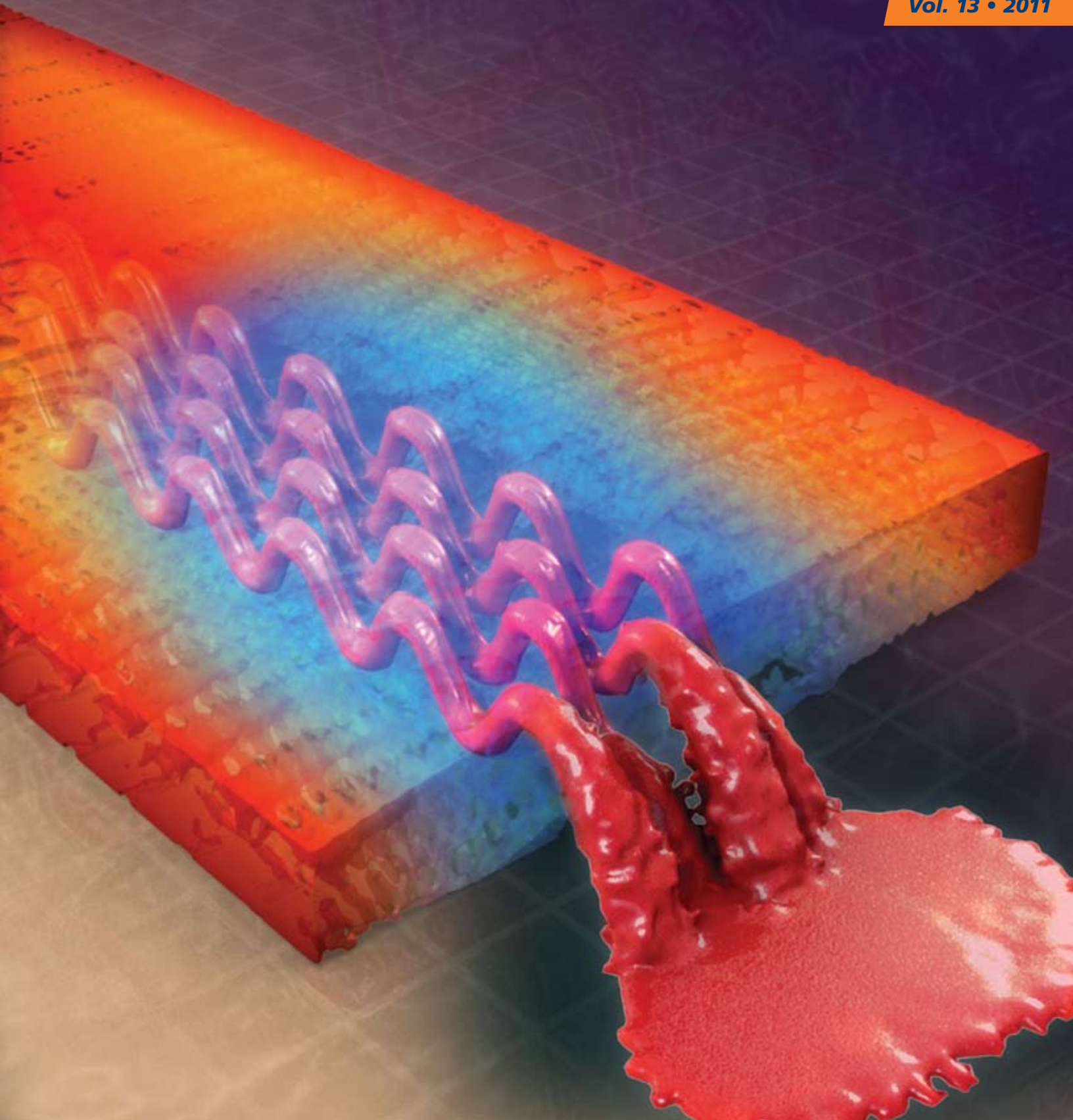


AE Illinois



*Newsletter of the Department of Aerospace Engineering
University of Illinois at Urbana-Champaign*

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Department Head's Remarks

Welcome to the 2011 Alumni Newsletter of Aerospace Engineering at Illinois. As the new Interim Head of the Aerospace Engineering Department, I would like to start this letter by thanking Prof. Craig Dutton, who recently stepped down after four years at the helm. During his tenure, AE has flourished despite a difficult financial environment. Professor Dutton leaves the department in excellent condition both academically and financially. Under his leadership, AE undertook important revisions to its undergraduate and MS curricula. Now fully in place, the new undergraduate curriculum continues to emphasize fundamental aerospace disciplines while introducing new ones such as aerospace information technology, and provides additional flexibility to the students.

