

WAY TO THE FUTURE

DEPARTMENT CHANGES NAME

This newsletter reflects news and events that occurred in 2002. We want to inform you, however, that in May 2003, the department received approval to change its name to the Department of Aerospace Engineering. Our 2003 newsletter will incorporate this update.

—Alison Weingartner, Editor

2002 AWARDS HONOR BOEING ENGINEERS, OUTSTANDING STUDENTS

Alumni from The Boeing Company, a faculty member, and several outstanding students were recognized at the 2002 awards dinner in April for the Department of Aeronautical and Astronautical Engineering. David Daniel, dean of the College of Engineering, and other officials from the University of Illinois at Urbana-Champaign were also at hand. Present were Myron Salamon, associate dean and director of the Engineering Experiment Station; Ellen Amberg, Assistant Director for Constituent Programs for the Alumni Association, and Kent Studer, the College of Engineering Assistant Director of Development. Also present were Mrs. Jo Lee Stillwell and Mrs. Gertrude McCloy (spouses of former faculty members, for whom two of the awards are named), and Ms. Artha Chamberlain, a former alumni coordinator for the department. AAE Department Head Mike Bragg ('76, MS '77) welcomed attendees to "possibly the last awards dinner for the Department of Aeronautical and Astronautical Engineer-

ing," referring to a proposed name change for the department.

DISTINGUISHED ALUMNUS AWARD

This award honors alumni and alumnae who have distinguished themselves by outstanding leadership in planning and direction of engineering and scientific work, by fostering professional development of young engineers, or by contributions to knowledge in the fields of science and engineering. The award was first presented in 1965.

Thomas J. Tobey, '69, is the Director of Manufacturing Research & Development for the Boeing Commercial Airplane Company. He acquires and develops new manufacturing technology from around the world for current and future Boeing aircraft products. Tobey also directs manufacturing technology efforts for Boeing Phantom Works in the state of Washington.

Before this, he was director of the Interiors Responsibility Center,

AE MOURNS PASSING OF BEDDINI

Robert Beddini, an associate professor in aerospace engineering, died Thursday, October 9, 2003. Condolences can be sent to Ann Beddini, care of the Aerospace Engineering Department. We will have a more complete memorial article in our next newsletter.

which designs and builds interior components for various Boeing commercial aircraft. Tobey has also served as director for both operations technology and continuous quality improvement for the Boeing Commercial Airplane Group and as director of program management for the fabrication division.

He joined Boeing in 1979 as manager of research and technology for Boeing Aerospace in Washington, D.C. In 1981, he moved to Seattle and served in various assignments in technology

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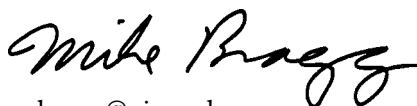
FROM THE DEPARTMENT HEAD

In the last issue, we had several articles about a possible name change for the department to "Aerospace Engineering." We solicited your thoughts and comments and many of you responded by email. The comments were very thoughtful and were an important part of our process in considering whether to propose a name change. We also solicited comments from our undergraduate and graduate students, as well as others in the university community. The overwhelming majority of all groups solicited felt that it was time to change the department name to "Aerospace Engineering." The faculty met in May and voted almost unanimously to propose the name change. Of course, the department can't do this without university approval. The College of Engineering has approved the proposal, and we await approval by the university and the governing bodies in the state. We will keep you posted on the progress.

In the department, things keep moving forward despite a tight state budget. We continue to build our expertise in aerospace information with the addition of assistant professor Natasha Neogi (*read an introduction to Neogi in this issue*). There are many opportunities in this area for exciting research, and we look forward to fully integrating it into the department. We have also hired a new faculty member in experimental high-speed aerodynamics, who will start in January 2003. More on that in the next issue.

Overall, we continue to enjoy outstanding students and a vibrant research program. We look forward, as always, to your input and participation in the life of the department.

Best regards,



mbragg@uiuc.edu



development before becoming an assistant to the corporate vice president of engineering in 1987. He spent 10 years at McDonnell Douglas, with assignments in propulsion systems and field technical support.

In addition to his AAE degree, Tobey earned an MBA from the University of California in 1975. He has also completed executive development programs at the University of Washington and Columbia University. Tobey serves on AAE's alumni advisory board and is the Boeing executive focal for the University of Illinois.

April was a good month for **Lee H. Sentman**, '58. Not only was he nominated as a Distinguished Alumnus of the department, he was also elected a Fellow of the American Institute of Aeronautics and Astronautics (AIAA). At the time of the awards dinner, he was in Arlington, Virginia, being honored as an AIAA fellow at the Global Air and Space 2002 International Business Forum and Exhibition.

As a faculty member of the department, Sentman's research interests include the commercialization of high-energy chemical lasers, molecular dynamics, fluid mechanics, and kinetic theory and statistical mechanics. He directs the Chemical Laser Lab at AAE, conducting research into developing a fundamental understanding of the fluid dynamic, chemical kinetic, and radiative interactions that determine the performance of continuous wave chemical lasers.

After receiving his doctorate from Stanford University in 1965, Sentman joined AAE as an assistant professor. He became a professor in 1979. He was the associate department head from 1987 to 1999. Sentman has, at various times, worked in California as an engineer for Douglas

Aircraft Corp., Lockheed Missiles and Space Company, and in the Rocket Propulsion Lab at Edwards Air Force Base, as well as at Bell Aerospace in Buffalo, New York.

