Grand Challenges Scholars Program Info Session

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14 Grand Challenges set by NAE

- Team of esteemed National Academy of Engineering members got together and identified the 14 largest challenges facing society.
  - Including our own Dean Yannis C. Yortsos, USC is one of the original pioneering members.

- WHY?
The next century poses some challenges for society as populations grow and the demands of those populations grow - need to sustain continuing advancement, while improving overall quality of life.

The vision is about serving people and society.

4 BROAD REALMS –
- Sustainability
- Health
- Security
- Joy of Living
NAE’s 14 Grand Challenges

**Sustainability**
1. Make solar energy economical
2. Provide energy from fusion
3. Develop carbon sequestration methods
4. Manage the nitrogen cycle
5. Provide access to clean water

**Security**
6. Secure cyberspace
7. Prevent nuclear terror
8. Restore and improve urban infrastructure

**Health**
9. Engineer better medicines
10. Advance health informatics
11. Reverse-engineer the brain

**Joy of Living**
12. Enhance virtual reality
13. Advance personalized learning
14. Engineer the tools of scientific discovery

[https://viterbischool.usc.edu/viterbi-research-nae-grand-challenges/](https://viterbischool.usc.edu/viterbi-research-nae-grand-challenges/)
GCSP and COVID-19

Engineering is at the forefront of addressing societal needs in dealing with challenges posed by COVID-19. In fact, “pandemic” has explicitly been addressed in one the original 14 NAE Grand Challenges, Advance Health Informatics — “How to prepare against a pandemic?”

The National Academy of Engineering and the Grand Challenges Scholars Program has teamed up to tackle the COVID-19 with its Call to Action. The Call to Action brings engineers, medical, and scientific expertise to address our current COVID-19 crisis.

https://www.nae.edu/230195/COVID19-Call-for-Engineering-Action
GCSP and COVID-19

Moreover, since the start of the outbreak in the US, the following noteworthy efforts have been initiated by Viterbi and USC levels, which could provide you with further information concerning opportunities related to COVID-19 research and engagement at USC:

• **Addressing COVID-19 Challenges:**
  [https://viterbischool.usc.edu/covid-19-related-research/](https://viterbischool.usc.edu/covid-19-related-research/)

• **USC COVID-19 Experts:**
  [https://research.usc.edu/covid19-collab/](https://research.usc.edu/covid19-collab/)
Why?

Solving the Grand Challenges requires a new kind of engineer and an interdisciplinary approach:
- Create new capabilities
- Come up practical solutions for meeting basic human needs
- Develop new entrepreneurial opportunities
- Reinvent the way humans interact
- Transform systems thinking
- Create a sustainable society
- Be mindful of unintended consequences
- Connect technology and society
- Interact with non-engineering partners
- Design & implement context-sensitive solutions
Goals

• Solving world’s most pressing problems
• Transformative experiences
• Global perspectives
• Join a network of distinguished alumni!
Grand Challenge Scholars Program at USC

- Led by Faculty Director, Professor Najmedin Meshkati and Associate Director of Undergraduate Programs and Women in Engineering, Myra Fernandez

- Students must fulfill 5 competencies:
  - Talent/Research
  - Multidisciplinary – Engineering +
  - Entrepreneurship
  - Multicultural Competence
  - Social Consciousness – Per Dean Yortsos: “Heroic Engineering”
    - Flexible and easy to accomplish at Viterbi (Engineering +)
Grand Challenge Scholars Program at USC

Examples of ways to fulfill the **Research/Talent** Competency are:

- **Working with faculty** in a research lab focused on one of the Grand Challenges
- Developing your **own independent research and enrolling in a Directed Research course**
- Focusing a **senior capstone design project** on one of the Grand Challenges
- **Presenting independent research** on one of the Grand Challenges at USC Undergraduate Research Symposium or other such venue
- **Participate in team project** with Grand Challenge focus, such as Solar Car Team, HackSC, AthenaHacks; etc.
Grand Challenge Scholars Program at USC

Examples of ways to fulfill the Multidisciplinary Competency are:

• Pursuing a minor related to the Grand Challenges
• Taking at least two courses in biotechnology; communication and the entertainment industry; ethics & moral philosophy; global health; human rights; applied computer security; social entrepreneurship; non-profits, philanthropy & volunteerism; science visualization, or other potential courses outside of your major that can potentially connect to Grand Challenge themes.
• Taking courses outside of engineering or engaging in university-wide activities that outside the scope of engineering.
Examples of ways to fulfill the Viable Business/Entrepreneurship Competency are:

- Pursue a minor or enroll in at least two courses in digital entrepreneurship; social entrepreneurship, etc.
- Participate in entrepreneurial focused activities such as Maseeh Prize Competitions or Min Family Social Entrepreneurship Challenge by submitting a business plan related to the Grand Challenges
- Participate in iPodia, the Viterbi Tsinghua Research program, Engineers Without Borders or other USC international programs
Grand Challenge Scholars Program at USC

