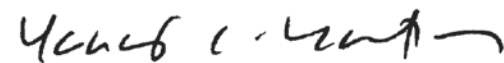


## MESSAGE FROM THE DEAN

**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

## 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

### 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

### USC Viterbi School of Engineering

3650 McClintock Avenue, Los Angeles, CA 90089

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[viterbi.usc.edu](http://viterbi.usc.edu)

# Viterbi K-12



DESIGN: WARREN GROUPE | STUDIO DEUXE | ILLUSTRATION: GAVIN POTENZA

THE DEAN'S REPORT 2011/2012

# 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

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

HOLLYWOOD

## 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.