Agenda

UCLA MAE Industrial Advisory Board Meeting Agenda: Friday, October 28, 2011
(Tesla Room, 53-125 Eng IV)

8:30 – 9:00
Welcome, Introductions
Prof. Ann Karagozian, Vice Chair, Industrial Relations

9:00 – 9:05
Introductions
Dean Vijay K. Dhir

9:05 – 9:20
Departmental overview, updates
Prof. Tsu‐Chin Tsao, Department Chair

9:20 – 9:50
Industrial outreach updates and programs
Prof. Ann Karagozian

9:50 – 10:20
Undergraduate students/programs
Prof. Adrienne Lavine, Vice Chair, Undergraduate Studies

10:20 – 10:50
Group Photo and Break

10:50 – 11:00
Graduate students/programs
Prof. teD Iwasaki, Vice Chair, Graduate Studies

11:00 – 11:20
Institute for Technology Advancement
Prof. Dwight Streit, Materials Science & Engineering

11:20 – 12:45
Buffet Luncheon with Faculty

12:45 – 2:50
Student group and other projects:
SAE Mini‐Baja Project (15 min)
AIAA Design‐Build‐Fly Project (15 min)
UCLA Robotics Project (20 min)
SAE Supermileage Project (15 min)
AIAA AUAV Project (15 min)
Parikh PWR Scholarship/AFRL Internship project (10 min)
AIAA Rocket Project (15 min)
ASME Projects (20 min)

2:50 – 3:00
Break

3:00 – 4:30
Open discussion on leveraging MAE/IAB talents
Led by Ann Karagozian and Dr. Wayne Goodman, IAB Chair

4:30 – 5:30
Wine & Cheese Reception

MAE IAB Membership, 2011-12

Aerospace Corporation
Wayne H. Goodman
Vice President, Space Programs Operations

ConocoPhillips
Jim Hardly
Manager, Project Engineering, Los Angeles Refinery

Air Force Research Laboratory
David Phillips
Deputy Chief, Space & Missiles Division

Honeywell Engines, Systems & Services
Roger Marcy
Chief Engineer Environmental Control Systems

Boeing Phantom Works
Jason Habekost
Director, AM&T Strategic Programs & Social Site Lead

HRL Laboratories, LLC
Dr. Geoffrey McKnight
Sensat
Sensors and Materials Laboratory

Mal
### MAE IAB Membership, 2011-12

<table>
<thead>
<tr>
<th>Name</th>
<th>Company/Position</th>
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<tbody>
<tr>
<td>G. A. Chotani</td>
<td>Georgia Tech, ME Department, Tech Mech Group (Post: Innovators, Tech Mech Group)</td>
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<tr>
<td>J. Burns</td>
<td>Meggitt Safety Systems, Chief Mechanical Engineer</td>
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<tr>
<td>D. A. C. Statler</td>
<td>NASA Dryden Flight Research Center, Aerospace Engineer</td>
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<tr>
<td>P. A. Conners</td>
<td>Lockheed Martin, Aerospace Manager, Palmdale Site</td>
</tr>
<tr>
<td>G. N. Choksi</td>
<td>Intel, Manager, Core Competency Development, Tech Manf Group (Sub: M. Vujosevic, Senior MTS, Tech Manf Group)</td>
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<tr>
<td>J. S. Paulsen</td>
<td>Pratt &amp; Whitney Rocketdyne, SSME Program Manager</td>
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<tr>
<td>M. M. Sindir</td>
<td>Raytheon Space and Airborne Systems, Chief Engineer, California Operations</td>
</tr>
<tr>
<td>G. J. Crawford</td>
<td>RAND Corporation, Senior Fellow and Program Director, Project AIR FORCE</td>
</tr>
<tr>
<td>D. Ervin</td>
<td>Northrop-Grumman, President, NG Aerospace Systems</td>
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<tr>
<td>S. T. Roderick</td>
<td>Northrop-Grumman, Vice President, Military Programs &amp; SBIRS Program Manager</td>
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<tr>
<td>N. Crawford</td>
<td>Northrop-Grumman, Senior Fellow_SR, Project AIR FORCE</td>
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### New Industry Partners

