactive tools that can be used by schools to provide data from space. Cubesats introduce children to systems engineering and allow them to put the engineering method, which Simmons distinguished from the scientific method, into practice. Kang emphasized the two essential factors of effective education: motivation and hands-on education which are key to encouraging creativity and innovation.

The panel responded to audience questions about the integrity of the geoSTEM programs, differences between the U.S. and Korean education systems, and the new common core standards and standardized testing.

*By: Elizabeth White, Program on America and the Global Economy*