Training the Whole Engineer
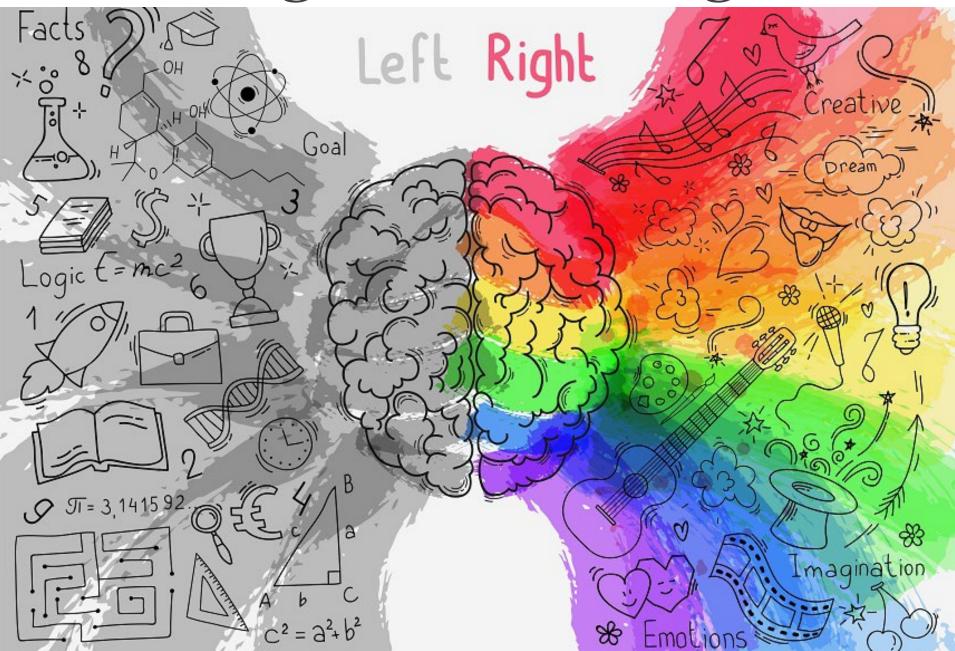
Grand Challenges and Development Goals
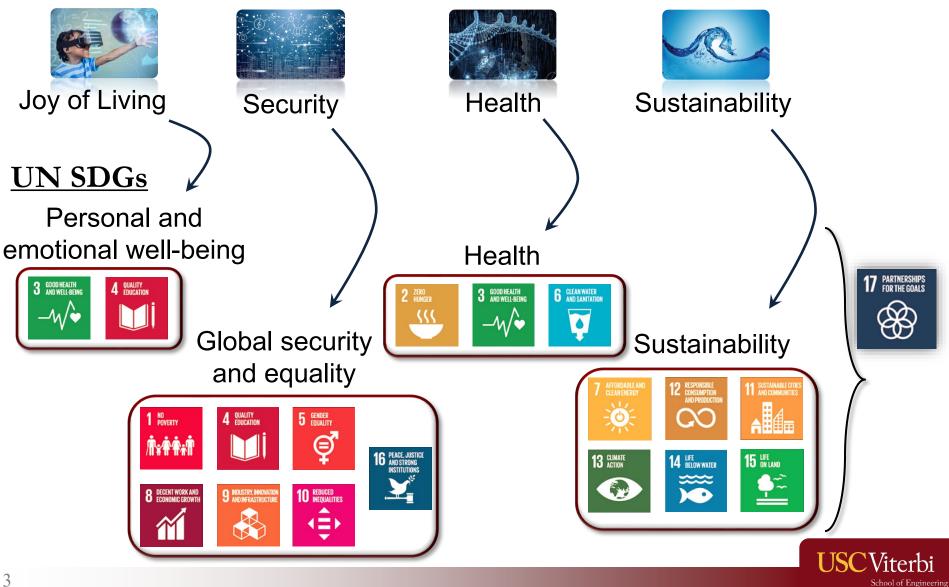
UN Millennium summit established **8** MDGs, target: 2015

UN Forum on Sustainable Development established, which drafted 2030 Agenda

17 UN SDGs approved, target: 2030

2000

2012

2015

2008

NAE established **14** Grand Challenges

2010

GCSP launched

8 Millennium Development Goals (MDGs)

1 Eradicate Extreme Poverty and Hunger
2 Achieve Universal Primary Education
3 Promote Gender Equality and Empower Women
4 Reduce Child Mortality
5 Improve Maternal Health
6 Combat HIV/Aids, Malaria, and Other Diseases
7 Ensure Environmental Sustainability
8 Global Partnership for Development

