



News & Highlights

Third Global Grand Challenges Summit for Engineering

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On July 18–20, 2017, the third and largest Global Grand Challenges Summit (GGCS), jointly organized by the US National Academy of Engineering (NAE), UK Royal Academy of Engineering (RAE), and Chinese Academy of Engineering (CAE), was held in Washington, DC on the campus of the George Washington University. Nearly 900 people attended, half of them were undergraduate or graduate students.

Based on the NAE Grand Challenges for Engineering[†], the GGCS series aims to illuminate and explore the status and prospects of engineering efforts related to the Grand Challenges, to inspire the next generation of change makers to engage the Grand Challenges, and to spark global collaborations that lead to innovative ways of addressing these critically important engineering challenges and opportunities. The previous summits were held in London in 2013 and Beijing in 2015.

The 2017 GGCS focused on selected themes of the NAE Grand Challenges—sustainability, health, and joy of living—as well as education and public engagement. Workshops explored virtual reality and artificial intelligence, engineering and health care, sustainability, and reverse engineering the brain. The Summit also included a brainstorming session on how to further the Grand Challenges movement.

The Summit presented world class speakers, including the following:

- As keynote speakers:
 - Alec Broers**, member, UK House of Lords; original member, NAE Grand Challenges Committee
 - Zhonghan Deng**, cofounder, chair, and CEO, Vimicro
 - Martha Lane Fox**, entrepreneur, member, UK House of Lords
 - Rajiv Shah**, president, Rockefeller Foundation



Gordon England, chair of the US National Academy of Engineering, welcomes attendees to the Summit, while (left to right) Ji Zhou, president, Chinese Academy of Engineering, David Thomlinson, international secretary, UK Royal Academy of Engineering, and C. D. (Dan) Mote, Jr., president, US National Academy of Engineering, wait to provide additional remarks of welcome.

[†] <http://engineeringchallenges.org/>

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- On virtual reality:
Michael Abrash, chief scientist, Oculus
- On artificial intelligence:
Jeffrey Dean, senior fellow, Google
- On the interplay of engineering and healthcare:
Sally Davies, chief medical officer, United Kingdom
Molly Stevens, professor, biomedical materials and regenerative medicine, Imperial College London
- On sustainability:
Yihui Ding, senior advisor, China Meteorological Administration
Zhiqiang Wu, vice president, Tongji University
- On reverse engineering the brain:
Christof Koch, president and CSO, Allen Institute for Brain Science
Rikky Muller, cofounder, Cortera Neurotechnologies; assistant professor, electrical engineering and computer science, UC Berkeley
- On public engagement:
Deanne Bell, founder and CEO, Future Engineers; host, CNBC's "Make Me a Millionaire Inventor"
Tim Kaine, US Senator (D-VA)
Dean Kamen, inventor, entrepreneur, and founder, FIRST

Video of the speakers is available on the NAE website[†]. It is anticipated that several papers from these speakers will appear in this journal in the near future.

The NAE Grand Challenges Scholars Program (GCSP)[‡] is an educational paradigm for engineering students, which combines curricular and extracurricular approaches to inculcate capabilities essential to prepare them for solving the Grand Challenges. More than 40 colleges and universities across the United States and around the world have implemented the program. A panel of recently graduated GCSP students described the successes of their individual experiences in the program at the Summit. In addition, a secondary school using the Grand Challenges in its curriculum—Thomas Edison High School in Alexandria, Virginia, the United States—was also featured. It was noted that the Grand Challenges concept provides a context to help secondary school students understand the value of pursuing a STEM (i.e., science, technology, engineering, and math) education. Three school administrators and a student described their experience in developing or experiencing the curriculum during its initial year.

On July 18, five teams of undergraduate students, of approximately five students each, from each of the host countries competed in a Student Business Model Competition, presenting ideas and business

models for addressing one or more of the Grand Challenges. The students competed for a first place prize of \$25 000 USD, won by a team from the University of California, San Diego, the United States; second place, \$15 000 USD, won by a team from Bournemouth University, United Kingdom; and third place, \$10 000 USD, won by a team from Shanghai University, China.

The Summit also included an opportunity for university students to present posters related to research on the NAE's 14 Grand Challenges for Engineering. Undergraduate and graduate winners were chosen in three categories—originality, impact, and design—and received \$2000 USD each. The undergraduate winners included one from each country; all but one of the graduate poster presenters were from the United States and all the winners were from the United States.

A student activity, "How to Change the World," conducted in collaboration with the RAE and University College London, enabled attending students to team with those from other schools or countries to produce a podcast, based on their experiences at the Summit, about how engineering can improve the health, security, sustainability, or joy of living of the planet. The students met during and immediately after the Summit to work on their podcasts and get advice from engineering mentors. The podcasts will be evaluated shortly by a judging panel and the winning team will receive an all-expenses-paid trip to the next GGCS in London in 2019.

The 2017 GGCS was generously supported by Lockheed Martin Corporation, the Boeing Company, Northrop Grumman Corporation, and Shell. Students met with representatives of the sponsors at an evening networking event where they were able to try out virtual reality goggles, augmented reality gadgets, and flight simulators, play challenging games, and have their resumes reviewed.

The 2017 GGCS was held in conjunction with the inaugural FIRST Robotics Competition at the nearby DAR Constitution Hall in Washington, DC. Teams of high school students from nearly 160 countries competed in a contest based on the NAE Grand Challenge to "Provide Access to Clean Water."

The 14 Grand Challenges for Engineering were outlined in 2008 by an expert committee convened from across the globe by the NAE to identify challenges whose solutions were considered critical to the future well-being of humanity and the planet. Developed with input from the public and experts around the world, the Grand Challenges range from advances to ensure sustainable life on the planet, to improving health outcomes for individuals through engineering, to addressing threats to our security generated by humans or nature, to engineering that amazes us in the way it improves our quality of life^{††}.

[†] <https://www.nae.edu/>

[‡] <http://engineeringchallenges.org/GrandChallengeScholarsProgram.aspx>

^{††} <http://engineeringchallenges.org/>