

# Coverstone, Walenczewski Receive Pierce Awards



**Victoria H. Coverstone**

AE Prof. Victoria H. Coverstone and Sylvee Walenczewski, who graduated with her bachelor's degree in May, have won the 2008 Stanley H. Pierce faculty and undergraduate awards, respectively, from the College of Engineering at the University of Illinois at Urbana-Champaign.

The awards, established in 1969 to honor Stanley H. Pierce, an associate dean, are in recognition of a faculty member's and student's efforts to develop empathetic student-faculty cooperation.

## **Prof. Victoria H. Coverstone**

Over the past 12 years, students from Coverstone's senior design class have taken first, second, or third place—sometimes all three—in the AIAA national design competition, the result of high standards set for these capstone projects. Coverstone has established a strong teaching record with the ability to motivate students to pursue advanced work. With AE Prof. Philippe Geubelle, she redesigned the space section of the Department's introductory freshman course, adding a section on spacecraft design and performance, which includes the design, building, and launch of a payload-carrying model rocket to conduct flight experiments and gather data to verify classroom exercises. Currently, she is working to create another

version of the course called BalloonSats that was offered for the first time last spring.

As campus director of the NASA Illinois Space Grant, Coverstone was a co-founder of the Undergraduate Research Opportunities Program, initiating the program and securing funding from Boeing, NASA, and other sources. Since the program's 2004 beginning, 85 students have connected with approximately 75 faculty research programs. In 2002, with ECE Prof. Gary Swenson, Coverstone co-founded the CubeSat program that has introduced over 100 students

to the design, development, and flight of earth satellites. She continues as co-director of this program, which is now building its second satellite.

Coverstone was selected for the AIAA student chapter's Teacher of the Year Award in 1995, 1997, and 2001. She has received both the College of Engineering Teaching Excellence Award and the Everitt Award for Teaching Excellence, as well as an

Honorable Mention for the Campus Award for Excellence in Undergraduate Teaching. In addition, she has appeared on the "Incomplete List of Teachers Ranked as Excellent by Their Students" 11 times and has received eight College of Engineering Excellence in Advising awards. Beginning in fall 2006, Coverstone was appointed associate head for graduate studies in the AE Department. Most recently, she has assumed a similar position as associate dean for graduate and professional programs for the College of Engineering.

## **Sylvee Walenczewski**

Walenczewski's teachers considered her to be one of the most talented students in AE. She speaks four languages, and her broad interests range from chairing Habitat for Humanity locally, to being a regional finalist with a paper on rocket engines (in Russian) in the Moscow Technical Paper Competition. Throughout her undergraduate career, Walenczewski has worked diligently to create empathetic student-faculty relations. She has chaired the Aerospace Undergraduate Advisory Board, worked with the Department's faculty and administration on curriculum revisions, helped increase study-abroad participation, helped the Department with enrollment retention, and helped to provide students with computer lab access.

To help students get to know the faculty, she developed a set of AE faculty trading cards, featuring each professor's photo, area of concentration, PhD degree information, number of years at Illinois, and a "fun fact." Two years ago, in addition to attending all of the events related to AE Prof. John Prussing's retirement, Walenczewski commissioned a life-sized cardboard cutout of the Department's beloved professor and placed it in the office so he would "always be around."

Walenczewski is a dedicated member of the Illinois Space Society, the American Institute of Aeronautics and Astronautics (AIAA), Students for the Exploration and Development of Space (SEDS), and Sigma Gamma Tau, the honor society for aerospace engineering. She is a member of the Polish Club as well as the Russian conversation table.

From January to June 2006, Walenczewski studied at Moscow Technical University. There she worked with SEDS colleagues at Illinois to begin establishing a sister chapter for the organization at MTU. Recently, both the U of I chapter and the MTU chapter shared a CubeSat launch on the same booster rocket, a result of connecting Russian students and faculty with their counterparts at Illinois.



**Umberto Ravaioli, Interim Associate Dean for Academic Programs, presents the Pierce Award to AE undergraduate Sylvee Walenczewski, who now works for Lockheed Martin Space Systems in California.**

## **Austin Wins Young Investigator Award**

AE Assistant Prof. Joanna M. Austin has received a Young Investigator Award from the U.S. Air Force Office of Scientific Research. Austin's proposal was one of 29 chosen from among 215 submitted.

