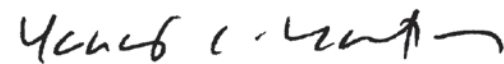


MESSAGE FROM THE DEAN

The outreach of engineering schools to our K-12 educational system is becoming an increasingly important priority. The competitiveness of our nation in the new global knowledge economy requires a highly educated workforce in the STEM (Science, Technology, Engineering and Mathematics) fields. Creating a well-oiled and dynamic pipeline for Engineering, in particular, is a key necessity for empowering the society with the new industries and businesses of the future.

Outreach occurs in a number of ways: from the direct involvement of engineering students (undergraduate or graduate) with K-12 students, the development of curriculum, teaching, mentoring and extra-curriculum activities; to the engagement of teachers at the various K-12 levels with our faculty, staff and students; to the development of innovative models for K-12 curricula and instruction; and to the support of the National Academy of Engineering “Changing the Conversation” initiative.

This report provides a snapshot of the various activities of the USC Viterbi School of Engineering in K-12 Outreach, an effort that we have dubbed Viterbi K-12. It is an effort that is growing fast and aims at the ultimate goal of “engineering empowering society” by making sure that “society is empowering engineering.”



Yannis C. Yortsos

Dean, USC Viterbi School of Engineering



On the cover: Maja Matarić, Viterbi’s vice dean of research, hosts an annual USC Robotics Open House to introduce kids to cutting edge research robots. In the background – circa 1964 – George Bekey, robotics pioneer and Viterbi professor emeritus (leaning, to the right of Matarić), is seen alongside an early digital-analog computer system in the lab he created.

VITERBI SCHOOL AT A GLANCE

SELECTED KEY PERSONNEL



Larry Lim
Director, Pre-College Programs,
USC Viterbi School of Engineering



Dr. Gisele Ragusa
Director of the Center for Outcomes
Research and Evaluation



Dr. John Brooks Slaughter
Professor of Engineering
and Education

Research Centers and Institutes Home to:

- Information Sciences Institute (ISI)
- The Ming Hsieh Institute
- The Daniel J. Epstein Institute
- Two National Science Foundation (NSF) Engineering Research Centers (ERC)
 - Integrated Media Systems Center (IMSC)
 - Biomimetic MicroElectronic Systems Center (BMESC)
- University Center of Excellence of the U.S. Department of Homeland Security
 - Center for Risk and Economic Analysis of Terrorism Events (CREATE)
- Department of Energy Frontiers Research Center (EFRC)
- Biomedical Informatics Research Network (BIRN)
- HTE@USC (Health, Technology and Engineering@USC)
- LADWP/DOE Smart Grid Demonstration Project
- Center for Interactive Smart Oil Field Technology (CiSoft)
- NIH Center on Genomics and Phenomics of Autism

Affiliated with:

- Alfred E. Mann Institute for Biomedical Engineering (AMI)
- Institute for Creative Technologies (ICT)
- USC Energy Institute
- USC Stevens Institute for Innovation

Founded

USC engineering began in 1905

Student population

Approximately 2,100 undergraduate students and 4,000 graduate students

Faculty

174 tenured and tenure-track faculty, with 52 endowed chairs and professorships

Academic departments

Eight

Alumni

More than 60,000

Education centers

- Division of Engineering Education
- KIUEL (Klein Institute for Undergraduate Engineering Life)
- K-12 Center

Annual research expenditures

More than \$180 million, with more than 45 research centers and institutes

Spotlight on:

USC MESA Program (Mathematics, Engineering, Science Achievement)— one of the nation’s most successful efforts to encourage K-12 students from minority/disadvantaged groups to consider science and technology as career paths.

35 years — 25,000 students

- **1206** Students (middle and high school) enrolled in MESA, 2010-2011
- **180** MESA seniors in 2010
- **94.7%** enrolled in college in 2010-2011
- **83%** enrolled in a 4-yr college in 2010-2011
- **56%** with STEM major

Viterbi K-12



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THE DEAN’S REPORT 2011/2012

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Viterbi K-12

STEM Pathways in the Heart of a Mega-City: Los Angeles

USC was recently ranked the #1 “Good Neighbor” University in America for its strong ties with the local underserved community that includes educational outreach, service learning, health programs, and business development.

The USC Viterbi School recognizes that we live in an unprecedented era —

“the most exciting era for engineering and science in human history”, in the words of President Chuck Vest of the National Academy of Engineering. There are 746,000 students in Los Angeles public schools, many from low-income, underrepresented minority families. These nearly 50 schools depicted below represent Viterbi’s STEM pathways to attract and retain the best students, the greatest diversity of thought and ideas in the second largest city in America.

A CRITICAL NEED: Snapshot of USC’s Neighbors

44,513 people
in a 2.8 sq mile area

30.71% adults
with less than a 9th grade education

\$23,887
median income

35.6% households
at or below federal poverty rate

49.7% adults
not in labor force or unemployed

HOLLYWOOD

Long Beach Arena
site of FIRST Robotics competition
(co-sponsored by Viterbi School)

Viterbi’s K-12 Family of Schools

- High School
- Middle School
- Elementary School



Center for Robotics and Embedded Systems

Working with K-12 students all over Los Angeles, Viterbi’s programs have provided robotics curriculum development, teacher training, robot kits and lesson plans, as well as robot contest mentoring for events like FIRST Robotics competition.



The Engineering for Health Academy (EHA) at Francisco Bravo Medical Magnet High School

As part of USC’s Biomimetic MicroElectronic Systems Engineering Research Center, EHA introduces 10-12th grade students to all aspects of biomedical engineering, including USC and industry research laboratories, experiential projects and university mentors and equipment.



Ped-Tek at LEMA High School

Can students learn math by creating video games? Supported by a NSF Creative IT award, computer scientists at the Viterbi School explore innovative ways to use technology to teach mathematics and 21st century skills to at-risk high school students.



NSF GK-12 Award: Body Engineering LA

Using the human body as the gateway to engineering topics from lever strength to viscosity, BE-LA will directly impact at least 45 graduate fellows, 45 teachers, roughly 2000 underserved 6th-8th graders and six participating schools over five years.



NSF Research Experience for Teachers

Inner-city Los Angeles teachers (grades 6-12) are immersed in cutting edge research — from robotics to nanotechnology. After six weeks in a USC Viterbi laboratory, they’ll bring their new found expertise and pedagogy back to the classroom.