Discover Viterbi: Aerospace & Mechanical Engineering with Professor Julian Domaradzki

Viterbi School of Engineering
University of Southern California

Spring 2019

USC Viterbi School of Engineering | USC University of Southern California

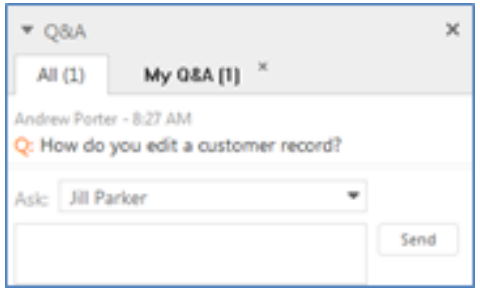
WebEx Quick Facts

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.

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Today's Program

- University of Southern California
- USC Viterbi School of Engineering
- Aerospace & Mechanical Engineering
  - Program Overview
  - Application Criteria
- DEN@Viterbi
- Tuition & Fees
- Q&A

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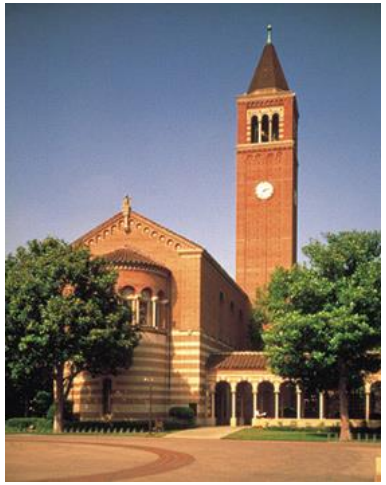

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The University of Southern California

- Oldest Private University in the western U.S.
  - Founded in 1880
- 47,500 Students
  - 20,000 Undergraduates | 27,500 Graduates
- 4,361 Full-time Faculty
- Diverse Student Population
- Located in Los Angeles

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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

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U.S. News & World Report, 2019

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 Computer Information Technology Program (Computer Science) for Veterans
- **Ranked #2** Online Graduate Engineering Programs for Veterans

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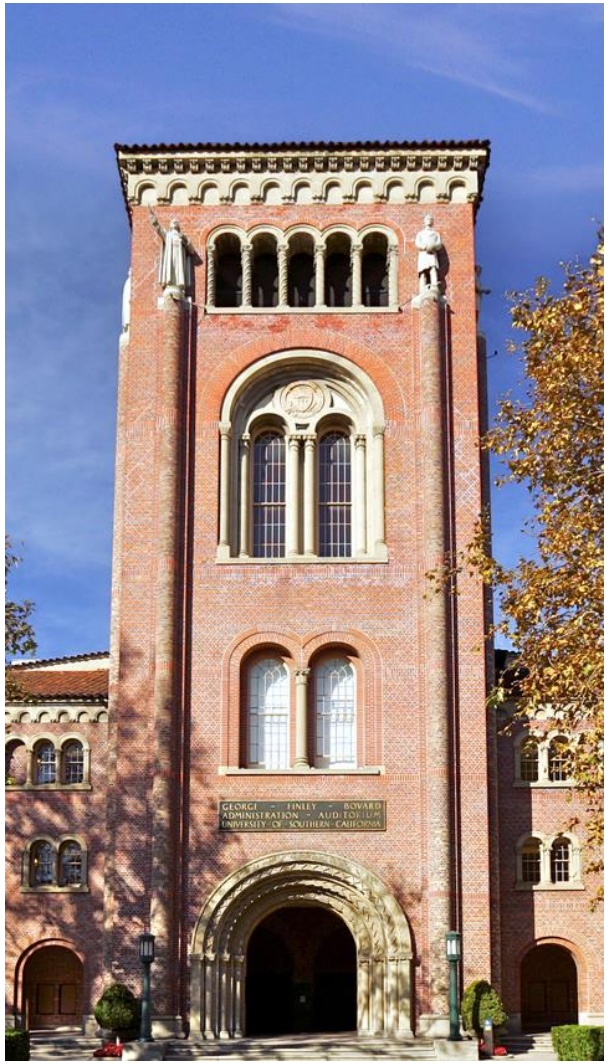
USC Engineering: Points of Distinction



