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How the U.S. can stay on top

By John P. Holdren and Secretary Arne Duncan - 03/01/10 06:43 PM ET

Americans feeling beleaguered by today's many challenges —economic uncertainty at home, the heartbreaking struggles of our neighbors in Haiti, the need to boost global development while tempering habitat loss and climate change — need look no further for inspiration than two of the youngest guests in the presidential box seats at the recent State of the Union address. Those two women — a high school student from Bellaire, Texas, and a Stanford University freshman geology major — represent the catalytic convergence of science and education that promises to fuel America's economic recovery while generating new approaches to improving our world.

Consider Li Boynton, an 18-year-old high school senior with a love of science and concern for global health. Having learned that almost 1 billion people lack access to safe drinking water and that conventional methods of testing for dangerous contaminants are complicated and expensive, she worked with her science teacher to invent a novel test that harnesses helpful bacteria to tell whether water is tainted by chemicals. Her achievement earned her top honors last year in the Intel International Science and Engineering Fair and leaves us convinced that, whether or not this innovation makes it to market, Boynton is on track to change the world.

Sitting with Boynton was Gabriela Aylin Farfan, a collector of rocks and minerals since age seven who, as an Intel Science Talent Search finalist last year, won a scholarship for her independent research describing why certain gemstones appear to change color when viewed from different angles — a peculiar property of some crystals that may prove useful in an array of nano-engineering applications.

We were thrilled to see Boynton and Farfan honored because they personify our shared commitment, and that of the president, to raise American students from the middle to the top of the pack in science, engineering and mathematics — not simply to proclaim "We're No. 1," but rather, for the profoundly important reason that science and technology are America's best chance to meet some of the biggest challenges this country faces in the 21st century: creating the new products and jobs that will drive economic recovery and growth, delivering better healthcare for Americans at lower cost, providing the new domestic energy sources that will reduce dependence on foreign oil and protect the climate, and keeping America secure while protecting our freedoms.

Science and technology have long been the primary driving force behind America's economic and political strength. But a number of indicators — including figures released this month by the National Science Board — show that America's lead in science and engineering is at risk. To keep the pipeline of excellence flowing, we must boost our science, technology and mathematics programs and better support the educators who introduce these subjects to our children. Specifically, the nation needs to:

• Make robust, highly targeted federal investments in science, engineering, and mathematics education. The Education Department's Race to the Top program, for example, is offering $4.35 billion in competitive grants to states with smart plans to improve teaching and learning, with science, math, and engineering education — including investments in teachers and school leaders — highlighted as major criteria in the awards process.

• Tap the diversity of America to bring new approaches to discovery, design, and innovation. Women and girls, students of color, and individuals with disabilities often face barriers that discourage participation in science and engineering. By engaging their diversity of experiences and approaches, we can accelerate discovery and the development of new technologies and jobs.

• Get the private sector involved. Through the administration's Educate to Innovate initiative, corporations, philanthropies, science and engineering societies, and non-profits have responded to the president's call for partnership, donating more than $500 million in funds and in-kind services to improve science, engineering, and mathematics education.

• Make science and engineering a hands-on subject again. Programs such as National Lab Day are linking the expertise and enthusiasm of the nation's talented scientists, engineers and community volunteers with students and teachers to bring more real-world-relevant, hands-on activities into the classroom.

• Raise the public profile of science, engineering, and mathematics. The president has been doing his part, hosting Astronomy Night on the White House Lawn, for example, which got 150 middle school students looking through telescopes with the first family; honoring science and mathematics teachers and mentors at the White House earlier this month; and just last week visiting Loraine County, Ohio's "Fab Lab," a community college-based facility where students operate high-tech fabrication tools. It's also why he committed to join both of us in a campaign to recruit the next generation of teachers — especially in subjects suffering from shortages, such as science and math.

When we were elementary and high school students, neither of us had any idea that we would someday be secretary of education or serve in the White House as the president's science adviser. But like Li Boynton and Gabriela Farfan, we were fortunate to have excellent teachers and well-equipped schools that nourished our curiosity and cultivated in us a passion for learning. Today we owe it to students like Li and Gabriela — and to the nation and the world — to keep that chain of opportunity alive by boldly supporting the innovative teachers and schools that will help make America, as the president has urged, once again a nation of creators and not just consumers.

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