Astronautical Engineering (ASTE)
DEN @ Viterbi Orientation

Luis Saballos, Student Advisor & Assistant Director of ASTE Student Affairs
AGENDA

- Welcome
- Department Overview
- Degree Requirements
- Department Policies, Procedures, Tips
- ASTE DEN
- Academic Advising
- Questions?
Welcome to ASTE @USC & DEN@Viterbi!

Luis Saballos, ASTE Student Advisor

Contact Information

Email       Lsaballo@usc.edu
Phone       (213) 821-4234

- Advise undergraduate, certificate, master, and doctoral students
- Advise for the Astronautical Engineering (ASTE) and the Systems Architecting and Engineering (SAE) degree programs
Department of Astronautical Engineering

- Unique pure-space-engineering department (established in 2004)
- Offers the full set of degrees in Astronautical Engineering (ASTE)
  - Bachelor of Science
  - Bachelor of Science Minor
  - Master of Science
  - Engineer
  - PhD
  - Graduate Certificate
- Among largest national programs in space engineering on Master’s level
- Mission:
  to provide forefront research and education in astronautical (space) engineering
Department of Astronautical Engineering
Faculty, Adjunct Faculty, and Lecturers

Faculty
• Prof. Mike Gruntman (Chairman; (Director, Master of Science Program)
• Prof. Daniel Erwin (Director, Bachelor of Science Program)
• Prof. Joseph A. Kunc
• Prof. Azad Madni
• Prof. E. Phillip Muntz
• Prof. Stan Settles (joint appt.; ISE/SAE)
• Prof. Joseph Wang (Director, PhD Program)

Research Faculty
• Prof. Elliot Axelband
• Prof. David Barnhart
• Prof. Sergei Gimelshein
• Prof. Herb Schorr (joint appt.; ISI)
• Prof. Peter Will (joint appt.; ISI)

Adjunct Faculty and Lecturers (grad courses)
• Dr. Mohamed Abid (JPL)
• Dr. Oscar Alvarez-Salazar (JPL)
• Dr. Rodney Anderson (JPL)
• Dr. Kirstie Bellman (Aerospace Corp.)
• Dr. Douglas Buettner (Aerospace Corp.)
• Prof. Bruce Cordell (21st Century Waves)
• Prof. Don Edberg (Cal Poly Pomona)
• Dr. Anthony Freeman (JPL)
• Dr. Michael Gabor (TASC)
• Dr. Keith Goodfellow (Aerojet Rocketdyne)
• Dr. Troy Goodson (JPL)
• Prof. Gerald Hintz (ret., JPL, Aerospace Corp.)
• Prof. Michael Kezirian (IAASS, ISSF)
• Dr. Johnny Kwok (JPL)
• Mr. Steve Matousek (JPL)
• Dr. Leila Meshkat (JPL)
• Prof. Ryan Park (JPL)
• Dr. Robert Parker (ret.; Northrop-Grumman)
• Dr. G.P. Purohit (Aerospace Corp.)
• Prof. Anita Sengupta
• Mr. Madhu Thangavelu (AAA Visioneering)
• Prof. Kent Tobiska (Space Environm. Techn.)
• Prof. James Wertz (Microcosm)
• Dr. Bret Williams (Raytheon)
• Dr. Sydney Yuan (Aerospace Corp.)
Department of Astronautical Engineering
Research Areas

- Astronautics
- Space environment and spacecraft interactions
- Space science
- Space instrumentation and sensors
- Spacecraft propulsion
- Space mission and spacecraft design
- Non-equilibrium processes in gases and plasmas
- Computational physics and high performance computing

- Faculty are Principal Investigators (PI’s) and Co-Investigators (Co-I’s) on programs supported by NASA, Air Force, Navy, NSF, industry
- Served on science teams (members, investigators, development, analysis): Pioneer 10/11, SOHO, Deep Space 1, IMAGE, Dawn
- Current NASA missions Co-I: TWINS and IBEX

- Student (undergraduate and Master’s) projects
  - Rocket propulsion lab
  - Liquid-propulsion lab
  - Lunar lander
  - Student microsatellites and cubesats
Department of Astronautical Engineering
Interdisciplinary Collaborations

