SUMMER 2010

METRICS

MECHANICAL ENGINEERING

A. JAMES CLARK SCHOOL *of* ENGINEERING

A NEWSLETTER FOR ALUMNI AND FRIENDS OF THE DEPARTMENT OF MECHANICAL ENGINEERING AT THE A. JAMES CLARK SCHOOL OF ENGINEERING, UNIVERSITY OF MARYLAND.

2008-2009
Annual Report

IN THIS ISSUE:

www.enme.umd.edu

chair's MESSAGE

BAR-COHEN

Dear Friends,

I am pleased to present the Summer 2010 issue of METRICS, which contains our 2008-2009 Annual Report. This report highlights academic and professional achievements of the faculty, staff and students who are vital to our department.

In addition to garnering extraordinary academic and professional acclaim last year, our department unveiled the DEWALT Conference Suite, a redesigned conference and seminar space generously co-sponsored by DEWALT. With its attractive design and invaluable technology, the DEWALT Conference Suite serves as a beacon of our department's commitment to collaboration and excellence.

Our dedication to academic excellence was built on a philosophy of collaboration and knowledge-sharing. In adhering to this philosophy, ME continued to develop engaging educational programs last year, such as the increasingly popular Distinguished Seminar Series. This exciting program invites renowned faculty from domestic and international research organizations and universities to address current and emerging topics in engineering research. As the program grows, we look forward to welcoming more veteran and rising Mechanical Engineering faculty to our campus for enlightening discussions of significant topics in our field.

While celebrating the academic contributions of non-UMD faculty is essential to our mission of collaboration, we could not ignore the amazing accomplishments of our internal community. ME recognized the achievements of current students and faculty at the annual Student Awards Reception and the Faculty Awards Breakfast, both of which are highlighted in this issue. With respect to the achievements of our students and faculty, I offer special congratulations to Professors Hugh Bruck, Peter Sandborn and Bao Yang, as well as recent graduate Phillip Hannam (ME '09). Professor Bruck was recently elected Fellow of the American Society of Mechanical Engineers (ASME), Peter Sandborn was promoted to full Professor and Bao Yang was promoted to Associate Professor. Mr. Hannam, former recipient of the nationally prestigious Truman Scholarship, was awarded the University Medal—the highest honor bestowed on a graduating senior. As pleased as I am to deliver news of these successes, I must also express my immense pride in the efforts of the entire ME community, and I encourage readers to visit the Student, Faculty and Staff sections of this Annual Report for more on their accomplishments.

I truly wish I could share all of the great news from our department, but we have more achievements than space in this issue. As such, I encourage you to visit our website, **www.enme.umd.edu**, for the latest ME news. I hope you enjoy this issue of METRICS. While it only captures snippets of our successes from the 2008-2009 academic year, it undoubtedly offers the best perspective on our department as we reflect on one dynamic year and prepare for another year of discovery and achievement.

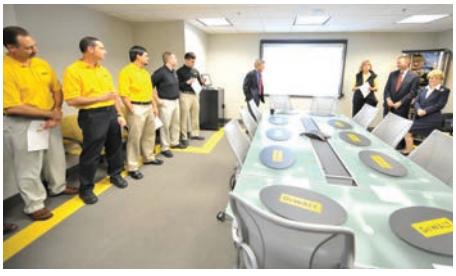
Dr. Avram Bar-Cohen
Chair and Distinguished University Professor
Department of Mechanical Engineering

DEWALT, ME UNVEIL REVITALIZED CONFERENCE SUITE

On May 4, 2009, the ME department unveiled the new DEWALT Conference Suite. Sponsored by DEWALT, a subsidiary of Black & Decker, the new Seminar Room and Conference Room boasts increased square footage and technological updates, in addition to new interior and exterior designs.

The grand opening of the Conference Suite was attended by John Schiech, President of DEWALT Industrial Products Company; Natalie Shields, Vice President and Corporate Secretary, B&D Corporation; Greg Moores, VP of Engineering, DEWALT Construction Tools; and several DEWALT employees. Clark School Dean Darryll Pines and Department Chair Avram Bar-Cohen, along with several faculty and staff, were on hand to thank the sponsors for the renovation.

Throughout the years, Black & Decker has employed over 300 graduates from the university, many of whom are ME alumni. Additionally, faculty members and Black & Decker research and development staff have partnered on many research endeavors.



MECHANICAL ENGINEERING MISSION

The mission of the University of Maryland's Department of Mechanical Engineering is to provide an outstanding education; conduct innovative, ground breaking research; address the needs of citizens, industry and government; and provide related service to the campus community, as well as the community at large.

The mission shall be guided by a commitment to continuous improvement in the overall quality of teaching, research, and service. A major focus of the Department is to provide engineering education with sufficient scope to include the basic and specialized engineering training necessary for the current and emerging needs of society. The Department has a related responsibility to contribute to the advancement of knowledge by conducting research at the cutting edge of science and technology. Given the rapid advances in science and technology, the department also has a professional responsibility to provide continuing education to practicing engineers.

As part of this mission, our Department faculty and administration are driven by an obligation to serve the needs of the campus community and the community at large in the spirit of collegial cooperation.

By staying focused on our Strategic Plan and achieving its quantitative and qualitative goals, we aspire to place the Department of Mechanical Engineering at the University of Maryland among the nation's top 15 mechanical engineering programs and in the top 10 among the publicly supported research universities by 2012.

