Mechanical and Aerospace Engineering

Industrial Advisory Board
October 30, 2009

Adrienne Lavine, Chair

Vice Chairs:
Ann Karagozian, Industrial Relations
Robert M’Closkey, Undergrad. Programs
Xiaolin Zhong, Graduate Programs
# Department Overview

## Faculty and Staff

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ladder Faculty</td>
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</tr>
<tr>
<td>Joint Faculty</td>
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</tr>
<tr>
<td>Emeritus Faculty</td>
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</tr>
<tr>
<td>Adjunct Faculty</td>
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<tr>
<td>Lecturers</td>
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<td>Administrative Staff</td>
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## Recognitions

<table>
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<tbody>
<tr>
<td>Society Fellows</td>
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</tr>
<tr>
<td>CAREER or Young Investigator Awards</td>
<td>11</td>
</tr>
<tr>
<td>NAE members</td>
<td>8</td>
</tr>
<tr>
<td>Regular Faculty</td>
<td>4</td>
</tr>
<tr>
<td>Affiliated Faculty</td>
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<tr>
<td>Emeriti</td>
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## Publications

<table>
<thead>
<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Journal Articles</td>
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<tr>
<td>Conference Papers</td>
<td>57</td>
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<tr>
<td>Books &amp; Book Chapters</td>
<td>4</td>
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<tr>
<td>Patents</td>
<td>13</td>
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</table>

## Fiscal Year 2008-2009 Sponsored Research Budget - Total $26.2M

(Fiscal Year 2008-2009 Sponsored Research Expenditures - Total $14.2M)

- Federal: $18.2M (69%)
- Industry: $4.7M (18%)
- University & Endowment: $3.1M (12%)
- State: $1.0M (1%)

**UCLA HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE**
John Kim Elected to NAE

- For development of direct numerical simulation and seminal contributions to the understanding of the physics and control of turbulent flows.
NAE Members Compared to Our Competitors

UCLA MAE: \( \frac{4}{32} = 12.5\% \)

<table>
<thead>
<tr>
<th>Mechanical Engineering</th>
<th>Aerospace Engineering</th>
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</thead>
<tbody>
<tr>
<td>Berkeley: 5/44 (11%)</td>
<td>MIT: 6/33</td>
</tr>
<tr>
<td>MIT: 5/69</td>
<td>Stanford: 5/13</td>
</tr>
<tr>
<td>Stanford: 4/34</td>
<td>Caltech: 1/11 (President)</td>
</tr>
<tr>
<td>Caltech: 2/7</td>
<td></td>
</tr>
<tr>
<td>Average: 16/154 = 10%</td>
<td>Average: 12/57 = 21%</td>
</tr>
</tbody>
</table>

Combined average: \( \frac{28}{211} = 13\% \)
**Department Comparison**

US News & World Report Graduate Rankings

- **ME: 11th, AE: 13th** (up from 14 and 15 prev. yr.)

<table>
<thead>
<tr>
<th></th>
<th>MAE</th>
<th>Depts. ranked higher ME &amp; AE Combined*</th>
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</thead>
<tbody>
<tr>
<td># Faculty</td>
<td>32</td>
<td>58</td>
</tr>
<tr>
<td>Research</td>
<td>$460,000</td>
<td>$400,000</td>
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<tr>
<td>Expenditure/Faculty</td>
<td></td>
<td></td>
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<tr>
<td>Undergraduate</td>
<td>22.9</td>
<td>13.0</td>
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<tr>
<td>Enrollment/Faculty</td>
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<td></td>
</tr>
<tr>
<td>Graduate</td>
<td>8.5</td>
<td>6.4</td>
</tr>
<tr>
<td>Enrollment/Faculty</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Based on 2006-07 data.*
Selected Grants (30 of 83 Active)

Predictive Capabilities, Analysis & Experiments for Fusion Nuclear Science & Plasma Chamber Research (Abdou)

Energy Harvesting a Nano-Scaled Based Magneto-thermo-electric Element (Carman)

Enhancing Technologies to Improve Telemedicine and Surgical Technology (Holmes, Carman, et al.)

