West Virginia University
College of Engineering and Mineral Resources

MECHANICAL AND AEROSPACE ENGINEERING

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FULFILLING OUR MISSION


Ever Barbero, Chair

Great achievements have been the result of great challenges. In the 1960's, our department rose to unprecedented levels of excellence, along with the rest of the US science and technology establishment, while responding to the Sputnik scare. In the 1980's, our productivity grew along with that of the country in response to the now forgotten Japan Inc. phenomenon. In the 1990's, continued improvements were and continue to be made possible by empowerment of our students, faculty, and staff. You will get a glimpse of this continued transformation of the department in this report. Furthermore, we reflect on what lies ahead.

There are those who say that market forces will restore the balance, and they are right. There is no denying that those of us that anticipate the unavoidable challenges will benefit in the process. Because of the long time it takes to complete a Ph.D. degree, about nine years past 12th grade, a great opportunity lies with training the teachers and research leaders of the future, for which there is a great demand. The ranks of Ph.D.s in government and industry, as well as university faculty are laden with talented people that will retire in the next five to ten years, and we are not producing nearly enough to replace them. Furthermore, security concerns have choked the influx of gifted immigrant students that would otherwise fill our doctoral programs.

In Mechanical and Aerospace Engineering, we are responding to these challenges and thus fulfilling our mission of teaching and research while elevating the department to new heights of excellence and reputation among our peers.

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WVU recognized for diversity

The College of Engineering and Mineral Resources at West Virginia University (WVU) has been recognized for diversity by Hispanic Business magazine in its September issue. WVU ranked eighth on the magazines list of Top 10 Best Engineering Schools for Hispanics. The publication surveyed close to 200 schools in the categories-enrollment, faculty, student services, retention rate and reputation. The magazine also cited WVU's proximity to the National Energy Technology Laboratory, The National Institute of Occupational Safety and Health and the National Aeronautics and Space Administration for providing many research opportunities for WVU students.

More information on rankings available at: http://www.hispanicbusiness.com/magazine/

Pumpkin Drop

The 18th Annual Pumpkin Drop was held at the College of Engineering and Mineral Resources at West Virginia University on October 28, 2005. The sport has a traditional crowd of over 1000 and is enjoyed by both young and old. Gourd Hurlers fling the pumpkins from the top of the Engineering Sciences Building at a target eleven floors below. The challenge of the contest is to hit closest to the target center and have the pumpkins stay intact.

This event was sponsored by the WVU Student Chapter of American Society of Mechanical Engineers with all proceeds going to the Ronald McDonald House. A total of 133 pumpkins were dropped. **Connellsville Junior High West** took the first place with a distance of 1 foot. **Suncrest Middle School TAG** class took second place with a distance of 2 feet 4 inches. **Trinity Christian School** took third place with a distance of 3 feet 7 inches.

THE ACADEMY OF DISTINGUISHED ALUMNI INDUCTS NEW MEMBERS

The Academy of Distinguished Alumni of Aerospace Engineering was pleased to induct Dr. Baxter R. Mullins Jr. and Dr. Marvin Dale Martin in May 2005 at their annual spring ceremony. **Dr. Baxter Mullins** joined the General Dynamic Corporation as an Aero Systems Engineering specialist receiving his BSAE degree at WVU. By 1979, he raised to a senior position with responsibility for threat analysis and the design and the verification of weapon system simulations for the Air Force Electronic Warfare Evaluation Simulator.

After completing his MSE degree at South Methodist University, Dr. Mullins began working on his Ph.D. degree at the University of Texas, Arlington while teaching a variety of courses. Dr. Mullins continued to teach after completing his Ph.D., performing research and developing a reputation for his expertise in a variety of areas including Aerodynamics and Atmospheric Flight Mechanics of Aircraft in adverse weather conditions, including airframe icing, wind shear and turbulence.

Dr. Mullins served as director of TCS Consulting from 1986 to 1996. He specialized in flight vehicle design, modeling, simulation and wind tunnel testing and accident reconstruction. He also worked with a variety of defense and aircraft companies. From 1996 to the present, he has worked for Bell Helicopter Textron; joining the company as a staff engineer and rising to the position of Chief, Research Project and Technology Programs.

Dr. Marvin Dale Martin went to work as a Mechanical Engineer for the U.S. Department of Navy, Bureau of Ships in Washington, D.C. upon the completion of his BSME degree in 1952 from WVU. He proceeded to receive a steady series of promotions until he reached the rank of GS-15 and the title of Head Engineer for Systems Performance in 1966.

Dr. Martin was one of the principal inventors of many of the control systems for both experimental high-speed hydrofoils and Air Cushion Vehicles. His responsibilities included both automatic and manual control of ship altitude, stability, steering, hydrofoil extension/retraction systems, and a variety of stabilization systems. He was the Project Engineer/Manager for the Navy's first activated fin stabilizer system-a system still in widespread use today. He developed a novel low-altitude radar altimeter and managed the development of a special cable-laying system and the specifications a ship to carry out the operations.

