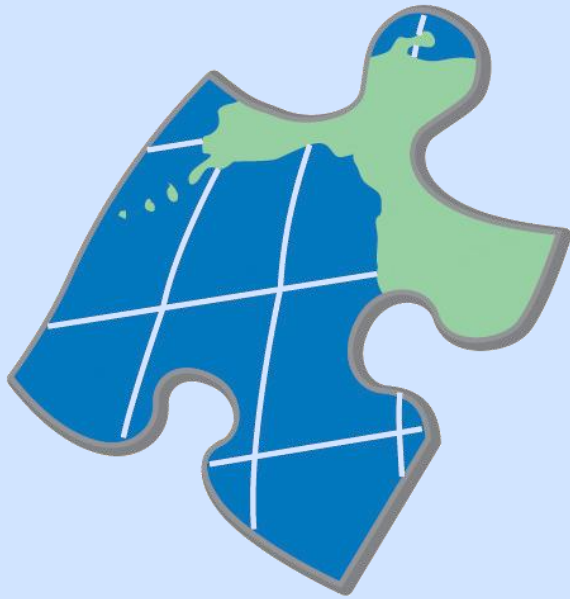




Thanks to AMD!

Please join me in expressing our appreciation to **Advanced Micro Devices, Inc.**, for their exclusive sponsorship and hosting of this National Academy of Engineering Grand Challenge Scholars Program 2011 Workshop.





National Academy of Engineering
**Grand Challenge
Scholars Program**

Dr. Jenna P. Carpenter, Chair
GCSP National Steering Committee
Associate Dean, Louisiana Tech University



Background

The **National Academy of Engineering (NAE)** has developed **fourteen Grand Challenges** that focus on some of the most important and complex issues facing our world in the 21st century. To solve them will require integration of knowledge and creativity together with expertise in global and social issues.





14 NAE Grand Challenges

Energy and Environment

- Make solar energy economical
- Provide energy from fusion
- Develop carbon sequestration methods
- Manage the nitrogen cycle
- Provide access to clean water

Health

- Advance health informatics
- Engineer better medicines

Security

- Restore and improve urban infrastructure
- Prevent nuclear terror
- Secure cyberspace

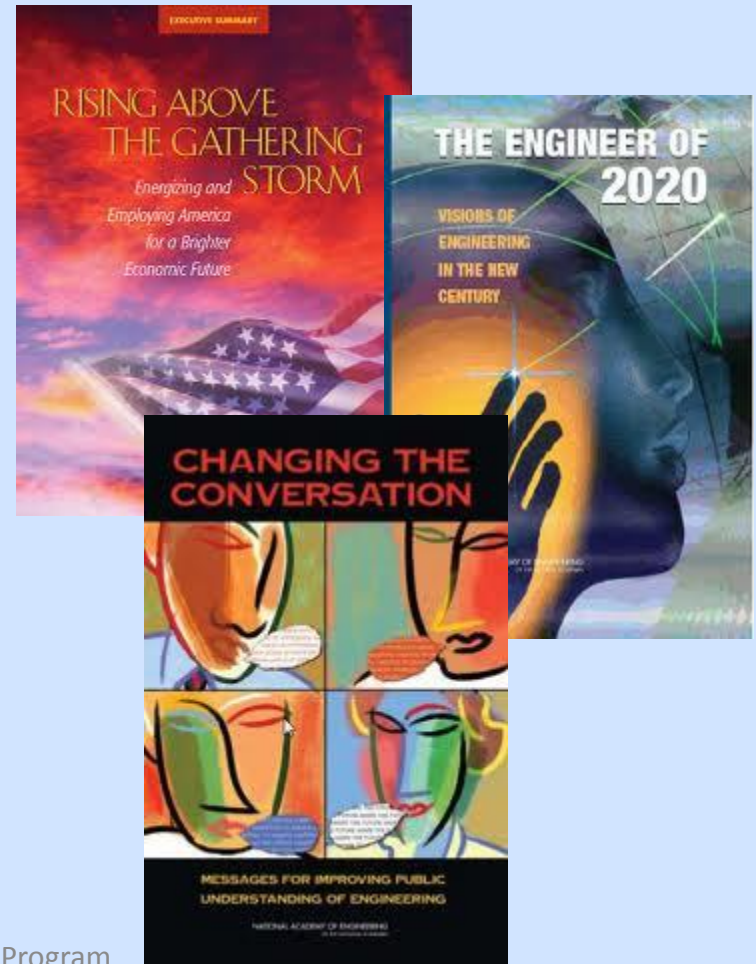
Learning and Computation

- Reverse-engineer the brain
- Enhance virtual reality
- Advance personalized learning
- Engineer the tools of scientific discovery



Other Calls for Innovation in Engineering Education

There have been a number of other **National Academy** reports over the last decade which have made similar calls for engineering students to receive a broader education, including **Rising Above the Gathering Storm** and **The Engineer of 2020**, as well as calls for improved messaging of how engineering provides an opportunity to make a difference (**Changing the Conversation**).





GCSP History

Motivated by this vision for the future and reports such as The Engineer of 2020, Duke, Olin College, and USC proposed a combined curricular and co-curricular program designed to prepare engineering and science students to solve these Grand Challenges. **This Grand Challenge Scholars Program (GCSP) was endorsed by the National Academy of Engineering in 2009.**



USC Dean Yannis Yortsos, Duke Dean Tom Katsouleas, Olin President Richard Miller



GCSP History

“The National Academy of Engineering endorses the NAE Grand Challenge Scholars Program. Engineering skills and leadership are essential to meeting the great challenges facing humankind. This program will build a cadre of young men and women who not only have the necessary engineering skills but also the cross-disciplinary knowledge, entrepreneurial spirit, global perspective and sense of mission needed to serve and lead this country.”

