UC DAVIS COLLEGE OF ENGINEERING
2011-12 Annual Report
UC DAVIS COLLEGE OF ENGINEERING FACTS

<table>
<thead>
<tr>
<th>Category</th>
<th>Statistic</th>
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</thead>
<tbody>
<tr>
<td>Undergraduate Students</td>
<td>3,463</td>
</tr>
<tr>
<td>Graduate Students</td>
<td>1,252</td>
</tr>
<tr>
<td>Faculty</td>
<td>201</td>
</tr>
<tr>
<td>CAREER/PECASE Awards to UC Davis Faculty</td>
<td>42</td>
</tr>
<tr>
<td>Research Expenditures</td>
<td>$87.1 million (2012)</td>
</tr>
<tr>
<td>Alumni</td>
<td>21,500</td>
</tr>
<tr>
<td>Best Undergraduate Engineering Programs (US News, 2012)</td>
<td>#34 (tied)</td>
</tr>
<tr>
<td>Best Graduate Engineering Programs (US News, 2012)</td>
<td>#31 (tied)</td>
</tr>
<tr>
<td>Engineering Student Organizations</td>
<td>36+</td>
</tr>
<tr>
<td>Transfer Student Average Time to Degree</td>
<td>2.25–2.75 years</td>
</tr>
</tbody>
</table>

UNIVERSITY OF CALIFORNIA, DAVIS

#1 Cool School, for sustainable practices (Sierra Magazine, 2012)

#1 Producer of U.S. Fulbright Scholars, 2012-13. (Chronicle of Higher Education)

#5 Among U.S. universities in the number of international scholars (Open Doors)

#10 Happiest U.S. college campus (Newsweek College Rankings, 2011)

#14 In research expenditures among U.S. public universities (NSF, FY 2011)

#17 Overall for Social Mobility, Research, Service, (Washington Monthly, 2012)
The 2011-12 academic year was very eventful and productive for the College of Engineering at UC Davis. The yearlong celebration of our 50th anniversary kicked off with a memorable reception in Cupertino, where we welcomed speakers Diane Bryant ('85), senior vice president and general manager of Intel’s Datacenter and Connected Systems Group; and Vinay Reddy ('08), construction engineer at PGH Wong.

The busy year-long anniversary celebration also featured distinguished lectures by Curtis Carlson, president and CEO of SRI International; Deirdre Meldrum, senior scientist and director of the Arizona State University Biodesign Institute's Center for Biosignatures Discovery Automation; and James Plummer, dean of Stanford University's School of Engineering. The 2011-12 academic year concluded with an ambitious Engineering Connections and Design Showcase, which highlighted the exciting programs in our seven college departments, while providing an outstanding platform for our students to demonstrate their senior design projects.

The College of Engineering continues to attract outstanding students, enrolling 3,463 undergraduates in 2011-12. In the 2011-12 academic year, the College of Engineering awarded 199 master’s degrees — 51 more than the previous year! — and 114 doctoral degrees.

Despite continued financial challenges, our research programs continue to grow. For the 2011-12 fiscal year, the College of Engineering’s research awards totaled a record $108.1 million. Our research expenditures totaled more than $87 million, a 134% increase from 2001-02. In an increasingly competitive extramural research funding environment, this investment support from federal, state and private sources reaffirms the excellence of our faculty and staff researchers.

The College of Engineering continues to make significant economic contributions. Our technology incubator, the Engineering Translational Technology Center (ETTC), saw its first “graduate.” Dysonics, a start-up based on audio technology research from UC Davis, left ETTC after less than a year of incubation, having secured $750,000 in funding from angel investors.

The College of Engineering welcomed several new faculty members in 2011-12. New faculty include Jerry Woodall, a National Academy of Engineering member and National Medal of Technology laureate, who has joined the Department of Electrical and Computer Engineering; and astronaut Stephen Robinson, a veteran of four space shuttle missions, who has joined the Department of Mechanical and Aerospace Engineering.