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<tr>
<th>Name</th>
<th>Company/Position</th>
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<tr>
<td>Ingo Foldvari</td>
<td>National Instruments, Principal Academic Field Engineer</td>
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**Department Administration**

Tsu-Chin Tsao, Ph.D.
Professor and Department Chair

Tetsuya Iwasaki, Ph.D.
Professor and Vice Chair for Graduate Affairs

Adrienne Lavine, Ph.D.
Professor and Vice Chair for Undergraduate Affairs

Ann Karagozian, Ph.D.
Professor and Vice Chair for Industrial Relations

**Department Overview 2010-2011**

- Ladder Faculty: 32
- Joint Faculty: 3
- Emeritus Faculty: 11
- Adjunct Faculty: 7
- Lecturers: 30
- Administrative Staff: 24
- Staff Research Associates: 21
- Development Engineers: 6
- Postdoctoral Scholars: 29
- Visiting Ph.D. Scholars: 11
- Visiting Intl. Students: 19

- Recognitions: Society Fellows: 28
  - CAREER or Young Investigator Awards: 13
  - NAE members: 9
  - Regular Faculty: 4
  - Affiliated Faculty: 3
  - Emeriti: 2

- Publications:
  - Journal Articles: 131
  - Conference Papers: 80
  - Books & Book Chapters: 6
  - Reports: 18

- Federal $23M (78%)
  - Facilities & Research: 52.7M sq. ft.
  - Development Square footage: 14,960 sq. ft.
**Department Overview**

<table>
<thead>
<tr>
<th>Undergraduate Students</th>
<th>Graduate Students</th>
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<tr>
<td>Students Enrolled:</td>
<td>Students Enrolled:</td>
</tr>
<tr>
<td>606</td>
<td>276</td>
</tr>
<tr>
<td>Freshmen Applicants:</td>
<td>Applicants (MS and PhD):</td>
</tr>
<tr>
<td>2152</td>
<td>521</td>
</tr>
<tr>
<td>Transfer Applicants:</td>
<td>Admitted:</td>
</tr>
<tr>
<td>429</td>
<td>250 (48%)</td>
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<tr>
<td>New Students Enrolled:</td>
<td>New Students Enrolled:</td>
</tr>
<tr>
<td>131 (22%)</td>
<td>99 (40%)</td>
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<tr>
<td>Unweighted High School GPA: 3.92/4.0</td>
<td>Average Undergraduate GPA: 3.55/4.0</td>
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**Department Ranking**


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<tr>
<th>MAE</th>
<th>Depts. ranked higher in ME &amp; AE(2010)</th>
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<tr>
<td># Faculty</td>
<td>32</td>
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<td>42</td>
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**Retirement and Hiring**

- Retirement: Tony Mills and Owen Smith
- Raytheon Chair in Manufacturing Engineering
  - Last year’s search was not successful.
- Opportunity hire
  - Last year’s search had not completed.
- This year’s hiring plan
  - New search of Raytheon Chair
  - Consider candidates from last year
  - New Areas: Robotics and Heat Transfer
National Academy of Engineering Members

Selected Grants (34 of 86 Active)

- Control, Filtering and System Identification for High Energy Lasers and Laser Communications (Gibson)
- Tactical HEL Weapon Alignment System Architecture Efficiencies (Gibson)
- Loading Metal Nanostructures under Extreme Conditions Using Stress Waves with Rarefaction Shock Profiles (Gupta)
- A SIM Card-Based Disposable Biosensor for Rapid Malaria Detection (Ho)
- MURI: Towards a Mission Configurable Stealth Underwater Batoid (Iwasaki)
- Development of Thermal Ground Planes Incorporating Bio-Inspired Multiscale Wicks for High Heat Flux Devices (Ju, Catton, Dunn)
- Manufacturing and Multifunctional Characterization of Load Bearing Energy Harvesting Structures (Ju, Hahn)
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- Manufacturing and Multifunctional Characterization of Load Bearing Energy Harvesting Structures (Ju, Hahn)
- Numerical Simulation of Pulse Detonation Rocket-Induced MHD-Electromechanical Concepts for Advanced Propulsion Systems (Karagozian)
- Experimental Investigation of the Free Surface Evolution at the Moving Contact Line of Polymeric Fluids (Kavehpour)
- Electrostatically Driven Micro Rotary Stages on Conductive Liquid Bearings and Applications for Optical Data Transmission (CJ Kim, Chou)

