Discover Viterbi: Biomedical Engineering
with Prof. Ellis Meng

Viterbi School of Engineering
University of Southern California
Spring 2018
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
The University of Southern California

- Oldest Private University in the western U.S.
  - Founded in 1880
- 44,000 Students
  - 19,000 Undergraduates | 25,000 Graduates
- 4,190 Full-time Faculty
- Diverse Student Population
- Located in Los Angeles
Viterbi School at a Glance

**Academic Departments**
- 8 Academic Departments

**Faculty**
- 185 tenure-track faculty
- 20+ NAE
- 60+ NSF CAREER, National & Presidential Young Investigator

**Student Populations**
- 2,700 Undergraduate
- 5,600 Graduate students

**Research**
- Leader in funded research
- 45+ Research Centers
- More than $185M in research expenditures

**Alumni**
- More than 65,000+
U.S. News & World Report, 2018

Best Engineering Graduate Schools
- Top 10 Ranked Graduate Engineering Program

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

Best Online Graduate Engineering Programs for Veterans
- Ranked #1 Online Graduate Engineering for Veterans
- Ranked #1 Online Computer Information Technology for Veterans
USC Engineering: Points of Distinction

- International Reputation for Excellence
- The Trojan Family Network: 65,000+ engineers strong
- Unique engineering programs available: *Online, on site & on campus*
- Complete range of programs
  - PhD, Masters and Bachelors
  - Graduate Certificates
  - Short Courses
  - Custom Programs
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 45 research centers
- Industrial partnerships and collaboration
Meet Professor Ellis Meng

- **Professor Ellis Meng**
- Department Chair of Biomedical Engineering
- PhD in Electrical Engineering, California Institute of Technology (Caltech)
- NSF CAREER award, 2009 TR35 Young Innovator Under 35, Viterbi Early Career Chair, ASEE Curtis W. McGraw Research Award, AIMBE Fellow, IEEE Fellow, ASME Fellow and BMES Fellow
- Founded the Biomedical Microsystems Laboratory which conducts research on biocompatible polymer technology and micromachining, sensors and actuators, microfluidics, and implantable and biomedical microelectromechanical systems (MEMS).
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 elective courses; please see the program page for a full list of approved elective courses
- BME 416 | Development and Regulation of Medical Products (3 units)
- BME 525 | Advanced Biomedical Imaging (3 units)
- BME 527 | Integration of Medical Imaging Systems (3 units)
- BME 528 | Medical Imaging Informatics (3 units)
- BME 535 | Ultrasonic Imaging (3 units)
- BME 650 | Biomedical Measurement and Instrumentation (3 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 Informatic 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 416 | Development and Regulation of Medical Products (3 units)
- 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)
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 Masters 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 (Bachelor of Science) in engineering, math, or hard science from a regionally-accredited university

- A cumulative undergraduate GPA of at least 3.0 on a 4.0 scale is recommended

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

- Resume/CV and Supplemental Materials (Letters of Recommendation/Statement of Purpose)

- TOEFL (International Applicants)
Application Deadlines

Application Deadlines for 2018

Fall 2018
- Deadline to submit all required materials: January 17, 2018*

Spring 2019
- Deadline to submit all required materials: September 15, 2018*
- Deadline for Scholarship Consideration (on-campus only): August 31, 2018

Helpful Links:
List of DEN@Viterbi Programs
http://viterbi.usc.edu/DENDegrees

USC Graduate Application:
https://usc.liaisoncas.com

*A deadline extension for DEN@Viterbi applicants may be available. Please email DEN@Viterbi.usc.edu for more information.
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>
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<tr>
<td>Kaiser Permanente</td>
<td>Imaging Solutions Architect</td>
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<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>
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</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)
<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</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>Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>USC Diploma (No Distinction)</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*DEN@ViterbiSections 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
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 Summer 2018:
  https://viterbigradadmission.usc.edu/denviterbi/getting-started/

Tuition Deferment Program

- Students supported by company can defer “up front” payment of tuition until after the semester is over.
- Company must pay 75-100% of tuition to be eligible for program.
- For additional information:
  https://viterbigrad.usc.edu/tuition-and-funding/employer-supported
# Tuition & Fees (2017-2018)

<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>$1,937</td>
<td>$5,811</td>
<td>$7,748</td>
</tr>
</tbody>
</table>

Degree Programs are 27-36 units (9-11 courses)

For an overview of additional fees, please visit: https://viterbigradadmission.usc.edu/programs/masters/tuition-funding/
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 Summer 2018
  Complete the DEN@Viterbi Profile: viterbi.usc.edu/denprofile
Contact Us

USC Viterbi School of Engineering
Graduate & Professional Programs

On Campus: viterbi.gradprograms@usc.edu
DEN@Viterbi: DEN@Viterbi.usc.edu

213.740.4488

http://viterbi.usc.edu/gradprograms