We expect to do even better, as we move further into the College of Engineering’s second half-century. Our innovative and dynamic faculty members are perfectly matched to their talented and enthusiastic students. I’m pleased to share, in the following pages, the progress we’ve all made during the past year.

Enrique J. Lavernia
Dean, Distinguished Professor
Facts and Figures

- Founded in 1962
- Academic departments: 7
- Undergraduate majors: 15
- Graduate programs: 10
- Faculty: 201
- Alumni: 21,500
- Current and former faculty elected to national academies: 14
- Faculty Early Career Development Awards (NSF): 42
- Endowed Chairs and Professorships: 10

Student Information

- Undergraduate enrollment: 3,463
- Graduate enrollment: 1,252
- Degrees awarded:
  - Bachelor's degrees: 661
  - Master's degrees: 199
  - Doctoral degrees: 114
- Undergraduate program distinctions:
  - Most comprehensive engineering program in UC system
  - Most ABET-accredited majors in UC system

Rankings

- Among the top 18 U.S. public university undergraduate engineering programs
- Among the top 20 public engineering graduate schools
- Biological and Agricultural Engineering ranked 5th nationally
- Ranked 3rd among top 50 engineering programs for percentage of female faculty
- Research-Doctorate programs ranked highly by National Research Council, 2010: Civil & Environmental Engineering, Materials Science & Engineering, Chemical Engineering, and Computer Science

Trends in Research Expenditures
Top Research Grants and Contracts 2011-12

- **John Harvey**  
  Department of Civil & Environmental Engineering  
  Partnered Pavement Research Center  
  California Department of Transportation  
  $24,530,000

- **Stephen Velinsky**  
  Department of Mechanical & Aeronautical Engineering  
  Development of Innovative Highway Maintenance and Construction Technology and Deployment Support for Caltrans Application  
  California Department of Transportation  
  $7,492,558

- **Neville Luhmann**  
  Department of Electrical & Computer Engineering  
  High Power Transportable Active Denial Transmitter Subsystems, Space & Naval Warfare Systems Command  
  $2,958,292

- **Joan Lindberg**  
  Department of Biological & Agricultural Engineering  
  Delta Smelt Research and Refugial Population Development, USDI Bureau of Reclamation  
  $2,900,000

- **S. Geoffrey Schladow**  
  Department of Civil & Environmental Engineering  
  3D Visualization Tools for Enhancing Awareness, Understanding, and Stewardship of Fresh Water Ecosystems  
  National Science Foundation (NSF)  
  $1,634,243

- **Ross Boulanger**  
  Department of Civil & Environmental Engineering  
  National Science Foundation-Network for Earthquake Engineering Simulation, Purdue University  
  $1,622,489

- **Bryan Jenkins**  
  Department of Civil & Environmental Engineering  
  Orissa Sanitation Trial Behavioral Research (ref ITDCW67), London School of Hygiene and Tropical Medicine (Great Britain)  
  $1,222,095

- **Julie Sutcliffe**  
  Department of Biomedical Engineering  
  CARE California Alliance Radiotracer Education  
  U.S. Department of Energy  
  $1,163,072

- **Neville Luhmann**  
  Department of Electrical & Computer Engineering  
  Innovative Diagnostic Developments for Turbulence and Transport Measurement and Visualization, U.S. Department of Energy  
  $1,095,000

- **Jeannie Darby**  
  Department of Civil & Environmental Engineering  
  Center for Affordable Technology for Small Drinking Water Systems  
  Cal H&W Health Care Services, Department of (DHCS)  
  $900,000

- **Frank Loge**  
  Department of Civil & Environmental Engineering  
  Underwater Video Monitoring of Adult Fish Ladder Modification to Improve Pacific Lamprey Passage at McNary, Ice Harbor and Lower Monumental Dams, 2012  
  US Army Corps of Engineers/Walla Walla District  
  $885,851

- **Katherine Ferrara**  
  Department of Biomedical Engineering  
  Specific and High-Resolution Ultrasound Imaging in Cancer  
  NIH National Cancer Institute (NCI)  
  $834,465