In addition to being an AIAA Fellow, his other honors include the AIAA Plasmadynamics and Lasers Award in 1999, AAE Teacher of the Year Award in 1995-96, and the College of Engineering Andersen Consulting Award for Excellence in Advising in 1993.

OUTSTANDING RECENT ALUMNUS AWARD

This award honors recent graduates who have distinguished themselves early in their careers. The award was first presented in 1973.

Awards night for **Abdollah "Abdi" Khodadoust**, PhD '93, was a milestone of sorts. It was eight years ago to the day when he left the University of Illinois. He is now a principal engineer/scientist with Boeing, where "he is responsible for evaluating the effect of the atmosphere on the Space Shuttle during launch, and he must certify its safety before each flight," said Mike Bragg, his former adviser.

Khodadoust began his career at McDonnell Douglas in the advanced engineering group doing aircraft icing and applied aerodynamics. He received a Douglas certificate of recognition in 1997 for his work on the Blended Wing Body aircraft wind tunnel test. He then was involved in flight-testing for certification of the Boeing 717 and was recognized in 1999 for this work by then Phantom Works president, David Swain. Khodadoust received two awards, both in 2001, for his shuttle work, including a NASA award for outstanding technical contributions and a Boeing

Quality Award. As a student, he won the AIAA Ground Test student paper in the graduate category in 1992, and he received the Roger Strehlow award for outstanding graduate research accomplishments in 1993.

He is the current chair of the atmospheric environment technical committee at the American Institute for Aeronautics and Astronautics (AIAA). "I oversee the activities of 36 members With their input, I promote knowledge in all areas of science and technology relating to vehicular flight through the atmospheric and space environment," he said. Khodadoust was the technical program chair for atmospheric environment at the 40th AIAA Aerospace Sciences Meeting in January 2002. He served as the general program co-chair for the 10th American Meteorological Society's Aviation, Range, and Aerospace Meteorology meeting in May 2002.

ROBERT W. MCCLOY MEMORIAL AWARD

Presented annually to a junior or first-semester senior student in recognition of outstanding academic performance.

Tom Krenzke of Lake Zurich, Illinois, is this year's McCloy recipient, maintaining his performance in academics even as he is involved in extracurricular activities. The junior, who is a James Scholar and an Illinois State Scholar, earns a grade-point average of 3.95 out of 4.0. Since October 2001, Krenzke has been a lab assistant in the computer drafting class, helping other students learn the Auto-CAD, Mechanical Desktop, and Inventor drafting programs. He is also an engineering learning assistant,

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From left to right: Prof. Emeritus Shee-Mang Yen reminisces about the department's earlier days with Mrs. Gertrude McCloy, Mrs. Maria Yen, Mrs. Jo Lee Stillwell, and Prof. Rod Burton at the 2002 annual awards banquet.

teaching an introductory class to incoming engineering students. He was named the outstanding initiate in the Tau Beta Pi engineering honors society in 2002. Krenzke also finds time to tutor math at Urbana High School, serve as an executive member of the student chapter of AIAA, and participate in the Design/Build/Fly team.

H.S. STILLWELL MEMORIAL AWARD

Two awards presented annually on the basis of students' outstanding scholastic achievement and extracurricular activities.

It is a testament to **Leia Blumenthal's** accomplishments that two faculty members nominated her for the Stillwell award. The senior from Downers Grove, Illinois, has maintained an "exceptional" grade point average, according to her undergraduate adviser Mike Bragg, and she has been a James Scholar and on the Dean's List since 1999. "What really distinguishes her . . . is the degree to which she seeks out opportunities for learning outside of the classroom," wrote Prof.

Bruce Conway in his nomination letter. Blumenthal took advantage of the engineering coop program and worked as an engineering intern for Pratt & Whitney in her sophomore year.

Since May 2001, she has worked as a research assistant for Bragg in the NASA-funded Smart Icing Systems project. "Leia is . . . resourceful and needs little direction," said Bragg, recalling that Blumenthal diagnosed a problem in some software developed by a previous graduate student and came up with a

corrected version of the code. Bragg said that she also helped him prepare a presentation on unsteady aerodynamics of aircraft forebodies with very little guidance. "This presentation at NASA Johnson was in part responsible in the award of a new grant in this area," he said.

Blumenthal has also taught an introductory class to freshman engineers since March 2001 in her capacity as an engineering learning assistant (ELA). She has co-directed the ELA program since October 2001, training juniors and seniors who will teach other ELA classes. Blumenthal also devotes some of her time to the AIAA student chapter (where she currently serves as vice president) and Women in Engineering. She was on the College of Engineering Advisory Board in 2001 as the AAE undergraduate representative, and she developed and taught a course on space and rockets for an after-school program at an elementary school in Urbana.

Being the space enthusiast that he is, **Robert Travis Wendt** of Urbana fueled his enthusiasm by working for a year as an under-



Prof. Larry Bergman (left) converses with AAE students who were recognized at awards night. From left to right: Leia Blumenthal, Kirk Kittell, Kevin Brown (seated), Meghan Meharry, and Tom Krenzke.

Photos by Harry Zanotti

graduate research assistant on a space-related project for Prof. Victoria Coverstone. In 2000, he participated in a research project in the nonlinear systems group, under the guidance of Prof. N. Sri Namachchivaya.

Wendt has been a tutor of mathematics, physics, and chemistry to area high school and college students since fall 1998. He supervises and instructs small learning groups at the Spectrum Learning Center in Urbana. Since fall 2001, he has been a grader for three AAE courses. He has also worked for the Champaign Cycle Co. and as a lab technician for the Department of Crop Sciences.