Nanoimprint Lithographic Process of the Fabrication of 3D Multilevel Crossbar Circuits (Chen)

Plasmonic Photothermal Micropipettes for Living Cell Surgery (Chiou)

A Mechanistic Study of Nucleate Boiling Heat Transfer under Microgravity Conditions (Dhir)

Numerical Investigations of Transitional and Turbulent Flow Physics in Hypersonic Boundary Layers (Eldredge)

Survival and Reliability Assessment of Chamber Structure Materials for High-Average Power Laser Systems (HAPL) (Ghoniem)

Control, Filtering and System Identification for High Energy Lasers and Laser Communications (Gibson)

Tactical HEL Weapon Alignment System Architecture Efficiencies (Gibson)

Design of Polyurea-Bonded Steel/E-Glass Composite Joints under Dynamic and Hygrothermal Loads (Gupta)

Biomimetic Multifunctional Composites for Autonomic Aerospace Structures (Hahn)

Titanium/Graphite Hybrid Laminate for Supersonic/Hypersonic Missiles (J.M. Yang, Hahn)

Manufacturing and Multifunctional Characterization of Load Bearing Energy Harvesting Structures (Ju, Hahn)
Selected Grants (30 of 83 Active)

Numerical Simulation of Pulse Detonation Rocket-Induced MHD-PDRIME Concepts for Advanced Propulsion Systems (Karagozian)

Strategic Control of Variable Density Jets in Crossflow (Karagozian, M’Closkey)

Drop Shape Analysis System and Tensiometer for Parametric Studies of Interfacial Tension and Wettability of the Ionic Liquids (Kavehpour)

Three-Dimensional Micropower Sources from MEMS/NEMS Technology (Dunn, CJ Kim)

EWOD-MALDI-MS for High-Throughput Proteomics (Garrell, CJ Kim)

A Numerical Study of Turbulence Physics in Hypersonic Boundary Levels (J Kim)

CAREER: Membrane-Protein Interactions and the Mechanics of Cell Organelles (Klug)

Center for Scalable and Integrated Nano-Manufacturing (SINAM) (Lavine, Chen, Ho, et al.)

Computational Modeling of Active Phase Transforming Materials (Lynch)

Mass Balancing Algorithms for the Boeing Silicon Disk Resonator Gyro (M’Closkey)

Nanoporous Pyroelectric Materials for Direct Energy Conversion of Waste Heat into Electricity (Pilon)

Cauchy Dynamic Estimators for Active Sensors (Speyer)

Transient Dynamics Modeling and Control for Waste Heat Recovery of Heavy Duty Diesel Powertrains (Tsao)

Thruster Development for Precision Formation Flying Missions (Fellow: Hann-Shin Mao; Wirz)

Direct Numerical Simulation of Hypersonic Boundary Layer Transition for Heat Transfer Prediction (Zhong)

Simulations of Turbulent Flows with Strong Shocks and Density (Zhong)
Three faculty hires in last three years

• Chris Lynch, Professor, Georgia Tech
  – Ferroelectric materials and applications: Constitutive behavior, reliability, fracture mechanics, actuator and sensor design. Applications to aerospace structures.
• Richard Wirz, Assistant Professor
  Caltech Ph.D., JPL senior engineer
  – Electric and micro propulsion, low temperature plasma and plasma discharges, spacecraft and space mission design, alternative energy generation and storage.
• Tetsuya (Ted) Iwasaki, Professor
Ph.D. Purdue
Faculty Tokyo Tech, Univ. Virginia
Neuronal control mechanism of animal locomotion, nonlinear oscillators, and robust/nonlinear control theory and its applications to mechanical, aerospace, and electrical systems.
Hiring plans

• None this year because of budget circumstances.

