WebEx Quick Facts

Will I be able to get a copy of the slides after the presentation?

YES!

How can I ask a question during the information session?

1. Using the Q&A Panel, type a question in the box below the Ask drop-down menu.
2. Select a recipient from the Ask drop-down menu.
3. Click Send. We will respond as soon as we are able.
Today’s Program

- University of Southern California
- USC Viterbi School of Engineering
- Graduate Programs in Biomedical Engineering
  - Program Overview
  - Application Criteria
- DEN@Viterbi
- Tuition & Fees
- Q&A
UNIVERSITY OF SOUTHERN CALIFORNIA
The University of Southern California

- Oldest Private University in the western U.S.
  - Founded in 1880
- 47,500 Students
  - 20,000 Undergraduates  |  27,500 Graduates
- 4,451 Full-time Faculty
- Diverse Student Population
- Located in Los Angeles
Viterbi School at a Glance

**Academic Departments**
- 8 Academic Departments

**Faculty**
- 188 tenure-track faculty
- 16 Full-time, TT NAE Members (30 Total)
- 70+ NSF CAREER, National & Presidential Young Investigator

**Student Populations (Fall 2018)**
- 2,767 Undergraduate
- 5,922 Graduate students

**Research**
- Leader in funded research
- 35+ Research Centers
- More than $207M in research expenditures annually
USC Engineering: Points of Distinction

- International Reputation for Excellence
- The Trojan Family Network: 77,000+ (engineers) strong
- Unique engineering programs available: Online, on site & on campus
- Complete range of programs
  - Doctoral, Masters and Bachelors
  - Graduate Certificates
  - Short Courses
  - Custom Programs
U.S. News & World Report, 2019

Best Engineering Graduate Schools

- Top 10 Ranked Graduate Engineering Program

Best Online Graduate Engineering Programs

- Ranked #1 Online Graduate Computer Information Technology Program (Computer Science)
- Ranked #2 Online Graduate Engineering Programs

Best Online Graduate Engineering Programs for Veterans

- Ranked #1 Online Graduate Computer Information Technology Program (Computer Science) for Veterans
- Ranked #2 Online Graduate Engineering Programs for Veterans
The Viterbi School of Engineering: A Leader in Research

Viterbi School is a consistent leader in funded research in the U.S.

- Highly interdisciplinary research environment
- Diverse research areas such as robotics, software engineering, sensor networks, vision sciences, automated construction and photonics
- Over 35 research centers
- Industrial partnerships and collaboration
Meet Professor Kirk Shung

- **Professor Kirk Shung**
  - Department Chair of Biomedical Engineering
  - Ph.D. in Electrical Engineering, University of Washington
  - 2016 IEEE Biomedical Engineering Award
  - 2011 IEEE Engineering in Medicine and Biology Society Professional career achievement award
  - 2010 American Institute of Ultrasound in Medicine Joseph Holms Pioneer Award in Basic Science
  - 2008 VSoE, USC VSoE Senior Research Award
Department of Biomedical Engineering – Quick Facts

- Founded 1976 (celebrating 43 years!)
- Core Faculty:
- Affiliated Faculty: >50
- Staff: 12
- Undergraduate students: 250
- M.S. students: 124
- Ph.D. students: 117
Department of Biomedical Engineering – Faculty

• 1976: 4 faculty
• 1996: 9 faculty
• 2019: 24 faculty and growing!

Prof. Jennifer Treweek
Joined in Spring 2019

Physiological function of stress-related neuropeptide circuits using advanced neuroscience techniques.

Prof. Maral Mousavi
Joined in Fall 2019

Point-of-care diagnostics, electrochemical sensors
# Department of Biomedical Engineering – Faculty Areas of Specialization

<table>
<thead>
<tr>
<th>Area</th>
<th>Core and Research Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio-signals and Systems</td>
<td>D’Argenio, Khoo, Marmarelis, Yamashiro</td>
</tr>
<tr>
<td>Neural Engineering</td>
<td>Berger, Boutellier, Humayun^, Lee, Loeb, Mel, Sanger^, Song,</td>
</tr>
<tr>
<td></td>
<td>Valero-Cuevas^, Treweek*</td>
</tr>
<tr>
<td>Devices and Imaging</td>
<td>Liu, Maarek, Meng, Shung, Yen, Zavaleta*, Zhou^, Mousavi*</td>
</tr>
<tr>
<td>Cellular/Molecular Bioengineering</td>
<td>Chung*, Finley*, Fraser^, Kay^, McCain*, Shen*</td>
</tr>
</tbody>
</table>