- 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

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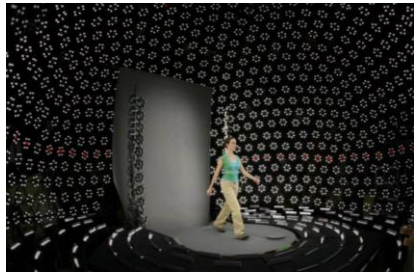
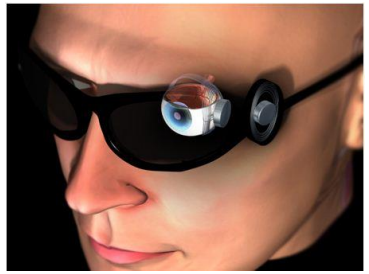
The Viterbi School of Engineering: A Leader in Research

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



Institute for Creative Technologies



Biomimetic Microelectronic Systems Engineering Research Center

National Center for Metropolitan Transportation Research

CREATE Homeland Security Center

- 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

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Meet Professor Julian Domaradzki

Professor Julian Domaradzki

- Professor & Chairman, Department of Aerospace and Mechanical Engineering
- PhD in Physics, University of Warsaw
- Research work has been supported by organizations such as the Office of Naval Research (ONR), the Department of Energy (DOE), NASA's Jet Propulsion Laboratory (JPL) and the National Science Foundation (NSF).
- Fellow of the American Physical Society (APS) and associate fellow of the American Institute of Aeronautics and Astronautics (AIAA)

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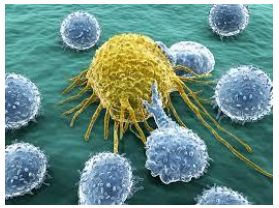
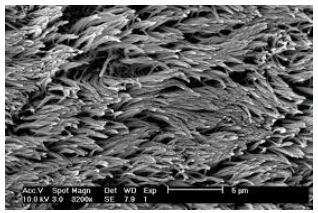
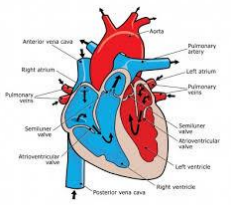
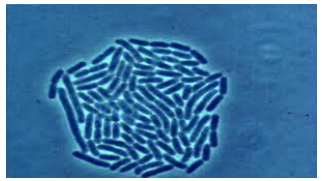
Major Research Themes in AME

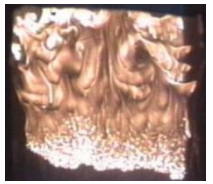
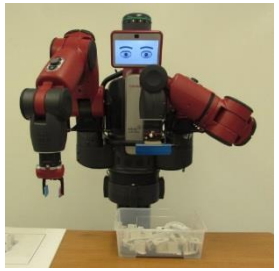
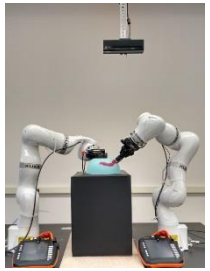
- Aerospace Systems and Technologies
- Biodynamical Engineering
- Energy Engineering
- Autonomous Systems, Robotics, and Advanced Manufacturing





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Aerospace & Mechanical Engineering

Numbers

- 21 Faculty + 18 Joint Appointments + 9 Full-Time Lecturers
- 515 undergraduates (~20% of VSoE), 472 graduate students (~10% of VSoE)
- ~ $20M in active external research funding

Student groups

- AIAA student design-build-fly team (placed 6th, 3rd, 1st, 3rd,1st, … in last 5 years)
- Formula SAE race car team (placed 12th last year)
- ASME human powered vehicle design team (placed 4th in the West competition)

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Aerospace & Mechanical Engineering – MS Programs