• Opportunity for further strategic planning.
Budgetary Considerations

• 20% cut to UC from state for 2009-10. Much greater than originally anticipated.
• Rising costs of benefits, utilities, maintenance.
• Spike in undergraduate enrollment at time of plummeting resources.

• Both worse and better (as we’ll see) than expected.
Budgetary Considerations

• In anticipation of a large state cut, we took the following steps regarding our course offerings:
  – We saved from 08-09 to apply toward 09-10 (by reducing elective offerings and # TAs).
  – In 09-10:
    • A small number of faculty will teach more.
    • Around 10 undergraduate and 3 graduate electives will not be offered. This was made manageable by our recent curricular change.
    • We decreased the number of offerings of a few courses – and did not increase the number of offerings even in a time of increased enrollments.
Budgetary Considerations

• Here’s how things fell out…
Budgetary Considerations

Temporary instructor and TA funds

<table>
<thead>
<tr>
<th>Year</th>
<th>Savings</th>
<th>Bridge Funding</th>
<th>Carry-Forward</th>
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<tr>
<td>2007-08</td>
<td>$1,400,000</td>
<td></td>
<td></td>
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<tr>
<td>2008-09</td>
<td>$1,200,000</td>
<td></td>
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<tr>
<td>2009-10</td>
<td>$1,000,000</td>
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</tbody>
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HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE
Budgetary Considerations

Instructional Equipment and Software Funds

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th>2007-08</th>
<th>2008-09</th>
<th>2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
<td>$120,000</td>
<td>$120,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-09</td>
<td>$100,000</td>
<td></td>
<td>$100,000</td>
<td></td>
</tr>
<tr>
<td>2009-10</td>
<td>$60,000</td>
<td></td>
<td></td>
<td>$0</td>
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</table>

12.5% reduction relative to 2007-08
Budgetary Considerations

Graduate student support from dean and campus

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
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<tbody>
<tr>
<td>2007-08</td>
<td>$900,000</td>
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<tr>
<td>2008-09</td>
<td>$900,000</td>
</tr>
<tr>
<td>2009-10</td>
<td>$900,000</td>
</tr>
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</table>
Industry participation in design classes

• Industry guest lectures: economics, solid modeling, robotics, aircraft structural design and its history, design, manufacturing, mechanisms, entrepreneurship. “Real” engineering problems and how they were solved. Design tradeoffs.
• Material donations of a very general type: aluminum tubing, steel sheets, power screws, stepper motors, adjustable gear boxes, sensors, amplifiers, etc.
• Mid-term design reviews.
• Judges for the final competition (including contributions towards awards, such as plaques or even monetary prizes).
• Representatives of local industries could devote a section of their presentation to their company’s employment outlook, potential internships, and upcoming employment opportunities.
UNDERGRADUATE PROGRAMS

Prof. Robert M’Closkey
Program Summary

Lower Division Preparatory Courses Common to ME and AE (58 units):

**Chemistry and Biochemistry 20A, 20B/L** (chemical structure and kinetics)
**Mathematics 31A, 31B, 32A, 32B, 33A, 33B** (Diff. and integral calculus, infinite series, calculus of several var., linear algebra, differential equations)
**Physics 1A, 1B, 1C, 4AL, 4BL** (Mechanics, oscillations, waves, fields, electrodynamics, optics)
**Computer Science 31** (C programming)

Departmental Core Courses Common to ME and AE (36 units):

**MAE 101** (statics and strength of materials), **102** (dynamics), **103** (intro fluids), **105A** (intro thermo), **107** (signals and systems), **171A** (intro controls), **182A** (engineering math)
**EE 100** (circuits)
**MSE 104** (intro materials)

Technical Breadth Areas (3 courses -- 12 units):

Bioengineering
Chemical and Biomolecular Engineering
Civil and Environmental Engineering
Computer Science
Electrical Engineering
Materials Science and Engineering
Mechanical and Aerospace Engineering
Nanotechnology
Technology Management
Engineering Science
Engineering Mathematics
Program Summary, cont’d

General Education Electives (33 units)

AE-specific Core Courses (40 units)