Austin's work for the award studies hypervelocity boundary layers for axisymmetric engine flowpaths. Her research interests focus on reacting, compressible flows. Other current research projects include the study of thermochemical nonequilibrium effects on transition and turbulence in hypervelocity flow; hotspot formation and detonation initiation in heterogeneous energetic materials; the study of compressible flows in geological applications, such as volcanic blasts and impact craters; compressible flows at small scale; and engine exhaust studies for the supersonic business jet.

## **Bodony is AIAA Teacher of the Year**

In only two years time, Daniel J. Bodony has already made a lasting impression upon AE's students. The local American Institute of Aeronautics and Astronautics (AIAA) student chapter selected the young faculty member as AE's 2008 Teacher of the Year. He also has been listed this year in Who's Who in Engineering Education.

Bodony's research has particular emphasis on flows that generate sound, using large-scale simulations (large-eddy and direct numerical simulations) and analytical methods. His work includes high-speed flows (e.g., the noise produced by modern turbo-fan engines and turbulent jets), low-speed flows (e.g., the sound produced by the human voice), and in the interaction of a compressible fluid with mechanically and thermally compliant structures.

## **Bragg is New AIAA Vice President; Muellner Assumes Organization's Presidency**

AE Prof. Michael B. Bragg is the new Vice President, Publications, of the American Institute of Aeronautics and Astronautics.

Bragg was selected during the 2008 AIAA Board of Directors election in April, and assumed office in May. Also at that time, AE alumnus and Alumni Board

member George K. Muellner, BS 1967, assumed office as AIAA President.

In addition to serving on the AE faculty, Bragg also is Executive Associate Dean in the College of Engineering. Bragg served as AE Department Head from 1999 until 2006, having joined AE in 1990.

Muellner retired as president of Advanced Systems for the Integrated Defense Systems business unit of the Boeing Company, responsible for developing advanced cross-cutting concepts and technologies, and executing new programs prior to their reaching the System Design and Development phase. Since starting with Boeing in 1998, Muellner has held a variety of positions, including vice president-general manager of Air Force Systems and president of Phantom Works, the advanced research and development unit.

## **Chasiotis' Work in MEMS and Nanostructured Materials Recognized**

The work of AE Associate Prof. Ioannis Chasiotis and his graduate students in MicroElectroMechanical Systems (MEMS), thin films and other materials has been well-received and recognized over the past year.

Chasiotis received a 2007 Office of Naval Research Young Investigator Program Award for his proposal on Polymer Nanocomposites, work that aims at bringing nanotechnology to the service of the U.S. Navy. In 2008 he was also selected for an NSF-CAREER award from the Materials Design and Surface Engineering Program at the National Science Foundation. This five-year award will support his group to develop a research program on soft/hard interfaces in polymeric materials with applications to Aerospace Engineering.

In addition, an article he co-authored with his graduate students on "Mode I and mixed mode fracture of polysilicon for MEMS," published by the *Fatigue and Fracture of Engineering Materials and Structures* in January 2007, received the journal's 2007 Best Paper Award. According to the award, "This paper addressed for the first time experimentally the



**Joanna M. Austin**



**Daniel J. Bodony**



**Michael B. Bragg**



**George K. Muellner**



**Ioannis Chasiotis**

problem of mixed mode fracture in brittle materials for Microelectromechanical Systems (MEMS) by novel experiments coupled with a detailed numerical analysis. A key finding of this paper is that fracture of brittle thin polycrystalline silicon films that are routinely used in MEMS is stochastic in nature, because it is strongly controlled by the random orientation of individual nanoscale grains comprising the material. As a consequence, one cannot talk about a unique value of fracture toughness for such thin films, but rather a broad envelope of fracture toughness values with the grain boundaries providing a toughening effect."

The research interests of Chasiotis' group are experimental mechanics at the nanoscale with emphasis in

mechanical reliability, fracture, and fatigue of MEMS, NanoElectroMechanical Systems (NEMS), and thin film electronic materials. These materials are employed to fabricate microscale sensors for common engineering systems including aircraft and satellites. In addition, his group is working on the experimental failure mechanics of inhomogeneous and anisotropic materials for lightweight applications with emphasis in the nanoscale deformation and damage mechanics of polymer nanocomposites.