Selected Grants (34 of 86 Active)

- Microhand to Remove Ingested Foreign Objects (CJ Kim)
- Self-Pumping Micro Fuel-Cell System with Scalable Monolithic Construction (CJ Kim)
- A Numerical Study of Turbulence Physics in Hypersonic Boundary Levels (John Kim)
- CAREER: Membrane-Protein Interactions and the Mechanics of Cell Organelles (Klug)
- REU Site: Center for Scalable and Integrated Nanomanufacturing (SINAM) Nanomanufacturing Summer Academy (Lavine)
- Advanced Ferroelectric Materials for Explosive Pulsed Power (Lynch)
- Piezoelectric Sensor/Actuator Rosettes for Noise and Vibration Control (Lynch)
- Multi-Modal MEMS Resonator Tuning via Mass Perturbation (McClosey)
- Efficient Multi-Scale Radiation Transport Modeling (Piro)
- Dynamic Estimation and Control of Linear Systems with Additive Cauchy Noises (Speyer)
- Transient Dynamics Modeling and Control for Waste Heat Recovery of Heavy Duty Diesel Powertrains (Tsao)
- Thruster Development for Precision Formation Flying Missions (Wirz)
- Simulations of Turbulent Flows with Strong Shocks and Density Variations (Zhong)
Research Center

Advanced wireless/communications, internet and sense-and-control technologies to enable the development of the next generation of the electric utility grid.

Director: Gadh

Research Center

• Manipulate relevant signal complexes by multiple stimulations for therapeutic purposes.
• Precisely measure system responses of signaling.
• Drug cocktail treatment on non-small cell lung cancer through clinical collaboration.

Director: Ho

Research Center

California NanoSystems Institute

ENERGY
• Materials that work more efficiently and are more cost effective.
• Decreasing battery size and smaller energy sources.
• Store and use energy at the nanoscale.

ENVIRONMENT
• Efficiently use natural resources in ways that will not harm the environment.
• Testing and risk assessment methods to deal with the proliferation of new materials being created.

HEALTH – MEDICINE
• Develop sensors that aid in early cancer detection.
• A variety of drug-delivering therapeutics to treat a wide variety of diseases including heart disease and diabetes.
• Treatment and outbreak management of infectious diseases.

INFORMATION TECHNOLOGY
• Smaller chip sizes for computers and the ability to store more information.
• Membrane materials for information technology devices such as computers.

MAE Faculty: Carman, Chen, Chiu, Ju, CJ Kim, Klug, Lynch
Research Center

NSF Center for Scalable and Integrated NanoManufacturing

Chen, Hahn, Ho, Lavine, Tsao, Zhang (Adjunct)

Research Center

Molecularly Engineered Energy Materials (MEEEM)

Visweswaran, Olive (UCLA)

RESEARCH PLAN AND DIRECTIONS

Widespread adoption of renewable energy technologies requires significant improvements in their efficiency, cost. MEEEM will create new materials that can efficiently generate, transport and store energy and water. These materials will be used to improve the performance of organic solar cells, microsupercapacitors, and carbon capture systems.

Research Center

Fusion Science and Technology Center

Director: Abdou

PREDICTIVE CAPABILITIES, ANALYSIS & EXPERIMENTS FOR FUSION NUCLEAR SCIENCE & PLASMA CHAMBER RESEARCH
Research Center

UCLA Center for Systems, Dynamics and Control

Gibson, Iwasaki, M’Closkey, Speyer, Tsao

Research Center

David Geffen School of Medicine

UCLA Center for Advanced Scientific and International Technology

Carman (Co-Executive Director), Tsao

Sponsored Research

Predictive Equations, Analysis & Experiments for Fusion Chamber Technology, and for IBD (Abdou); Fusion/ICF Analysis (Youssef); Fusion and Extended-Disruption Testing of Prefusion Devices to be Instrumented for Circular Motion (Abdou); Computational Fluid Dynamics Analysis (Abdou); Titan Task 1-3: Flow Control and Thermofluid Modeling (Abdou); U.S. Diagnostic and Integration Nuclear Medicine (Carman)