**MAE 150A** (intermed fluids), **150B** (aerodynamics), **150P** (propulsion), **154A** (aircraft design), **154B** (structural design), **154S** (intro controls), **157A** (fluids and aero lab), **157S** (basic aero lab), **166A** (flight structures), **155** (intermed dynamics) or **161A** (intro to astronautics) or **169A** (mechanical vib)

ME-specific Core Courses (38 units)

**MAE 94** (CAD), **105D** (transport phenom), **156A** (adv strength of mat), **157** (basic ME lab), **162A** (mechanisms), **162B** (product design), **162M** (senior design), **183** (manufacturing), **131A** (intermed heat trans) or **133A** (thermo)

**EE110L** (circuits lab)

Major-specific Technical Electives (8 units for each major)

Grand Total: **AE** 187 units, **ME** 185 units

Both undergraduate programs are **ABET** accredited --most recent review was October 2006 and we received the full 6 year accreditation
SEAS Freshman and Transfer Statistics

green = transfers
blue = freshman

Applications

Admissions

Enrolled
MAE Stats on Underrepresented Minority and Female Enrollment

<table>
<thead>
<tr>
<th>Year</th>
<th>Minority Percent of Total MAE Enrollment</th>
<th>Female Percent of Total MAE Enrollment</th>
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</thead>
<tbody>
<tr>
<td>2007</td>
<td>12.0%</td>
<td>15.0%</td>
</tr>
<tr>
<td>2008</td>
<td>12.0%</td>
<td>15.0%</td>
</tr>
<tr>
<td>2009</td>
<td>12.0%</td>
<td>15.0%</td>
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Graduate Programs of Mechanical and Aerospace Engineering Department

Industrial Advisory Board Meeting
October 30, 2009

Xiaolin Zhong
Vice Chair for Graduate Affairs
Major & Minor Fields

GRADUATE PROGRAMS

• The MAE Department offers programs leading to the M.S. and Ph.D. degrees in Mechanical Engineering or Aerospace Engineering, as well as to the M.S. degree in Manufacturing Engineering.
• The Ph.D. degree program is based on major fields of engineering science that provide support for the two engineering disciplines.

Major Fields of Study:

• Dynamics
• Fluid Mechanics
• Heat and Mass Transfer
• Manufacturing and Design
• MEMS/Nanotechnology
• Structural and Solid Mechanics
• Systems and Control

Minor Fields of Study:

• Applied Mathematics
• Applied Plasma Physics
Graduate Student Recruitments

A fellowship method has been employed in the last three years in order to engage the faculty actively in graduate student recruitment.

• Budget:  
  Graduate Division $583,041  
  Deans Office $156,500  
  Matching NRT $117,552  
  IAB $10,000  
  TOTAL $867,093

• Each faculty is given a fellowship position of $26,037.00. (Consisting of $15,039.00 stipend which includes 1 quarter TA-ship. In addition the faculty could supplement this fellowship or nominate the student for a supplemental stipend of $10,000.00 or $15,000.00 for the Non-resident tuition): 46 offers (21 accepted at 46%).

• 24 students were offered Non-Resident Tuition (13 accepted, 54%).

• 9 students were offered $10K Industrial Affiliates Fellowship (2 accepted, 22%)

• Awarded 1 Cota-Robles Fellowships (for PhD Students). This four-year fellowship currently provides a stipend of $18,000.00 plus registration fees and nonresident tuition (for the first year only) if necessary. During the student's second, third or fourth year, the Graduate Division provides a second year of support in the form of a Graduate Research Mentorship Award upon activation of the award by the student and the department.