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**2011-12 Research Expenditures by Department**

<table>
<thead>
<tr>
<th>Department</th>
<th>Expenditures</th>
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<tbody>
<tr>
<td>Biological &amp; Agricultural Engineering</td>
<td>$6,247,671</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>$16,173,766</td>
</tr>
<tr>
<td>Chemical Engineering &amp; Materials Science</td>
<td>$11,944,126</td>
</tr>
<tr>
<td>Civil &amp; Environmental Engineering</td>
<td>$22,785,074</td>
</tr>
<tr>
<td>Computer Science</td>
<td>$9,735,827</td>
</tr>
<tr>
<td>Electrical &amp; Computer Engineering</td>
<td>$10,350,172</td>
</tr>
<tr>
<td>Mechanical &amp; Aeronautical Engineering</td>
<td>$9,862,107</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$87,098,743</strong></td>
</tr>
</tbody>
</table>
Facts, Figures and Leadership

**Biological and Agricultural Engineering:**
- Faculty: 17
- Undergraduates: 146
- Graduate Students: 46
- Research Expenditures: $6,247,671
- Undergraduate Majors: Biological Systems Engineering
- Graduate Programs: M.S., Ph.D., Master of Engineering, Doctor of Engineering

**Chair:** Raul Piedrahita

**Biomedical Engineering:**
- Faculty: 24
- Undergraduates: 384
- Graduate Students: 135
- Research Expenditures: $16,173,766
- Undergraduate Majors: Biomedical Engineering
- Graduate Programs: M.S., Ph.D.

**Chair:** Kyriacos Athanasiou

**Chemical Engineering and Materials Science:**
- Faculty: 31
- Undergraduates: 506
- Graduate Students: 128
- Research Expenditures: $11,944,126
- Graduate Programs: M.S., Ph.D. – Chemical Engineering, Materials Science and Engineering. Designated emphases in Biotechnology, Biophotonics.

**Chair:** Ahmet Palazoglu

**Civil and Environmental Engineering**
- Faculty: 33
- Undergraduates: 628
- Graduate Students: 301 + 44 *(TTP)
- Research Expenditures: $22,785,074
- Undergraduate Majors: Civil Engineering
- Graduate Programs: M.S., Ph.D.; Areas of Specialization: Environmental Engineering, Geotechnical Engineering, Structural Engineering and Structural Mechanics, Transportation Planning and Design, Water Resources Engineering.

**Chair:** Sashi Kunnath

**Computer Science**
- Faculty: 32
- Undergraduates: 572
- Graduate Students: 210
- Research Expenditures: $9,735,827
- Undergraduate Majors: Computer Science and Engineering, Computer Science (in College of Letters & Science)
- Graduate Programs: M.S., Ph.D.

**Chair:** Prasant Mohapatra

**Electrical and Computer Engineering**
- Faculty: 31
- Undergraduates: 472
- Graduate Students: 180
- Research Expenditures: $10,350,172
- Undergraduate Majors: Electrical Engineering, Computer Engineering
- Graduate programs: M.S., Ph.D.

**Chair:** Rick Kiehl

**Mechanical and Aerospace Engineering**
- Faculty: 33
- Undergraduates: 738
- Graduate Students: 170
- Research Expenditures: $9,862,107
- Undergraduate Majors: Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science Engineering
- Graduate programs: M.S., M.E., D. Eng., Ph.D.

**Chair:** C.P. “Case” van Dam
2011-12 Gift Source

Total = $8,127,290

- Corporations: $6,766,073
- Foundations: $806,850
- Alumni: $214,663
- Individuals: $196,400
- Other Organizations: $143,304

2011-12 Purpose of Gifts

Total = $8,127,290

- Student and faculty scholarship, research and instruction: $7,156,022
- Student support/Project You Can: $538,061
- Endowed chairs and professorships: $10,000
- Emerging opportunities across the university: $260,621
- World-class programs and unparalleled patient care: $82,450
- The university environment, to benefit students, faculty, staff and community: $79,596
Dean’s Executive Committee

The continuing success of the College of Engineering is fueled by the involvement of influential friends and alumni who promote its visibility and help secure philanthropic support to advance its goals in education, research and public service.