The graduate enrollment has seen a dramatic (40%) increase at both MS and PhD levels over the past few years. An important component of the revised MS program is the new Aerospace Systems Engineering option offered for the first time this year. Prof. Steve D'Urso leads this new option, one of the very few around the country to focus on aerospace-specific systems engineering. Professor D'Urso recently joined our department after a very successful career in the aerospace industry. His tremendous experience in aerospace systems engineering is a major asset to this new program. More information about this exciting new program can be found on p. 16.

We are also happy to have Dr. Huck Beng Chew join our department. Huck Beng's expertise in multiscale modeling of complex materials, from atomistic to continuum, fills an important gap in our structures

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The new undergraduate curriculum continues to emphasize fundamental aerospace disciplines while introducing new ones such as aerospace information technology, and provides additional flexibility to the students.

and materials group, as modern research in these areas explores phenomena at increasingly smaller scales. I invite you to find out more about Huck Beng's background and research activities on p. 12. AE continues to grow, and this year, the department plans to fill two additional open rank faculty positions in the areas of computational fluid mechanics and space systems.

Remarkable achievements of our faculty members, students and alumni over the past year are described in this newsletter. Included among the many accomplishments and awards are Prof. Joanna Austin's recent promotion to Associate Professor (p. 5), and Prof. Jonathan Freund's and Prof. Petros Voulgaris's elections as APS and IEEE Fellows, respectively (pgs. 11 and 12). Under the supervision of Prof. Soon-Jo Chung, a team of AE seniors won the AIAA Space Design Competition with their innovative space debris removal system design (p. 28). Dr. Robert Liebeck, BS 61, MS 62, PhD 68, was recently inducted to the College of Engineering at Illinois Hall of Fame and delivered the Dean's Distinguished Leadership Lecture (p. 32).

I invite you to read about these and many other outstanding developments detailed in this newsletter. We look forward to your comments. Our contact information can be found on the department's web site at www.ae.illinois.edu.

Sincerely,

Philippe H. Geubelle
Bliss Professor and Interim Head

On the cover: Image by Piyush Thakre, Alex Jerez, Ryan Durdle and Jeremy Miller, Beckman Institute, University of Illinois. "A vascularized fiber-reinforced composite material. Illinois researchers developed a class of sacrificial fibers that degrade after composite fabrication, leaving hollow vascular tunnels that can transport liquids or gases through the composite."

Department of Aerospace Engineering

Tenured/Tenure Track Faculty

Joanna M. Austin
Lawrence A. Bergman
Daniel J. Bodony
Michael B. Bragg
Timothy W. Bretl
Ioannis Chasiotis
Huck Beng Chew
Soon-Jo Chung
Bruce A. Conway
Victoria L. Coverstone
J. Craig Dutton
Gregory S. Elliott
Jonathan B. Freund
Philippe H. Geubelle
John Lambros
Cedric Langbort
Eric Loth
N. Sri Namachchivaya
Michael S. Selig
Petros G. Voulgaris
Scott R. White

Emeritus Faculty

John D. Buckmaster
Rodney L. Burton
Harry H. Hilton
Ki D. Lee
Allen Ormsbee
John E. Prussing
Kenneth R. Sivier
Wayne C. Solomon
Shee Mang Yen

Affiliate/Adjunct Faculty

Kenneth T. Christensen
Steven J. D'Urso
Naira Hovakimyan
Thomas L. Jackson
Arif Masud
George H. Miley
James W. Phillips
Srinivasa M. Salapaka
Nancy R. Sottos
Alexander Vakakis

Administrative Staff

Dustin Burns
Brett Clifton
David Farrow
David Foley
Joel Franzen
Diane Jeffers
Barbara Kirts
Kendra Lindsey
Steve Mathine
Greg Milner
Susan Mumm
Staci Tankersley
Shared Services
Lori Rairden
Paul Redman

AE Faculty Listed As Excellent

AE faculty recently included on the List of Teachers Rated as Excellent by Their Students have been: Spring 2011, Assistant Prof. Daniel J. Bodony, Prof. Michael B. Bragg, Prof. Bruce A. Conway, Prof. J. Craig Dutton; Prof. Gregory S. Elliott; Prof. Jonathan B. Freund; Fall 2010, Bodony, Conway, Elliott, Prof. John Lambros; Spring 2010, Bodony, Assistant Prof. Timothy W. Bretl, Conway, Prof. Victoria L. Coverstone, Freund, Prof. Philippe H. Geubelle; Emeritus Prof. Harry H. Hilton; Lambros, and Emeritus Prof. John E. Prussing.