DEGREE PROGRAMS

Mechanical Engineering: B.S., M.E., M.S., Ph.D.
Reliability Engineering: G.C.E.N., M.E., M.S., Ph.D.
Professional Master of Engineering & Public Policy

MAJOR RESEARCH CENTERS

Center for Advanced Life Cycle Engineering (CALCE)
Center for Energetic Concepts Development (CECD)
Center for Environmental Energy Engineering (CEEE)
Center for Risk and Reliability
Smart Materials & Structures Research Center (SMSRC)

INSTRUCTIONAL DIVISIONS

Design and Reliability of Systems
· Design · Information Sciences
· Risk and Reliability · Manufacturing

Electronic Products and Systems
· Physics of Failure & Reliability · Competitive Systems
· Supply Chain Engineering

Mechanics and Materials
· Solid Mechanics · Materials
· Dynamics and Control · MEMS/NEMS

Thermal, Fluids and Energy Sciences
· Energy Systems · Fluid Mechanics
· Thermal Sciences · Reacting Flows

2008 STATISTICS FROM THE FACULTY ACTIVITY REPORT

41	Tenured & Tenure-Track Faculty
27	Research Faculty & Lecturers
28	Professional Society Fellow Memberships
8	National Academy of Engineering Members
8	Journal & Book Series Editors
23	Journal Associate Editors
8	Published Books (edited, co/authored)
23	Published Book Chapters (edited, co/authored)
163	Published Journal Articles
203	Proceeding Papers & Presentations
172	Presentations at Conferences, Symposia

Based on 2008 statistics from the Faculty Activity Report and includes: Tenured/Tenure-Track Faculty, Research Scientists, Lecturers and select Affiliated & Emeriti Faculty.

2008-2009 ACADEMIC CALENDAR STATISTICS

Undergraduates

272	Undergraduate Freshmen Applications (Fall 2008)
1285/1400	SAT 25/75 Percentile of Entering Freshman
628	Total Undergraduate Enrollment (Fall 2008)
16	% of Women Undergraduates
25	% of Minority Undergraduates
32	% of Undergraduates in Honors Programs
163	B.S. Degrees Awarded

Graduates

141	Masters Applications (Fall 2008)
222	Doctorate Applications (Fall 2008)
283	Total Graduate Student Enrollment (Fall 2008)
40	M.S. Degrees Awarded (ENME, ENRE, ENPM)
15	M.S. Degrees Awarded (PME)
33	Ph.D. Degrees Awarded (ENME, ENRE)

FACULTY

The Department of Mechanical Engineering is composed of four divisions. As of June 30, 2009, the following 39 faculty held primary appointments in department:

Design and Reliability of Systems

Shapour Azarm, Professor
Ph.D., University of Michigan (1984)
Fellow of ASME

David Bigio, Associate Professor
Ph.D., Massachusetts Institute of Technology (1986)
Fellow of SPE

§ **Michel Cukier**, Associate Professor
Ph.D., National Polytechnic Institute of Toulouse (1996)

Jaydev Desai, Associate Professor
Ph.D., University of Pennsylvania (1998)

§ **Satyandra (S.K.) Gupta**, Professor
Ph.D., University of Maryland (1994)
Fellow of ASME

§ **Jeffrey Herrmann**, Associate Professor
Ph.D., University of Florida (1993)

Mohammad Modarres, Professor
Ph.D., Massachusetts Institute of Technology (1979)
Fellow of ANS

Ali Mosleh, Professor
Ph.D., University of California-Los Angeles (1981)

Linda Schmidt, Associate Professor
Ph.D., Carnegie Mellon University (1995)

Byeng Dong Youn, Assistant Professor
Ph.D., University of Iowa (2001)

§ **Guangming Zhang**, Associate Professor
Ph.D., University of Illinois (1986)

Electronic Products and Systems

Avram Bar-Cohen, Distinguished University Professor & Chair
Ph.D., Massachusetts Institute of Technology (1971)
Fellow of ASME, IEEE

Donald Barker, Professor
Ph.D., University of California, Los Angeles (1976)
Fellow of ASME

Bongtae Han, Professor
Ph.D., Virginia Polytechnic Institute (1991)
Fellow of ASME, SEM

F. Patrick McCluskey, Associate Professor
Ph.D., Lehigh University (1991)

Michael Pecht, Professor
Ph.D., University of Wisconsin
Fellow of ASME, IEEE

* **Peter Sandborn**, Professor
Ph.D., University of Michigan (1987)

Mechanics and Materials

Balakumar Balachandran, Professor
Ph.D., Virginia Polytechnic Institute (1990)
Fellow of ASME

Amr Baz, Professor
Ph.D., University of Wisconsin (1973)
Fellow of ASME

§ **Sarah Bergbreiter,** Assistant Professor
Ph.D., University of California-Berkeley (2007)

Hugh Bruck, Associate Professor
Ph.D., California Institute of Technology (1994)
Fellow of ASME

§ **Nikhil Chopra**, Assistant Professor
Ph.D., University of Illinois (2006)

Abhijit Dasgupta, Professor
Ph.D., University of Illinois (1989)

Don DeVoe, Professor
Ph.D., University of California-Berkeley (1997)

Teng Li, Assistant Professor
Ph.D., Harvard University (2006)

Elisabeth Smela, Associate Professor
Ph.D., University of Pennsylvania
Fellow of NSF

Santiago Solares, Assistant Professor
Ph.D., California Institute of Technology (2006)

Miao Yu, Assistant Professor
Ph.D., University of Maryland (2002)

Thermal, Fluids, and Energy Sciences

Peter Bernard, Professor
Ph.D., University of California, Berkeley (1977)
Fellow of APS

James Duncan, Professor
Ph.D., Johns Hopkins University (1979)
Fellow of APS

Ashwani K. Gupta, Distinguished University Professor
Ph.D., University of Sheffield (1973)
D.Sc., University of Sheffield (1986)
Fellow of AIAA, ASME, Institute of Energy (UK), SAE

* Promotion effective July 1, 2009.
§ Joint appointment with the Institute for Systems Research

FACULTY (CONTINUED)

Thermal, Fluids, and Energy Sciences

Gregory Jackson, Associate Professor
Ph.D., Cornell University (1994)

Kenneth Kiger, Associate Professor
Ph.D., University of California, San Diego (1995)

Jungho Kim, Professor
Ph.D., University of Minnesota (1990)
Fellow of ASME

Michael Ohadi, Professor
Ph.D., University of Minnesota (1986)
Fellow of ASHRAE, ASME

Reinhard Radermacher, Professor
Ph.D., Technical University Munich (1981)
Fellow of ASHRAE

