

US engineering schools to educate 20,000 students to tackle grand challenges

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In a letter of commitment presented to President Barack Obama at the White House Science Fair today, more than 120 U.S. engineering schools announced plans to educate a new generation of engineers expressly equipped to tackle some of the most pressing issues facing society in the 21st century.

These "Grand Challenges," identified through initiatives such as the White House Strategy for American Innovation, the National Academy of Engineering (NAE) Grand Challenges for Engineering, and the United Nations Millennium Development Goals, include complex yet critical goals such as engineering better medicines, making solar energy cost-competitive with coal, securing cyberspace, and advancing personalized learning tools to deliver better education to more individuals.

Each of the 122 signing schools has pledged to graduate a minimum of 20 students per year who have been specially prepared to lead the way in solving such large-scale problems, with the goal of training more than 20,000 formally recognized "Grand Challenge Engineers" over the next decade.

More than a quarter of the nation's engineering schools are now committed to establishing programs to educate engineers to take on the Grand Challenges. "We're poised to transform the landscape of engineering higher education," said Tom Katsouleas, dean of Duke University's Pratt School of Engineering and a co-leader of the initiative

along with Yannis Yortsos, dean of the University of Southern California's Viterbi School of Engineering, and Richard Miller, president of the Franklin W. Olin College of Engineering. "The tremendous response suggests we've tapped into something powerful—the very human element connecting engineering with students who want to make a real difference. I think we're going to see these Grand Challenge Engineers do just that."

Grand Challenge Engineers will be trained through special programs at each institution that integrate five educational elements: (1) a hands-on research or design project connected to the Grand Challenges; (2) real-world, interdisciplinary experiential learning with clients and mentors; (3) entrepreneurship and innovation experience; (4) global and cross-cultural perspectives; and (5) service-learning.

"Teaching engineering fundamentals in the classroom is important, but it's not enough," said Richard Miller of Olin College. "Solving our planet's Grand Challenges requires engineering expertise, but they won't be solved by engineers alone. Doubling down on even more hard sciences and math will not help. Instead, we need to incorporate new elements into engineering students' education to give them both the skillset and the mindset needed to become leaders in addressing societal challenges."

The training model was inspired by the National Academy of Engineering-endorsed Grand Challenge Scholars Program (GCSP), established in 2009 by Duke's Pratt School of Engineering, Olin College, and the University of Southern California's Viterbi School of Engineering in response to the NAE's 14 Grand Challenges for Engineering in the 21st century. There are currently 20 active GCSPs and more than 160 NAE-designated Grand Challenge Scholars have graduated to date. Half of the graduates are women—compared with just 19 percent of U.S. undergraduate engineering students—demonstrating

the program's appeal to groups typically underrepresented in engineering.

"The idea of giving back is so important, and we're actually learning how to do that," said Lyssa Aruda, a Grand Challenge Scholar at the University of Southern California, who is working on making solar energy economical. "I think that's probably the reason most of us choose engineering in the first place—to have the opportunity to give back to people."

Other examples of GCSP participants working on Grand Challenges include: Alex Caven at the State University of New York (SUNY), who is involved in efforts to provide access to clean water in Haiti; Michaela Rikard, who is working on engineering better medicines at North Carolina State University; Allison Kindig at Iowa State, who is creating sustainable engineering projects in developing countries; and Olin College's Luke Metz, who is engineering computerized writing aids to advance personalized learning.

"The NAE's Grand Challenges for Engineering are already inspiring more and more of our brightest young people to pursue careers that will have direct impacts on improving the quality of life for people across the globe," said NAE President C.D. Mote Jr. "Imagine the impact of tens of thousands of additional creative minds focused on tackling society's most vexing challenges. 'Changing the world' is not hyperbole in this case. With the right encouragement, they will do it and inspire others as well."

More information on this initiative, including a copy of the letter of commitment, is available [here](#). The initiative grew out of a 2014 workshop organized by the American Association of Engineering Societies, Epicenter, Engineers Without Borders USA, EPICS, and the NAE Grand Challenge Scholars Program.

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More information: www.engineeringchallenges.org/15680.aspx

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