



SAPIENZA
UNIVERSITÀ DI ROMA

Grand Challenge Scholars Program for Engineering

**AIMSEA Conference,
June 21st 2018 Rome**

Carlo Tacconelli, PhD student
Sapienza University of Rome

Program Overview

The US [National Academy of Engineering](#) (**NAE**) created the [Grand Challenges Scholars Program](#) (**GCSP**) to educate students in how to engineer solutions to the most pressing problems impacting humanity and biodiversity.



This program fits within Sapienza's educational mission to advance knowledge and skills to promote the leadership necessary for the stewardship of both the natural and designed environments, and is a form of humanitarian engineering.

In June 2018 Sapienza University has become the first European university member of the National Academy of Engineering – Grand Challenge Scholar Program



SAPIENZA
UNIVERSITÀ DI ROMA

Vision

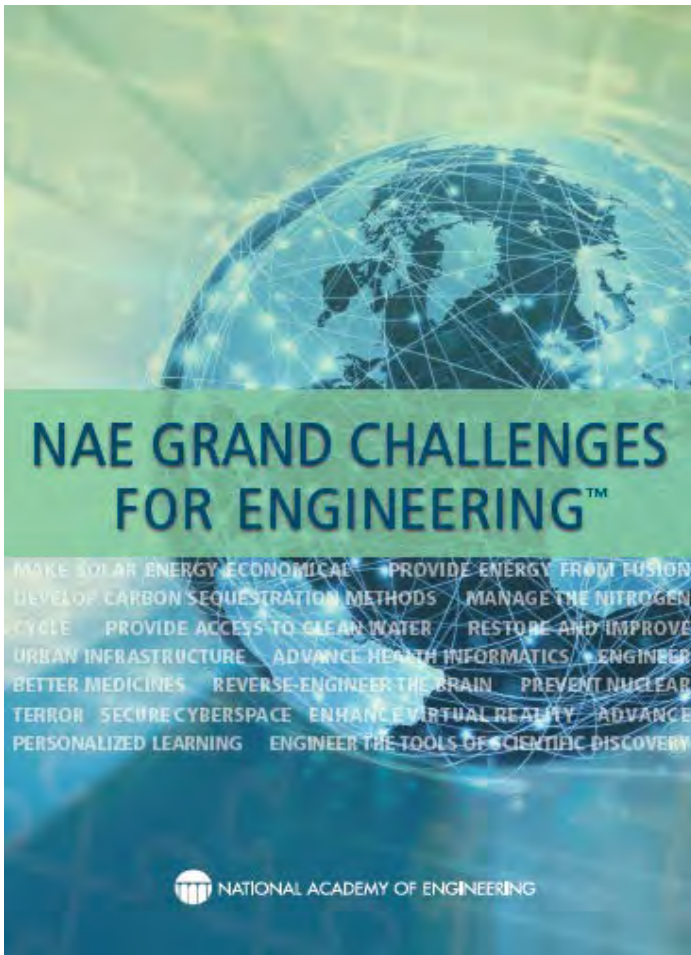
“Continuation of **life** on the **planet**, making our world more **sustainable, safe, healthy, and joyful**”

Goals:

14 Challenges

Objectives:

- R & D Effort - Advance the Frontiers
- Talent Building – Inspire the Next Generation



NAE's Engineering 14 Grand Challenges



Make Solar Energy Economical



Provide Energy From Fusion



Develop Carbon Sequestration Methods



Manage the Nitrogen Cycle



Provide Access to Clean Water



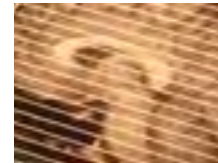
Restore and Improve Urban Infrastructure



Advance Healthcare Informatics



Engineer Better Medicines



Reverse Engineer the Brain



Prevent Nuclear Terror



Secure Cyberspace



Enhance Virtual Reality



Advance Personalized Learning



Engineer the Tools of Scientific Discovery



NATIONAL ACADEMY OF ENGINEERING
OF THE NATIONAL ACADEMIES



7 AFFORDABLE AND
CLEAN ENERGY



11 SUSTAINABLE CITIES
AND COMMUNITIES



12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



14 LIFE
BELOW WATER



6 CLEAN WATER
AND SANITATION



Sustainability

Energy

Environment

Global Warming

15 LIFE
ON LAND



2 ZERO
HUNGER



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



13 CLIMATE
ACTION



Security

Reducing

Vulnerability
to Human and
Natural Threats

1 NO
POVERTY



16 PEACE, JUSTICE
AND STRONG
INSTITUTIONS



Health

Improve Medicine and
Healthcare Delivery

3 GOOD HEALTH
AND WELL-BEING



4 QUALITY
EDUCATION



Joy of Living

Expand and
Enhance Human
Capability

5 GENDER
EQUALITY



8 DECENT WORK AND
ECONOMIC GROWTH



10 REDUCED
INEQUALITIES





Provide Access to Clean Water



Restore and Improve Urban Infrastructure



Manage the Nitrogen Cycle



Make Solar Energy Economical



Provide Energy from Fusion



Develop Carbon Sequestration Methods

Competencies

1. **Talent Competency:** mentored research/creative experience on a Grand Challenge-like topic
2. **Multidisciplinary Competency:** understanding multidisciplinary of engineering systems solutions developed through personal engagement
3. **Entrepreneurship Competency:** understanding, preferably developed through experience, of the necessity of a viable business model for solution implementation
4. **Multicultural Competency:** understanding different cultures, preferably through multicultural experiences, to ensure cultural acceptance of proposed engineering solutions
5. **Social Consciousness Competency:** understanding that the engineering solutions should primarily serve people and society reflecting social consciousness