**Color Code:**
- Core Faculty
- Research Faculty

* Assistant Professors
^ Joint Appointments
Department of Biomedical Engineering – Noteworthy Events

- Instructional lab (DRB351) has been revamped
- Instructional wet lab (BHE 18) is ready
- A full time technician is hired to run these labs
- A Maker Space (8,000 SF) for project design and fabrication located at Seaver Science and Engineering Library will open in Jan, 2020
- BME’s own maker space is now functional
Noteworthy Biomedical Engineering News

- Prof. Vasilis Marmarelis received a 5 year $10M NIH grant on model-based diagnosis of early Alzheimer’s disease which is a joint effort of 3 universities.

- Prof. Eun Ji Chung Receives 2019 IEEE Nanomedicine New Innovator Award.

- Profs. Ellis Meng and Dong Song received a 5 year $6M Brain Initiative Award from NIH.
Biomedical Engineering: Program Offerings

- MS in Biomedical Engineering
- MS in Biomedical Engineering (Medical Imaging & Imaging Informatics)
- MS in Biomedical Engineering (Neuroengineering)
- MS in Medical Device and Diagnostic Engineering

Available online via DEN@Viterbi
MS in Biomedical Engineering – Program Details

Program Requirements: 28 units

Required Courses (15 units)
- BME 501 | Advanced Topics in Biomedical Systems (4 units)
- BME 502 | Advanced Studies of the Nervous System (4 units)
- BME 511 | Physiological Control Systems (3 units)
- BME 513 | Signal and Systems Analysis (3 units)
- BME 533 | Seminar in Bioengineering (1 unit)

Elective Courses (13 units)
*BME approved technical elective courses; please see the program page for a full list of approved elective courses*
- BME 525 | Advanced Biomedical Imaging (3 units)
- BME 527 | Integration of Medical Imaging Systems (3 units)
- BME 528 | Medical Diagnostics, Therapeutics and Informatics Applications (3 units)
- BME 535 | Ultrasonic Imaging (3 units)
- BME 650 | Biomedical Measurement and Instrumentation (3 units)
- CSCI 561 | Foundations of Artificial Intelligence (4 units)
MS in Biomedical Engineering
(Medical Imaging & Imaging Informatics) – Program Details

Program Requirements: 29 units

Required Courses (23 units)

- BME 501 | Advanced Topics in Biomedical Systems (4 units)
- BME 513 | Signal and Systems Analysis (3 units)
- BME 525 | Advanced Biomedical Imaging (3 units)
- BME 527 | Integration of Medical Imaging Systems (3 units)
- BME 528 | Medical Diagnostics, Therapeutics and Informatics Applications (3 units)
- BME 535 | Ultrasonic Imaging (3 units)
- EE 569 | Introduction to Digital Image Processing (4 units)

Elective Courses (2 courses required - 6 units)

BME approved elective courses; please see the program page for a full list of approved elective courses

- BME 502 | Advanced Studies of the Nervous System (3 units)
- BME 511 | Physiological Control Systems (3 units)
- BME 650 | Biomedical Measurement and Instrumentation (3 units)
- CSCI 530 | Security Systems (4 units)
MS in Biomedical Engineering (Neuroengineering) – Program Details

Program Requirements: 28 units

Required Courses (21 units)

- BME 501 | Advanced Topics in Biomedical Systems (4 units)
- BME 502 | Advanced Studies of the Nervous System (4 units)
- BME 511 | Physiological Control Systems (3 units)
- BME 513 | Signal and Systems Analysis (3 units)
- BME 533 | Seminar in Bioengineering (1 unit)
- BME 552 | Neural Implant Engineering (3 units)
- BME 575 | Computational Neuroengineering (3 units)

Approved Technical Elective Courses (7 units)
MS in Medical Device and Diagnostic Engineering – Program Details

Program Requirements: 28 units

Required Courses (19 units)

- BME 501 | Advanced Topics in Biomedical Systems (4 units) or
- BME 502 | Advanced Studies of the Nervous System (4 units)
- BME 513 | Signal and Systems Analysis (3 units)
- BME 650 | Biomedical Measurement and Instrumentation (3 units)
- MPTX 511 | Introduction to Medical Product Regulation (3 units) or
- BME 416 | Development and Regulation of Medical Products (3 units)
- MPTX 515 | Quality Systems and Standards (3 units)
- ISE 527 | Quality Management for Engineers (3 units)
- ISE 545 | Technology Development and Implementation (3 units)