Charles Vest, President
National Academy of Engineering





GCSP Overview

The **Grand Challenge Scholars Program (GCSP)** consists of a network of Programs on individual campuses which focus on activities and experiences that equip students in the following five areas

- **Research experience**
- **Interdisciplinary curriculum**
- **Entrepreneurship**
- **Global dimension**
- **Service learning**

and adhere to the guidelines outlined in the GCSP Operational Document.



GCSP Program Components

Research experience

Project or independent research related to a Grand Challenge.

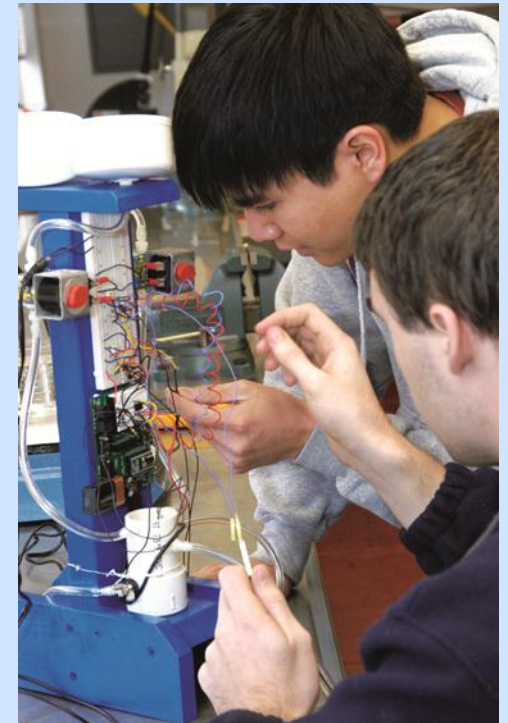




GCSP Program Components

Interdisciplinary Curriculum

Preparing engineering students to work at the overlap with public policy, business, law, ethics, human behavior, risk as well as medicine and the sciences.





GCSP Program Components

Entrepreneurship

Preparing students to translate invention to innovation; to develop market ventures that scale to global solutions in the public interest.





GCSP Program Components

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.





GCSP Program Components

Service learning

Developing and deepening students' social consciousness and their motivation to bring their technical expertise to bear on societal problems.





Other Characteristics of a GCSP

GC Scholar Selection

Students should represent a diverse cohort of students in good standing

Curricular Connectivity

GC Curricular Plan must demonstrate connectivity across the 5 curricular components and a GC-themed problem



Scholar Designation

GC Scholar Apprentices will be designated *National Academy of Engineering Science Grand Challenge Scholars* at graduation upon successful completion of the program.





GCSP Overview

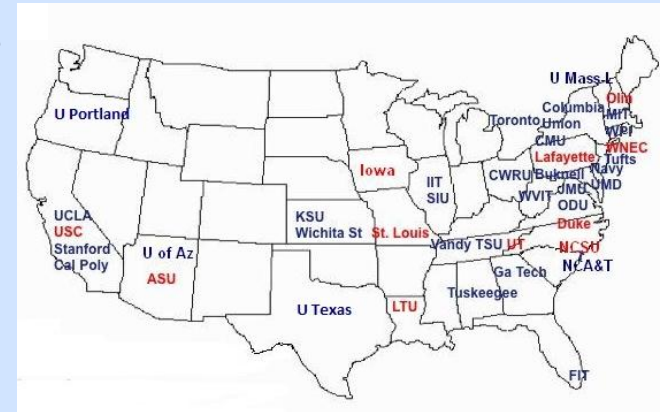
The Grand Challenge Scholars Program national **Steering Committee** provides guidance to institutions as they develop and implement their Programs, as well as final Program approval. In addition, the Committee coordinates dissemination, encourages growth of the Program, and seeks to collaborate with funding and corporate partners to provide workshops and training activities.

The **explicit objective** of the National GCSP is to develop a nationwide network of GCSPs within participating schools that will educate the future leaders of the NAE Grand Challenges.



GCSP Progress-to-Date

- 11 institutional GCSPs in the US
- 32 institutions working to develop GCSP
- 26 Scholars graduated thus far
- National Steering Committee:
 - Monty Reichert & Martha Absher, Duke
 - Lynn Stein, Franklin W. Olin College
 - Louise Yates, University of Southern California
 - Jenna Carpenter, Louisiana Tech University (Chair)
- Series of national Workshops, Session at 2011 ASEE Conference
- Media coverage including the White House OSTP website, the NAE/NA websites, SWE magazine, Forbes magazine
- Listserv: <https://lists.latech.edu/mailman/listinfo/grand-challenges-scholars>





Joining the GCSP Network

- Dean of Engineering joins the “GCSP Update List” (website)
- Institution develops a proposal for their institutional program:
 - Contact information (Director)
 - GCSP Vision
 - Selection of GC Scholars
 - Requirements for 5 GC Curricular Components
 - Assessment/Tracking of GC Scholars (incl. recruitment)
- Proposal is reviewed by the national Steering Committee
- Approved Programs join the National GCSP Network



National GCSP website

<http://www.grandchallengescholars.org/>