• Awarded 1 G.O.F.P. Fellowships (for MS Students). This one-year fellowship program provides recipients with a $12,500.00 stipend plus registration fees (and nonresident tuition if necessary).
Graduate Program Statistics

Graduate Students Registered

Graduate Total Enrollment

HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE
Graduate Program Statistics

MASTERS DEGREE AWARDED

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<tr>
<th>Year</th>
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<tr>
<td>F04</td>
<td>56</td>
<td>105</td>
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<td>F05</td>
<td>54</td>
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<td>F06</td>
<td>17</td>
<td>71</td>
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<td>F07</td>
<td>16</td>
<td>93</td>
</tr>
<tr>
<td>F08</td>
<td>13</td>
<td>64</td>
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AEROSPACE: Red | MECHANICAL: Blue

PHD DEGREE AWARDED

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<th>Mechanical</th>
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<tr>
<td>F03</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>F04</td>
<td>22</td>
<td>13</td>
</tr>
<tr>
<td>F05</td>
<td>23</td>
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<td>24</td>
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<td>F07</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>F08</td>
<td>30</td>
<td>29</td>
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AEROSPACE: Red | MECHANICAL: Blue

HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE
### Graduate Enrollment

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<tr>
<th></th>
<th>MAE</th>
<th>National</th>
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<tr>
<td><strong>Female</strong></td>
<td>05-06 17.6%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>07-08 13.3%</td>
<td></td>
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<tr>
<td></td>
<td>08-09 12.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Minority</strong></td>
<td>05-06 6.8%</td>
<td>5.5%</td>
</tr>
<tr>
<td></td>
<td>06-07 10.9%</td>
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<tr>
<td></td>
<td>08-09 8.0%</td>
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</table>
Some good news!
MAE Programs and Industrial Outreach

Prof. Ann Karagozian
Vice Chair, Industrial Relations
MAE Department Educational Programs

- **B.S. programs** in both ME and AE afford students extensive educational and practical experiences:
  - **Strong technical background** in fundamental areas (fluids, solids, structures, thermodynamics, heat transfer, controls, materials)
  - **Significant breadth** in technical areas and technological systems (energy, manufacturing, design, aircraft, spacecraft systems)
  - **Meaningful capstone design** (“system engineering”) and development experiences within each major
  - **Stimulating design, development, and testing experiences** through extra-curricular professional organizations and projects (AIAA, ASME, SAE)
  - **Opportunities for industrial experience** via summer internships and part-time employment
MAE Department Educational Programs

- **M.S. programs** in both ME and AE afford students strong educational, research/practical experiences:
  - **Strong technical background** in fundamental areas (fluids, solids, structures, thermodynamics, heat transfer, controls, manufacturing, MEMS)
  - **Opportunities for research** in fundamental areas (M.S. thesis plan, 7 courses)
  - **Opportunities for applied research or industry projects** (M.S. comprehensive exam or project plan, 9 courses)
  - **New Online M.S. program** meets needs for distance learning
- **Ph.D. programs** in both ME and AE afford students extensive educational and research experiences to prepare them for professions in basic & applied research or teaching
MAE Industrial Outreach: Benefits to UCLA

- Exposure for our **students** to current industry directions and technological projects (can lead to internships, scholarships, permanent employment)

- Exposure for our **faculty** to current industry directions, technological projects (can lead to collaborations, partnerships, extension of industry IRAD programs)

- Positive exposure of our educational and research activities to our primary “customers”
  - Impact on future directions in teaching and research
  - Impact on unrestricted funding to the department
  - Impact on school rankings by industry
Industrial Outreach: Benefits to Industry

- Exposure to exceptionally strong future employees for internship and permanent positions
- Exposure to our faculty and their research for potential collaborations, partnerships, investment, joint proposals
- Exposure to MAE advanced degree programs for current employees’ continuing education
- Ability to influence the future directions of the department and hence the education of future generations of engineers
  - i.e., “preserving the seed corn”, even in VERY difficult economic times
Our Commitments:

Universities:
- Keep students engaged in the field (especially early!)
  - Plant the seed corn early, to develop future students (i.e., those currently in elementary and middle school)
  - Work to keep the curriculum relevant, but maintain the necessary technical depth to move into future arenas
  - Keep focused on our ultimate objectives (education and research), making research opportunities available to graduates and undergraduates