The Dean’s Executive Committee is composed of 17 executive-level leaders, including venture capitalists and successful entrepreneurs. They work closely with the Dean to assist the College of Engineering through advocacy, prospective donor identification and cultivation, and personal philanthropy.

- Enrique Lavernia  
  Dean and Distinguished Professor
- Diane Bryant  
  Vice President and GM, Datacenter and Connected Systems Group  
  Intel Corporation
- Tim Bucher  
  CEO and Founder, Tastingroom.com  
  President and Founder, Dry Creek Olive Company  
  President and Founder, Tattore Wines
- Jeff Child  
  Advisor for a private trust
- Mike Child  
  Managing Director, TA Associates, Inc.
- Alfred Chuang  
  Founder and CEO, Magnet Systems
- Richard Chuang  
  CEO, Cloudpic
- Dick Dorf, PhD  
  Professor Emeriti, UC Davis
- Adam Hansel  
  COO, DTL Mori Seiki Co.
- Francis Lee  
  Chairman (RET), Synaptics
- Steven Montoya  
  Vice President for Product Engineering, Topanga Technologies
- Cynthia Murphy  
  Portfolio Manager – University Affairs, Chevron Corporation
- Earl Rennison  
  CTO and Founder, Trovix
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  Professor Emeritus, UC Davis  
  Vice President (RET), General Electric
- Brian Underwood  
  President/CEO of California Gold Almonds LLC
- Bruce G. West  
  Principal, West Yost & Associates Inc

Strategic Leadership Board

The College of Engineering's Strategic Leadership Board is a distinguished group of thought-leaders whose expertise and industry leadership represent, inspire, and honor the College’s vision.

- Curtis Carlson, PhD  
  Chairman, SRI International
- Irwin Jacobs, PhD  
  Co-Founder, Qualcomm
- John Maroney  
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- Masahiko Mori, PhD  
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- Stratton Sclavos  
  Partner, Radar Partners
- William “Bill” Sullivan  
  President, Agilent Technologies
- Alan Taub  
  Professor, University of Michigan  
  Vice-President, Global Research & Development, General Motors (RET)
- Woong-Chul Yang, PhD  
  Vice Chairman, Hyundai Kia Motors
Student Scholarships & Awards

- Alan Jackman Scholarship Fund
- Amorocho Memorial Scholarship
- Anil K. Jain Memorial Prize
- Arthur and Julia Suran Endowed Scholarship
- The Beaver’s Charitable Trust
- Ben L. Hagglund Scholarship
- Brian and Louanne Horsfield Fund
- Bud and Lorraine Gerdes and Walt and Paula Rohrich Grants in Engineering and Veterinary Medicine
- Chemical Engineering Alumni Fellowship
- College of Engineering SFC Graduate Fellowship Fund
- Dean Karnopp Endowed Fellowship
- Farrar/Patten Award Fund
- Fred Fuchslin Memorial Scholarship
- George and Rosemary Tchobanoglous Graduate Fellowship
- Howard R. Murphy Scholarship
- Jane C. Elliott Scholarship Fund
- Jeff and Dianne Child/Steve Whitaker Undergraduate Scholarship
- John C. Harper Memorial Scholarship Fund
- John W. and Ernestine L. Heinrich Scholarship
- Joseph L. Steger Memorial Fellowship
- M.S. Ghausi College of Engineering Medals
- Montoya CALESS Scholarship Fund
- N&M Sarigul-Klijn Space Engineering/Flight Research Award
- Northrop Grumman’s Graduate Fellowship
- Pamela J. Fair ’80 Undergraduate Scholarship for Leadership in Engineering
- Ramey & Romstad Endowed Scholarship I
- Ramey & Romstad Endowed Scholarship II
- Richard C. and Joy Dorf Graduate Student Award in Electrical and Computer Engineering
- Richard C. and Joy Dorf Fund for Academic Excellence and Leadership
- Richard Snavely Memorial Award
- Risken Environmental Engineering Fund
- Robert A. and Denzil M. Kepner Endowment Fund
- Robert Murdoch Memorial Scholarship
- Robert Roy Owen Scholarship in Engineering
- Roy Bainer Engineering Scholarship
- Russell L. Perry Scholarship
- Sander Wilson Memorial Award
- SFC - Engineering Undergraduate Scholarship
- Teichert Foundation
- UC Davis Prize for Excellence in Geotechnical Engineering
- Walter D. Buehler Scholarship
- Wu Family Foundation Endowed Fund
- Zuhair A. Munir Award for the Best Doctoral Dissertation
- Zuhair A. Munir Mentorships and Opportunities for Research in Engineering (MORE) Fund