Geubelle Named Bliss Professor



Geubelle

The Bliss bequest, established by Helen Eva Bliss in memory of her father, Abel Bliss, Jr., is used to advance scholarly activities in the College of Engineering.

AE Prof. and Interim Department Head Philippe H. Geubelle has been named one of six Bliss Professors in the College of Engineering at Illinois. An official investiture is slated for Nov. 11, 2011.

“Chairs and named professorships recognize faculty members who have demonstrated leadership in their technical areas and contribute significantly to the reputation of the College and the University,” explained Engineering Dean Ilesanmi Adesida. “We offer our congratulations to these new Bliss Professors of Engineering and we commend them for their many achievements in engineering education and research.”

Geubelle holds joint appointments in the Mechanical Science and Engineering, and Civil and Environmental Engineering departments. He is also affiliated with the Beckman Institute of Advanced Science and Technology, and with the National Center for Supercomputing Applications. For the past 6 years, he has been serving as Director of the Illinois Space Grant Consortium, a NASA-sponsored higher-education program involving a variety of institutions across the State of Illinois. Prior to becoming interim Department Head in October 2011, Geubelle had been AE Associate Department Head, overseeing the graduate programs.

Geubelle has distinguished himself nationally and internationally as an engineer and educator in computational mechanics. His research interests pertain to the theoretical and numerical treatment of complex problems in solid mechanics, and, in particular, of fracture mechanics, multiscale modeling of heterogeneous, granular and layered materials, composite manufacturing processes and computational design of novel biomimetic materials. Other research activities involve computational aeroelasticity and parallel programming. His current research activities are supported by the Boeing Company, AFOSR, AFRL, ARO, NSF and the Industrial Research Institute. An important aspect of his research activities is his close collaboration with experimentalists, as the enhanced understanding of the physical phenomena that he gains through those interactions informs the concepts and approaches that he applies to the analytical methods in his research.

A (co-)author of about 90 peer-reviewed papers and 40 conference papers, Geubelle received the 2007

Best Paper of the Year Award from the Materials Division of the American Society of Mechanical Engineers (ASME). In 2009, he was elected ASME Fellow. Over his fifteen-year career at the University of Illinois, he has received various departmental and college award for excellence in research, teaching and advising.

Originally from Belgium, Geubelle earned his bachelor's degree in mechanical engineering in 1988 from the Catholic University of Louvain, and his master's degree and Ph.D. in aeronautics from the California Institute of Technology in 1989 and 1993, respectively. After a postdoc at Harvard University, he joined the University of Illinois in 1995.

The Bliss bequest, established by Helen Eva Bliss in memory of her father, Abel Bliss, Jr., is used to advance scholarly activities in the College of Engineering. Upon the College Advisory Committee on Endowed Appointments' recommendation and the Provost's approval, the Dean nominates holders of college professorships. Faculty members with named professorships are bestowed to recognize leaders who are among the most talented and accomplished on the College's faculty.

Helen Eva Bliss graduated from the University of Illinois in 1911 with a degree in Liberal Arts and Sciences. Early in her career, she taught engineering at a Shreveport, Louisiana, high school, and later did clerical work with the Bureau of Aircraft Production in Washington, D.C. From 1936 until her retirement in 1962, she worked for the Washington law firm of Ivins, Phillips & Barker as an executive secretary.

Her father, Abel Bliss Jr., entered the University in 1872 to study civil engineering, but was forced to leave the University before completing his degree. In June of 1874, the University granted him a partial certificate in civil engineering. His business ventures included agriculture and real estate, and by 1929, he was a partner in the land development and oil production company of Bliss & Wetherbee. Mr. Bliss died in the mid-1930s.

A portion of the Bliss bequest went to support the Grainger Engineering Library and Information Center Endowment as well as other projects for “advancing the scholastic activities of the School of Engineering.”

College Honors Austin with Xerox Award for Faculty Research

Joanna M. Austin was among eight College of Engineering faculty members recognized in Spring 2011 with the Xerox Awards for Faculty Research. Established by the Xerox Foundation, four awards are given to assistant professors for their research productivity and impact during the last academic year.

Austin was promoted to Associate Professor in August.

Austin is conducting research focused on fundamental problems in fluid mechanics, particularly in reacting, compressible flows that occur in a broad range of applications: hypervelocity planetary entry, shock-driven bubble collapse, detonation and supersonic combustion, and high speed flow phenomena in geological applications such as explosive volcanic eruptions.