High Frequency Miniature Piezopump for Ventricular Assist (Carman); Energy Harvesting a Nano Scale Based Magneto-Thermal-Bioelectric Marker (Abdou); Order in Magnetic Phase Transformations for Therapeutic Nanowires (Abdou); Microfluidics to improve Telemedicine and Optical Technology (Carman); High Volume Ignition (Carman); A Novel Thin Film Mixed Current (Abdou); Foreign Object Ingestion for Computed Marine Autonomous (Abdou); Design and Development of a Multi-Functionable Nanoeletric Device (Carman); A Technical Meeting/Workshop on Complex Oxide and Multiferroic Thin Film Materials Science, Technologies, and Applications (Carman)

Dai, H., and Development of Tools to Optimize Microtechnologies for Air-Cooled Exchangers (Dai)

Self-Organized Physical Intelligence System (SOPHIS) (Chen, Ho)

Career: Massively Parallel Light-Driven Droplet Manipulation Platform for Large Scale Multiplexed SIN (Chiou); Plasmonic Photothermal Micropipettes for Living Cell Surgery (Chiou); Collaborative Research: Integrated Multifunctional Platform for High Throughput Single-Cell Gene Profiling (Chiou); Pulse Laser Driven Ultrafast Micro and Nanofluidic Systems (Chiou); A Plasmonic Photothermal Nanoblade for Large Cargo Transfer into Stem Cells (Chiou); Photothermal Delivery of Large Cargo into Mammalian Cells (Chiou)

Flow Boiling of Coolant Liquids Under Reduced Gravity Conditions (Chiou); A Microcyclic Study of Neutrons Motiok Heat Transfer Under Microgravity Conditions (Chiou)

Career: Numerical Investigations of Biological and Bio-Inspired Locomotion (Eldredge); Collaborative Research: Integrated Multifunctional Platform for High Throughput Single-Cell Gene Profiling (Eldredge); Pulse Laser Driven Ultrafast Micro and Nanofluidic Systems (Eldredge); A Plasmonic Photothermal Nanoblade for Large Cargo Transfer into Stem Cells (Eldredge)

Multiscale Modeling of Deformation, Fracture and Failure of Fusion Materials and Structures (Ghoniem); Micro-Engineered Material Surfaces for Electric Propulsion and Pulsed Power (Ghoniem); Fellowship and Scholarship Support in Nuclear Engineering at UCLA Fellow: Darius Sief (Ghoniem)

Sponsored Research

HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Gibson, Iwasaki, M’Closkey, Speyer, Tsao

HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Carman (Co-Executive Director), Tsao

Sponsored Research

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Sponsored Research

Thermal Management (Egle): Cooling of Electronic Components, Computing, and Power Electronics (Egle, Egle, Egle, Egle)

Advanced Cooling Technologies (Egle, Egle, Egle, Egle)

Physics of Solid and Liquid Structures (Egle, Egle, Egle, Egle)

Chemical Physics of Liquid crystals (Egle, Egle, Egle, Egle)

Materials Science and Engineering (Egle, Egle, Egle, Egle)

Sponsored Research

Encourage student society projects

Curricular Revision

Use ABET assessment to improve our curricula

Curricular Revision

- Created foundation for ongoing curricular revision

- Strengthened ties to industry and alumni

- Revised AE space technology class 161B

- Created new ME senior design classes 162D/E

- Encourage student society projects

  - Student societies thriving

    - AIAA, DBF: Rocket, UAV

    - ASME Battlebot, Underwater Vehicle

    - Robotics Club: Mars Rover, RoboGames

    - SAE: Mini-Baja, Supernailing Vehicles

    - BEAM: Outreach mentoring
Strategies & Accomplishments: Undergrad.