The senior, who will receive a minor in mathematics when he completes his degree in May 2003, is a James Scholar and on the Dean's List. He is a member of various honor societies, including Sigma Gamma Tau, Phi Kappa Phi, Alpha Lambda Delta, and Phi Eta Sigma. Wendt is also a member of the Illini Space Development Society and the Float'n Illini, a multidisciplinary group of college students who conceive and carry out experiments in zero gravity.

ROGER A. STREHLOW MEMORIAL AWARD

Presented annually to a graduate student in recognition of outstanding research accomplishments.

Over the duration of **Dhirendra Kubair's** research towards his doctoral degree, he developed "very sharp analytical and numerical skills," according to his adviser Philippe Geubelle. So sharp are Kubair's skills, in fact, that other graduate students in his research group often went to him when they needed an analytical solution to test their numerical schemes. Another Kubair charac-



Diane Jeffers, AAE's Coordinator of External Relations, converses with an award recipient's parent at the awards dinner. In the background, Outstanding Recent Alumnus Award winner Abdi Khodadoust (left) speaks to Prof. John Prussing. Also shown is the Strehlow Memorial Award winner, Dhirendra Kubair.

teristic is his intellectual curiosity. "He is always 'looking around' for extensions of his current work, or even for new types of research activities," said Geubelle, who sometimes had to rechannel Kubair's enthusiasm to the problem at hand. Kubair earned his doctorate in August 2001.

At AAE, his research activities were dedicated to the theoretical and numerical analysis of fundamental dynamic fracture problems, particularly in the effect of rate dependence on dynamic cohesive failure, intersonic crack propagation under mixed-mode conditions, and extrinsic versus intrinsic cohesive failure models. His research activities have resulted in four journal papers. Two have been accepted for publication in the *Journal of the Mechanics and Physics of Solids*, which is "regarded as the top journal in the field of solid mechanics," according to Geubelle. Another paper will appear in *Engineering Fracture*, and the fourth has been submitted to the *International Journal of Solids and Structures*.

At Bangalore University in India, Kubair graduated first among the class of 150 graduating seniors in July 1993, with a bachelor's degree in mechanical engineering. In 1992, he received first prize in the 23rd National Student Design Competition, conducted annually for juniors and seniors in engineering by the National Design and Research Forum, which is part of the Institution of Engineers (India). He received a master's in mechanical engineering from the Indian Institute of Science-Bangalore in 1996. Kubair has worked as a senior scientist in the Aeronautical Development Agency, a national defense lab in India; and at Caterpillar, Champaign, as a summer intern. He was a teaching assistant in finite element analysis of aerospace structures for Prof. Geubelle and a tutor for solid mechanics for Prof. John Lambros. Kubair is now a postdoctoral research associate at the Princeton Material Institute at Princeton University, working on failure

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ALUMNI AWARDS, *continued from page 5*

analysis of thermal barrier coatings used in gas turbine engines.

DALE S. MARGERUM MEMORIAL AWARD

Presented annually to an undergraduate student for outstanding leadership qualities as exemplified by his or her participation in departmental extra-curricular activities.

Jeff Kowtko of Cedar Point, Illinois, is a member of many associations but he is being recognized for his leadership as president of the microgravity team, the Float'n Illini. Prof. Eric Loth, the new faculty adviser for the Float'n Illini, recommended Kowtko for the award. Loth noted several "outstanding successes" under Kowtko's leadership, including fundraising efforts that obtained more funds from industry and university units despite budget restraints, acceptance of the Float'n Illini's experiment that was tested in April 2002 at NASA's Johnson Space Flight Center, and learning opportunities

for grade schools through visits, and an exhibit for the Engineering Open House. "It should be noted that this was all done with a new faculty adviser to the Float'n Illini, who . . . very much depended on Jeff to make the majority of the decisions and organize the group primarily on his own," wrote Loth in his nomination letter.

Kowtko, who will graduate in May 2003 in his major with a minor in computer science, also performed research for the Center for Simulation of Advanced Rockets and is a member of the Illini Space Development Society (where he is on the Executive Council), National Space Society, American Institute of Aeronautics and Astronautics, the Planetary Society, and Natural Resource Defense Council. When he presented the award, Prof. Rod Burton noted that Kowtko was a "human dynamo" who had accomplished a great deal since arriving at the department from a community college only 18 months ago.



Thomas Tobey, who received the Distinguished Alumnus Award for 2002, receives congratulations from Debra Bragg. In the background, Department Head Mike Bragg is seen talking to Mrs. Stillwell.

IN MEMORIAM

Robert L. Orem, MS '55, of Indianapolis, died April 8, 2002. He was 75. He worked for 20 years as an aeronautical engineer for the Naval Avionics Center, retiring in 1987. A veteran of the Korean War, he served in the Air Force for 17 years, retiring in 1967. Orem also served in the Army and the Navy. He was awarded a 40-year service award by the secretary of the Navy. He is survived by his wife Mary Ellen Baker Orem; children Daniel, Elizabeth Orem, and Patricia Garretson; stepchildren L. Michael, Patrick Mitchell, Lynn Gosser, and Ellen Charlene McClain; two grandsons; eight stepgrandchildren, and six great-stepgrandchildren.