Endowed Chairs & Professorships

- Blacutt-Underwood Professorship in Materials Science
- Child Family Professorship of Engineering and Entrepreneurship
- Child Family Professorship in the College of Engineering
- Edward Teller Chair
- Gerald T. and Lillian P. Orlob Professorship in Water Resources Engineering
- Jeff and Dianne Child-Steve Whitaker Professorship in Chemical Engineering and Materials Science
- Joe and Essie Smith Endowed Chair in Chemical Engineering
- Ray B. Krone Professorship in Environmental Engineering
- Tim Bucher Family Chair of Computer Science
- Warren and Leta Giedt Endowed Professorship in the Department of Mechanical and Aerospace Engineering

Department Support

- Maroney-Bryan Fund
- Ed and Mary Schroeder Scholarship Fund
Honor Roll of Donors

JULY 1, 2011 – JUNE 30, 2012

Thanks to the generosity of many College of Engineering supporters, this year the College raised $8.1 million in gifts and grants from businesses, foundations, alumni and friends. We gratefully thank you for your support.

Gifts targeted faculty research and teaching, undergraduate scholarships, graduate student awards, and equipment needs. Contributions to the College of Engineering Annual Fund furnished unrestricted funds for College priorities, including student design teams and graduate student recruitment activities.

The College of Engineering acknowledges the following donors:

**$500,000 and above**

Mori Seiki Co., Ltd.

**$100,000-499,999**

American Chemical Society Foundation
Arnold & Mabel Beckman Foundation
Charles Pankow Foundation
Chevron Corporation
Ericsson, Inc.
The Hartwell Foundation
Intel Corporation

**The Golden Anniversary Dean’s Circle**

**$50,000-99,999**

Agilent Technologies
Broadcom Foundation
DP Technology Corporation
Futurewei Technologies, Inc.
LSI Logic Corporation
Marvell Semiconductor, Inc.
National Semiconductor
Samsung Telecommunications America
Jerome J. Suran and Helen Singer Suran
Texas Instruments Foundation

**Dean’s Blue and Gold Circle**

**$25,000-49,999**

Agilent Technologies Foundation
American Society – Engineering Education
Anritsu Company
Cadence Design Systems, Inc.
ConocoPhillips Company

**Dean’s Gold Circle**

**$10,000-24,999**

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Cal Poly Foundation
China Steel Corporation
Cisco Systems, Inc.
Jesus I. Colmenares
Pamela J. Fair, ’80, and
Glen J. Sullivan
George & Ruth Bradford Foundation
Hayward Baker
Intelligent Fiber Optic Systems Corporation