**Jonathan B. Freund**

### **Freund Chosen for APS Frenkiel Award**

Jonathan B. Freund, associate professor in Aerospace Engineering, has been selected as the 2008 winner of the Francois Frenkiel Award, a prestigious honor given by the American Physical Society's Division of Fluid Dynamics.

Freund was chosen for his paper, "Leukocyte margination in a model microvessel," published in the February 20, 2007, online edition of *Physics of Fluids*. The Frenkiel Award recognizes significant contributions to fluid mechanics that have been published by young investigators in *Physics of Fluids* during the preceding year.



**Philippe H. Geubelle**

Freund's research concerned the fluid mechanics of white blood cells when a body responds to physiological inflammation. Said Freund, "As part of inflammation, the white cells somehow get preferentially pushed toward the walls of vessels. There have been lots of ideas about why this happens. My simulation model suggests that it just involves the interaction with the red cells."

Continuing, he said, "I was also able to look at the detailed flow when a white cell is near the wall and explain, in part, why, once there, it is in a relatively stable configuration. I developed a sophisticated simulation tool to study these mechanisms."

Freund has appointments in Aerospace Engineering and in Mechanical Science and Engineering at Illinois. His research areas include aerodynamic sound, compressible turbulence, numerical methods, large-scale parallel computing, molecular dynamics simulation of nanometer scale flows and heat transfer in solids.

### **Geubelle Earns Best Paper Award**

Prof. Philippe H. Geubelle and his colleagues have been recognized by the Materials Division of the American Society of Mechanical Engineers (ASME) as the authors of the Best Fatigue and Fracture paper published in the *Journal of Engineering Materials and Technology* between July 2006 and June 2007.

The paper, "Continuum and Molecular-Level Modeling of Fatigue Crack Retardation in Self-Healing Polymers," was co-written by Spandan Maiti, Chandrashekar Shankar and John Kieffer. The paper, which appeared in the journal's October 2006 issue, describes a multi-scale model of the fatigue response of the self-healing polymers developed at the University of Illinois by a group led by Prof. Scott White. Geubelle's research interests are theoretical and computational solid mechanics, (dynamic) fracture mechanics, multiscale modeling of complex materials, computational aeroelasticity, massively parallel computing, solid mechanics issues in manufacturing, and computational design of novel autonomic materials.

Geubelle is the AE Associate Head for Graduate Programs and directs the Illinois Space Grant Consortium.

## Voulgaris Awarded NCSA Fellowship

Aerospace Engineering Professor Petros Voulgaris has been awarded a National Center for Supercomputing Applications (NCSA) Fellowship for his project, "Simulation-Based Performance and Robustness Analysis of Large Distributed Control Applications."

Voulgaris, a 17-year veteran of the AE Department, was one of five Engineering faculty members awarded fellowships. Projects from a total of nine researchers across the University of Illinois at Urbana-Champaign were chosen for the honor.

The fellowships are a joint effort between the Urbana campus and NCSA. Through this program, faculty can access and benefit from NCSA's high-performance computing and storage environment, cutting-edge visualization and data analysis capabilities, and opportunities for multidisciplinary collaboration.

Voulgaris' research interests include robust and optimal control and estimation, structured and distributed control, networks and control, and applications of advanced control and estimation methods to engineering practice.

His project through NCSA builds on recent technological advances that have made it possible to construct complex systems and networks with a very large number of actuation and sensing devices possessing communication and computation capabilities. For example, in the case of large arrays of Micro-Electro-Mechanical-Systems (MEMS), there are potentially tens of thousands of actuator/sensor and imbedded control sub-systems. Similarly, for systems like giant segmented telescope mirrors, several thousands of sensors and actuators are present.

However, a standing hurdle in validating the performance of such complex systems is high fidelity simulation. In particular, for the high precision systems like telescopes or microcantilever arrays on which this project concentrates, where accuracy requirements reach the nano-meter scale, it is essential to have a detailed model and simulation capability.