- Interdisciplinary collaborations with other USC programs/departments/schools
  - Systems Architecting and Engineering
  - Electrical Engineering
  - Mechanical Engineering
  - Information Sciences Institute (ISI), VSOE
  - Physics and Astronomy

- External collaborations
  - U.S. Universities (Harvard, UC Berkeley, U of Az., BU, U Mass., ...)
  - NASA centers (JPL, Goddard)
  - DoE National Labs (Los Alamos, Princeton Plasma Physics Lab)
  - R&D centers and institutes (Applied Physics Laboratory; Southwest Research Institute, ...)
  - Industry (Northrop-Grumman, Lockheed-Martin, Boeing, ...)
  - Foreign R&D centers and universities (Germany, Japan, ...)
Master of Science Program in Astronautical Engineering  
– Students –

- Students pursuing MS in Astronautical Engineering
  - Full-time on-campus students – 25-30%
  - Working full-time and studying part-time students (through Distance Education Network of the Viterbi School – DEN@Viterbi) – 70-75%
  - Active duty military (Air Force, Army, Navy, Marine Corp)
  - Student background (BS and MS degrees)
    - Astronautical engineering
    - Mechanical Engineering
    - Electrical engineering
    - Aerospace engineering
    - Other areas (chemical, computer, systems, etc) of engineering
    - Physics and Astronomy
    - Other areas of science (including medical doctors)
    - Planning apply for astronaut training
  - Pathway to positions in system engineering of space systems
    (especially important for engineers with BS and MS in EE, ME, etc.)
Master of Science Program in Astronautical Engineering
– Common Questions –

• Typical time to complete the program
  - Full-time students: 1.5 years (3 semesters)
  - Part-time student: 3 – 4 years (1 – 2 courses per semester)

• Course sequence (e.g., required courses before electives?)
  - Course sequence is entirely up to students. Advisors help as needed. Few exceptions:
    space navigation requires orbital mechanics; advanced propulsion requires propulsion, ...

• Waiver of required courses – yes
  - Required courses waived if a student had similar level courses elsewhere.

• Technical electives from other departments – yes
  - Almost any graduate science and engineering course approved
ASTE Degree Requirements
Master of Science in Astronautical Engineering (MS ASTE)

- 27 units of course work (9 classes)
- 3.0 minimum GPA required to fulfill degree requirements
- 5-year limit to satisfy degree requirements
- Thesis *not* required but is possible (for on-campus students)

ASTE Department Chair, Director of the Master’s Program
Dr. Mike Gruntman, mikeg@usc.edu

Helpful websites:
https://viterbigradadmission.usc.edu/programs/masters/msprograms/astonautical-engineering/ms-astronautical-engineering/

http://astronauticsnow.com/msaste/faq.html
Degree Requirements for the ASTE Master’s Program

Core Required Courses (4 courses, 3 units each)
- ASTE 470 Spacecraft Propulsion
- ASTE 520 Spacecraft System Design
- ASTE 535 Space Environments and Spacecraft Interactions
- ASTE 580 Orbital Mechanics I

Core Electives (3 courses, 3 units each)
- ASTE 501ab Physical Gas Dynamics
- ASTE 523 Design of Low Cost Space Missions
- ASTE 524 Human Spaceflight Systems
- ASTE 527 Space Studio Architecting
- ASTE 529 Safety of Space Systems and Space Missions
- ASTE 552 Spacecraft Thermal Control

Technical Electives (2 courses, 6 units total)
Degree Requirements for the ASTE Master’s Program cont’d

Core Electives Continued
ASTE 553 Systems for Remote Sensing from Space
ASTE 554 Spacecraft Sensors
ASTE 556 Spacecraft Structural Dynamics
ASTE 562-
ASTE 524-
ASTE 577-
ASTE 557 Spacecraft Structural Strength and Materials
ASTE 570 Liquid Rocket Propulsion
ASTE 572 Advanced Spacecraft Propulsion
ASTE 574 Space Launch Vehicle Design
ASTE 581 Orbital Mechanics II
ASTE 583 Space Navigation: Principles and Practice
ASTE 584 Spacecraft Power Systems
ASTE 585 Spacecraft Attitude Control (summer only)
ASTE 586 Spacecraft Attitude Dynamics
ASTE 589 Solar system Navigation
Degree Requirements for the ASTE Master’s Program continued

Two Technical Electives, 500-level, 6 units total.