**Dean’s Circle**

**$1,000-4,999**

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Melinda Baum
Alayne D. Bolster
John E. Baum, ’69, and
Melinda Baum
Alayne D. Bolster
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Don O. Brush
Mary Ann Brush
Michelle B. Bryden, ’92, and
Kenneth J. Bryden, ’92
Howard J. Bush, ’79
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Rita Woon-Chu
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Patricia M. Cousins
Paul P. Craig
Robert H. Davis, ’78
Kenton S. Day, ’67
Richard Dorf and Joy Dorf
Robert C. Doss, ’75
Earthquake Engineering Research Institute
Fugro Consultants, Inc.
Fugro West, Inc.
GEL Consultants
Genentech, Inc.
Geosyntec Consultants
Bruce R. Gilbert, ’69
John R. Goss, ’56, and
Patricia L. Goss
Gary E. Hackney, ’81, and
Natalie A. Poole
Timothy G. Jellison, ’84
Masakazu Kanematsu, ’11
Kevin W. Keck, ’75, and
R. Gail Keck
A professor in the UC Davis Department of Biomedical Engineering, **Angelique Louie**, has a mission: helping eliminate heart disease, the No. 1 killer worldwide.

Her research in medical imaging focuses on the early-stage detection of the disease. “I develop agents that improve image quality,” she explains, “specifically, agents that can detect unstable plaques in our arteries, before they rupture and cause a heart attack or stroke. But it’s difficult to identify these unstable plaques; it’s believed that up to two-thirds of them are too small to detect via normal methods.”

Angiograms are today’s detection system of choice, but this method only detects large plaques. Louie’s proposed solution is a completely new approach.

“We’re trying to develop probes — chemical agents, small molecules or nanoparticles — that can bind to these plaques, and allow them to be seen. These probes would be injected into the bloodstream, where they would bind to specific targets on the vulnerable plaques. Then physicians would use imaging techniques to find those plaques.

“And that would allow them to make better, more informed decisions on patient management.”

“We’re trying to develop probes — chemical agents, small molecules or nanoparticles — that can bind to (unstable plaques in arteries) and allow them to be seen.”

— Angelique Louie
Honor Roll of Donors CONTINUED

John Kemper and Bobbie Kemper
Donald F. Lathen and Nancy N. Newman
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NEC Laboratories America, Inc.
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Peter Streoe
Wilson K. Talley and Helen Talley
George Tchobanoglous and Rosemary Tchobanoglous
Brett A. Tiano and Kiki N. Tiano
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David A. Hutchinson, ’78
Izzat M. Idriss
Anthony T. Iwamiya, ’85
Maxim D. Jovanovich, ’95
William Lai, ’84, and Ruby D. Lai
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$100-499
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Dennis F. Dal Porto, ’71
Jane M. Daniel, ’86
Michael A. Davis
Richard A. Davis, ’68
W. R. Davis, ’65
Sophia K. Day, ’81
Claire J. De Lucchi, ’81, and Robert C. Moats, ’79
Michael J. Dean, ’76
Michael L. Deas, ’00
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Thomas W. Eskstedt, ’76
James T. Elliott and Anne A. Elliott
David F. Elmore, ’79
Helge M. Evensen, ’72
Steven Falabella, ’88

10 • UC DAVIS COLLEGE OF ENGINEERING
When San Francisco’s new Public Utilities Commission headquarters and administration building debuted at 525 Golden Gate Avenue in July 2012, passersby were intrigued by the external vertical “wing” that stretched up to the roof. This “green” element actually is a series of external wind turbines designed to produce at least 7 percent of the building’s energy requirements.

The wind analysis studies included plenty of input from a UC Davis consulting team led by Bruce White, an emeritus professor of mechanical and aerospace engineering; and C.P. “Case” Van Dam, chair of the Department of Mechanical and Aerospace Engineering.

White is a nationally recognized authority in the fields of wind energy engineering and the physics of airflow over surfaces. The PUC headquarters project is his most recent Bay Area success; in 1995, he led a project that prevented a major design disaster for the proposed home of the San Francisco Giants. Thanks to White’s strong recommendation that the new stadium be pivoted 180 degrees, fans and players have been spared the strong winds that were such a nuisance at Candlestick Park, the Giants’ former stadium.