Tien-Mo Shih, Associate Professor
Ph.D., University of California, Berkeley (1977)

* **Bao Yang**, Associate Professor
Ph.D., University of California, Los Angeles (2003)
Ph.D., University of Science and Technology of China (1998)

Michael Zachariah, Professor
Ph.D., University of California, Los Angeles (1986)

During the 2008-2009 academic year, the department said goodbye to the following faculty:

Joseph Bernstein relocated to Bar Ilan University, Israel

Ugo Piomelli relocated to Queen's University, Ontario

EMERITI FACULTY

Davinder Anand, started in 1965, retired in 2004
Ronald Armstrong, started in 1968, retired in 1999
Bruce Berger, started in 1965, retired in 1999
Patrick Cunniff, started in 1963, retired in 1999
James Dally, started in 1984, retired in 2000
George Dieter, started in 1977, retired in 1994
David Holloway, started in 1975, retired in 2004
James Kirk, started in 1977, retired in 2008
Edward Magrab, started in 1987, retired in 2006
Colin Marks, started in 1967, retired in 1994
Ugo Piomelli, started in 1987, retired in 2008
Marvin Roush, started in 1971, retired in 2002
Robert Sanford, started in 1984, retired in 2007

For more information on our award winning faculty, please visit: **www.enme.umd.edu**

ACADEMIC STAFF

Sami Ainane, Ph.D.
Director of Student Services

Bala Balachandran, Professor
Director of Graduate Studies

David Bigio, Associate Professor
Director of Undergradaute Studies

Amarildo Damata
Graduate Studies Coordinator

Terry Island
Assistant Director of Undergraduate Studies

Fitzgerald (Fitz) Walker
Graduate Studies Coordinator

DEPARTMENT STAFF

Isabelita (Lita) S. Brown
Payroll/Personnel Coordinator
20 Years of Service in 2008

Margaret (Peggy) Brumfield
Executive Director, Administrative Affairs

Erin Chen
Assistant Director, Finance
5 Years of Service in 2008

Melvin Fields
IT Coordinator
10 Years of Service in 2008

D.B. Galpoththawela
Office Clerk
10 Years of Service in 2009

Dylan Hazelwood
IT Manager
10 Years of Service in 2008

Juanita Irvin
Senior Business Manager
20 Years of Service in 2008

Sripen (Penny) Komsat
Business Services Specialist

Arlene Samowitz
Research Coordinator

Felicia Stephenson
Assistant to the Chair
Faculty Affairs & Communications Coordinator

Steve Wicker
Personnel and Payroll Coordinator

Janet Woolery
Business Services Specialist

Dan Wysling
IT/Computer Engineer

2008-2009 PH.D. GRADUATES

Graduate name followed by title of dissertation and faculty advisor.

Summer 2008 (6)

Gregory W. Anderson (ENME)
Development and Testing of a Multiplexed Temperature Sensor
Jungho Kim and Marino di Marzo

Nikolaos G. Beratlis (ENME)
Direct Numerical Simulations of Transitional Pulsatile Flows in Stenotic Vessels
Elias Balaras

Sean M. Gahagan (ENME)
Simulation and Optimization of Production Control for Lean Manufacturing Transition
Jeffrey Herrmann

Zenghu Han (ENME)
Nanofluids with Enhanced Thermal Transport Properties
Bao Yang

William L. McGill (ENRE)
Critical Asset and Portfolio Risk Analysis for Homeland Security
Bilal Ayyub

Pedro O. Quintero (ENME)
Development of a Shifting Melting Point Ag-In Paste Via Transient Liquid Phase Sintering for High Temperature Environments
Patrick McCluskey

Fall 2008 (11)

Rui Wu Chang (ENME)
Influence of Cryogenic Temperature and Microstructure on Fatigue Failure of Indium Solder Joint
Patrick McCluskey

Arindam Goswami (ENME)
Quantitative Hermeticity Assessment of Packages with Micro to Nano-liter Cavities
Bongtae Han

Zhixin Hu (ENME)
Numerical Simulation of Low-Pressure Explosive Combustion in Compartment Fires
Arnaud Trouve

Thomas P. McGrath II (ENME)
Numerical Modeling of Multiphase Explosions
Gregory Jackson

Kevin A. Moores (ENME)
Effect of Tip Clearance on the Thermal and Hydrodynamic Performance of Shrouded Pin Fin Arrays
Yogendra Joshi and Jungho Kim

Anand Pillarisetti (ENME)
Mechanical Manipulation and Characterization of Biological Cells
Jaydev Desai

Anduin E.Touw (ENRE)
Latent Failures and Mixed Distributions: Using Mixed Distributions and Cost Modeling to Optimize the Management of Systems with Weak Latent Defect Subpopulations
Peter Sandborn

Mary E. Vechery (ENME)
Plate and Micro-Scale Structures: Analysis and Experiments
Balakumar Balachandran

James R. Watkins (ENME)
Evaluating the Susceptibility of Electronic Components Assembled with Leaded Solder to Flexural Failures, with High Rate Considerations
Donald Barker

Shuang Yang (ENME)
Multidimensional Microfluidic Bioseparation Systems with Spatial Multiplexing
Donald DeVoe

Kehai Zhang (ENRE)
Ali Mosleh

Spring 2009 (16)

Ahmed Abdelhafez (ENME)
Effect of Swirl on the Choking Criteria, Shock Structure, and Mixing in Underexpanded Supersonic Nozzle Airflows
Ashwani Gupta

Khalid H. Almitani (ENME)
Minimizing the Acoustic Coupling of Fluid Loaded Plates Using Topology Optimization
Amr Baz

Arvind Ananthanarayanan (ENME)
Development of In-Mold Assembly Methods for Producing Mesoscale Revolute Joints
Satyandra Gupta

Robin G. Berthier (ENRE)
Advanced Honeypot Architecture for Network Threats Quantification
Michel Cukier

Hongbo Bi (ENME)
Development of Nano-Pattern Recognition and Correlation Technique for Deformation Measurement of Nano-Scale Structures
Bongtae Han

Sourav Chowdhury (ENME)
Study of Condensation of Refrigerants in Micro-Channels for Development of Future Compact Micro-Channel Condensers
Michael Ohadi

2008-2009 PH.D. GRADUATES (CONTINUED)

Graduate name followed by title of dissertation and faculty advisor.