As one of his final project of his career, Dr Martin originated and managed Industry/Navy/Joined Services Automatic Testing Project. This project was an extremely complex undertaking to assess the impact of complex weapon systems.

FACULTY AWARDS

Each year, the College of Engineering and Mineral Resources selects an awards those individuals who have demonstrated exemplary performance in the areas of advising, research and teaching. During the University's Weekend of Honors Ceremony on April 15, 2005 at Erickson Alumni Center, the University announced its outstanding advisors, researchers and teachers.

Dr. Mridul Gautam was named one of the five outstanding researchers for the College of Engineering and Mineral Resources for 2004-05. Professor Mridul Gautam is an internationally recognized expert in the area of heavy-duty mobile source exhaust emissions, and aerosol sampling, particulate matter measurement, characterization, and control. He has been instrumental in the development and operation of the National Research Center for Alternative Fuels, Engines and Emissions program at WVU, and currently serves as its Co-Director. He is also serving as the Director of the National Center for Mining Engines and Safety.

Dr. Xingbo Liu was awarded the New Researcher of the year His active areas of research are high temperature alloys for aerospace and power generation industries, processing, microstructure and materials properties interaction, liquid metal corrosion and nano materials.

Dr. John Kuhlman was selected as the Student Section Advisor of the American Society of Mechanical Engineers. This award recognizes advisors/faculty/staff who have made contribution above and beyond the call of duty to their organizations.

Dr. Victor H. Mucino and Dr. James E. Smith was this years recipients of the Academy of Distinguished Alumni Teaching Award. The Academy of Distinguished Alumni of Aerospace Engineering and the Academy of Mechanical Engineering in Mechanics established this award to recognize excellence in teaching within the department.

A partnership between WVU and Queretaro (Mexico) has been awarded a US-AID/ALO grant under the TIES-II Program. This is a multi disciplinary project that involves engineering, agricultural sciences, business and education to develop greenhouse technologies for rural community development. The proposal was submitted on behalf of WVU by **Dr. Victor H. Mucino.** Currently, Dr. Mucino directs WVU's Industrial Outreach Program in Mexico, in which he takes WVU students to Queretaro, Mexico, to team them up with Mexican students and conduct meaningful industrial projects. Intermixed teams of students work with engineers from industry across disciplines and cultures.

Dr. James E. Smith has taught at the University since 1976, before which he was a Research Engineer for the Department of Energy (DOE). Dr. Smith is currently the Director of the Center for Industrial Research Applications (CIRA) at West Virginia University where he is a Professor in the Mechanical and Aerospace Engineering Department. Dr. Smith has been involved in transferring technology from academia into the commercial sector. To date, he has helped form seven companies that now market commercial applications of technology developed through West Virginia University.

UNDERGRADUATE SCHOLARSHIPS

Jason Gross, a dual major in Mechanical and Aerospace Engineering was awarded the undergraduate scholarship of $1000. He servers as the Vice-Chairman of the Student Body Government.

The 2005 Mid-Atlantic Region Award of Sigma Gamma Tau was received by **Aaron Shinn**. This award honors the top eight outstanding Aerospace Engineering Seniors in the United States and is based on academic, service and extracurricular accomplishments.

The Jerome B. Fanucci Scholarship was awarded to **Hussein H. Ammar** for the 2005-2006 academic year. This scholarship is named for Jerome B. Fanucci, a former faculty member in the department. Its given to students who have demonstrated outstanding academic performance, and is provided by donations from alumni, faculty, staff and friends of the department.

The Honor Undergraduate Student Award recipient was **Aaron Shinn**. This honor is awarded for exceptional academic and technical achievement participation in extracurricular activities and excellence in their chosen profession.

The CNG Scholarship is funded by an endowment income provided by CNG Corporation. This scholarship is awarded to a junior or senior engineering student based on appropriate academic qualifications. The 2004-2005 recipients of this award were **Eli Litton** and **Frank Wineland**.

The Charles C. Copenhaver Scholarship is funded by the Estate of Charles C. Copenhaver. This scholarship is awarded to students majoring in an engineering field. The 2004-2005 recipients of this award were **Theodore Adams** and **Ryan Starn**.

The Governor's Honors Academy Scholarship is awarded to students attending the West Virginia Governor's Honors Academy. These students are selected from among the best academic-achieving students throughout West Virginia. This scholarship is awarded for four undergraduate years. The 2004-2005 recipient of this award was **John Harman**.

The Homer P. Nutter Scholarship funded by Hobet Mining and Construction Company. This scholarship is awarded to a West Virginia resident based on academic ability and is awarded to a Mining, Civil, Electrical or Mechanical Engineering students. The 2004-2005 recipients of this award were **Lola Burke** and **Aaron Shinn.**

GRADUATE STUDENT AWARD

The Kumar Tamma Award is named in honor of Dr. Kumar Tamma, former Assistant Professor and Associate Professor of Mechanical and Aerospace Engineering at WVU and major contributor to the establishment of this award. This award is given annually to the outstanding student in the masters program continuing for a doctorate in Mechanical and Aerospace Engineering. The 2004-2005 recipient of this award was **Sam George**.