“I hope the concept of developing sustainable energy on urban buildings takes hold,” White notes. “I see it as the next big breakthrough in wind energy. It’s a wave of the future!”
DIRAN APELIAN

Diran Apelian may be an Alcoa-Howmet Professor of Engineering — and Director of the Metal Processing Institute — at Massachusetts’ Worcester Polytechnic Institute (WPI), but recently his presence has had a significant impact at UC Davis.

Apelian and colleague Svetlana Nikitina, a professor of humanities and arts, have been making waves with their first-year “Great Problems” seminar course at WPI. The two-term class was designed so that students would grapple with the “messy problems” of our world — sustainable development, climate change, energy sources, food and water issues, housing, health and transportation concerns — thereby developing skills of rigorous analysis, active engagement and creative synthesis.

When UC Davis College of Engineering Dean Enrique J. Lavernia wanted to replicate this experience for first-year UC Davis students, Apelian happily obliged. The result was a winter quarter 2012 course — ENG 098: Sustainable Development for the 21st Century: The Pivotal Role of Engineering — which Apelian taught as a visiting professor.

The results thus far are more anecdotal than statistical, but they’re raising eyebrows nonetheless. Other WPI and UC Davis instructors, tracking students who depart this course, report that these sophomores, juniors and seniors have become, in Apelian’s words, “a different breed.

“They’re much more engaged and empowered.”

Jennifer Faler, ’94
April A. Fallon, ’89
Deborah A. Farynjarz, ’85
Valentino S. Felipe, ’96
Edward L. Fields, ’81
Lee O. Fleming, ’85
Matthew C. Fleming, ’81
Forell/Elsesser Engineers, Inc.
William C. Freeman, ’92
Alexander A. Friedman, ’70
Katheryn A. Friend, ’84
Wilton B. Fryer, ’83
David P Funston, ’00
Randall M. German, ’75
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Jerry Woodall, a National Medal of Technology Laureate and a pioneer in the research and development of compound semiconductor materials and devices, has collected 85 issued U.S. patents, and his work is cited in more than 350 publications.

He’s also one of the newest members of the UC Davis College of Engineering.

Woodall is best known for having invented the high-efficiency red LEDs used in remote control and data-link applications such as TV sets and IR LAN, and the super-bright LEDs used in CD players and short link optical fiber communications. Fully half of the world’s annual sales of compound semiconductor components have been made possible by his research legacy.

One of his most significant achievements was the perfection of a process dubbed “liquid-phase epitaxy,” which grew exceptionally pure crystals of gallium arsenide, the semiconductor used to make infrared LEDs.

President George W. Bush presented Woodall with the National Medal of Technology in 2001. At that point, roughly half the annual $5 billion in sales of gallium arsenide-based semiconductor devices could be traced to his work.

“Since UC Davis has highly recognized faculty working in all areas of my interests,” Woodall notes, “I expect this phase of my career to be the best yet for me, my collaborators, and for the university.”
When Dr. Kazuo Yamazaki helped break ground on a new, Davis-based Mori Seiki machine tool manufacturing plant on June 22, 2011, this was merely the next step in his long-developing goal to make Northern California the destination of choice for top-flight engineering students.

Yamazaki joined the UC Davis College of Engineering faculty in July 1990, bringing his focus on intelligent manufacturing and computer applications.

“There are only two design issues in machine tools,” he explains, “how to enhance the accuracy of the machine, and how to achieve maximum productivity. If your machine makes certain parts 5 minutes faster than a different machine, then you win.”

By the mid-1990s, Yamazaki had established a mutually beneficial working relationship with Japan’s Mori Seiki group, one of the world’s largest manufacturers of machine tools. A $3 million gift in 2003 to UC Davis’ College of Engineering, from Mori Seiki’s West Sacramento-based Digital Technology Laboratory Corporation, was followed by a grant of $4.25 million in 2007, to cover the next round of Yamazaki’s work.

Yamazaki also founded the Machine Tool Technology Research Foundation, a non-profit public charity he established in San Francisco, in 2002. The foundation shares “cast-off” equipment which, while no longer applicable for industry, still holds ample use for research work. MTTRF’s recipient list has grown to 18 educational institutions in Europe, Asia and the United States, including MIT, British Columbia University, the University of Wisconsin and both UC Davis and UC Berkeley.