Technical Elective Course (3 units)

Required Specialization Track (6 units)

Complete 6 units from the Regulation, Medical Technology & Device Science or Product Development Track
Application Criteria for Master’s Programs

Each program has unique application requirements – please be sure to review specific information for your program(s) of interest: https://viterbigradadmission.usc.edu/programs/masters/msprograms/biomedical-engineering/

General Application Criteria

- Undergraduate degree in engineering, math or a hard science from a regionally-accredited university (official transcripts submitted)

- To be competitive, a cumulative undergraduate GPA Of at least 3.0 on a 4.0 scale is recommended (not required)

- Satisfactory scores on the general portion of the Graduate Record Examination (GRE) General Test that are less than 5 years old

- CV/Resume Required

- Statement of Purpose Required

- 3 Letters of Recommendation Required

- TOEFL (International Applicants)
Application Deadlines

Fall 2020
- Deadline to submit all required materials: January 15, 2020*
- Deadline for Scholarship Consideration (on-campus only): December 15, 2019

Spring 2021
- Deadline to submit all required materials: September 15, 2020*
- Deadline for Scholarship Consideration (on-campus only): August 31, 2020

* A deadline extension for DEN@Viterbi applicants may be available. Please email DEN@Viterbi.usc.edu for more information.

Helpful Links:
- List of DEN@Viterbi Programs: http://viterbi.usc.edu/DENDegrees
- USC Graduate Application: https://usc.liaisoncas.com
## Where Our Alumni Are Working

<table>
<thead>
<tr>
<th>Sample Company</th>
<th>Sample Job Titles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott</td>
<td>Quality Engineer, Process Engineer, Senior Clinical Specialist</td>
</tr>
<tr>
<td>Amgen</td>
<td>Engineer, Director of Corporate Strategy</td>
</tr>
<tr>
<td>Apple</td>
<td>Biomedical Engineer, Sensor Calibration &amp; Instrumentation Engineer</td>
</tr>
<tr>
<td>Applied Medical</td>
<td>R&amp;D Software Engineer</td>
</tr>
<tr>
<td>Boston Scientific</td>
<td>Principal Scientist; Senior R&amp;D Engineer</td>
</tr>
<tr>
<td>Edwards Lifesciences</td>
<td>Medical Device Engineer, R&amp;D Manager, Technical Dvlp Program Engineer</td>
</tr>
<tr>
<td>Genentech</td>
<td>Project &amp; Manufacturing Engineer, Regulatory Program Manager</td>
</tr>
<tr>
<td>Google</td>
<td>Software Engineer</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>Regulatory Affairs</td>
</tr>
<tr>
<td>Kaiser Permanente</td>
<td>Imaging Solutions Architect</td>
</tr>
<tr>
<td>Medtronic</td>
<td>Sr. Biomedical Engineer, Principal R&amp;D Engineer, Sr. Quality Engineer</td>
</tr>
<tr>
<td>Stryker</td>
<td>Sr. Design Engineer, Director, Mechanical Design Engineer</td>
</tr>
</tbody>
</table>

Course Delivery Methods

Methods of Course Delivery

- **On-campus, full time**
  - 3 classes per semester
  - 1.5 – 2 years to complete

- **Online delivery via DEN@Viterbi**
  - 1-2 classes per semester
  - 2.5 – 3 years to complete degree
How DEN@Viterbi Works

The Viterbi School of Engineering uses a state-of-the-art, proprietary web-based delivery system that enables students from around the world to access classes live or on-demand.