14 NAE Grand Challenges (GS)

Security

Sustainability

Joy of Living

Health

17 Sustainable Development Goals (SDGs)

ECONOMY

SOCIETY

BIOSPHERE

Connecting NAE Challenges and UN Goals

NAE GCs

Joy of Living   Security   Health   Sustainability

UN SDGs

Personal and
emotional well-being

Health

Global security
and equality

Sustainability
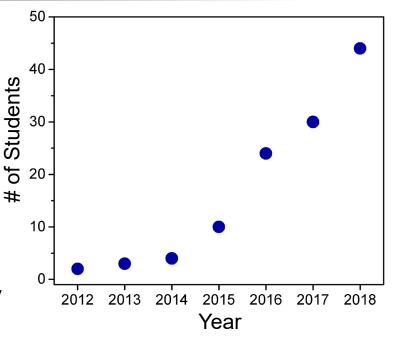
USCViterbi
School of Engineering

Trends of USC GCS Program

- First USC class (2012) had 2 Scholars

- 2018 Class had 44 Scholars

Students are introduced to NAE Grand Challenges during Engineering Academy (Freshman Seminar)

USC Scholars Program

Students must demonstrate ***breadth*** and ***depth*** in their education.

Entrepreneurship

Research/ Creativity

Multidisciplinary

Social Consciousness

Cultural awareness

USCViterbi
School of Engineering

Engineering Creativity: RPL

Rocket Propulsion Lab

- Student rocket design club

- In May 2019, they broke the Kármán line (340,000 feet) and reached space. This is a record for an all-student team.

USC Viterbi
School of Engineering

Entrepreneurship: Maker space/start-ups

Entrepreneurship support

- Students have free access to undergrad fab-lab and (new) Baum Makerspace to explore ideas

- Through the Viterbi Start-Up Garage or Maseeh Prize Competition, they can receive mentoring (and money!) to transition their ideas into a business

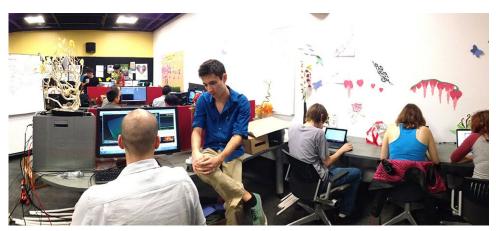USC Viterbi
School of Engineering

Multidisciplinary: Innovative Degrees

CS-Games degree program

- Joint degree program between Cinema school and Engineering school

- Students take classes in both schools and design a new game as a senior project.

CS students trained alongside design students

SCA Motion capture stage

USC Viterbi
School of Engineering

Cultural Awareness: Global Classrooms

iPodia Classroom

- Students can take degree-required classes through the iPodia networked classrooms

- Course includes end-of-semester, in-person meet-up

The iPodia students engage with global peers via the technology-enabled exchange across geographical borders.

The USC-NTU students meet up for the 2018 Fall iPodia class.

University of Southern California Los Angeles, USA

University of Patras Patras, Greece

RWTH Aachen University Aachen, Germany

Peking University Beijing, China

Korea Advance Institute of Science and Technology Daejeon, South Korea

National Taiwan University Taipei, Taiwan

(Research Partner) U.C. Santa Barbara

● *Headquarter*
● *Charter member*
● *Member*

- Equal-reciprocity
- Revenue-neutral
- No-joint-degree

As of 2019, the iPodia Alliance is 16 universities

National Autonomous University of Mexico

Universidade de São Paulo São Paulo, Brazil

Israel Institute of Technology Haifa, Israel

Qartar University Dohar, Qatar

BITS - Birla Institute of Technology & Science Pilani - Hyderabad India

Indian Institute of Technology Mumbai, India

Not shown:
- Tsinghua University in Beijing, China
- The University of Patras, in Patras, Greece
- University of New South Wales, Sydney, Australia
- Shanghai Jiaotong University, Shanghai, China

USC Viterbi
School of Engineering

Social Consciousness: Designing Solutions

Specialized courses

- CE 499: Innovation in Engineering Design for Global Challenges
- Students come from all degree programs
- Course includes:
    - Visit to location to meet with all stakeholders
    - Design, prototype of "innovation"
- Supported by Min Family Challenge

USC Program Information

Info about USC's program:

Website: http://viterbiundergrad.usc.edu/gcsp/

These slides:

Website: https://armani.usc.edu/

My contact info:

Prof. Andrea Armani, armani@usc.edu