- Revised AE Space Technology Class 161B
  - Cover 7 systems (power, thermal, propulsion, structure, attitude control, communications, command/data handling) and final design project for missions.

Strategies & Accomplishments: Undergrad.

- New ME senior design classes 162D/E
  - Support from Lockheed Martin cash gift and National Instruments donation $150K
  - Introduce mechatronics into design

Strategies & Accomplishments: Undergrad.

- Student projects get strong support from Industrial Advisory Board and Alumni Advisory Board
- UCLA Rocket Team takes first in ESRA competition (2008)
- UCLA Supermileage: 1030+ miles per gallon! (2009)
- UCLA ASME Robotics takes Home Gold (2010, 2011)
- UCLA Racing Baja places 1st in maneuverability event (2011)
Alumni Advisory

William R. Goodin, MS ’71, PhD ’75, ME ’82, Chair / UCLA Extension
Anthony Cudzilo, BS ’89 / Boeing
Andrew Chang, BS ’90 / Semiconductor Electric
Kathleen Esper, BS ’92 / Northrop Grumman
Christine Cloutier, BS ’05 / HDR Architecture
Aditi Gobburu, BS ’07, MS ’09 / Northrop Grumman
Christine Miller, BS ’10 / Boeing
Taline Khansa, BS ’07 / GKN Aerospace
David E. Lee, BA ’85, MS ’90, PhD ’98 / Northrop Grumman
Sasha Lukyanets, BS ’07, MS ’09 / SpaceX
Mark Malicdem, BS ’05 / B/E Aerospace
Margaret Motagally, BS ’05 / NASA
Jonathan Nguyen, BS ’09 / Jet Propulsion Laboratory
James Sharp, BS ’03, MS ’06 / Northrop Grumman
Stefan Schrijver, BS ’10, MBA ’11 / Northrop Grumman
Michelle Yi, BS ’03 / Consultant

Highest Priorities for This Year

• Recruiting excellent faculty
• Strengthening Industrial Affiliates program
• Develop and maintain close ties with industry and government to promote technical exchange and collaboration on projects

Questions for IAB

• Effects of federal budget anticipation on industry and hiring?
• Ideas for strengthening Industrial Affiliates & relation to IAB?
• Ideas from IAB for Departmental Initiatives
  – How to strengthen ties with industry and foster industry-sponsored research or industry-university collaborative research?
  – How to help students find industrial internships & jobs?
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)
  - 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 unrestricted funding to the department
  - Impact on critical scholarships/fellowships
  - Impact on future directions in teaching and research

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 profoundly difficult economic times

Our Commitments:

Universities:
- Prepare and train the future STEM workforce
- 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:
- Strengthen the organization by bringing in fresh ideas via new engineers and collaborations
- Continue to provide opportunities for engagement with UCLA via industry visits, internships/job opportunities
- Interactions/collaborations for students and faculty with experienced engineers
MAE Industrial Affiliates’ Programs

**Basic Level ($15,000/year):**
- Representation on MAE Industrial Advisory Board
- Three free registrations at the HSSEAS Technical Forum (likely in February, 2012)
- 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, upon request
- In-building and University Library use upon request
- Hard copies of MAE Annual Review and other relevant news and professional information

**Gold Level ($20,000/year):**
- All of the benefits of Basic Membership, plus:
  - Opportunities for yearly Industry-Sponsored Seminar Days, Recruitment Activities

**Platinum Level ($30,000+/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(s) 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

Special MAE Industrial Support

- Vishal Parikh memorial PW Rocketdyne Scholarship/AFRL internship, 2010 – present

- Lockheed-Martin and National Instruments funding for MAE 162D/ E Design Lab
- Upgrades to MAE 161B Spacecraft Design course and MAE 157S Aerospace laboratory course
Typical MAE Industrial Relations Activities

- MAE Industrial Advisory Board Meeting, Oct or Nov
- Industry Visit Days, Nov - May
  - Either company engineers visit UCLA for luncheon, lab tours, targeted seminars to students, recruitment
  - Or UCLA faculty and/or students visit company for presentations, collaborative discussions
- UCLA HSSEAS Technology Forum, March
- MAE Research & Technology Review (?), March - May
- MAE Distinguished Industry Seminars, any time