Mori Seiki’s new Davis plant opened its doors during a ribbon-cutting ceremony on Nov. 7, 2012. The facility is an opening salvo that Yamazaki hopes will jump-start high-tech industry in Davis and the Sacramento Valley. His long-term goal is to help establish a massive research and manufacturing presence in California — expanding on the nascent Davis operations — that will help encourage young engineers, from all over the world, to come to UC Davis for their doctorate work. Many of them, in return, may funnel into Mori Seiki’s expanding U.S. operations.

“If I can do that,” Yamazaki explains, “then I’ll be ready to hand my operation over to the next generation.”
“University professors can have a profound effect on people’s lives,” says Scott Maxwell, who earned both an undergraduate and master’s degree in mechanical engineering at UC Davis, and today is founder and senior managing director of OpenView Venture Partners.

“Professors probably don’t hear that often enough, and they should. In my case, it was Maury L. Hull. He was a big part of my growing from boy to man; he’s a special person in my life.”

Maxwell recently honored his former professor with a gift of $100,000 to endow a fellowship. Hull, a professor of mechanical and aerospace engineering, currently directs the Orthopedic Biomechanics Laboratory and the Biomechanical Engineering Laboratory.

Maxwell entered UC Davis in 1980 and first encountered Hull in an upper-division mechanical measurements class. “That course sounded boring, but Maury made it unbelievably interesting,” Maxwell recalls. “I learned things in great detail, and was totally obsessive about every single measurement system, and how it all worked.”

Maxwell completed his doctorate in 1990 at MIT. He already was doing financial services work at the consulting firm of McKinsey & Company. During the next decade, he rose through various positions at Lehman Bros., Putnam Investments and Insight Venture Partners. Maxwell then founded OpenView Venture Partners in 2006, as a spin-off from Insight’s Boston operation.

“The abstract tools of engineering are equally helpful with such work. Engineers are designers; we can use those tools to design something mechanical, or anything else. Engineering also involves a lot of analysis, which can be used (for example) to analyze a cost structure or an economic model.”

Having mastered his domain as a venture capitalist, Maxwell decided to acknowledge the degree to which Hull had influenced his life.

“What you go on to become doesn’t matter; it’s the launch you get,” Maxwell insists, acknowledging his own shift from mechanical engineering to venture capital. “It’s remarkable, what a professor can do for you; it’s a sacred trust.”
Imagine an organic-waste “digester,” no larger than a trash compactor, which could be installed in residential homes in order to generate energy — electricity — much like a solar panel.

Science fiction?
Not if Ruihong Zhang, a professor in the UC Davis Department of Biological and Agricultural Engineering, has a say in the matter. She’s determined to extract every possible resource from what we reflexively discard.

The nation’s first commercial-scale anaerobic digester — the Clean World Organic Waste Conversion Center, designed to recycle waste that historically has been hauled to landfills — became operational April 19, 2012, at the Sacramento, Calif., headquarters of American River Packaging. It converts a daily load of 7.5 tons of food waste from regional food producers, along with half a ton of unrecyclable corrugated material from American River Packaging, into natural gas that will be used to generate 1,300 kilowatt-hours of renewable electricity per day. This will supply roughly 37 percent of the company’s electricity needs.

The digester was developed by Clean World Partners, a 2009 startup formed to commercialize Zhang’s anaerobic digestion technology.

And this is merely an intermediate step for Zhang, whose ultimate ambition would have sounded far-fetched even a few years ago.

“I strongly believe,” she says, “that zero waste is a realistic goal we can achieve in our lifetimes.”
TO LEARN MORE

For information on the College of Engineering, including how to make a gift, please visit:

www.engineering.ucdavis.edu

While every attempt has been made to eliminate errors in these lists, we realize they might occur. If you note any discrepancies or omissions, please accept our apologies and contact:

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