William G. Nelson, '58, died on January 31, 2002. A native of Mount Olive, Illinois, he was born in 1928. He enlisted in the U.S. Navy in 1948, and served in a torpedo patrol squadron. After earning his AAE degree in 1958, he went to work for the Boeing Corporation in Seattle, Washington. He later joined LTV in Dallas, Texas, and McDonnell Douglas in 1964, retiring in 1996. At McDonnell Douglas, Nelson worked on such projects as the F-4 Phantom, F-15 Eagle, F-18 Hornet, the AV8B VSTOL, and the T-45. He then served as chief financial officer of PRN Transcription, Inc. until February 2000. He is survived by Helen, his wife of 40 years, and a son, William.

INTRODUCING NATASHA NEOGI . . .

In Natasha Neogi resides a person of many accomplishments— aerospace researcher, speaker of many languages, figure skater, ballet dancer, piano player, and ardent Savoyard. Neogi is the most recent addition to the AAE Department, the second faculty member hired to build up the department in a new direction, that of information technology.

Neogi employs hybrid modeling and backwards reachability techniques to assess the safety of software and other systems. According to her, a safe system is one that is free from accidents or unacceptable losses. “The heart of analyzing a system from a safety perspective is identifying and analyzing the system for hazards, which are states or conditions of the system that, combined with some environmental conditions, can lead to an accident or loss event,” Neogi said. How one analyzes for hazards in a system is through modeling, whether this be formal or informal. “. . . (This) may be an informal model in the mind of the analyst, a written informal or formatted specification of the system, or a formal mathematical model. Different models allow for different types of analyses and for additional rigor and completeness in the analysis. It’s very ad hoc at this point. Part of my research is to come up with ways to formalize hazard analysis. The more people think about this problem, the more possibilities and more hazards one can predict.” But she cautions that this does not guarantee complete success.

The department’s newest faculty member came to dependable software systems by a roundabout route. Neogi started out in space research, made the transition to fluids, and ended up in software. “I started out doing the dynamics of thin, flexible struc-



tures in space (the Canadarm) for an undergraduate senior thesis. I then got interested in the dynamics of thin wing structures (like on the Space Shuttle), and what the effects of re-entry to the Earth’s atmosphere would be like.” She continued her research at Cambridge University in England, where she worked on visualization techniques for high-speed fluid flows. Neogi then attended the Massachusetts Institute of Technology (MIT) to further her work on space structures, studying the effect of crew motions on a space station. “I was actually working on my master’s at MIT, when the unmanned cargo ship crashed into the Spektr module of Mir in June 1997, causing us to lose half of our data. That got me interested in the role of software and autonomous vehicles in accidents.

“Several other accidents that are directly linked to software are the Ariane 5 rocket, which exploded on its first launch because of improper software reuse from Ariane 4, and the Airbus 320 accident in Warsaw, Poland, in September 1993, in which the pilot

attempted to deploy spoilers after landing. A software interlock prevented this from happening as the aircraft wheels were hydroplaning and thus the onboard systems did not think the plane had touched down. Mars Climate Orbiter failed to insert into Mars orbit because one software program performed calculations in imperial units and handed the answers off to another component, which worked in SI (the international system) units.”

Neogi maintains strongly that engineers, computer scientists, and programmers need to talk to each other and review each other’s assumptions to achieve integration between engineering hardware and software. “In aerospace, single points of failure don’t happen often but it’s disastrous when systems fail. These errors incur economic costs to corporations and governments, as well as loss of life.”

She elaborated: “Most accidents are system accidents; that is, they stem from complex interactions between various components and activities. To attribute a single cause to an accident is usually a serious mistake. It is still a common belief that any good engineer can build software, regardless of whether he or she is trained in state-of-the-art, software-engineering procedures. Many companies building safety-critical software are not using proper procedures from a software-engineering and safety-engineering perspective. This is not limited to the aerospace industry but to any industry which relies on software to provide safety-critical functions. Domain-specific knowledge (whether it be aerospace, medical, or nuclear) must be conveyed from the engineering experts to the scientists who design the

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software. Aerospace accidents merely occasion the most comment because they are normally very visible (plane crashes and exploding hardware), and very expensive."

Neogi and fellow faculty member Emilio Frazzoli shared a common adviser at MIT, and now at AAE they are collaborating together on a project. "Prof. Frazzoli and I are working on investigating trustworthy networked systems. At present, we are trying to create an environment where we can fly both real and simulated airplanes and air vehicles and then perform conflict detection upon them. This is a long-term project, covering three to five years, and we are applying for funding from the National Science Foundation."

Neogi is also collaborating with faculty members from several other engineering departments on campus. "Prof. Bill Sanders (of the Coordinated Science Lab) and I are looking at dependable networked systems. We are investigating issues of reliability, security, stability, and availability of mobile systems (such as a mobile cellphone

network, or a group of autonomous air vehicles).

"Prof. Ravi Iyer (of Electrical and Computer Engineering and director of the Coordinated Science Lab) and I are working on fault-tolerant systems. Basically, given that you already have a system (such as the national airspace, in which a whole lot of planes are flying) and something goes wrong (one plane has an engine failure and must land suddenly), how does it affect the rest of the system? So you take a system, inject some faults into it, and see how badly the dynamics of the system are perturbed. If the system goes back to working efficiently very quickly, then it is a fault-tolerant system."

Neogi and several other engineering professors who have similar research interests have set up a formal methods group. "Prof. Gul Agha (Computer Science), Prof. Michael Loui (Electrical and Computer Engineering), and several other professors from CS and ECE meet for a seminar every Friday, where one person will talk about his or her work (in verification, validation, reliability, etc.), and we have guest

speakers from NASA, other universities, and industry."