Her research is predominantly experimental, combined with analytical modeling. Upon her arrival at Illinois in 2003, she established the Compressible Fluid Mechanics (CFM) laboratory, and with the support of the Air Force Office of Scientific Research, built the Hypervelocity Expansion Tube (HET) facility. This

facility uses a novel method of gas acceleration to produce a minimally contaminated free-stream representative of planetary entry conditions for ground-based testing.

Austin has conducted a number of fundamental studies using the HET and other facilities in the CFM lab and has been published widely in such journals as *Physics of Fluids*, *Progress in Aerospace Sciences*, *Journal of Fluid Mechanics*, *Journal of Geophysical Research*, and *AIAA Journal*. The depth and innovation of her research has led to funding by AFOSR, the U.S. Department of Energy, the National Aeronautics and Space Administration, the National Science Foundation, and industries such as Gulfstream and Rolls-Royce.

Her honors and awards include the Richard Bruce Chapman Memorial Award for distinguished research in hydrodynamics in the Engineering and Applied Sciences Division at Caltech, the Young Investigator Program Award from AFOSR, Best Paper Award from the American Institute of Aeronautics and Astronautics Fluid Dynamics Technical Committee, and an NSF Career Award.



Austin

Conway Chosen for Campus Graduate and Professional Teaching Award

The consummate teacher, AE Prof. Bruce A. Conway has once again been recognized for his talents, this time with the 2011 Campus Graduate and Professional Teaching Award from the Office of the Provost.

Conway, a 30-year veteran of the AE Department, was one of only two faculty members from across the Urbana campus selected for this award, presented April 26 during the Celebration for Teaching Excellence. He and Roy Axford, professor of Nuclear, Plasma, and Radiological Engineering, are this year's awardees, and both are the first Illinois faculty members to have received the campus's highest honors for both undergraduate and graduate teaching.

Criteria including sustained excellence, positive impact and innovative approaches to graduate or professional teaching were considered in choosing the winners. There's plenty of evidence why Conway fits these criteria:

- Conway's Instructor and Course Evaluation System (ICES) scores have placed him on the List of Teachers Ranked as Excellent 57 times in his career, 26 times for graduate courses.
- He's been honored with every College of Engineering teaching award available, as well as the 2007 Campus Award for Excellence in Undergraduate Teaching. He was a finalist for that award as early as 1990.

continued on next page



Conway

- Conway blends fundamental mathematics with recent numerical methods, some he and his graduate students have developed.
- He's coauthored a textbook, *Orbital Mechanics*, used in his own courses and at several major universities, and he recently edited *Spacecraft Trajectory Optimization*, to be used in future courses.
- Conway has incorporated the MATLAB software into his courses, allowing students to do sophisticated numerical simulations of astrodynamics problems similar to those done in industry.

Former AE Department Head Craig Dutton offered these congratulations upon the presentation of the award: "As teachers, our greatest satisfaction, and most humbling realization, is knowing that the lessons we share have the potential to grow exponentially. They can spread not only in distance, around the world, but in time, across generations. Professor Conway teaches about a person's desire to reach far beyond our own planet. Like his subject matter, his lessons span great distances and will last for generations."

Chasiotis Chosen for Frontiers of Engineering Symposium



Chasiotis

AE Associate Prof. Ioannis Chasiotis was among 85 of the nation's brightest young engineers selected to take part in the National Academy of Engineering's (NAE) 17th Annual U.S. Frontiers of Engineering Symposium.

The event was held September 19–21 at Google headquarters in Mountain View, California, and examined additive manufacturing, engineering sustainable buildings, neuroprosthetics, and semantic processing.

Participating engineers were of ages 30 to 45, and have performed exceptional research and technical work in industry, academia, and government. Approximately 315 engineers were nominated.

"The young engineering innovators of today are solving the grand challenges that face us in the coming century," said NAE President Charles M. Vest. "We are proud that our Frontiers of Engineering program brings this diverse group of people together and gives them an opportunity to share and showcase their work."

Chasiotis, who concentrates on experimental mechanics at the nanoscale, has been widely recognized for his work over the last several years. Most recently, the Society for Experimental Mechanics awarded Chasiotis and collaborators, including AE

Prof. John Lambros, the M. Hetényi Award for the Best Research Paper published in 2010 in SEM's journal, *Experimental Mechanics* (see story on page 13).

Chasiotis was one of only 100 young researchers in the nation honored in a ceremony at the White House when he was presented a 2008 National Science Foundation (NSF) Presidential Early Career Award for Scientists and Engineers (PECASE).

He delivered SEM's 2011 *Journal of Strain Analysis* Young Investigator Lecture in June, making him only the third person so honored. In October 2010, he received the Society of Engineering Science, Young Investigator Medal.