- MS in Aerospace Engineering 💻
- MS in Aerospace & Mechanical Engineering (Computational Fluid & Solid Mechanics) 💻
- MS in Aerospace & Mechanical Engineering (Dynamics and Control) 💻
- MS in Mechanical Engineering 💻
- MS in Mechanical Engineering (Energy Conversion) 💻
- MS in Product Development Engineering 💻
- MS in Aerospace Engineering/Engineering Management (Dual degree) 💻
- MS in Mechanical Engineering/Engineering Management (Dual degree) 💻

💻 Available online via DEN@Viterbi

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MS in Aerospace Engineering – Program Details

Available on DEN@Viterbi

Program Requirements: Minimum of 27 units

Required Engineering Analysis Courses (6 units)

AME 525 | Engineering Analysis

AME 526 | Engineering Analytical Methods

(to be replaced in Fall 2019 by 4 unit required AME 525 Engineering Analysis course)

Required Core Specialization Track – *One core specialization track must be selected from the following list – number of units vary by track. Specialization electives are also required.*

- Aerodynamics/Fluid Dynamics
- Aerospace Controls
- Aerospace Design
- Aerospace Structures
- Computational Fluid Dynamics
- Propulsion

USC Viterbi School of Engineering

MS in Aerospace & Mechanical Engineering (Computational Fluid & Solid Mechanics) – Program Details

Available on DEN@Viterbi

Program Requirements: Minimum of 27 units

Required Core Courses (21 units)

- AME 404 | Computational Solutions to Engineering Problems (3 units)
- AME 509 | Applied Elasticity OR CE 507
- CE 507 | Mechanics of Solids OR AME 509
- AME 525 | Engineering Analysis
- AME 526 | Engineering Analytical Methods
- AME 530a | Dynamics of Incompressible Fluids
- AME 535a | Introduction to Computational Fluid Mechanics
- CE 529a | Finite Element Analysis

Technical Elective (3 units) - One course. *Sample courses include:*

- AME 511 | Compressible Gas Dynamics
- AME 516 | Convection Processes
- CE 541a | Dynamics of Structures

Computational Technical Elective (3 units) - One course. *Sample courses include:*

- AME 535b | Introduction to Computational Fluid Mechanics
- CE 529b | Finite Element Analysis
- MASC 575 | Basics of Atomistic Simulation of Materials
- MASC 576 | Molecular Dynamics Simulations of Materials and Processes

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MS in Aerospace & Mechanical Engineering (Dynamics & Control) – Program Details

Available on DEN@Viterbi

Program Requirements: Minimum of 27 units

Required Core Courses (21 units)

- AME 525 | Engineering Analysis
- AME 526 | Engineering Analytical Methods
- AME 521 | Engineering Vibrations II
- AME 522 | Nonlinear Vibrations
- AME 524 | Advanced Engineering Dynamics
- AME 541 | Linear Control Systems II
- AME 552 | Nonlinear Control Systems

Elective Courses (6 units)

Elective courses can be chosen in areas of specific interest to the student such as orbital dynamics, spacecraft control, aircraft dynamics and control, chaos and chaotic dynamics, random vibrations, computer control of mechanical systems and robotics.

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MS in Mechanical Engineering – Program Details

Available on DEN@Viterbi

Program Requirements: Minimum of 27 units

Required Engineering Analysis Courses (6 units)

- AME 525 | Engineering Analysis
- AME 526 | Engineering Analytical Methods

(to be replaced in Fall 2019 by 4 unit required AME 525 Engineering Analysis course)

Required Core Specialization Track

Students choose one of the following tracks and take track core courses and electives

- Thermal and Fluid Sciences Track with the following emphasis options:
  - Combustion
  - Fluid Dynamics
  - Heat Transfer
- Engineering Design Track
- Mechanics and Materials
- Advanced Manufacturing

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MS in Mechanical Engineering (Energy Conversion) – Program Details

Available on DEN@Viterbi

Program Requirements: Minimum of 27 units

Required Engineering Analysis Courses (21 units)

- AME 430 | Thermal System Design
- AME 525 | Engineering Analysis
- AME 526 | Engineering Analytical Methods
- AME 577 | Survey of Energy and Power for a Sustainable Future
- AME 578 | Modern Alternative Energy Conversion Devices
- CE 501 | Functions of the Constructor
- SAE 515 | Sustainable Infrastructure Systems