Voulgaris plans to use NCSA expertise in order to obtain reliable simulation capability that can test thoroughly the distributed control system. These high fidelity simulation models will require the use of several software tools (ABAQUS, Simulink, Matlab and interfaces) in parallel performing massive computations.

For example, an estimated minimal computational ability to perform only 0.5 sec simulation for an overly simplified 1000-microcantilever array model, under

closed loop and with 10 states in every subsystem, runs into hundreds of peta flops.

With more reliable models and graphic capability, the overall computational task can become a challenge met only by using NCSA expertise. By developing this master computing framework for such applications, Voulgaris' group will be able to simulate these complex systems in closed loop control, reliably analyze their performance and robustness characteristics, and provide enough tangible evidence for their successful operation.

## SciAm 50 List Recognizes White, Sottos

Aerospace Engineering Prof. Scott R. White and affiliate Prof. Nancy R. Sottos were included in the SciAM 50 for 2007, a distinct honor that appears in the January 2008 edition of *Scientific American* magazine.

The awards list recognized 50 individuals, teams, companies and other organizations whose accomplishments in research, business or policymaking during 2006-2007 demonstrate outstanding technological leadership. The SciAM 50 honorees were celebrated for their contributions to areas including biotechnology, microelectronics, energy and genetics. White and Sottos, of Materials Science and Engineering, were recognized for their development of self-healing materials. Both White and Sottos are Donald Biggar Willett Professors in the College of Engineering.

White was also recognized for this research by the Champaign County Economic Development Corp. and several University of Illinois groups when they honored him with the Innovation Discovery Award in February. These awards are designed to encourage technological development in Champaign County, Illinois.

## Engineering Council Honors AE Faculty

Emeritus Prof. John E. Prussing has been honored with the 2008 Engineering Council/Accenture Multi-Year Faculty Achievement Award.

Profs. Lawrence A. Bergman and Victoria L. Coverstone and Associate Prof. Jonathan B. Freund have been recognized with the 2008 Engineering Council Award for Excellence in Advising. AE Alumnus Robert E. Tatro, BS 49, and his wife, Mary, made a donation to the AE Department so that the advising honors would include a monetary award as well.



Petros Voulgaris



Scott R. White



Nancy R. Sottos

## At Illinois, Everyone Counts as a Member of the Alumni Association

The University of Illinois Alumni Association (UIAA) has introduced a new membership model that is the first of its kind among major alumni associations. The UIAA now automatically extends membership to all alumni and all currently enrolled students. Membership is also available to former students, faculty, staff, parents of students, and friends of the University, upon request.

During recent University-wide strategic planning efforts, the Alumni Association explored new ways to connect with more alumni and engage their talents, support and advocacy for the University of Illinois and the Urbana campus. As a result, the UIAA Board of Directors endorsed an all-inclusive membership plan.

That means a group of more than 400,000 alumni who have a shared interest in a vibrant, thriving University of Illinois. Adding in alumni from the UI sister campuses in Chicago and Springfield, that number increases to an even more impressive 600,000.

In this case, there is strength in numbers. The U of I Alumni Association wants to foster a collegial environment that involves as many alumni and students as possible with Illinois and with each other—now and throughout their lives.

For those who are already Life Members of the Alumni Association, the UIAA continues to honor their commitment and appreciate their support.

Although this new plan requires no dues, those who choose to make annual gifts of \$50 or more will be recognized as Sustaining Members. Going forward, Life Membership is attained when cumulative Alumni Association-designated gifts reach \$1,000. And a new Sustaining Life Member category will recognize existing Life Members who voluntarily make additional contributions.

Sustaining and life membership levels activate additional benefits and services, such as a subscription to Illinois Alumni magazine and access to the vast Pro-Quest online periodicals database library, in addition to tax-deductible gift credit from the University.

The U of I Alumni Association invites all alumni and students to actively participate in the incredible Illinois alumni network—the world’s largest alumni community—a highly diverse and global family with shared experiences and pride in the University of Illinois. To learn more about how you can get involved, visit [www.uiaa.org](http://www.uiaa.org).

### Here’s How to Support Your Alma Mater

In support of high-quality education in the Department of Aerospace Engineering, enclosed is my gift of:

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