Daniel P. Cole (ENME)
Fabrication and Characterization of Compositionally-Graded Shape Memory Alloy Films
Hugh Bruck

Steven C. DeCaluwe (ENME)
Quantifying the Role of Cerium Oxide as a Catalyst in Solid Oxide Fuel Cell Anodes
Gregory Jackson

Jie Gu (ENME)
Prognostics of Solder Joint Reliability Under Vibration Loading Using Physics of Failure Approach
Michael Pecht and Donald Barker

Brian J. Henz (ENME)
Molecular Dynamics Studies of Metallic Nanoparticles
Michael Zachariah

Wende Kong (ENRE)
Towards a Formal and Scalable Approach for Quantifying Software Reliability at Early Development Stages
Carol Smidts

Philip L. Knowles (ENME)
Sediment Suspension Events from Ripple Beds in Oscillatory Flow: Experiments
Kenneth Kiger

Leoncio D. Lopez (ENME)
Quality and Reliability of Elastomer Sockets
Michael Pecht

Mark White (ENME)
A Study of Nanometer Semiconductor Scaling Effects on Microelectronics Reliability
Joseph Bernstein

Justin W. Williamson (ENME)
Measurements and Analysis of Extinction in Vitiated Flame Sheets
Andre Marshall

Yuxun Zhou (ENME)
Harmonic and Random Vibration Durability Investigation for SAC305 (Sn3.0Ag0.5Cu) Solder Joint
Abhijit Dasgupta

(ENME) - Mechanical Engineering
(ENRE) - Reliability Engineering

PROFESSIONAL MASTER OF ENGINEERING PROGRAM GRADUATES

Mechanical Program Advisor:
Dr. Sami Ainane

Reliability Program Advisor:
Professor Ali Mosleh

Fall 2008 (7)

Sonia Barrantes (ENME)

Jason Budd (ENME)

Krisnandito Hardjoko (ENRE)

Sachin Karkhanis (ENME)

Thomas Philips (ENME)

Edward Sekamanya (ENME)

Desmond St Rose (ENRE)

Spring 2009 (8)

Gashaw Bedassa (ENME)

Bryan Charboneau (ENME)

Anita Currano (ENME)

Thomas Gunderson (ENME)

Robert Lechton (ENRE)

Jess Lewis (ENME)

Ryan Lanuti Steger (ENME)

Jeffrey Kielar (ENRE)

For more information on our top ranked Mechanical Engineering program, please visit: **www.enme.umd.edu**

2008-2009 M.S. GRADUATES

Graduate name followed by faculty advisor.

Summer 2008 (8)

Khalid H. Almitani (ENME)
Amr Baz

Robert E. Benedetti (ENME)
Bill Fourney

Samuel F. Fomundam (ENME)
Jeffrey Herrmann

Tiffany Harris (ENRE)
Michel Cukier

Edward E. Lust (ENME)
Reinhard Radermacher

Ravikumar Sanapala (ENME)
Michael Pecht

Sigmund Young (ENME)
Balakumar Balachandran

Kehai Zhang (ENRE)
Ali Mosleh

Fall 2008 (12)

Robert G. Barrick (ENRE)
Ali Mosleh

Atul Bhargav (ENME)
Gregory Jackson

Joshua Crone (ENME)
Santiago Solares

Nicholas E. Fernandez (ENME)
Reinhard Radermacher

MacLain M. Holton (ENME)
Gregory Jackson

Paul F. Jawlik (ENME)
Gregory Jackson

Elnaz Kermani (ENME)
Michael Ohadi

Benjamin Mailler (ENRE)
Ali Mosleh

Timothy J. Oberc (ENME)
Patrick McCluskey

Jonathan M. Schoenfeld (ENME)
Reinhard Radermacher

Marcos Vanella (ENME)
Elias Balaras

Aykut Yilmaz (ENME)
Gregory Jackson

Spring 2009 (20)

Alex F. Askari Farahani (ENME)
Abhijit Dasgupta

Garry Brock (ENME)
Michael Pecht

Eric Choate (ENRE)
Ali Mosleh

Jun Dai (ENRE)
Michael Pecht

Rachel L. Emmel (ENME)
Donald Barker

Patrice B. Gregory (ENME)
Donald Barker

Faith H. Harr (ENME)
Teng Li

William C. Ireland (ENRE)
Aristos Christou

Shane E. Khoury (ENRE)
Ali Mosleh

Viatcheslav Litvinovitch (ENME)
Avram Bar-Cohen

Patrick Luckow (ENME)
Avram Bar-Cohen

Andrea Pogany (ENRE)
Ali Mosleh

Shaughn M. Roettele (ENME)
Abhijit Dasgupta

Milind M. Sawant (ENRE)
Aristos Christou

Jason J. Smoker (ENME)
Amr Baz

Thierry M. Some (ENME)
Jungho Kim

Christopher M. Somers (ENME)
Reinhard Radermacher

Gregory A. Teitelbaum (ENME)
Linda Schmidt

Weiqiang Wang (ENME)
Michael Pecht

Baoguang Yan (ENRE)
Joseph Bernstein

(ENME) - Mechanical Engineering
(ENRE) - Reliability Engineering

TOP STORIES OF 2008-2009

Jeffrey Herrmann Group Develops Vaccine Allocation Model

Peter Sandborn Receives NSF Grant for Managing Product Obsolescence

NSA Designates University of Maryland as 'National Center of Academic Excellence'