Approved Elective Courses (6 units)

Students are encouraged to consider electives from other Sustainable Infrastructure Systems programs. Sample elective courses include:

- AME 513 | Principles of Combustion
- AME 514 | Applications of Combustion and Reacting Flows
- AME 581 | Introduction to Nuclear Engineering
- ENE 505 | Energy and the Environment

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MS in Product Development Engineering – Program Details

Available on DEN@Viterbi

Program Requirements: Minimum of 27 units

Required Core Courses (6 units)

- AME 503 | Advanced Mechanical Design
- ISE 545 | Technology Development and Implementation

Required Core Specialization Track

Students will choose one area of specialization (track):

Product Development Systems Required Courses (6 units)

- ISE 515 | Engineering Project Management
- ISE 544 | Management of Engineering Teams

Product Development Technology Required Courses (6 units)

AME 505 and AME 525 or AME 526 are required

- AME 505 | Engineering Information Modeling
- AME 525 | Engineering Analysis OR AME 526
- AME 526 | Engineering Analytical Methods OR AME 525

Engineering Electives (9 units)

Approved (by advisement) 400-, 500-, or 600-level engineering courses

Deficiency Courses

Depending on the student's educational background some deficiency courses may be required to complete the degree.

- AME 420 | Engineering Vibrations
- AME 451 | Linear Control Systems I

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Dual Degree Program Offerings

Available on DEN@Viterbi

Dual Degree Programs

- MS in Aerospace Engineering/Engineering Management
- MS in Mechanical Engineering/Engineering Management

- All applicants must meet the admission requirements of both the Department of Aerospace and Mechanical Engineering and the Department of Industrial and Systems Engineering;
- A minimum of 48 units is required; A minimum of 18 units must be graduate-level course work in Aerospace & Mechanical Engineering, approved by an graduate advisor
- A dual degree requires a total of 48 units
- Dual degree programs are available online via DEN@Viterbi and on-campus

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Where Our Alumni Are Working

WHAT DO OUR STUDENTS DO?

WHAT DO OUR GRADUATES DO?

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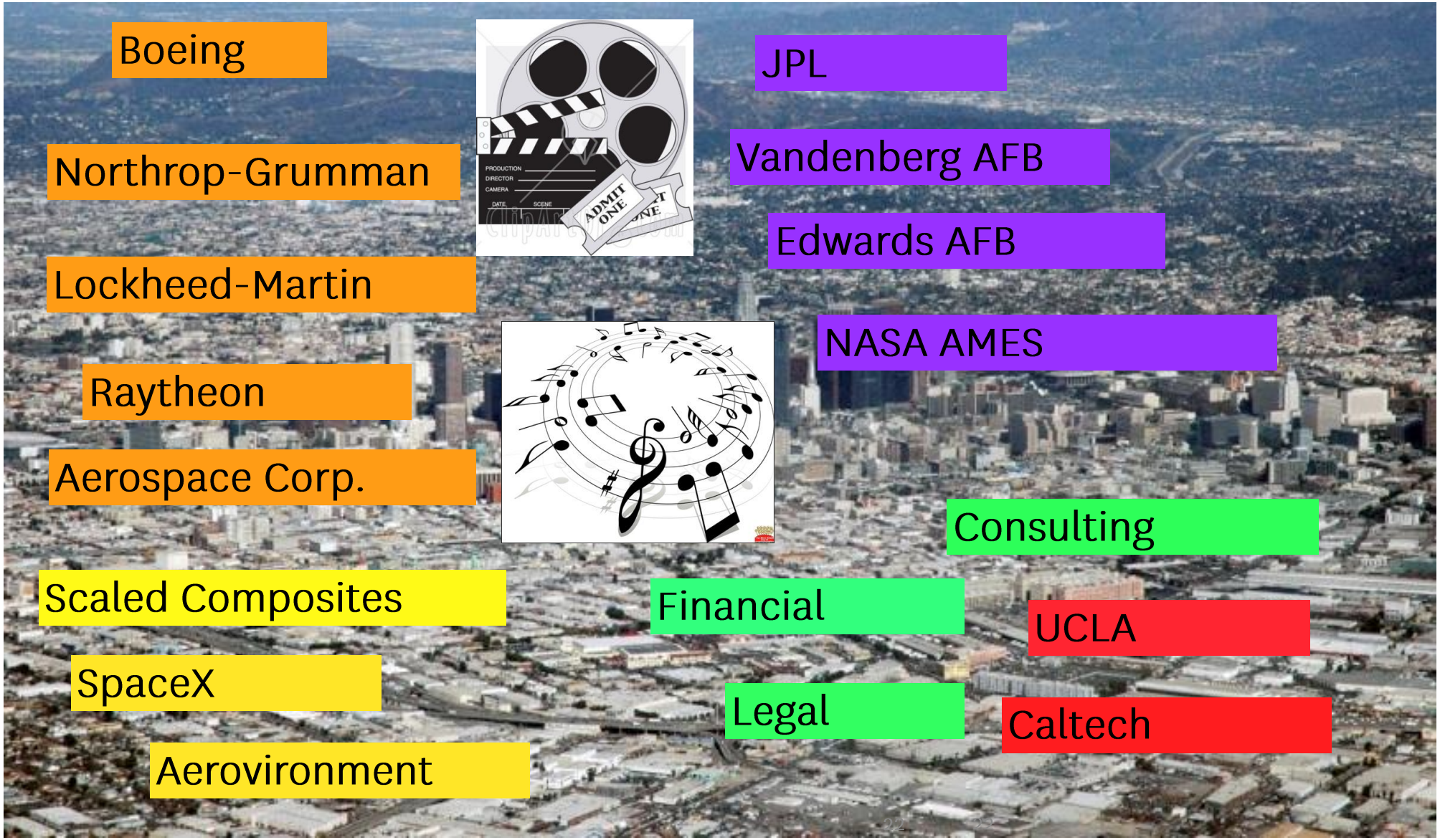
Aerospace & Mechanical Engineering – USC, Los Angeles