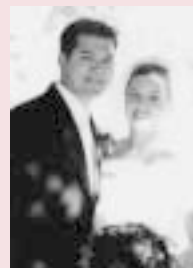
At the department, she is teaching Introduction to Aerospace Engineering for first-year students, and she will next teach Advanced Flight Mechanics. She also supervises the ASME Green Emus, a student design team that competes in an SAE aircraft competition.

Outside of the department, Neogi is coaching 8- to 10-year-old girls in figure skating. "I've been figure skating since I was 6 years old and skated competitively for my last years of high school. I've also done ballet and have been playing the piano since I was 5. I enjoy singing and was a part of the MIT Savoy society, singing in such plays as *The Mikado*, *Princess Ida*, *Iolanthe*, and the *HMS Pinafore*."

Neogi is also an ace in languages, being fluent in English, French, and Bengali (her father's native tongue) and conversant in German, Russian, and Hindi. "At Cambridge University, a student is required to read and comment proficiently in two technical languages. I chose Russian and German."



William "Todd" Cerven, '97, MS '99, wed Marie Graziano on March 31, 2001, in Carbondale, Illinois. The couple resides in Rantoul. Cerven, who is working towards his doctorate, hopes to graduate in summer 2003.



John "Bill" Hartmann, '96, MS '99, and Kristine Stolte of DeKalb were married September 21, 2002 in Geneva, Illinois. Hartmann is pursuing an AAE doctorate in the area of spacecraft trajectory optimization.

Fired Up: STUDENT-BUILT SATELLITE NEARS COMPLETION

The Department of Aeronautical and Astronautical Engineering is actively involved in this interdisciplinary design project, from program management to working on the propulsion system to faculty advising. The students hope to launch their tiny satellite into orbit in early 2004.—Editor

A small satellite being built by students at the University of Illinois may help pave the way to more versatile and less expensive spacecraft.

Called the Illinois Observing Nanosatellite (ION), the spacecraft was designed and is being built by a group of about 25 graduate and undergraduate students. Drawn from various engineering disciplines, the students in this special class are not just building a satellite, they are also building self-confidence and a spirit of camaraderie.

"Students rarely get the opportunity to take something from concept to launch in a university setting," said Victoria Coverstone, a professor of aeronautical and astronautical engineering and one of two faculty advisers for the project. "We are very pleased with how well the students have cooperated with one another in this interdisciplinary design project."

The satellite is tiny—measuring 4 x 4 x 8 inches and weighing less than 5 pounds—but the students have great expectations for its performance.

"In addition to a scientific mission, ION also will serve as a test bed to demonstrate several new technologies, including an electric propulsion system and a novel attitude control system," said **Bill Hartmann** ('96, MS '99), a graduate student and program manager for the satellite project. "In many ways, this project is a stepping stone toward a much more versatile and less costly small satellite system."

As a technology demonstration, ION has as its primary mission the space qualification of a miniature electric propulsion system. The propulsion system is being developed with Alameda Applied Sciences Corp. in San Leandro, California.

"The micropropulsion system consists of four vacuum arc thrusters, which work in a manner similar to a spark plug," said graduate student **Filip Rysanek** ('98), who presented a paper (co-written with Hartmann) at this summer's Small Satellite Conference, held at Utah State University in Logan, Utah. "An electric arc ejects material from the thruster surface at high velocity, producing a highly efficient method of propulsion."

Validation of the tiny thrusters would give small satellites such as ION a maneuverability previously reserved for much larger spacecraft, said Rysanek, who will continue working on the thrusters for his doctorate.

The students also are developing an active, three-axis attitude control system based upon free-air magnetic torque coils. The system will use three mutually orthogonal torque coils—which work as electromagnets—to reposition the spacecraft and to control roll, pitch, and yaw.

"Sending an electric current through a coil generates a magnetic field that interacts with Earth's magnetosphere and produces a torque on the satellite," Hartmann said. "By varying the current in the three coils, we can produce whatever torque is needed to control the satellite."

ION's main scientific mission is to study the airglow layer of Earth's upper atmosphere. Located about 60 miles above Earth's surface, the

CLASS NOTES

1950s

Robert Farquhar, '59, mission director at the Applied Physics Lab, Johns Hopkins University, presented a seminar on campus November 20, 2002. He talked about his successes and failures during his 30-year career with spacecraft missions to comets and asteroids. His presentation highlighted three NASA missions: the fly-by in September 1985 of comet Giacobini-Zinner by the international Cometary Explorer (ICE) spacecraft; the Comet Nucleus TOUR (CONTOUR), which was successfully launched in July 2002 but was terminated by a catastrophic event on August 15; and the NEAR Shoemaker spacecraft, which became the first spacecraft to land on a small body, the near-Earth asteroid 433 Eros, in February 2001.

1960s

Sridhar Ramachandra, PhD '62, worked for NASA in Cleveland, Ohio, until 1991. He then became a consultant in the field of information technology and retired in April 2002. In his retirement, Ramachandra has resumed his aerodynamic research: "I have been engaged for some time in looking at the classical, century-old problem of transition of laminar flow into turbulence from the molecular viewpoint instead of the continuum model." He returned to campus recently and was able to meet former professors Hilton and Yen after nearly four decades.

Ed Prior, '65, is the Deputy Director for Education at NASA Langley in Hampton, Virginia.