UM President C. Daniel Mote Elected NAE Treasurer

Mechanical Engineering Graduate Program Maintains High Ranking

LEAFHouse Reaps More Honors

Team Excels at Baja SAE Alabama

Clark School Tops in NIST Fellowships

Michel Cukier Teaches New Clark School Risk Assessment Course

Ali Mosleh Re-Appointed to Nuclear Review Board

Aerospace Publication Highlights Miao Yu Research

Engineers' Work Could Leave Golfers Smiling

Students Collect 100+ Donated Coats

ME Alum Returns to Campus to Recruit Engineers

S.K. Gupta's Group Pioneers New Development in Drive Mechanisms for Ornithopters

Clark School Honors Hybrid Engine Inventor

Maryland Hosts Inaugural Robot Speedway Competition

Jaydev Desai Awarded NIH Grant for $1.27M

S.K. Gupta Receives NSF Grant for Nanoassembly Research

Please visit our news archives for more information about these and other stories:
www.enme.umd.edu/news

STUDENT AWARDS AND RECOGNITION

On April 29, 2009, the A. James Clark School of Engineering hosted the 2009 Undergraduate Honors and Awards Ceremony. Those honored from the Department of Mechanical Engineering include:

The A. James Clark School of Engineering International Service Award
Phillip Hannam
Presented to a student who demonstrates significant involvement in international engineering activities through leadership or service.

Mechanical Engineering Department Academic Achievement Award
Daniel Calderone and Joshua Kusnick
Presented to ME juniors who have attained the highest scholastic average.

Mechanical Engineering Department Chair's Award
Sarah Grice and Jackelyn Lopez
Presented to ME seniors who have attained the highest scholastic average.

Mechanical Engineering Department Chair's Award for Leadership and Service
Charles Choe and Mohamad Gabriel Affandy
Awarded for outstanding service and contributions to the department.

Outstanding Engineering Co-op/Intern Award
Nathan Farlow and Steven Swern
Presented to students who have demonstrated scholastic excellence, exceptional work performance and remarkable potential for a successful engineering career while participating in a cooperative learning or internship position.

Center for Minorities in Science and Engineering Service Award
Elizabeth LeBrun
Presented to an outstanding student for providing dedicated service to the Center and the university community, and for commitment to promoting diversity in engineering.

Center for Minorities in Science and Engineering Director's Award
Bryan Henderson
Presented to an outstanding student who excels academically, provides outstanding service to the Center, and has a strong commitment to promoting diversity in engineering.

The Mechanical Engineering Student Awards Reception was held on May 1, 2009. The annual event is held to recognize our students who received awards, fellowships or scholarships during the past year.

Keystone Design Challenge Award
Fall 2008 Competition Winners – CJ Gorrel, Peter Sulich, and Austin Zeleny
Spring 2009 Competition Winner – Cory Peterson
Presented to freshmen engineering design team participants who built an autonomously controlled hovercraft that completed a specified course in the minimum amount of time.

American Society of Mechanical Engineers Senior Award
Dana Colegrove
Presented to the ASME senior member who has contributed the most to the student chapter.

Pi Tau Sigma Outstanding Service Award
Courtney Laigle and Michael Siemann
Presented to PTS members for outstanding service and contributions to the student chapter.

Pi Tau Sigma Memorial Award
Charles Choe
Presented to the PTS senior who has made the most outstanding contributions to the University.

Pi Tau Sigma Outstanding Sophomore Award
James Maresco and Andrew Oles
Presented to the PTS sophomores who have attained the highest scholastic average.

Society of Automotive Engineers Senior Award
Thomas Doehner
Presented to the SAE senior member who has contributed most to the student chapter.

Society of Automotive Engineers Service Award
James Ngan
Presented to an SAE member for outstanding service and contributions to the student chapter.

The University Medal
Phillip Hannam
Presented to the graduating senior who best personifies academic distinction, extraordinary character and extracurricular contributions to the University and the general public.

A. James Clark School Fellowship
Hyungdae Bae, John Bush, Ishita Chakraboroty, Juan Cevallos, and Zhichao Wang
Presented to outstanding incoming doctoral students on behalf of the Clark School and supplements both teaching and research assistantships.

Alfred P. Sloan Minority Ph.D. Program Fellowship
Sophoria Westmoreland
Presented to outstanding minority students studying engineering, natural science or mathematics.

Ann G. Wylie Dissertation Fellowship
Vidyu Challa and Danial Shahmirzadi
Presented to outstanding students based on the quality of their work, and the potential contribution/significance of the dissertation to the student's field of research.

ASHRAE Charles Kannapell Student Scholarship
Magnus Eisele
Presented to an outstanding ME graduate specializing in the HVAC area.

ASHRAE Scholarship
Edvin Cetegen
Presented to an outstanding ME graduate specializing in the HVAC area.

Best Ph.D. Dissertation
Arindam Goswami
Quantitative Hermeticity Assessment of Packages with Micro to Nano-liter Cavities

STUDENT AWARDS AND RECOGNITION (CONTINUED)

Coast Guard Fellowship
Ryan James
Presented to exceptional commissioned officers who wish to earn a Master's degree in a field related to Naval Engineering.

Future Faculty Program
Bavani Balakrisnan, Danielle Chrun, Haijun Liu, Rishi Raj, Jessica Sheehan, and Pingfeng Wang
Presented to outstanding Clark School Ph.D. students intending to pursue academic careers at prestigious engineering schools.

Graduate Summer Research Award
Vidyu Challa
Presented to outstanding doctoral students at mid-career.

Hulka Energy Fellowship
Islam Ahmed
This Fellowship, a generous gift from Ms. Barbara G. Hulka, supports the research of an outstanding graduate student working on alternative energy, generation, or storage.

NSF Bridge Scholarship
Time Aighe and Reuel Smith
Presented to students who attend Louis Stokes Alliances for Minority Participation institutions as undergraduates and wish to pursue a graduate education.

Phi Delta Gamma Graduate Fellowship
Vidyu Challa
Presented to an outstanding student who best exemplifies interdisciplinary scholarship achievement.

FACULTY AWARDS AND RECOGNITION

The Annual Faculty Awards Reception was held on May 15, 2009. This event brings together the Mechanical Engineering family to celebrate our faculty's achievements.