DEN@Viterbi Students:

- View the same lectures as on-campus students, with fresh content every semester
- Participate in highly interactive discussions with professors and peers
- Submit homework electronically
- Take exams at proctored testing centers near their home or work (or at USC if in the Los Angeles area)
## DEN@Viterbi Overview

<table>
<thead>
<tr>
<th></th>
<th>DEN@Viterbi Student</th>
<th>On-Campus Student</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Admission</strong></td>
<td>USC Graduate Application &amp; required materials</td>
<td>USC Graduate Application &amp; required materials</td>
</tr>
<tr>
<td><strong>Weekly Course Lectures</strong></td>
<td>Online with Interactivity</td>
<td>On USC’s Campus</td>
</tr>
<tr>
<td><strong>Online Course Archives</strong></td>
<td>✅</td>
<td>✅ *</td>
</tr>
<tr>
<td>(Lectures &amp; Course Documents)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Assignments</strong></td>
<td>Submit electronically according to course deadlines</td>
<td>Submit during lecture or lab according to course deadlines</td>
</tr>
<tr>
<td><strong>Exams</strong></td>
<td>Proctored location</td>
<td>USC’s campus</td>
</tr>
<tr>
<td><strong>Courses per Semester</strong></td>
<td>1-2</td>
<td>3-4</td>
</tr>
<tr>
<td>(Average)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Degree Completion Requirements</strong></td>
<td>27-37 units with a 3.0 GPA or above</td>
<td>27-37 units with a 3.0 GPA or above</td>
</tr>
<tr>
<td><strong>USC Diploma</strong></td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>(No Distinction)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*DEN@Viterbi Sections Only*
DEN@Viterbi’s E-Learning System

DEN@Viterbi Classroom
DEN@Viterbi’s E-Learning System
DEN@Viterbi’s E-Learning System

Helium Porosity vs. Air Permeability

- Used to select porosity cut-offs, for reservoir rocks.
- Based on permeability values.

dgh@hillpetro.com

PTE-461: Fall 2017 Section 3: Petrophysics

Slide No.: 23
Student Interactivity & Group Meetings

- All DEN@Viterbi students are provided access to their own meeting rooms which can be used for several purposes:
  - Enable video communication (web and mobile)
  - Integrate phone conferencing
  - Integrate fixed room IP video systems
  - Desktop sharing
  - Set up meetings with faculty, teaching assistants and peers

- Call in during live lectures

- Participate in live chats and threaded discussion boards
DEN@Viterbi

Question: Is there any difference between earning a Master’s degree on campus vs. via DEN@Viterbi?

Answer: NO. DEN@Viterbi is a delivery method. Students adhere to the:
- Same Admission Criteria
- Same Curriculum
- Same Exams and Homework
- Same Academic Standards and Graduation Requirements

Therefore...

You earn the same diploma whether you earn the degree on-campus or online through DEN@Viterbi.
DEN@Viterbi Additional Info

Limited Status

- Allows strong candidates to begin coursework before formal admission.
- Courses (maximum of 12 units) can be applied toward degree program once admitted but limited status does not guarantee admission.
- Get Started this Spring 2020:
  https://viterbigradadmission.usc.edu/denviterbi/getting-started/

Employer Reimbursement Deferment

Students supported by a company can defer payment of up to 90% of tuition until after the semester is over.

Program Eligibility

- Your employer reimburses you for tuition at the end of each term.
- Your student account is current.

For additional information: https://sfs.usc.edu/payment/employer-reimbursement/
Tuition & Fees (2019-2020)

Example of tuition and fees for a DEN@Viterbi Student

<table>
<thead>
<tr>
<th>PER-COURSE FEES</th>
<th>Unit Cost</th>
<th>Tuition for 3-Unit Course</th>
<th>Tuition for 4-Unit Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition for 500/600 level course</td>
<td>$2,075</td>
<td>$6,225</td>
<td>$8,300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PER-SEMESTER FEES</th>
<th>Cost</th>
<th>Total per semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Access Fee</td>
<td>$35</td>
<td>$35</td>
</tr>
<tr>
<td>Norman Topping Student Aid Fund</td>
<td>$8</td>
<td>$8</td>
</tr>
</tbody>
</table>

*Additional fees include textbooks ($150 - 200) and exam proctoring fees ($40 - 100)*
Getting Started

For those interested in taking classes on campus:

- Visit USC campus
- Start your application: https://gradadm.usc.edu/apply/

For those interested in taking classes online via DEN@Viterbi:

- Start your application: https://gradadm.usc.edu/apply/ -or-
- Start as a Limited Status Student as early as Spring 2020
  Complete the DEN@Viterbi Profile: viterbi.usc.edu/denprofile
Contact Us

USC Viterbi School of Engineering
Admission & Student Engagement

Email: On Campus: viterbi.gradadmission@usc.edu
      DEN@Viterbi: DEN@Viterbi.usc.edu

Phone: 213.740.4488

http://viterbi.usc.edu/gradprograms