Discover Viterbi:
Computer Science

Gaurav S. Sukhatme
Professor and Chairman
USC Computer Science Department

Meghan Balding
Graduate & Professional Programs

November 2, 2015
Will I be able to get a copy of the slides after the presentation?

YES!

How can I ask a question during the info session?

1. Use the Q&A panel to the right of this presentation.
2. Type your question in the box.
3. An USC representative will answer your question as soon as they are able.
Today’s Program

- The University of Southern California
- Viterbi School of Engineering
- Master of Science in Computer Science
  - Introduction to Program
  - New Program Highlights
- DEN@Viterbi Overview
- Tuition & Fees
- Q&A
University of Southern California
University of Southern California

- Oldest private university in western U.S. – founded in 1880
- 43,000 Students: 19,000 Undergrads | 24,000 Graduates
- 3,900+ full-time faculty
- Diverse student population
A Dynamic Location: Los Angeles, California

Principal world center for aerospace, communications, biotech R&D, commerce, entertainment and the arts

Los Angeles provides a setting for numerous cultural, educational and career opportunities

California offers rich opportunities for internships and careers, with Silicon Valley to the north; the hub of biotech activity in San Diego, to the south; and Silicon Beach to the west - right in our back yard
Recent Announcements

- **Top Ranked** Graduate Engineering Program

**Best Online Graduate Engineering Programs** *by U.S. News & World Report (2015 Edition)*
- **Ranked #1** in Online Computer Information Technology Program (Computer Science)
- **Top 3 Ranked** Online Graduate Engineering Program

**Best Online Graduate Engineering Programs for Veterans** *by U.S. News & World Report (2015 Edition)*
- **Ranked #1** Online Computer Information Technology for Veterans
- **Ranked #2** Online Graduate Engineering for Veterans
Viterbi School: Points of Distinction

- International Reputation for Excellence

- World Class Faculty & Research
  - NSF Career Awardees
  - Sol Golomb, Nat’l Medal of Science
  - MIT TR35 Faculty Distinctions

- Trojan Family Network

- Complete range of programs
  - Ph.D., Master’s & Bachelor’s Programs
  - Graduate Certificates
  - Continuing Education 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 as robotics, software engineering, sensor networks, vision sciences, automated construction and photonics
- over 45 research centers
- industrial partnerships and collaboration
Meet Professor Gaurav S. Sukhatme

Professor and Chairman, Department of Computer Science
(Joint appointment in Electrical Engineering)

Co-Director, Robotics Research Lab
Director, Robotic Embedded Systems Lab

Center for Embedded Networked Sensing
Center for Robotics and Embedded Systems

• IEEE Fellow and a member of AAAI and the ACM
• Recipient of the NSF CAREER award
• Recipient of the Okawa foundation research award

Education:
Undergraduate Education: IIT Bombay in Computer Science & Engineering
M.S. & Ph.D. in Computer Science from University of Southern California
Master of Science Programs in Computer Science at USC

Computer Science
CS – Computer Networks
CS – Computer Security

CS – Data Science
CS – Game Development
CS – High Performance Computing and Simulation
CS – Intelligent Robotics
CS – Multimedia and Creative Technologies
CS – Software Engineering

CS – Scientists and Engineers
Graduate Certificate in Software Architecture

• For every Big Data problem, the solution often rests on the shoulders of a data scientist
M.S. in Computer Science
(Data Science): Overview

1. Provides students with a core background in Computer Science

2. Specialized algorithmic, statistical, and systems expertise in acquiring, storing, accessing, analyzing and visualizing large, heterogeneous and real-time data

3. Diverse real-world domains including energy, the environment, health, media, medicine, and transportation

4. Available on campus and online via DEN@Viterbi
M.S. in Computer Science (Data Science): Faculty Highlights

Cyrus Shahabi
Professor, Computer Science
Director, Integrated Media Systems Center

Yan Liu
Assistant Professor, Computer Science
M.S. in Computer Science (Data Science): Course Outline

- The total number of units required for the degree: 32
- For courses available via DEN@Viterbi, visit: http://viterbi.usc.edu/DENdegrees

**Required Courses (All Required – 12 Units Total)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 570</td>
<td>Analysis of Algorithms</td>
</tr>
<tr>
<td>CSCI 585</td>
<td>Database of Systems</td>
</tr>
<tr>
<td>CSCI 561</td>
<td>Foundations to Artificial Intelligence</td>
</tr>
</tbody>
</table>
M.S. in Computer Science (Data Science): Course Outline

**Group Electives**
(Must take 3 courses with a min. of 1 course from each group – 9-12 units)

<table>
<thead>
<tr>
<th>Group 1 (Data Systems)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 548</td>
</tr>
<tr>
<td>CSCI 572</td>
</tr>
<tr>
<td>CSCI 586</td>
</tr>
<tr>
<td>CSCI 587</td>
</tr>
<tr>
<td>CSCI 653</td>
</tr>
<tr>
<td>CSCI 685</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 2 (Data Analysis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 567</td>
</tr>
<tr>
<td>CSCI 573</td>
</tr>
<tr>
<td>CSCI 686</td>
</tr>
<tr>
<td>ISE 520</td>
</tr>
<tr>
<td>MATH 467</td>
</tr>
<tr>
<td>MATH 574</td>
</tr>
</tbody>
</table>
Application Criteria for M.S. in Computer Science (Data Science)

- Undergraduate degree (Bachelor of Science) in engineering, math, or hard science from a regionally-accredited university

- Substantial background in computing is a minimum requirement

- 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

- TOEFL (International Applicants)

- Supplemental Materials:
  - Letters of Recommendation (optional)
  - Statement of Purpose (optional)

- Complete requirements: viterbi.usc.edu/msdegrees
M.S. in Computer Science (Scientists & Engineers)

1. An expanded M.S. degree, designed specifically for students with an academic background in engineering or science, but a limited background in computer science.