Industry:
- Keep science & technology pipeline issues in mind for current and future organizational health
  - Engage with universities as well as high schools to provide role models, collaborations, “seed planting”
  - Maintain “best practices” in research and educational partnerships
MAE Industrial Affiliates’ Programs

**Basic Level ($10,000/year):**
- Representation on MAE Industrial Advisory Board
- Three free registrations at the HSSEAS Technical Forum (likely in February, 2010)
- List of exceptional undergraduate and graduate students completing degrees (e.g., GPAs > 3.4)
- Technical papers and pre-prints by faculty and students on request
- Advance notice of departmental seminars and colloquia of interest
- In-building and University Library use upon request
- Hard copies of MAE Annual Review (forthcoming!) and other relevant news and professional information
MAE Industrial Affiliates’ Programs

**Gold Level ($15,000/ year):**
- All of the benefits of Basic Membership, plus:
  - Opportunities for yearly Industry-Sponsored Seminar Days, Recruitment Activities

**Platinum Level ($25,000/ year):**
- All of the benefits of Gold Membership, plus:
  - Assignment of a Faculty Liaison to facilitate collaborations, partnerships with the IA
  - Annual seminar at the IA company by the Faculty Liaison or another MAE faculty member
  - UCLA student assigned to work on an IA-sponsored project (either at UCLA or the company)
  - IA engineer can spend up to 3 months at UCLA collaborating with Faculty Liaison

UCLA Henry Samueli School of Engineering and Applied Science
MAE Industrial Relations Activities, 2008-9

- MAE Industrial Advisory Board Meeting, Nov. 21, 2008
- Aerospace Corp. Visit/ Tour of Labs, April 3, 2009
- HRL Laboratories Lunch & Lab Tours, April 17, 2009
- UCLA HSSEAS Technology Forum, April 23, 2009
  - Industry Panel on Aerospace/ Defense
- AeroVironment Visit & Lab Tours, May 14, 2009
- MAE Distinguished Seminar, Dr. Wanda Austin, Aerospace Corp. President/ CEO, May 29, 2009
### Aerospace Corporation Lab Tours for UCLA Faculty
**Friday April 3, 2009**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Visitor 2</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:45-9:00</td>
<td>Badging</td>
<td>Visitor 2</td>
<td>Sherrie Zacharius</td>
</tr>
<tr>
<td>9:00</td>
<td>Introduction and Overview</td>
<td>A6/1404</td>
<td>Tom Curtiss</td>
</tr>
<tr>
<td>Tours</td>
<td>Electric and Chemical Propulsion Research</td>
<td>D1</td>
<td>Michael O'Brien</td>
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<tr>
<td></td>
<td>Ceramic Fracture and Impact Gun</td>
<td>D1</td>
<td>Rich Welle</td>
</tr>
<tr>
<td>9:30</td>
<td>Tribology</td>
<td>A6</td>
<td>Steve Didziulis</td>
</tr>
<tr>
<td>10:20</td>
<td>MEMs Devices</td>
<td>A6-1525</td>
<td>Jon Osborn</td>
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<tr>
<td>Breakout Sessions</td>
<td>11:15</td>
<td></td>
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<tr>
<td>Picosats</td>
<td>A6</td>
<td></td>
<td>Siegfried Janson</td>
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<tr>
<td>Machine Augmented Composites</td>
<td>A6</td>
<td></td>
<td>Gary Hawkins</td>
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<tr>
<td>Electronics Engineering</td>
<td>D8</td>
<td></td>
<td>Richard Covington</td>
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<td>Steve Robertson</td>
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<tr>
<td>Network Architectures</td>
<td>Software Defined Radio</td>
<td>A2</td>
<td>Jim Hart</td>
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<td></td>
<td>BGP Stress Testing/Mobile Routing</td>
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<td>Joseph Kim</td>
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Visit to UCLA by (Hon.) Dr. Bill Jeffrey and Dr. Geoffrey McKnight