Examples of ways to fulfill the Multicultural Competency are:

- **Conduct research** related to global health issues, non-profit marketing or low-cost manufacturing
- Participate in an approved **study abroad program**
- Participate in iPodia, the Viterbi Tsinghua Research program, Engineers Without Borders or other **USC international programs**
- Participate in an **international internship** or the USC Global Fellows program, etc.
- Enroll in **minor or courses related to global issues** such as International Health Development & Social Justice; International Relations, etc.
- **Participate in community service activities** within communities that are uniquely different than your own
Grand Challenge Scholars Program at USC

Examples of ways to fulfill the Social Consciousness Competency are:

- Participate in activities or conduct research in an area of focus on improving the human condition
- Participate in Viterbi Impact, Engineers without Borders, Global Health Brigades, JEP, Volunteer Center programs and projects
- Participate in STEM related outreach activities through Viterbi’s STEM Educational Outreach office; enroll in Engineers as Teachers course, etc.
- Engineering Innovations for Global Challenges Minor (proposed)
Grand Challenge Scholars Lecture Series

The Grand Challenges Scholars program hosts a Lecture Series on topics related to the themes: **sustainability, health, security, and joy of living** by leading professionals and experts in the field of engineering.

Please complete the following [form](#) for suggested speakers and topics.

*Dates and times will vary. Must attend at least 4 per academic year.*
Entrepreneurship Speaker Series - Fall 2021

In Spring 2021, USC Viterbi School of Engineering, Campbell University School of Engineering, and Clemson agreed to embark on a joint Speaker Series on Entrepreneurship for Grand Challenge Scholars Programs. The program has expanded to include University of Notre Dame, Auburn University, and Tulane University.

September 16, 2021: Clemson University
October 21, 2021: University of Southern California
November 18, 2021: Campbell University
Grand Challenge Scholars Program at USC

- Every other year, opportunities to compete in national or international summit
  - Develop a team oriented business plan focused on a Grand Challenge

- Recognition is given to students at graduation by the school and the NAE
- Students also earn designation on their transcripts
- Albert Dorman Grand Challenge Scholar Award – Top Monetary Award is awarded every year
- Students Innovating for Global Challenges Student Org.
Students Innovating for Global Challenges (SIGC)

Students innovating for global challenges (SIGC) was formed just last semester with a goal to foster a community of like-minded students from all majors, and to further encourage multidisciplinary collaboration and innovation among students, faculty, and alumni.

➔ formed by students, for students- especially students passionate about engineering and innovating for social good!

➔ organizes social, educational, and skills-related events that are geared towards exposing you to various careers and professionals who are changing the world!

➔ works closely with the amazing GCSP faculty & staff to keep you on track to graduating with GCSP status!
Students Innovating for Global Challenges (SIGC)

Some of our events from last semester included:

➔ Plan Your GCSP Timeline with SIGC
➔ GCSP Alumni Panel
➔ Serving you Solar with AAEES & VP of Engineering @8minute Solar Energy
➔ MATLAB Skills Workshop with AIChE
➔ Caffeine and Self Care
➔ Fighting Water Scarcity in LA
➔ Immersing into a better Latin America through Sustainability
Students Innovating for Global Challenges (SIGC) - Spring 2021

get involved with us!

➔ follow us on Instagram @uscSIGC for event updates + reminders!

➔ Member Interest Form:
  (e-board positions opening soon!)

➔ scan & complete the form to be added to our slack page!
GCSP Panel

Jacob Totaro, May 2021 grad, Environmental Engineering

Radhika Bhuckory, Senior, Electrical and Computer Engineering
The Road to GCSP

- Submit GCSP Interest Application
- Admitted students must attend Orientation
- Admitted students must submit their Grand Challenges Scholars Action Plan
- Must be actively engaged in the program
- Spring Semester Check-in Meetings
  - Freshman, Sophomore, and Junior students must meet with Myra Fernandez, Associate Director of Undergraduate Programs and Women in Engineering to review the progress of their four-year plan

*Senior students must attend the Preparing your Portfolio – Eligibility for GCSP workshop and Submitting Success – How to Write and Prepare your Application Workshop (late Fall)

- Final applications to be recognized as a Grand Challenges Scholar is due in February. Students will be notified in mid-April.
How to Apply

Student Eligibility and Application:

• All interested applicants must submit their Grand Challenges Scholars Interest Application online.

  Application Deadline: Friday, September 24th, 2021 (11:59 p.m.)

• In order to be designated a Grand Challenges Scholar, Seniors must also apply for official recognition in Fall of their Senior year. *
Questions?

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