Industry Sponsored Seminar Day: Example

 Mechanical & Aerospace Engineering Department Fall Seminar Series

Schedule for Northrop-Grumman visitors

11:30 – 12:00 Arrive at Prof. Ann Karagozian’s office
12:00 - 1:20 Luncheon at Faculty Center with MAE faculty
1:20 – 1:40 Overview of MAE Department: Chair D. L. Mingori
2:00 - 3:30 Lab tours:
  - Prof. Jason Speyer, Autonomous Vehicle Systems
  - Prof. Ann Karagozian, Combustion/Propulsion/Fluids
  - Prof. Vijay Gupta, Experimental Mechanics
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

Aerospace Corp. “Reverse” Visit Day

Aerospace Corporation Lab Days for UCLA Faculty

6-6:30 student group 2003-2004
10:00 Session 1: Introduction and Overview
11:00 Session 2: Electromagnetics
11:30 Session 3: Materials and Chemical Processing
12:30 Lunch
1:00 Session 4: Computer-Aided Design
2:00 Session 5: Mechanical Engineering
3:00 Session 6: Aerospace Architecture
4:00 Session 7: Performance & Analysis
5:00 Session 8: Fluid Mechanics
6:00 Session 9: Atmospheres
HRL Laboratories Informal Visit Day

Visit to UCLA by HRL Labs; Bill Jeffrey and Dr. Geoffrey McIlhiney

Friday, April 13, 2000

Approx 11:30 am: Arrive at UCLA parking lot on Westwood Blvd parking arranged for Dr. Jeffrey and Dr. McIlhiney under their names (Confirmation number 1 773906)

11:30 am - 1:00 pm: Arrival at HRL, orientation, introduction, visit to HRL Center

12:00 pm - 1:35 pm: Lunch at UCLA Faculty Center with Dean Vlahovic Chair Adrienne Kuyper and Prof. Karpstam

1:30 pm - 1:50 pm: Tour of the Micro Sensor Lab, Prof. B. M. Chin

1:55 - 2:35 pm: Tour of the Micro Manufacturing Lab, Prof. C. Kim

2:30 - 3:05 pm: Tour of Prof. Chadland's lab

2:40 - 3:30 pm: Tour of the Active Materials Lab, Prof. Qing Cai

UCLA Henry Samueli School of Engineering and Applied Science

HSSEAS Tech Forum: March 1, 2011

Keynote Speakers:

Delivering Capabilities to the Warfighter
David A. Honey
Director, Research
Assistant Secretary of Defense for Research and Engineering

The Evolving Biomanufacturing Factory
Alison Moore
Vice President, Process and Product Engineering, AMGEN

Patricia A. Hoffman
Assistant Secretary
Office of Electricity Delivery and Energy Reliability
Department of Energy

Parallel sessions on Nanotechnology, Biotechnology, Technologies for Emergency Response

MAE Research & Technology Review

08:30 - 09:00 am Registration and Continental Breakfast

09:00 - 09:15 am Introductory and Welcoming Remarks: Salons 3 & 5

Professor Ann R. Karagozian, MAE Industrial Liaison
Professor D. Lewis Mingori, MAE Chair
Professor Mike Stenstrom, Associate Dean, Research and Physical Resources, HSSEAS

09:15 - 09:30 am Overview of MAE Research Activities

Professor D. Lewis Mingori

09:30 - 09:45 am Overview of MAE Education Programs and Industrial Outreach

Professor Ann. R. Karagozian

09:45 - 10:00 am Break

10:00 - 12:00 pm Simultaneous Technical Sessions (Oral):

Session I: Salon 6
Session II: Salon 2
Session III: Salon 4

12:00 - 02:00 pm Luncheon: De Neve Plaza

Guest Speaker:

Mr. Bernard (Ben) Koff, Executive Vice President (Retired), Pratt & Whitney Aircraft, "A Designer's Perspective on Aircraft Engines and Mechanical and Aerospace Engineering"