Courses that apply as technical electives:
• Any course from the list of ASTE Core Electives
• ASTE 599 Special Topics courses. They are not offered every semester, so check the Schedule of Classes for availability (http://classes.usc.edu/)
• A course from another engineering department must be approved by Dr. Mike Gruntman (copy Isaballo@usc.edu to the email) prior to registration. More information can be found here: http://astronauticsnow.com/msaste/faq.html

Full curriculum requirements found here: https://catalogue.usc.edu/preview_program.php?catoid=11&poid=10854&hl=aste&returnto=search
Five Areas of Concentration in ASTE

Spacecraft Propulsion
Spacecraft Dynamics
Space Systems Design
Spacecraft Systems
Space Applications

Students are *not* required to identify an area of specialization. These concentrations act as a guide for students in order to meet their educational or professional objectives.
Five Areas of Concentration in ASTE cont’d

Spacecraft Propulsion
- ASTE 501ab Physical Gas Dynamics
- ASTE 570 Liquid Rocket Propulsion
- ASTE 572 Advanced Spacecraft Propulsion
- ASTE 584 Spacecraft Power Systems

Spacecraft Dynamics
- ASTE 556 Spacecraft Structural Dynamics
- ASTE 557 Spacecraft Structural Strength and Materials
- ASTE 581 Orbital Mechanics II
- ASTE 583 Space Navigation: Principles and Practice
- ASTE 585 Spacecraft Attitude Control (*summer only*)
- ASTE 586 Spacecraft Attitude Dynamics
Five Areas of Concentration in ASTE cont’d

**Space Systems Design**
- ASTE 523 Design of Low Cost Space Missions
- ASTE 527 Space Studio Architecting
- ASTE 529 Safety of Space Systems and Space Missions
- ASTE 557 Spacecraft Structural Strength and Materials

**Spacecraft Systems**
- ASTE 552 Spacecraft Thermal Control
- ASTE 553 Systems for Remote Sensing from Space
- ASTE 554 Spacecraft Sensors
- ASTE 584 Spacecraft Power Systems

**Space Applications**
- ASTE 527 Space Studio Architecting
- ASTE 553 Systems for Remote Sensing from Space
- ASTE 554 Spacecraft Sensors
ASTE Policies, Procedures, Tips
ASTE Policies, Procedures, Tips

- Maintain a 3.0 grade point average
- Review your STARS Report every semester.
  - The STARS Report includes the degree and major you are currently pursuing, GPA, Catalogue year, admission term, the number of units and course required to fulfill your degree requirements.
  - You can access it through the “OASIS” section of the myUSC portal (http://my.usc.edu).
  - Your STARS Report is manually activated after you enroll in your first course as an officially admitted student.
- Check your USC email regularly
- It is possible to transfer in previous graduate coursework (please contact me for the full policy)
- If you desire to change majors, you can do so after your first semester if you receive a 3.0 of higher (contact the other department for the transfer procedures)
- USC requires graduate students to maintain continuous enrollment every Fall and Spring semester (more detailed information provided on the next slide).
ASTE Policies, Procedures, Tips Cont'd

USC Schedule of Classes:
http://classes.usc.edu/
ASTE Future Courses List:
http://astronauticsnow.com/msaste/astd_ms_class_schedule.pdf
ASTE Curriculum Requirements:
https://catalogue.usc.edu/preview_program.php?catoid=11&poid=10854&hl=aste&returnto=search

• Since some electives may be offered in specific semesters, it is recommended to plan out those courses first (use the future courses list above for reference). Most of the core classes can then be filled in between.