STUDENT ACTIVITES AND PROJECTS

Sigma Xi National Honor Society, WVU chapter conducted "Sigma Xi Graduate Research Day Competition" at National Research Center for Coal and Energy (NRCCE) on April 25, 2005. **Bhyrav Mutnuri**, a graduate research assistant supported by the Constructed Facilities Center on the Center of Excellence Project entitled "Characterization, Evaluation and Implementation of Fiber Reinforced Polymer Composites for Highway Infrastructure" secured the first place. The topic of his presentation was "Thermal Conductivity Characterization of

Composite Materials." The second place was awarded to **Mohit Bhardwaj**, a graduate assistant and his topic of presentation was "Water Vapor Diffusion through Glass Fiber Reinforced Nano Composites."

Jason Gross, student body president
(correct caption)

Curtis Groves was selected for a position in a Co-Op program at NASA. He will participate in the development of thermal data books for Expendable Launch Vehicles (Atlas V, Delta II, Delta IV and Pegasus) and in the development of thermo physical properties database for use in thermal modeling efforts.

Heath Morris, an undergraduate student was elected as the SAC Vice President for the academic year 2005-06.

ASME Conference

The WVU student chapter of the American Society of Mechanical Engineers (ASME) served as host of the ASME Region V Regional Student Conference. The conference gathers the best and the brightest mechanical engineering students from schools to compete in the competitions that test the skills they have developed in their mechanical engineering studies. This conference was held from March 31 to April 2, 2005 with over 250 students and advisors in attendance. According to student conference chair Karen Peyatt, "The Conference allows student participants to gain valuable knowledge as they collaboratively design and build structures for the formal and informal competitions that are part of the conference. Other students will sharpen their critical thinking abilities by participating hr technical paper and poster competitions."

ALUMNI NEWS

Eric Macfarlane graduated from WVU in the spring 2005 and was hired as a mechanical engineer for NAVSEA Naval Surface Warfare Center-Indian Head Division in July 2004. He is primarily involved with propellant formulations and is responsible for developing an Extended Range Gun Munitions for the Navy. He is named Engineer in Charge (EIC) of the Nitramine Propellant Facility and is directly in charge of his own program. He is also involved in researching functionally gradient explosives in dial-a-yield warheads.

Ziheng Yao, (2005) a Ph.D. graduate from the Department of Mechanical and Aerospace Engineering at WVU is working as Technical Specialist in the Core Laboratories, Inc., Houston, Texas. Core Laboratories is a leading provider of proprietary and patented reservoir description, production enhancement and reservoir management services for the global petroleum industry. Ziheng Yao's job function includes performing and developing various rock mechanics tests, wellbore stability and

hydraulic fracture design based on Core Laboratories data. It includes analyzing and solving problems encountered in the oil and gas industry.

Daniel J. Moyers finished his undergraduate program from WVU and joined JPL as a student employee. JPL has launched the Mars Reconnaissance Orbiter in August 2005. The Mars Phoenix Lander will be blasting off in 2007, and the Mars Science Laboratory will begin its journey in the 2009/2011 time frame. Daniel will likely work on the Mars Science Laboratory Mission in the future after finished his graduate program which he joined this semester at Stanford University

DONOR RECOGNITION

In this section, we wish to recognize those individuals and corporations that through their generosity have an indelible impact on the life of students in MAE. In this issue, we will to recognize donations received in the period of July 2005 to December 31, 2005. Our apologies to those that have been omitted inadvertently.

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QUALITY OF LIFE

Anyone who knows what engineers do has to be appreciative of the improved quality of life that their services provide nationwide and worldwide. At the core of the ability to provide those all-important services is the education received at educational institutions like West Virginia University.

In the years ahead, education will continue to play a vital role in the nation's economic future. Supporting the educational process becomes ever more and more important.

Your help is needed to maintain and extend the quality of the program available to those seeking degrees in mechanical engineering, aerospace engineering or both at WVU. One option that is easy to implement is a gift provision included in a will with the wording "to the West Virginia University Foundation, Inc. for the benefit of the College of Engineering & Mineral Resources' Department of Mechanical and Aerospace Engineering."

In this way, you may fund student projects, provide for laboratory improvements, create a scholarship or specify discretionary use. If you want your gift fund to last in perpetuity, it must be specified and requires certain gift amounts to assure that the fund can generate a meaningful annual amount of income to carry out your wishes for all time.

If you would like assistance in formulating a special gift for the Department or have already completed such a gift, please contact Bob Bragg at (304) 293-4821, ext. 2240 or at Robert.Bragg@mail.wvu.edu. More good engineering will be assured that way!