02:00 - 04:00 pm Simultaneous Technical Sessions (Oral):

Session IV: Salon 6
Session V: Salon 2
Session VI: Salon 4

04:00 - 05:00 pm Technical Session VII (Posters): Salons 3 & 5

05:00 - 06:30 pm MAE Lab Tours (Optional): Meet at Registration Desk
We value your input and contributions to our department, faculty, and students

Thank you on behalf of the people of California and the nation!
Undergraduate Programs in Mechanical and Aerospace Engineering

Industrial Advisory Board Meeting
October 28, 2010

Adrienne Lavine
Vice Chair for Undergraduate Programs

Applications of AE and ME Freshmen and Transfers

New Enrollments
ABET AGAIN!
VISIT FALL, 2012
Our Current Program Educational Objectives

• Objective 1: Our students will be able to apply their rigorous undergraduate education to creatively solve technical problems facing society.
  PROBLEM: NOT MEASURABLE.

• Objective 2: Our students will be prepared for
  – successful and productive careers in mechanical/aerospace or other engineering fields;
  – graduate studies in mechanical/aerospace or other engineering fields;
  – further studies in other fields such as medicine, business, and law.
  PROBLEM: “PREPARED” IS VERBOTEN!

Proposed Program Educational Objectives

• Our students will engage in
  – successful and productive careers in aerospace/mechanical or other engineering fields;
  – graduate studies in aerospace/mechanical or other engineering fields;
  – further studies in other fields such as medicine, business, and law.

NEW INITIATIVES IN UNDERGRADUATE PROGRAM
Goals/Plans

• Showcase the vitality of student group activities.
  – Create structures that make it easy for students to inform
department of their activities.
  – Publicize those activities to all students, at website, and in
annual report.

• Encourage activities that span groups.
  – Have initiated alumni speaker series – first event was in
September.
  – Once quarterly or more.
  – Will focus on personal stories of alumni – successes and failures
(different from “tech talks”).
  – Have established structure so that student groups will
collaborate to organize.

UCLA Engineering
Mechanical and Aerospace Engineering
Graduate Programs

Graduate Programs of Mechanical and Aerospace Engineering Department

Industrial Advisory Board Meeting
October 28, 2011

teD Iwasaki
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 four years in order to engage the faculty actively in graduate student recruitment.

2011 2010

<table>
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<th>Graduate Division</th>
<th>$544,305</th>
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<td>TOTAL</td>
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<td>$826,505</td>
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• 32 Departmental Fellowship offers were made (27 accepted, 85%), among those accepted, six are for two-year fellowships. Fellowships varied from $18,073 to $42,212 which consisted of a stipend, registration fees (and nonresident tuition if necessary).
• 19 students were offered Non-Resident Fellowships (6 accepted, 32%).
• 7 students were offered $5K Industrial Affiliates Fellowship (7 accepted, 100%).
• Awarded 2 Cota-Robles Fellowships (for PhD Students). This four-year fellowship currently provides a stipend of $20,000.00 plus registration fees and nonresident tuition (for the first year only) if necessary. During the student’s 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. The student’s department is obligated to provide two or more years of equivalent support.
• Awarded 3 G.O.P. Fellowships (for MS Students). This one-year fellowship program provides recipients with a $15,000.00 stipend plus registration fees (and nonresident tuition if necessary).
**Graduate Applications**

*50% increase in 3 years!*

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**Graduate Admissions**

*Steady increase over 8 years*

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**Graduate Enrollments**

*Large increase this year in mechanical*
Degrees Awarded

Aerospace

Mechanical

Graduate Total Enrollments

Graduate Diversity

National F2011

20.2% Female

4.8% Minority
A New Policy on M.S. Student Advising

Started in Fall 2009:

All new M.S. and Ph.D. students who are pursuing an M.S. degree in the MAE department must meet with their advisors in their first quarter at UCLA. The goal of the meeting is to discuss the students' plans for satisfying the M.S. degree. Students should obtain an M.S. planning form from the MAE Student Affairs Office, and return it with their advisor's signature by the end of the first quarter.