George Muellner, '67, was one of eight alumni and former faculty members honored with alumni awards for distinguished service at the 38th College of Engineering Honor Awards convocation. The event was held in April 2002 at the

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Illini Union. Muellner also presented a seminar that day on the future of aerospace and Boeing research.

Duane Teske, '68, most recently worked as the program manager for electric systems on the Embraer ERJ 170 for Hamilton Sundstrand in Rockford, Illinois. The company is supplying several integrated systems for Embraer's new family of regional aircraft.

Steve Nagel, '69, was the keynote speaker for the 2002 Illinois Aviation Hall of Fame induction and banquet on April 24. The event was the culmination of a two-day aviation conference in Urbana. Nagel also served on the steering committee to erect a veterans' memorial at Memorial Stadium.

1970s

Daniel Else III, '74, is an analyst in national defense for the Congressional Research Service. He has earned several degrees since his graduation from AAE: an MBA from National University, San Diego, in 1988; an MA in political science from Penn State in 1994; and an MA in political science from The George Washington University in 2000.

Dennis Reside, '75, works as an aerospace engineer in the U.S. Army's Program Executive Office in Madison, Alabama.

Bruce Goodwin, MS '77, PhD '82, was one of seven winners of the Ernest Orlando Lawrence Awards, presented on October 28 at The National Academies of Science, Washington, D.C. He was recognized in the national security category for his theory work in creating equations of state for plutonium under extreme pressures. Goodwin is a physicist and associate director in the Defense and Nuclear Technologies Directorate at Lawrence Livermore National Laboratory.

1980s

Scott Altman, '81, was an Illini Comeback Guest for 2002 homecoming activities on the Urbana campus in October. (Each year, the Student Alumni Association invites back to campus a group of distinguished alumni to take part in traditional activities such as the Homecoming Parade and Pep Rally.) The NASA astronaut talked to students about his work at a presentation on October 25. Altman's most recent Space Shuttle flight was in March 2002 on STS-109, a Hubble servicing mission.

Paul Lencioni, '86, and his wife, Cynthia, are new parents to a daughter, Arelia Cristina, who was born on January 13, 2002. The family lives in Portola Valley, California.

Richard Mange, '86, MS '90, PhD '96, was awarded Associate Fellow status by the American Institute of Aeronautics and Astronautics. Mange works for Lockheed Martin Aeronautics Company in Fort Worth,

STUDENT-BUILT SATELLITE, *continued from page 9*



Ann Peedikayil, who worked on the layout of the solar panels, and Ryan Kuester, leader of the communications and data handling team, hold the framework of the Illinois Observing Nanosatellite.

airglow emission can reveal information about waves moving through the atmosphere.

"This light is absorbed in the lower atmosphere, so you can't study it with ground-based sensors," said Rich Hudec, a senior in aeronautical and astronautical engineering from Chicago. "ION will measure the brightness of the airglow layer from low-Earth orbit using a photomultiplier-tube detector."

Hudec designed the detector's mounting plate and view shield—a cylinder-shaped device that restricts the field of view and holds a filter that restricts the wavelength of light the detector sees.

"It was exciting to help build something that will be going into orbit," Hudec said. "It's been a fun, hands-on project that forces you to work as a team and communicate effectively with others."

The students not only had to communicate effectively through written progress reports and weekly meetings, they also had to try to understand each other's problems and seek common solutions for the good of the project.

"There's something almost magical about building and launching a satellite," said Ryan Kuester, a senior in electrical and computer engineering from Wauconda, Illinois.

Kuester is leader of the communications and data handling team. Students will communicate with the satellite by means of an antenna on the roof of Everitt Laboratory.

"Last semester, we demonstrated some primitive command and control features from our ground

station in Everitt to a mock-up of the satellite," Kuester said. "This semester we will practice tracking and communicating with other satellites already in orbit."

Working on the project offered a very different experience from studying in the classroom or performing a laboratory experiment, Kuester said. "And it was a great chance to interact with professors in ways you wouldn't ordinarily get to."

The professors similarly have enjoyed both the challenge of building the satellite and the interaction with the students.

"I'm very proud of what our students have accomplished," said Gary Swenson, a professor of electrical and computer engineering who is the other faculty adviser. "In April, we participated in a NASA workshop at the Jet Propulsion Laboratory in Pasadena, California, where Ryan (Kuester) made a nice presentation on our project. Our students have never before built a satellite, but our project was certainly on a par with the others at the workshop."

The original flight schedule, calling for a November 2002 launch, has slipped somewhat, Swenson said. As a secondary payload, the satellite is dependent upon the launch schedule of communications satellites. The students are hoping to see their satellite boosted into orbit in early 2004.

"This was a great undergraduate experience," said Daniel Chen of Scottsdale, Arizona. He is ION's assistant program manager. "We divided the work among various teams, and the teamwork was excellent. We learned many practical things that are pertinent to careers in engineering and industry. These were things you normally wouldn't pick up in undergraduate classes."

The beneficial, real-life experiences were remarked on by many others in the class, including Ann Peedikayil, a senior in aeronautical and astronautical engineering from Chicago.

"This project taught me that it's really important to be flexible and see the big picture, not just your small piece of it," said Peedikayil, who worked on the layout of the solar panels and the rechargeable batteries. "Every little component in the satellite is important and can affect the performance of other components. You have to think about all the other people and their pieces when you make a decision."

