Training the Whole Engineer
**NAE Grand Challenges**

**Sustainability**
- Making solar energy economical
- Providing energy from fusion
- Developing carbon sequestration methods
- Managing the nitrogen cycle
- Providing access to clean water

**Health**
- Engineering Better Medicines
- Advancing Health Informatics
- Reverse engineering the brain

**Security**
- Securing cyberspace
- Preventing nuclear terror
- Restoring and improving urban infrastructure

**Joy of Living**
- Enhancing virtual reality
- Advancing personalize learning
- Engineering the tools of scientific discovery
United Nations Sustainable Development Goals

• United Nations High-level Political Forum on Sustainable Development formed in 2012 to develop vision
• “Transforming our World: the 2030 Agenda for Sustainable Development” proposed
• Approved in 2015 by the United Nations General Assembly
Overlap between NAE Challenges and UN Goals

**NAE Grand Challenges**

- Joy of Living
- Health
- Sustainability
- Security

**UN Sustainable Development Goals**

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals

USC Viterbi School of Engineering
Students must demonstrate **breadth** and **depth** in their education.

To be eligible, a student’s undergraduate experience must include all five dimensions, with a focus on one topic area.

**Research/Creativity**
*Participating in mentored research or project experience related to a Grand Challenge*

**Multidisciplinary**
*Understanding gained through engaging in curricular activities outside of engineering*

**Entrepreneurship**
*Understanding gained through experience that translates to a viable business model*

**Social Consciousness**
*Addressing societal problems through service learning and/or social entrepreneurship*

**Cultural competence**
*Understanding gained through global or different cultural experience*
Trends of USC Program

- First USC class (2012) had 2 Scholars
- 2018 Class had 44 Scholars

Students are introduced to NAE Grand Challenges during Freshman Engineering (Freshman Seminar)
Examples of Research and Creativity

• Perform research with faculty or industry focused on one of the Grand Challenges

• Focus a senior capstone design project on one of the Grand Challenges

• Participate in a team project with Grand Challenge focus, such as Solar Car Team, HackSC Hackathon
Examples of Multidisciplinary

- Pursue a Minor related to the Grand Challenges
- Enroll in at least two classes on science visualization, ethics, or related topics
Examples of Entrepreneurship

• Pursue a minor or enroll in at least two courses in digital entrepreneurship, social entrepreneurship

• Take on a leadership role in a student organizations related to entrepreneurship

• Participate in the Viterbi Start-Up Garage or Maseeh Prize Competition by submitting a business plan related to the Grand Challenges
Examples of Cultural Competence

• Conduct research related to global health issues, non-profit marketing or low-cost manufacturing

• Participate in iPodia, the Viterbi Tsinghua Research program, or other USC international program

• Participate in an international internship, approved study abroad program, or the USC Global Fellows program
Examples of Social Consciousness

- Participate in activities or conduct research in an area of focus on improving the human condition
- Participate in Viterbi Impact, Engineers Without Borders, JEP, or other Volunteer Center programs and projects
- Participate in STEM related outreach activities
Additional Information

Information about the USC program:
http://viterbiundergrad.usc.edu/gcsp/