• If you will be working full-time, we strongly recommend only taking 1 class in your first semester. If you will be a full-time student, it is recommended you enroll in no more than 3 classes per semester
Continuous Enrollment/Leave of Absence/Withdrawal/Reinstatement

• Once admitted to a graduate degree program, students must enroll at USC each fall and spring semester each year until she or he has satisfactorily completed all degree requirements.
• If a student must skip a semester, the student must petition for a leave of absence. Leave of absence request forms are available by emailing lsaballo@usc.edu.
• An approved leave may not exceed one academic year (and a total of 4 semesters are granted). A student who fails to maintain continuous enrollment without obtaining an approved leave must, when ready to return to school, may have to apply for readmission to the program.
ASTE DEN
(Distance Education Network)
Broadcast master control

Distance Education Network (DEN)
- webcast over the Internet, with lectures viewed anywhere in the world on PC (standard high-speed connection; no special software)
- on-campus students attend lectures in class
- password-protected lectures can be viewed asynchronously any time during the entire semester
- class notes, homework assignments, and handouts transmitted electronically
- exams: on campus for students in the Greater Los Angeles area and proctored (e.g., at local community colleges) for remote students
VSOE’s Distance Education Network (DEN@Viterbi)

**Student view**

**DEN classrooms**

**Control room**

**Instructor view**

- face camera
- overhead camera
- laptop connection
- broad/webcast monitor

**Instructor**

**Control room**

USC Viterbi
School of Engineering

University of Southern California
1. Bookmark https://courses.uscden.net
2. Your D2L username is your full USC Email Address
3. If you do not remember your D2L password, click “Forgot your password?”

Sign up for an exclusive one-on-one training session inside a virtual classroom to learn all about Desire2Learn: https://viterbigrad.usc.edu/technical-support/training-options/
HOW TO REQUEST D-CLEARANCE FROM DEN

All DEN courses require D-clearance.

1. Login to DEN Desire2Learn: [http://courses.uscden.net](http://courses.uscden.net)
2. Go to DEN@Viterbi Tools on the navigation bar
3. Select “Request D-clearance” link, select the term, and select a course
4. Approval process takes 1-2 business days. To view the status of a request, click on “Check D-Clearance Status”
5. You can register once your request has been processed. D-clearances expire 7 days from when it is issued so register as soon as you obtain it to secure a seat in a course.

For questions on D-Clearance status, contact den@vase.usc.edu
# DEN@Viterbi Contacts

**Viterbi Admission & Student Engagement Office**

- **Location:** Olin Hall of Engineering (OHE), Rm. 106
- **Hours:** Mon. - Fri. 8:30 am - 5 pm (Pacific Time)
- **Phone:** (213) 740-4488  |  **Fax:** (213) 821-0851  |  [https://viterbigrad.usc.edu/](https://viterbigrad.usc.edu/)
- **DEN d-clearance inquiries** [den@vase.usc.edu](mailto:den@vase.usc.edu)

## DEN@Viterbi Support

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<thead>
<tr>
<th>Support</th>
<th>Contact Information</th>
<th>Staff</th>
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<tbody>
<tr>
<td>Technical support,</td>
<td><a href="mailto:dentsc@usc.edu">dentsc@usc.edu</a></td>
<td>Rebecca Lee</td>
</tr>
<tr>
<td>Desire2Learn training,</td>
<td>213-740-9356</td>
<td>Bianca Richter</td>
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<tr>
<td>Homework</td>
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<tr>
<td>DEN d-clearance inquiries</td>
<td><a href="mailto:den@vase.usc.edu">den@vase.usc.edu</a></td>
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<tr>
<td>Exams</td>
<td><a href="mailto:denexam@usc.edu">denexam@usc.edu</a></td>
<td>Shirley Schutt</td>
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<tr>
<td></td>
<td>213-740-9356</td>
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<tr>
<td>VASE Advisor</td>
<td><a href="mailto:ptrinida@usc.edu">ptrinida@usc.edu</a></td>
<td>Patty Rinehart</td>
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<tr>
<td>• General advisement</td>
<td>213-740-0116</td>
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<tr>
<td>• Policies &amp; Procedures</td>
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Academic Advising Appointments

Luis Saballos, ASTE & SAE Student Advisor

Email: Lsaballo@usc.edu Phone: (213) 821-4234

- I am available by email and phone if you have any questions. If you send an email, please include your 10-digit USC ID number
- Scheduling an appointment is best if you have more detailed questions
- Advisement Appointment link: https://myviterbi.usc.edu/
- When scheduling a phone appointment, please indicate that a phone appointment is what is being scheduled
THANK YOU!

HAVE A GREAT SPRING 2020 SEMESTER!

A recording of this online orientation and presentation will be available for viewing and download on the VASE website at

https://viterbigrad.usc.edu/academic-services/denarchive/

FLIGHT ON!