



NAE Grand Challenge Scholars

What is the NAE Grand Challenge Scholars Program?

The [National Academy of Engineering](#) Grand Challenge Scholars program is a combined curricular and extra-curricular program with five components that are designed to prepare students to be the generation that solves the grand challenges facing society in this century.

In 2008, the NAE identified 14 [Grand Challenges for Engineering in the 21st Century](#). The Grand Challenges are a call to action and serve as a focal point for society's attention to opportunities and challenges affecting our quality of life.



Declaration of Principles

The profession of engineering has been, true to its latin root *ingeniare*, about invention. For the past one hundred years, about as long as most college of engineering programs have existed, the list of the most important engineering achievements is dominated by devices: planes and spacecraft, cars and agricultural machines, lasers and PET scanners, to name a few from the National Academy of Engineering report of the last century. Almost a decade into the new century, another NAE committee has addressed the new engineering grand challenges and come to a much deeper unfolding of invention: Their list includes making solar energy economical, preventing nuclear terror, advancing health informatics, clean water and reverse engineering the human brain. None of them are just devices. Nearly all address complex social issues that require innovative technology and a systems approach to solve but cannot be solved in a vacuum. They will also require engineers to shape public policy, transfer technical innovation to the market place, and to inform and be informed by social science and the humanities. These are challenges to “change the world,” and many of them are inherently global.

By a fortunate coincidence, engineering students of this generation have the “right stuff” to address them. Judging by the survey results of the recent NRC report [Engineer of 2020](#), this generation of students is surely motivated by puzzle solving – but more importantly, by a desire to change the world.

Preparing the next generation of engineers

The five components of the Grand Challenge Scholars Program include:

1. **Research experience.** Project or independent research related to a Grand Challenge.
2. **Interdisciplinary curriculum we call Engineering+.** Preparing engineering students to work at the overlap with public policy, business, law, ethics, human behavior, risk as well as medicine and the sciences. Examples that span these disciplines with a coherent theme are Energy and the Environment, Sustainability, Uncertainty and Optimization, etc.
3. **Entrepreneurship.** Preparing students to translate invention to innovation; to develop market ventures that scale to global solutions in the public interest.
4. **Global dimension.** Developing the students' global perspective necessary to address challenges that are inherently global as well as to lead innovation in a global economy.
5. **Service learning.** Developing and deepening students' social consciousness and their motivation to bring their technical expertise to bear on societal problems. Programs such as Engineers Without Borders, or Engineering World Health may be adapted to satisfy this component and/or component 3.

Open Invitation – Make This A National Program

Motivated by the National Academy of Engineering vision for the future and also by the increasing calls for a new engineering education paradigm, Duke's Pratt School of Engineering, The Franklin W. Olin College of Engineering, and the University of Southern California's Viterbi School of Engineering proposed this new education model to prepare engineers to be world changers. The program was endorsed by the National Academy of Engineering in February 2009.

Envisioned to initially attract and incent a select cadre of 20-30 students at each school, it is hoped that it will be replicated at many other outstanding engineering programs across the country to yield for the nation a pool of several thousand graduates per year uniquely prepared and motivated to address the most challenging problems facing the world and the nation. Moreover, the program will also serve to pilot innovative educational approaches that will eventually become the mainstream educational paradigm for all engineering students.

It is anticipated that each participating institution will develop its own specific realization of the five components and that students who complete the program successfully will receive a distinction of Grand Challenge Scholar endorsed by their institution and the National Academy of Engineering.

How to Apply

For more information about participating in this program, download the [operational document](#). If you are ready to join, submit your application [here](#).