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Application Criteria for Master's Degree Programs

- Undergraduate degree (Bachelor of Science) in engineering, math, or hard science from a regionally-accredited university
- To be competitive, 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 (Required)
- Supplemental Materials:
  - Statement of Purpose (Required)
  - Letters of Recommendation (Optional or Required – see program page)
- TOEFL (International Applicants)

Please visit **https://viterbigradadmission.usc.edu/ame/** for Individual program requirements

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Application Deadlines

Application Deadlines for 2019-2020

Helpful Links:

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

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

Fall 2019

- Deadline to submit all required materials: January 15, 2019*

Spring 2019

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

Fall 2020

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

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

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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

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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)

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DEN@Viterbi Overview

	DEN@Viterbi Student	On-Campus Student
Program Admission	USC Graduate Application & required materials	USC Graduate Application & required materials
Weekly Course Lectures	Online with Interactivity	On USC's Campus
Online Course Archives (Lectures & Course Documents)	✓	✓ *
Assignments	Submit electronically according to course deadlines	Submit during lecture or lab according to course deadlines
Exams	Proctored location	USC's campus
Courses per Semester (Average)	1-2	3-4
Degree Completion Requirements	27-37 units with a 3.0 GPA or above	27-37 units with a 3.0 GPA or above
USC Diploma (No Distinction)	✓	✓

*DEN@Viterbi Sections Only

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DEN@Viterbi's E-Learning System