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Breath vs. Depth in MS Program

Question: In our MS program, do we need to require all students to take courses with some depth in one major field or is the current requirement fine? We have some concern that students can take an eclectic mix of courses that may not lead to any expertise.

Background Information:
The question applies to terminal M.S. students, who can choose courses across the entire field of mechanical and aerospace engineering, with very few constraints. The details of the M.S. requirements are below:

Current M.S. Course Requirements
At least nine courses are required. For the thesis plan, seven of the nine must be formal courses, including at least four graduate courses; the remaining two courses may be courses involving work on the thesis. For the comprehensive examination plan, all nine must be formal courses. Under both plans, the courses should be chosen so that the breadth requirements and the graduate-level requirement are met.

Breadth Requirements (only applicable to students who do not have a B.S. degree from an ABET-accredited aerospace or mechanical engineering program). Students are required to take at least three courses from a list of foundational upper-division undergraduate courses in Mechanical and Aerospace Engineering.

Graduate-Level Requirement. Students are required to take at least one course from a list of foundational graduate courses that span the major fields.
UCLA Engineering
Institute for Technology Advancement

MAE Advisory Board
October 28, 2011

Dwight Streit
streit@ucla.edu

ITA Charter

• Add value to the UCLA Henry Samueli School of Engineering and Applied Science
  — Capture and manage research programs
  — Accelerate transition of UCLA IP to startup companies
  — Enable proprietary corporate research at UCLA

ITA Operational Model

• Develop new multi-disciplinary research efforts
  — Identify new opportunities and funding sources
  — Work with faculty to shape, propose and win new programs
• Support and grow potential spin-out technologies
  — Provide facilities and funding to start new companies
• Facilitate industry access to UCLA engineering
  — Enable near-term R&D projects to support industry needs
Ongoing Program Examples

• Smart Grid (Professor Gadh)
  – DOE-LADWP demo: UCLA ($5M), Caltech/JPL, USC
• California Energy Commission (Profs Tsao and Dunn)
  – Energy Storage Study, fast track January – August 2011
• Smart Water Systems (Professor Cohen)
  – US Navy demonstration under way, 12,000 gal/day
• Nano-Molecular Pothole Repair (Professor J. Yang)
  – NIST funding $3M/3 years, expanding to other applications
  – Significant 15x improvement to current technology

New Program Development

• DARPA: Defense Advanced Research Projects Agency
  – Recent win with Northrop Grumman Electronic Systems
  – $1.3M UCLA share of $9M program (S. Pamarti and F. Chang)
  – New MTO and ONR efforts in negotiations (Bahram Jalali)
• NRO: National Reconnaissance Office (AS&T)
  – $4.5M carbon nanotubes for space applications (L. Carlson)
  – Follow-on phases possible with close industry collaboration
• Maersk Line Technology Development
  – ITA-coordinated multi-departmental proposal to develop new refrigerated-container technology (A. Abele)

Technology Spin-Offs

• ITA investment in UCLA technology for spin-offs
  – IP protection, prototype and business plan development
  – Facilities, funding, guidance, angel and VC connections
  – Three out, three on deck, dozen in the queue
• New Anderson MBA hired as lead for spin-offs
  – BS/MS EE with ten years industry experience, starts 11/1
  – Was team leader for Anderson support of ITA business plans
**Student Involvement**

- **ITA lead assigned for student interactions**
  - Maxim Batalin (Ph.D. CS) for ITA – student development and TEC (Technical Entrepreneurial Community) coordination
- **Joint ITA, OIP and ISR Campus-Wide Apps Competition**
  - Three tracks: engineering, medical and arts
  - Advertised widely during spring quarter (Daily Bruin)
  - Seven teams selected, development platform provided
  - November down select
    - Grand prize of $3000
    - Three first prizes of $1000 each
  - ITA support for potential commercialization

**Financial Status**

- **Awards to date: some 30 programs worth $15M**
  - Moving towards larger multi-disciplinary proposals
- **Awards up year over year**
  - Stretch goals for 2011-12 fiscal year
- **Self-sufficient operation that returns value to HSSEAS**
  - Help the school win new programs