Friday, April 17, 2009

Approx. 11:30 am: Arrive at UCLA parking kiosk on Westwood Blvd; parking arranged for Dr. Jeffrey and Dr. McKnight under their names (Confirmation Number is 271508)

11:30 am – 12 noon: Arrival at Prof. Ann Karagozian’s office, introductions, walk to Faculty Center

12:00 pm – 1:15 pm: Lunch at UCLA Faculty Center with Dean Vijay Dhir, Chair Adrienne Lavine, and Prof. Karagozian

1:30 pm – 1:50 pm: Tour of the Micro Sensor Lab, Prof. Bob M’Closkey

1:55 – 2:15 pm: Tour of the MicroManufacturing Lab, Prof. CJ Kim

2:20 – 2:35 pm: Tour of Prof. Chris Lynch’s Lab

2:40 – 3:00 pm: Tour of the Active Materials Lab, Prof. Greg Carman
Schedule for Boeing/Rocketdyne visitors
Thursday, December 6, 2001

11:30 - 12 Arrival at Prof. Ann Karagozian's office (46-147K Engr. IV)

12 - 1:30 Luncheon at Faculty Center Sequoia 3 with MAE faculty

1:30 - 2:00 Overview of MAE Department: Chair D. L. Mingori (37-124 Engr. IV)

2:00 - 2:30 Lab tour, Prof. Carman – 32-138 Engr. IV

2:30 - 3:00 Lab tour, Prof. Karagozian – 1805 BH

3:00 - 3:30 Lab tour, Prof. M'Closkey – 33-138 Engr. IV

3:30 - 4:00 Seminar preparation - Engineering IV 47-124

4:00 - 5:30 Seminar - Engineering IV 47-124

5:30 - 6:30 Pizza party and recruitment activities
Keynote Session 3 *Defending Our Future*
Ronald D. Sugar, Chairman and CEO of Northrop Grumman Corporation

Panel on Aerospace & National Security
Panel Moderator: Prof. Ann R. Karagozian (UCLA MAE Department)

Panelists:
Dr. Allen Adler (Boeing Research and Technology)
Mrs. Natalie Crawford (RAND Corporation)
Prof. Rafail Ostrovsky (UCLA Department of Computer Science)
Ms. Heidi Shyu (Raytheon Company)
MAE Industrial Relations Activities, 2009-10

- Northrop-Grumman Visit, Recruiting, Oct 9 & 20, 2009
- MAE Industrial Advisory Board Meeting, Oct. 30, 2009
- Establishment of Vishal Parikh Memorial Scholarship & Internship with Rocketdyne and AFRL, ??
- Company Seminar or Visit Day, ??
- Company Seminar or Visit Day, ??
- Schoolwide Technology Forum, February, 2010
- Industry Panel Discussion on Energy Issues, ??
2009-10 MAE Industrial Advisory Board

Aerospace Corporation
Wayne Goodman
Gen. Manager, MILSATCOM
Air Force Research Laboratory
Shawn Phillips
Deputy Chief, Space & Missile Propulsion
Boeing Phantom Works
Jason Hatakeyama
Director, AM & ST Strategic Projects and So. Calif. Site Lead
Honeywell Engines, Systems & Services
Roger Murry
Chief Engineer, Env. Control Systems
HRL Laboratories, LLC
Geoffrey McKnight
Scientist, Sensors & Materials Laboratory
Intel
Gaurang N Choksi
Manager, Core Competency Devel.
Jet Propulsion Laboratory (NASA)
Dan Goebel
Senior Research Scientist
Lockheed-Martin Aeronautics
Philip Conners
Engineering Site Director, Skunk Works
Meggitt Safety Systems
Jim Burns
Chief Mechanical Engineer
NASA Dryden Flight Research Center
Lance Richards
Aerospace Engineer & Director for Higher Education
Northrop-Grumman Corporation
Gary Ervin, President, Aerospace Systems
Steve Toner, Vice President, ONI R Programs & SBI RS Program Manager
Pratt & Whitney - Rocketdyne
James Paulson, SSME Prog. Manager
Munir Sindir, Chief Engr., Calif. Ops.
Rand Corporation
Natalie Crawford
Senior Fellow; Fmr. Head, Proj. Air Force
Raytheon Electronic Systems
Patrick Fitzgerald
Dept. Manager, Therm. & Struct. Design