University Promotions

Yunho Hwang, Promoted to Associate Director of CEEE
Peter Sandborn, Promoted to Professor
Bao Yang, Promoted to Associate Professor

University Recognition

Ken Kiger, A. James Clark School of Engineering Poole and Kent Company Teaching Award for Senior Faculty

Peter Sandborn, A. James Clark School of Engineering Poole and Kent Company Teaching Award for Senior Faculty

Jan Sengers, 2008 Distinguished International Service Award, University of Maryland

Alex Severinsky, 2008 Innovation Hall of Fame Inductee, A. James Clark School of Engineering

Young Faculty Awards

Santiago Solares, 2009 Faculty Early Career Development Award, National Science Foundation (NSF)

Professional Society Fellows

Hugh Bruck, Elected Fellow, American Society of Mechanical Engineers (ASME)

Patents

Miao Yu & Bala Balachandran, "Micro-Optical Sensor Systems for Pressure Acceleration and Pressure Gradient Measurements" (U.S. Patent 7,428,054; September 23, 2008)

Elisabeth Smela (with B. Shapiro), "Electrically Driven Microfluidic Pumping for Actuation" (U.S. Patent 7,523,608; April 28, 2009)

Professional Recognition

Amr Baz, ASME Adaptive Structures and Material Systems Award

Don DeVoe, Kavli Fellow, National Science Foundation (NSF)

Jeffrey Herrmann, Innovator of the Year, Maryland Daily Record

Ashwani Gupta, Worcester Reed Warner Medal, ASME

Michael Pecht & the Center for Advanced Life Cycle Engineering, Schwarzkopf Award, National Science Foundation (NSF)

Greg Schultz, International Faculty Advisor Award, Society of Automotive Engineers (SAE)

Invention Recognition

Shapour Azarm (with M. Li), 2008 Invention of the Year Finalist (Information Science), University of Maryland Office of Technology Commercialization, "Multi-Objective Collaborative Robust Optimization (MCRO)"

Ashwani Gupta, 2008 Invention of the Year Finalist (Physical Sciences), University of Maryland Office of Technology Commercialization, "Ultra Low Emission Colorless Distributed Combustion"

Michael Zachariah (with P. DeShong, P. Demuth, A. Prakash, C. Luckett & D. English), 2008 Invention of the Year Finalist (Life Science), University of Maryland Office of Technology Commercialization, "Stimuli-Responsive Mesoporous Nanomaterials"

Publication Awards

Byeng Youn (with P. Wang and A. Kloess), ASME Design Automation Conference Best Paper Award, *Bayesian Reliability Analysis with Evolving, Insufficient, and Subjective Data Sets*

Jeffrey Herrmann (and T. Hoy), 2009 Maurice Simpson Technical Editors Award, Institute of Environmental Sciences and Technology (IEST)

ME SEMINAR SERIES

The Department was pleased to host the following seminar speakers throughout the year:

September 5, 2008
Chao-Ho Sung, Naval Surface Warfare Center
Vorticity-Preserving Artificial Dissipation Model for Vortical Wake Prediction

September 19, 2008
Krishnaswamy Nandakumar, Ph.D.,
The Petroleum Institute (Abu Dhabi, UAE)
Multiphase Computational Fluid Dynamics: A New Tool to Aid in Scale Up of Chemical Processes

October 3, 2008
Karl Ulrich, Ph.D., University of Pennsylvania
Innovation Tournaments

October 10, 2008
Andy Ruina, Ph.D., Cornell University
Issues in Bipedal Locomotion

October 17, 2008
Eckhard Wolfgang, Ph.D., European Center for Power Electronics
Robustness Validation of Power Electronics

November 7, 2008
Rao Gullapalli, Ph.D., University of Maryland School of Medicine
MRI: From Structure to Function

November 7, 2008
Nikhil Chopra, Ph.D., University of Maryland
Delay-Independent Stability and Synchronization of Interconnected Nonlinear Systems

November 21, 2008
Col. John Wissler, Air Force Research Laboratory
AFRL and the Air Vehicles Directorate

December 5, 2008
Satyandra (S.K.) Gupta, Ph.D., University of Maryland
New Manufacturing Approaches to Realizing Bio-Inspired Robots

February 20, 2009
George F. Wittenberg M.D., Ph.D.,
University of Maryland School of Medicine
Brain Mapping and Robots: New Directions in Rehabilitation

February 26, 2009
Günther G. Scherer, Ph.D., Paul Scherrer Institut, Switzerland
Contributions of Electrochemical Energy Devices to a Sustainable Mobility

February 27, 2009
B.C. Khoo, Ph.D., National University of Singapore
Simulations of Supercavitation Flows with Isentropic Model Equations-of-State (EOS)

March 13, 2009
John J. Buckley, Jr., Northrop Grumman and G. Lee Lushbaugh, Jr., Bechtel Power Corporation
Challenges in Engineering Practice, Education, and Research

March 27, 2009
Dong Lee, Ph.D., Pusan National University
Development of Single Particle Mass Spectrometry

April 3, 2009
Pierre Dupont, Ph.D., Boston University
Concentric Tube Robots for Minimally Invasive Surgery

April 24, 2009
Harsha K. Chelliah, Ph.D., University of Virginia
Challenges and Recent Progress in Development of Chemical Kinetic Models for Engineering Applications

May 1, 2009
Byeng D. Youn, Ph.D., University of Maryland
Structural Health Prognostics Using Sparse Bayes Learning Scheme

May 4, 2009
Antonio J. Conejo, Ph.D., Universidad de Castilla-LaMancha, Spain
Economic Valuation of Reserves in Power Systems with High Penetration of Wind Power

May 8, 2009
Michael Jensen, Ph.D., Rensselaer Polytechnic Institute
The Critical Heat Flux Condition in Mini-and Microchannels

May 15, 2009
John Gero, Ph.D., George Mason University
Cognitively-Based Computational Models of Design Creativity

For more information about our Seminar Series, please visit: **www.enme.umd.edu**

The Department was pleased to host the annual meeting of the Visiting Committee on March 13, 2009.