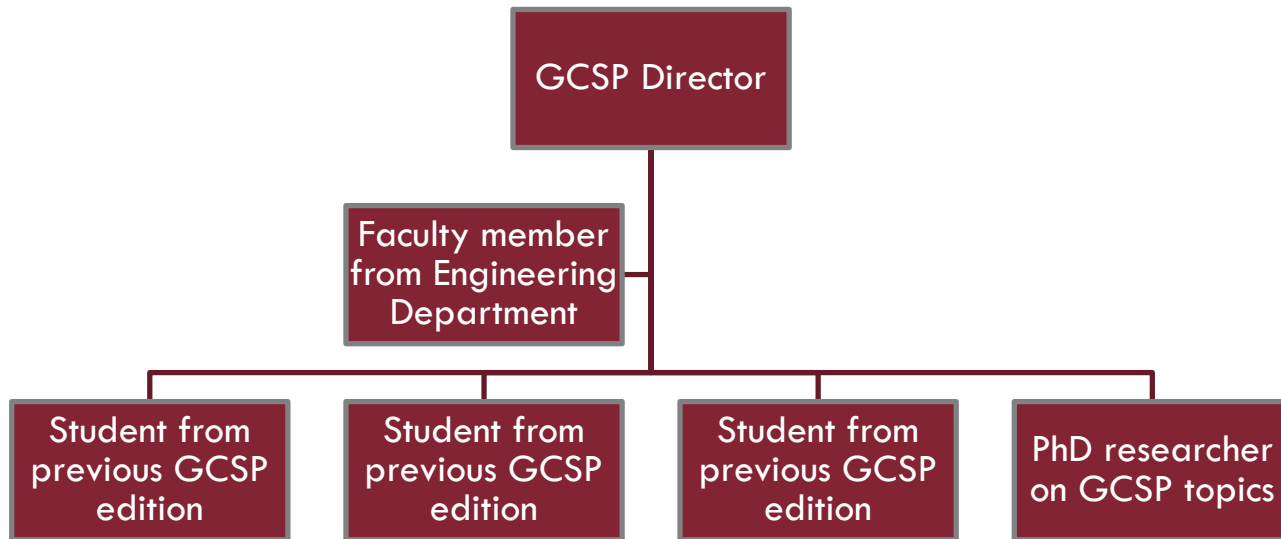
Sapienza Grand Challenge Experience

Competences	Activity	Output
1 - Talent	Research	Project presentation
2 - Multidisciplinary	Classes	Research Report
3 - Entrepreneurship	Classes	Business plan
4 - Multicultural	Internship/Field experience	Activities report
5 - Social Consciousness	Service-learning course	Presentation

Course mode

- Lectures from researchers, engineers, entrepreneurs, leaders from government or non-governmental institution (NGOs)
- Internships and On-field training in Developing countries (Africa, Latin America)
- Conferences, seminars, workshops on related GCSP topics
- Progress meetings

Sapienza Grand Challenge Steering Committee



- The Grand Challenge Experience has 1 semester duration after which students will submit the Final Report which will be judged by the Steering Committee
- Successful students will receive an official acknowledgment from U.S. National Academy of Engineering and from Sapienza University
- Most relevant works will be published on the international GCSP media

NAE Grand Challenges Scholars Program

Showcasing Student Work

Past Participants



Kristina Macro

Major: Environmental Resources Engineering
Class of 2017

Grand Challenge of Interest: Provide Access
Curricular Contributions: [Research](#) | [Engineering](#)
[Dimension](#) | [Service Learning](#)



Thomas Decker

Major: Environmental Resources Engineering
Class of 2015

Grand Challenge of Interest: Provide Access

ERE Student Kristina Macro on Global Dimension for NAE Grand Challenge Scholar Program

Filed under: Humanitarian Engineering, NAE Grand Challenge Scholars Program — Leave a comment

November 15, 2017

ESF Grand Challenge Scholars Program scholar, Kristina Macro, explains how a global perspective helps advance engineering solutions to pressing problems affecting sustainability.

Clean water is something that we tend to take for granted in the United States, so to truly understand how to engineer solutions for the grand challenge of providing access to clean water, it is necessary to gain a global perspective. Crumbling urban infrastructure is another issue that can be seen closer to home, but this grand challenge also needs to be addressed in areas of the world that have not yet developed modern urban infrastructure. After traveling in 2015 to Costa Rica with the [ESF Ecological Engineering in the Tropics](#), ERE 311 course, I learned how a global perspective can change the way you approach solving these problems.



Ready to challenge yourself?



Info

Carlo Tacconelli

PhD student in Energy and Environment

Department of Astronautical, Electrical and Energy Engineering

Sapienza University of Rome

carlo.tacconelli@uniroma1.it

www.fieldstudyabroad.com