"When you think about it, it's really pretty amazing that we are sending a satellite into space," Peedikayil said. "Even if I don't go to work in the aerospace industry and never work on another satellite, something I helped build actually went into space."

—Story by James E. Kloeppel,
courtesy of University News Bureau

Texas, where he is the lead in short takeoff/vertical landing (STOVL) aerodynamics in the Joint Strike Fighter (JSF) program. He is a member of the AIAA V/STOL Aircraft System Technical Committee.

Roy Richter, '86, is a structural designer at Cessna Aircraft Company in Wichita, Kansas. Previously, he worked at McDonnell Douglas and Lear. Of his Illini days, Richter remembers taking several courses from John Prussing and a senior aircraft design course from Ken Sivier.

Greg Mayer, '87, is a patent attorney and partner with Marshall, Gerstein & Borun in Chicago. He graduated with a law degree from the University of Chicago. After graduating from AAE, he earned a master's in aero and astro engineering from Stanford and worked two years at McDonnell Douglas in the strength department.

Joe Santos, '87, is head of technology for the Chicago Aviation Authority at O'Hare Airport. His job is to improve efficiencies and reduce delays at the airport.

Mike Grable, '88, MS '90, worked on the Iridium project for Lockheed Martin (California) and Motorola (Arizona) as the technical lead for orbital analysis software to control the constellation. He is now with Motorola in the Chicago area.

Daniel Jensen, '88, is Manager-Mechanical Design at Rolls-Royce in Indianapolis. He writes that he was the deputy technical chair for the 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, which Indianapolis hosted in July 2002. Jensen was also nominated by Rolls-Royce to join the Air Breathing Propulsion Technical Committee of the American Institute of Aeronautics and Astronautics.

Jeffrey Osman, '88, and Janice Kryger were married on September 2, 2001, in Chicago. Osman is a pilot with American Airlines and a lieutenant commander in the Naval Reserves. The couple resides in Chicago.

Mike Huff, '89, is a lieutenant commander in the U.S. Navy. He served on the aircraft carrier *Kitty Hawk* during the Persian Gulf War and has also served on the *Nimitz*.

1990s

Jeff Elbel, '90, MS '93, works as a senior orbital analyst for PanAmSat Corporation in Long Beach, California. Outside of work, Elbel continues to record and perform music. His group, Ping, toured this summer in support of its *No Outlet* album, a benefit project to support Habitat for Humanity. The band's next single will appear on a various-artists album from Andy's Angels Records, in support of cystic fibrosis research.

Eugene Wagner, '90, is a graduate of the U.S. Air Force Test Pilot School at Edwards Air Force Base in Rosamond, California. He has served in the military

for 11 years. Wagner earned a master's degree in 2001 from the Air Force Institute of Technology in Dayton, Ohio.

Justin Berman, '91, MS '93, PhD '01, is chief of the Applied and Military Engineering Branch with the U.S. Army Engineer Research and Development Center. He works out of the center's Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire. Berman will oversee a research program that involves military engineering on topics such as winter mobility. Previously, he worked as a project leader with the Advanced Durable Material Systems program at CERL (Construction Engineering Research Lab) in Champaign.

Michael Swartwout, '91, MS '92, is an assistant professor of mechanical engineering at Washington University in St. Louis. His research interests include microsatellite missions and solar sail applications.

Paul Werstler, '92, is an engineer with Kastalon, Inc. of Alsip, Illinois. He returned to campus in May 2002 on a recruiting trip. Kastalon makes polyurethane products for industrial applications.

David Ziegler, '93, currently works as the engineer for Gurnee Village, a Chicago suburb. Ziegler was Gurnee's assistant engineer when he was appointed by the mayor to replace the village's chief engineer. He became a civil engineer in Effingham before moving to Gurnee in 2000.

Mike Misiora, '94, based at NASA's Johnson Space Center, is attached to the Cargo Integration and Operations Group, where he is training to be a flight controller in the main control room for the International Space Station. He previously worked as a flight controller for one of the computer networks on the Space Station. Off duty, Misiora and his Australian shepherd dog Summer have been training to become a certified search team specializing in disaster searches. He and his dog also compete in canine Frisbee.

Josh Hopkins, '96, and his wife, Amy Hamilton Hopkins, are new parents. Alexander Dean was born March 8, 2001, in Littleton, Colorado. He weighed 9 lb 2 oz. Hopkins works for Lockheed Martin in a development program to find a replacement for the Space Shuttle. He previously worked in the company's Athena space launch system.

Blair Bromley, MS '98, is a postdoctoral research associate in the Energy Sciences and Technology Department at Brookhaven National Laboratory in Upton, New York. He received his doctorate in nuclear engineering from the University of Illinois in 2001. He is married to fellow UI alumna Jennifer Lai.

Pong Lee, '99, completed his master's degree in aeronautics and astronautics at the Massachusetts Institute of Technology in June 2001.

FACULTY NEWS

Lawrence Bergman, Bruce Conway, and John Prussing were nominated by their students to the Incomplete List of Teachers Ranked as Excellent for fall 2001. Recipients from AAE on the list for spring 2002 included John Buckmaster, Conway, Philippe Geubelle, John Lambros, Eric Loth, and Prussing.

John Buckmaster has received the AIAA Propellants and Combustion Award for 2002. The award was presented to him in Indianapolis on July 10 at the 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference. Buckmaster was honored for "outstanding theoretical contributions to the physical understanding of fluid mechanics in combustion processes ranging from detonation physics to propellants." Said AAE Department Head Mike Bragg, "This national award is particularly impressive as it is voted on by John's peers in the field."