VISITING COMMITTEE MEMBERS

Mostafa Aghazadeh, Director
Intel Corporation

Arthur Bergles, Emeritus Professor
Rensselaer Polytechnic Institute

Aris Cleanthous, Engineering Manager
DeWalt Power Tools

George Dieter, Emeritus Professor
University of Maryland

Howard Harary, Deputy Director
National Institute of Standards and Technology

T.G. Marsden, Vice President – Automotive Products
Bowles Fluidics Corporation

John Miller, Director
U.S. Army Research Laboratory

Hratch Semerjian, President and Executive Director
Council for Chemical Research

Alex Severinsky, Founder and CEO, Fuelcor, LLC
Chairman Emeritus, PAICE, LLC

Sheldon Shapiro, Executive Vice President
Shapiro & Duncan, Inc.

Susan Skemp, Executive Director
Florida Atlantic University

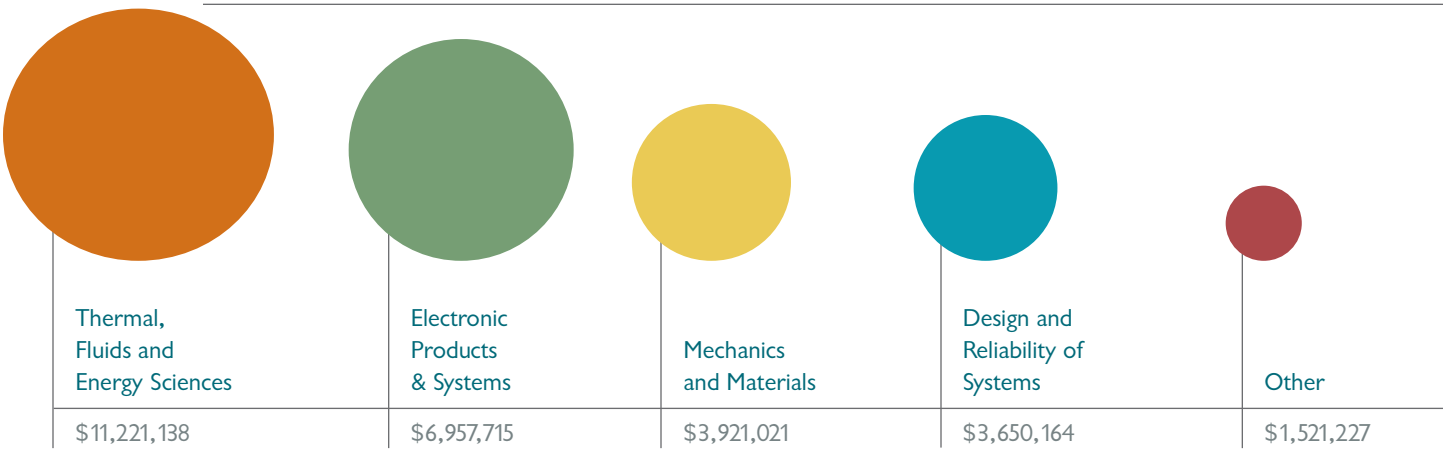
Tom Stricker, Corporate Manager – Director
Toyota Motor North America, Inc.

Ward Winer, Chair Emeritus
Georgia Tech University

RESEARCH EXPENDITURES

FY '09 fiscal expenditures, displayed according to research area in the chart below, indicate that 41% of the expenditures were from the Thermal, Fluids and Energy Sciences division; 26% were from the Electronic Products & Systems divison; 14% from the Mechanics and Materials division; and 13% from the Design and Reliability of Systems division.

FY '09 RESEARCH EXPENDITURES BY DIVISION



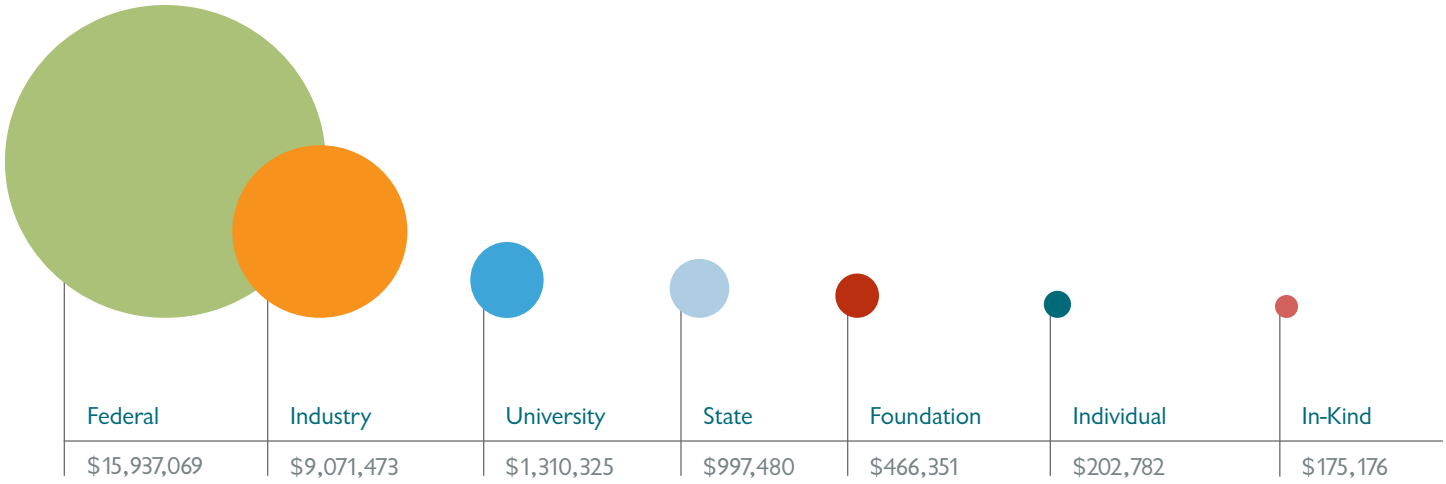
$27,271,256 Total Research Expenditures

207 Research Grants

RESEARCH REVENUE

In FY '09, ME faculty participated in a variety of research efforts across the field of mechanical engineering with support from the federal and private sectors and numerous corporate contracts.