UCLA Henry Samueli School of Engineering and Applied Science
We value your input and contributions to our department, faculty, and students

Thank you on behalf of the people of California and the nation!
INDUSTRIAL ADVISORY BOARD MEETING

Operating in a “New Normal”

Prof. Ann Karagozian
Vice Chair, Industrial Relations
What does a “new normal” mean?

- A completely different way of operating, in contrast to the past; a “paradigm shift”

- Often in response to external forces or challenges, this can mean a new and dramatically improved mode of operation if thoughtful and visionary strategic planning has taken place!

- Examples:
  - “Gentlemen, it appears we are out of time and money. Now we shall have to think.”
    - Winston Churchill
  - “It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change”
    - Charles Darwin
The “new normal” for California

- Significant declines in state revenues due to the national and international economic downturn...

California General Fund Revenues

![Graph showing California General Fund Revenues with a significant drop around 2008-2009.](image)

- Near-term outlook is no better...
The “new normal” for California: optimism?

Time Magazine Cover, Oct. 23, 2009:
“Despite Its Woes, California's Dream Still Lives”

- Technical innovation has historically driven and will drive the CA/nation’s economy
- Innovations foreseen in future energy sources, environmental remediation, transportation, health care
- “Nonpartisan groups have built momentum for sweeping [budgetary] reforms that could stop the unsustainable chaos”
The “new normal” for the Univ. of Calif.

- **Significant budget shortfall for 2009-10:**
  - $1.5B budget gap, including cut of $813M/2 years
  - Applies to core operating budget (which is 28% of total UC budget of $19B*)...effectively a 20% cut in operating budget

* Includes Lawrence Berkeley Lab

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UCLA Henry Samueli School of Engineering and Applied Science
The “new normal” for the Univ. of Calif.

- State’s share of funding UC students’ education has been declining for nearly 20 years*

- Currently 14,000 UC students “unfunded” (out of 225,000)
  - 1750 “unfunded” students at UCLA

- With declining state support...

* From UCOP website; data in constant 2007-8 dollars

UCLA Henry Samueli School of Engineering and Applied Science
There will be inevitable student fee increases that may bring us closer to "comparative" public universities.

UC fees for undergraduate California residents

Display 7
2009-10 UC and Public Comparison Institution Fees

Sources: University of California, Consumer Price Index

The Register
Potential solutions for the UC

- “UC Commission on the Future” (a.k.a. “Gould” Commission) will examine options for the new normal:
  - Size and shape of UC
    - How large should we be, should some areas be emphasized at only one or two campuses, etc.?
  - Education and curriculum
    - How can curricula be streamlined, should online education be a more significant part of learning, etc.?
  - Access and affordability
    - What are the implications of higher in-state fees and possibly increased numbers of out-of-state students?
  - Funding strategies
    - Private, federal, industrial partnerships will be explored
  - Research strategies
    - Targeted research areas, shared facilities, etc.

See http://ucfuture.universityofcalifornia.edu/ for details
Potential solutions for UCLA MAE

- Everything is on the table:
  - “Streamlining” curriculum (although this was just done a couple of years ago!)
  - Sharing courses and facilities with other departments and units
  - Building access to self-supporting programs such as the Engineering MS Online program
  - Growing co-op and/or education abroad programs to enhance students’ education while POTENTIALLY making room on campus and in classrooms
  - Even “differential fees” for some UC majors (shot down, but not dead!)
Optimism: Our role in Technical Innovation

Biofuels for near-term ground and air transportation

CO2 sequestration: flue gases + seawater -> “green” cement

Fuel cell/battery UAVs

Electric cars of the future
What is your organization’s “New Normal”? 