DEN@Viterbi Classroom

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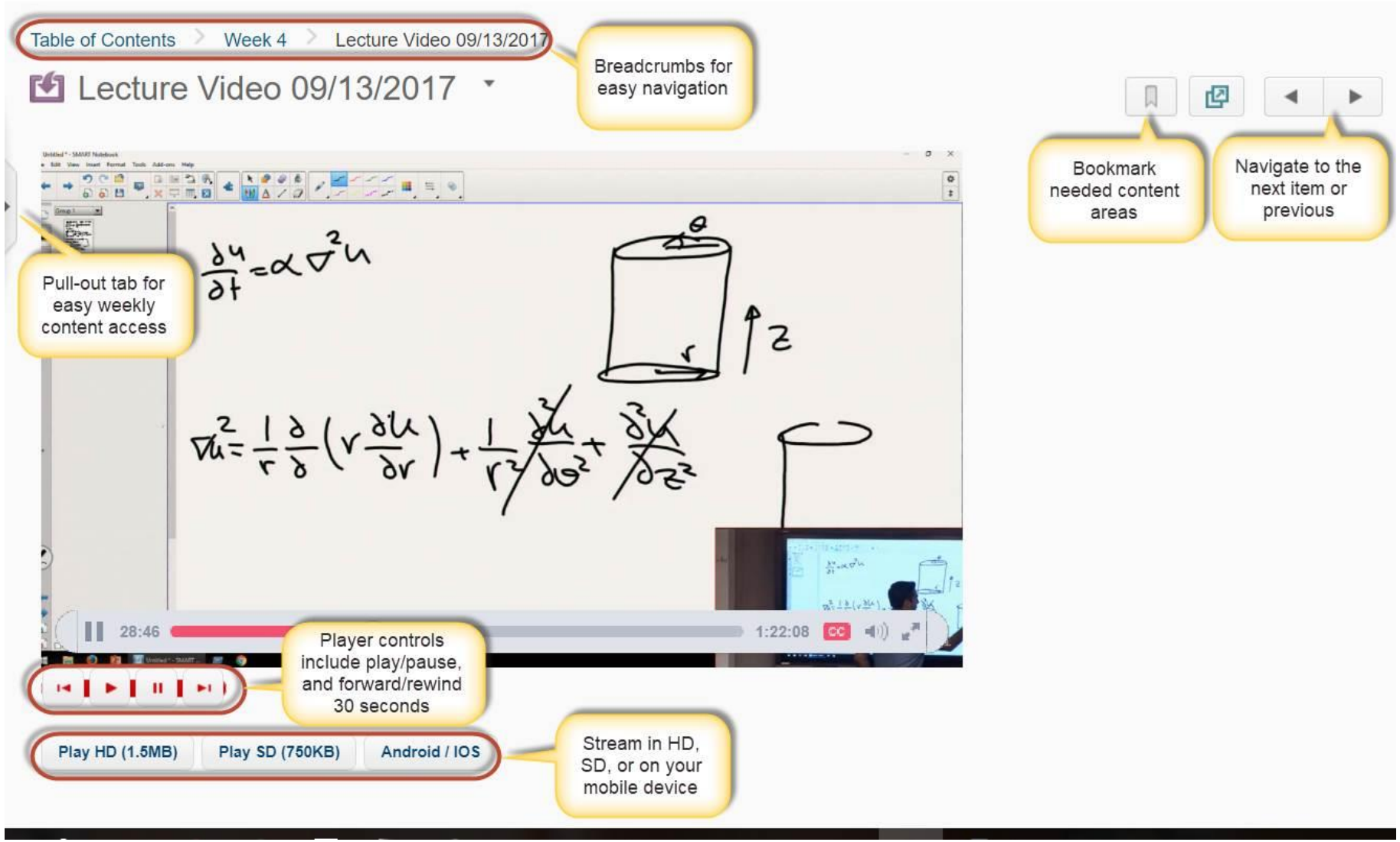
DEN@Viterbi's E-Learning System