2. Combines an introductory sequence of undergraduate preparatory and foundational coursework with all the graduate breadth requirements necessary to satisfy the traditional M.S. in Computer Science.

3. Available on campus and online via DEN@Viterbi
M.S. in Computer Science (Scientists & Engineers): Course Outline

- The total number of units required for the degree: 37 (33 degree applicable units)
- For courses available via DEN@Viterbi, visit: [http://viterbi.usc.edu/DENdegrees](http://viterbi.usc.edu/DENdegrees)

<table>
<thead>
<tr>
<th>Preparatory Programming Requirement (1 course)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 455</td>
</tr>
</tbody>
</table>

* CSCI 455 is a preparatory requirement for this program, but the units for this course do not count toward the 33 units required for the degree

<table>
<thead>
<tr>
<th>Foundational Requirements (2 courses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 402</td>
</tr>
<tr>
<td>EE 457</td>
</tr>
<tr>
<td>EE 450</td>
</tr>
</tbody>
</table>
M.S. in Computer Science
(Scientists & Engineers): Course Outline

**Breadth Requirements (All courses required – 16 units)**
- CSCI 561 | Foundations of Artificial Intelligence
- CSCI 570 | Analysis of Algorithms
- CSCI 571 | Web Technologies
- CSCI 585 | Database Systems

**Recommended Elective Courses (Select two – 7-8 units)**
- CSCI 577a | Software Engineering
- CSCI 577b | Software Engineering
- CSCI 576 | Multimedia Systems Design
- CSCI 580 | 3-D Graphics and Rendering
- CSCI 588 | Specification and Design of User Interface Software

Remaining 2-3 units can be completed from an approved list of elective courses.
Application Criteria for M.S. in Computer Science (Scientists & Engineers)

- 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

- TOEFL (International Applicants)

- Supplemental Materials:
  - Letters of Recommendation (optional)
  - Statement of Purpose (optional)

- Complete requirements: viterbi.usc.edu/msdegrees
Application Deadlines

FALL – January 15

- For on-campus students: Apply by December 15 for funding consideration

SPRING – September 15

Apply Online

- [http://www.usc.edu/admission/graduate/apply](http://www.usc.edu/admission/graduate/apply)
Where our Alumni are working

What do our students do?

What do our graduates do?
Course Delivery Methods

Methods of Course Delivery

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

- **Online delivery via DEN@Viterbi**
  - 1-2 classes per semester
  - 2 ½ - 3 years to complete degree
M.S. Programs in Computer Science via DEN@Viterbi

Computer Science
CS – Computer Security
CS – Data Science
CS – Multimedia and Creative Technologies
CS – Software Engineering
CS – Scientists and Engineers
Graduate Certificate in Software Architecture
Distance Education Network (DEN@Viterbi)

More than 40 years of distance education expertise

Online delivery makes earning an MS degree practical and flexible for working professionals

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)
## Distance Education Network (DEN@Viterbi)

<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><em>(Lectures &amp; Course Documents)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Assignments</strong></td>
<td>Submit electronically via email or fax 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>2-4</td>
</tr>
<tr>
<td><em>(Average)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Degree Completion</strong></td>
<td>27-34 units with a 3.0 GPA or above</td>
<td>27-34 units with a 3.0 GPA or above</td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>USC Diploma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(No Distinction)</em></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*DEN@Viterbi sections only.*
Schematic of deflagration

Turbulent premixed flame experiment in a fan-stirred chamber (http://www.mech-eng.leeds.ac.uk/res-group/combustion/activities/Bomb.htm)

Flame thickness ($\delta$) ~ \( \alpha / S_L \)
($\alpha$ = thermal diffusivity)

Direction of propagation
Speed relative to unburned gas = \( S_L \)

Reaction zone
Temperature
Convection-diffusion zone
Distance from reaction zone

2000K
Product concentration

300K
Reactant concentration

USC Viterbi
School of Engineering

Videos can be streamed or downloaded at high resolutions
DEN@Viterbi’s E-Learning System

DEN@Viterbi Classroom on USC’s Campus
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: [http://gapp.usc.edu/graduate-programs/den/getting-started](http://gapp.usc.edu/graduate-programs/den/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: [http://gapp.usc.edu/tuitiondeferment](http://gapp.usc.edu/tuitiondeferment)
Tuition & Fees for M.S. Students

<table>
<thead>
<tr>
<th>PER-COURSE TUITION</th>
<th>Tuition for 3-Unit Course</th>
<th>Tuition for 4-Unit Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>500/600 level course: $1,774 per unit</td>
<td>$5,322</td>
<td>$7,096</td>
</tr>
</tbody>
</table>

- Degree Programs are 27-34 units (9-11 courses)
- For an overview of additional fees, please visit: [https://gapp.usc.edu/graduate-programs/graduate-funding/masters/tuition](https://gapp.usc.edu/graduate-programs/graduate-funding/masters/tuition)
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 DEN@Viterbi delivery
- Start as Limited Student next semester or apply for admission at the link above
CONTACT US

USC Viterbi School of Engineering
Graduate and Professional Programs

Email (On Campus): viterbi.gradprograms@usc.edu
Email (DEN@Viterbi): DEN@Viterbi.usc.edu

Phone: 213.740.4488

Web: http://viterbi.usc.edu/msdegrees