FY '09 RESEARCH REVENUE BY SOURCE



$28,160,629 Total Research Revenue

RAINMAKERS

Thirteen faculty from the department were among the top "rainmakers" in FY '09, bringing in $500,000 or more in research funding:

Dr. Balakumar Balachandran
Associate Chair
Professor of Mechanical Engineering
Director of Graduate Studies

Dr. Avram Bar-Cohen
Department Chair
Distinguished University Professor of Mechanical Engineering

Dr. Jaydev Desai
Associate Professor of Mechanical Engineering
Director, RAMS Laboratory

Dr. James Duncan
Professor of Mechanical Engineering
Keystone: The Clark School Academy of Distinguished Professors

Dr. Satyandra (S.K.) Gupta
Professor of Mechanical Engineering

Dr. Gregory Jackson
Associate Professor of Mechanical Engineering

Dr. Jungho Kim
Professor of Mechanical Engineering

Dr. Michael Pecht
George E. Dieter Professor of Mechanical Engineering
Director, Center for Advanced Life Cycle Engineering (CALCE)

Dr. Reinhard Radermacher
Professor of Mechanical Engineering
Director, Center for Environmental Energy Engineering (CEEE)

Dr. Elisabeth Smela
Associate Professor of Mechanical Engineering

Dr. Santiago Solares
Assistant Professor of Mechanical Engineering

Dr. Bao Yang
Assistant Professor of Mechanical Engineering

Dr. Michael Zachariah
Professor of Mechanical Engineering and Chemistry
Director, Center for NanoEnergetics Research
Director, Center for Nano Manufacturing and Metrology

For more information on our outstanding innovative faculty, please visit: **www.enme.umd.edu**

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Sun Microsystems

University Technical Resource Service

Whirlpool Corporation

Wyle Lab

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Department of Energy

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NSF

U.S. Air Force

U.S. Army

U.S. Navy (NAS, NSWC, ONR)

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Complete Book & Media Supply, Inc.
Curran Associates, Inc.
CustomPartNet, Inc.
Daikin Industries, Ltd.
Daikin U.S. Corporation
Chrysler
Danfoss Shahua
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Defense Threat Reduction Agency
Dell, Inc.
Delphi
Delta Chemical Corporation
Delta Engineering Corporation
DENSO Corporation
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DOD-Army Research Lab
DOD-Navy ONR
DOE
Dri-Eaz Products, Inc.
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DTRA
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E.A.D.S.
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Emerson Rosemount, Inc.
ETC
Exxon Mobil Corporation
Fairchild Controls Corporation
Fastenal Company
Frontier Technology, Inc.
GE Aviation
GE Fanuc Embedded Systems, Inc.
GE Global Research
GE Healthcare
General Dynamics Corporation
General Electric Company
General Vortex Energy, Inc.
George Weston Bakeries, Inc.
Georgia Tech University
Godrej and Boyce MFG, Co., Ltd.
Goodrich Control Systems, Ltd.
Gree Electric Appliances, Inc.
Guentner Company
Hamilton Sundstrand
Harris Corporation
HHS
Honeywell International, Inc.
Hussmann Corporation
II-VI Foundation
Impact Education, LLC
Industrial Technology Research Institute
Iowa State University
Jaggi-Gunter-Schweiz
John Hopkins University-Applied Physics Laboratory
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Modine
Montgomery County Government
Muniz Engineering, Inc.
NASA Ames Center
NASA Goddard
NASA Shared Services Center
NAVAIR
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Netherlands Directorate
NIH
NIST
Nokia Siemens Network
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NSF
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Sanden
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Schweitzer Engineering Laboratories, Inc.
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Sherwin-Williams Company
Silicon Power Corporation
SolarEdge Technologies, Inc.
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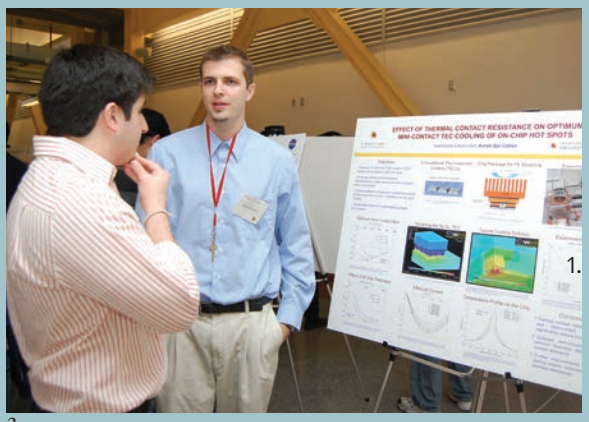
1

1. Fall 2008 Graduate Student Picnic

2. Formula SAE Team, Terps Racing

2



3

3. Juan Cevallo and Slava Litvinovitch, Research Review Day Poster Session

4. Gabe Affandy, Charlie Choe and Prof. Bigio, Student Awards Ceremony

4

5

5. John Schiech and Prof. Bar-Cohen, DeWALT Conference Suite Grand Opening

6. Bavani Balakrisnan and Prof. Balachandran, Student Awards Ceremony

6

7

7. 2009 Spring Graduation Reception

8. 2008-2009 Student Award Winners

8

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METRICS is designed to keep our readers informed about the activities and accomplishments of the Department of Mechanical Engineering. We would like for you, our alumni, to keep us informed about your activities and accomplishments so that we may share them with our readers. Please send your alumni news to **me_communications@umd.edu**, or visit our website: **www.enme.umd.edu.**

great EXPECTATIONS

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METRICS is published for alumni and friends of the Department of Mechanical Engineering at the A. James Clark School of Engineering.

PRODUCTION TEAM
Coordinator: F. Stephenson
Writers: L. Frye, F. Stephenson
Editor: C. Wildy
Designer: P. Weickert
Photos: J. Consoli, J. Osman, A. Santos, F. Stephenson

Above: Philip Hannam, B.S. '09 and Amarildo DaMata, ME Graduate Advisor