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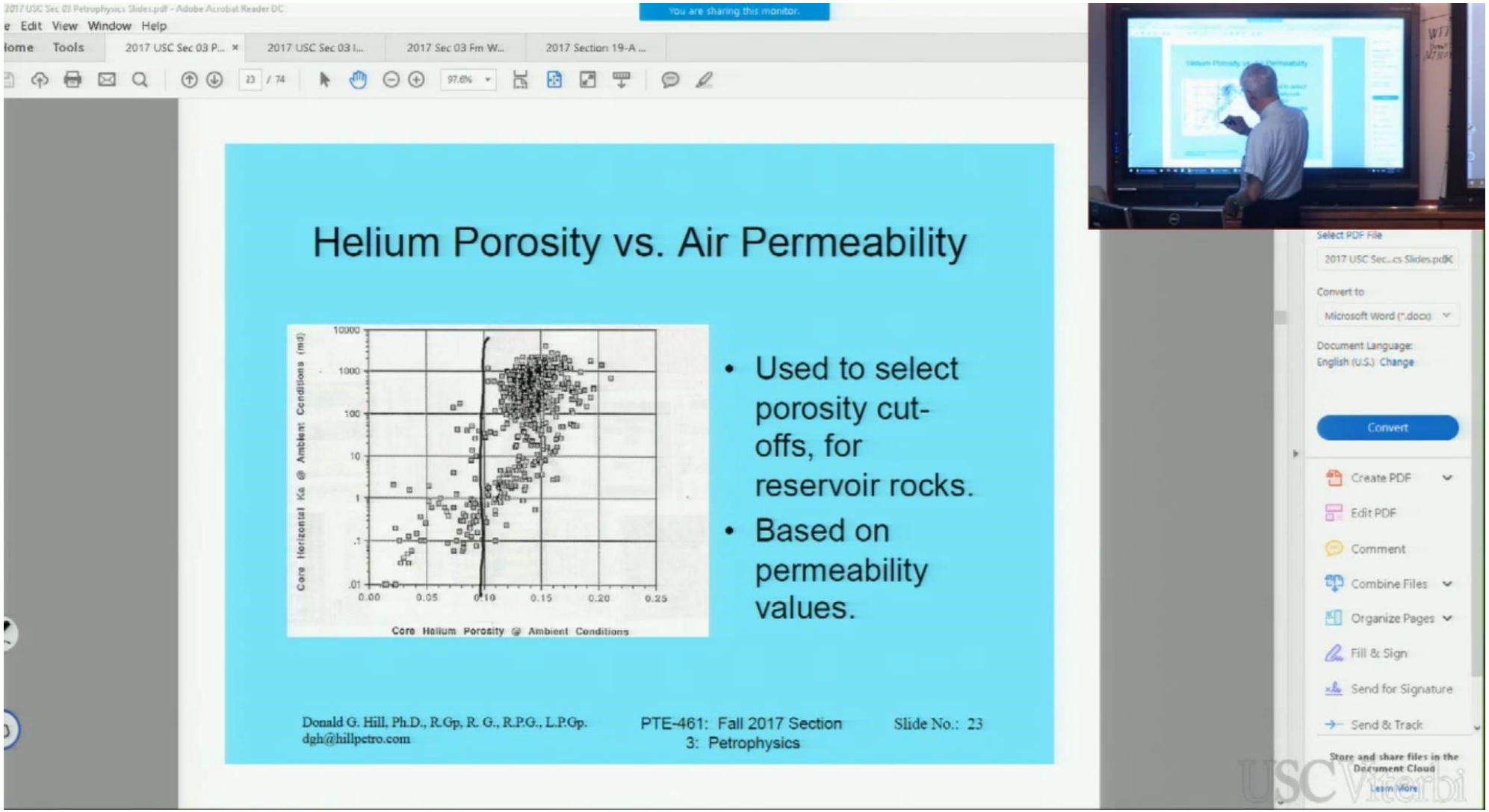
DEN@Viterbi's E-Learning System



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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

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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.

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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: 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

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DEN@Viterbi Additional Info

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  - Allows strong candidates to begin coursework before formal admission.
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  - **Get Started Summer 2019:** https://viterbigradadmission.usc.edu/denviterbi/getting-started/
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  - Students supported by company can defer “up front” payment of tuition until after the semester is over.
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  - For additional information: https://viterbigrad.usc.edu/tuition-and-funding/employer-supported

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Tuition & Fees (2018-2019)

PER-COURSE FEES	Unit Cost	Tuition for 3-Unit Course	Tuition for 4-Unit Course
Tuition for 500/600 level course	$2,005	$6,015	$8,020

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/tuition-funding-masters/

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Getting Started

For those interested in taking classes on campus:

- Visit USC campus
- Start your application:
  http://www.usc.edu/admission/graduate/apply

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

- Start as a Limited Status Student in Summer 2019 -or-
- Start your application:
  http://www.usc.edu/admission/graduate/apply

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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

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