Bruce Conway received the 2002 Teacher of the Year award from the student chapter of AIAA at the department's annual awards ceremony, held on April 25 at the Illini Union.

Victoria Coverstone ('85, MS '86, PhD '92) was one of 84 engineers chosen to participate in the National Academy of Engineering's 8th annual Frontiers of Engineering symposium. Fellow engineers or organizations nominated the participants, who were selected from industry, academia, and government. The symposium brought together young engineers age 30 to 45 who are performing leading-edge engineering research and technical work. The event was held September 19-21 at the National Academies' Arnold and Mabel Beckman Center in Irvine, California.

Coverstone was also recognized this August, when she became an Associate Fellow of the American Institute of Astronautics and Astronautics (AIAA). Associate fellows are selected and approved by committee, through peer review.

Emilio Frazzoli has received a Faculty Early Career Development (CAREER) Award from the National Science Foundation. He will receive \$300,000 over five years to work on his project, high-confidence software for embedded aerospace systems. The CAREER program is a Foundation-wide activity that offers the NSF's most prestigious awards for new faculty. The program recognizes and supports the early career development activities of those faculty members who are most likely to become the academic leaders of the 21st century.

Harry Hilton's paper, "Failure probability and survival time analysis for dynamic creep buckling of viscoelastic columns," was selected for best-paper award in structures/solid mechanics. He presented the paper at the 27th Dayton-Cincinnati AIAA Aerospace Science Symposium in March 2002.

Congratulations are in order for **Eric Loth** and **Scott White**, who have been promoted to full professor.

Natasha Neogi joined the AAE Department in August 2002. The assistant professor received her doctorate from MIT in 2001. (See related story in this issue.)

John Prussing was awarded the 2002 AIAA Mechanics and Control of Flight Award, recognizing him for his contributions to the theory and computation of optimal spacecraft trajectories. He was presented with the award at the AIAA Guidance, Navigation, and Control Conference in Monterey, California, on August 6. Graduate students **Jennifer Hargens** ('97, MS '01) and **Aaron Trask** ('98, MS '00) also attended the conference, as did faculty member Victoria Coverstone, who organized and chaired an eight-paper session, Optimized Trajectory Design, in which Prussing, Hargens, and Trask presented papers.

AAE alumni in attendance were **Daryl Boden** (PhD '86) of the U.S. Naval Academy, **Bob Cesarone** (MS '77) of the Jet Propulsion Laboratory, **Chris D'Souza** ('83, MS '84) of the C.S. Draper Laboratory, **Bob Farquhar** ('59) of the Johns Hopkins Applied Physics Laboratory, **Alan Hope** ('89, MS '91) of the Naval Research Laboratory, **Jinho Kim** (PhD '91) of Swales Aerospace, **Ron Lisowski** (PhD '84) of the U.S. Air Force Academy, **Der-Ren Taur** (PhD '89) of the Chung Shan Institute of Science and Technology, **Steve Tragesser** ('92) of the Air Force Institute of Technology, and **Geno Wagner** ('90) of Edwards Air Force Base.

Michael Selig ('84) was honored with the 2002 Wind Energy Academic Award for his work in advancing wind energy technology. The award was presented to him at a June 4 banquet during the American Wind Energy Association's (AWEA) conference and exhibition in Portland, Oregon. Selig's research in wind energy has focused on developing methods and software for aerodynamic design and analysis of wind turbine rotors and airfoils. Formed in 1974, the AWEA is a national trade association of the U.S. wind energy industry. Its membership includes turbine manufacturers, wind project developers, utilities, academicians, and interested individuals.

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UD01

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We gratefully acknowledge the continued support from our alumni and alumnae, other individuals, and corporations toward the work of the Department of Aeronautical and Astronautical Engineering. If we have made an error in reporting, please let us know, and we will correct the oversight in our next newsletter.

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AAE alumni/alumnae, we'd like to feature you in Class Notes! Share news and announcements about your job or life. Send slides, color or black-and-white pictures, or digital pictures. (Send electronic files on a floppy or 100 Mb zip disk in TIFF format with a

resolution of 300 pixels or more.) Mail, fax, or email your news to: Alison Weingartner, Editor, AAE Alumni Newsletter; 306 Talbot Lab; 104 South Wright Street; Urbana, IL 61801, USA; fax: 217-244-0720; email: wengrtnr@uiuc.edu.

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GREETINGS FROM THE PRESIDENT OF THE AAE ADVISORY BOARD

I would like to thank all the alumni for their generous contributions to the department for 2002. Alumni contributions allow the department to improve its equipment, facilities, and programs. These improvements help the department grow and increase its academic stature.

The AAE Advisory Board received several student appeals at the fall 2002 board meeting for financial and material aid for the national student competitions in which they are participating. The students work on these projects outside their required coursework, integrating their classroom knowledge with hands-on design experience. The AAE Department and the College of Engineering provide some funding, materials, and laboratory space for these projects; however, the students must use innovative and expensive new technologies to be competitive. If you are interested in helping provide materials or financial support for one or more of the student projects, please contact Diane Jeffers for more information.

The advisory board supports the department's initiative in hiring new faculty, whose expertise will provide an added dimension in new areas of aerospace engineering (*see related story on Natasha Neogi*). We encourage alumni to check out the many exciting projects occurring in AAE; perhaps you'll find a connection to be explored.



—David R. Riley '77



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