A Donald Biggar Willett Scholar in the College of Engineering, Chasiotis has received several other honors including the Office of Naval Research Young Investigator Award, the NSF Faculty Early Career Development (CAREER) Award, College of Engineering Xerox Awards for Faculty Research, and two First Prizes in the Sandia MEMS Design Competition.

His research interests focus on MicroElectro-Mechanical Systems (MEMS), nanostructured composite materials, mechanical behavior of polymeric and ceramic nanofibers and metal nanowires and the application of atomic force microscopy in experimental mechanics.

Physics of Fluids Features Airlines' Noise Reduction Research

An effort of AE researchers to reduce the noise created by commercial airliners has been featured on the *Physics of Fluids* website, <http://pof.aip.org/>.

AE Assistant Prof. Daniel J. Bodony explained that airframe and engine manufacturers are coming under increasing pressure to reduce airliner noise. Bodony's collaborative work with AE Prof. Jonathan B. Freund to control high-speed engine exhaust shows promise in reducing an aircraft's acoustic footprint without compromising performance.

Bodony and Freund have teamed with recent graduate Randall R. Kleinman, MS 04 (*Theoretical and Applied Mechanics*), PhD 10 (*TAM*), on the project that the National Aeronautics and Space Administration's NRA Supersonics Program is funding. Kleinman now is working at Boston Scientific in the Cardiology, Rhythm, and Vascular group in St. Paul, Minnesota.

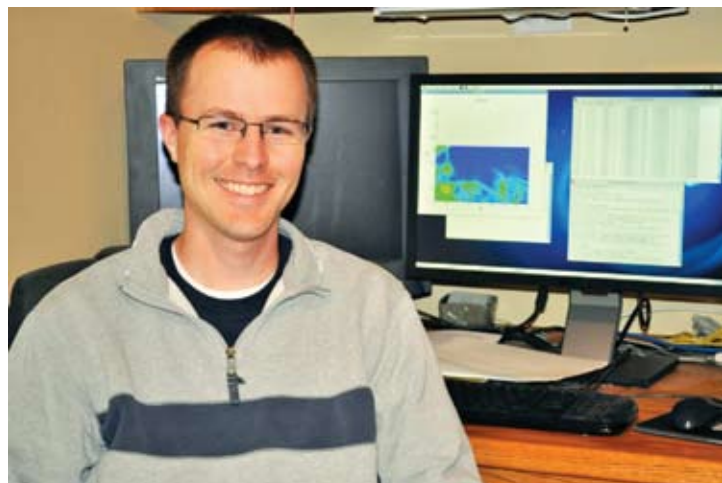
The researchers used large-scale simulations of the compressible Navier-Stokes equations to examine how a plasma-based actuator can control the jet exhaust very close to the nozzle exit. They believe noise can be reduced up to 30 percent by strategically modifying the engine exhaust in the boundary layer near the nozzle exit. Their findings show that careful tailoring of the actuator details can enhance effective control, pointing to future paths for increased noise reduction via an optimization strategy.



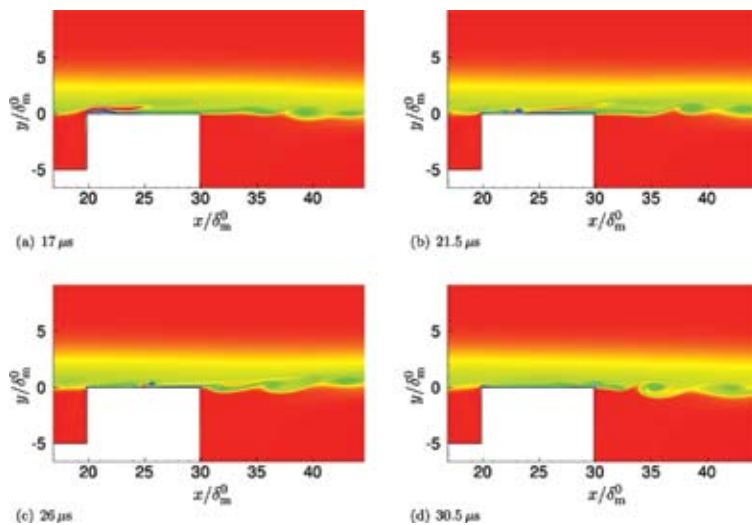
Bodony



Freund



Kleinman



Contours of vorticity, which measures the fluid's rate of rotation, visualize a plasma actuation sequence over a 13.5 microsecond window for a Mach 1.3 boundary layer moving left-to-right. The peak temperature in the cavity at left reaches 1500 Kelvin due to the actuator.



White



Sottos



Braun



Moore

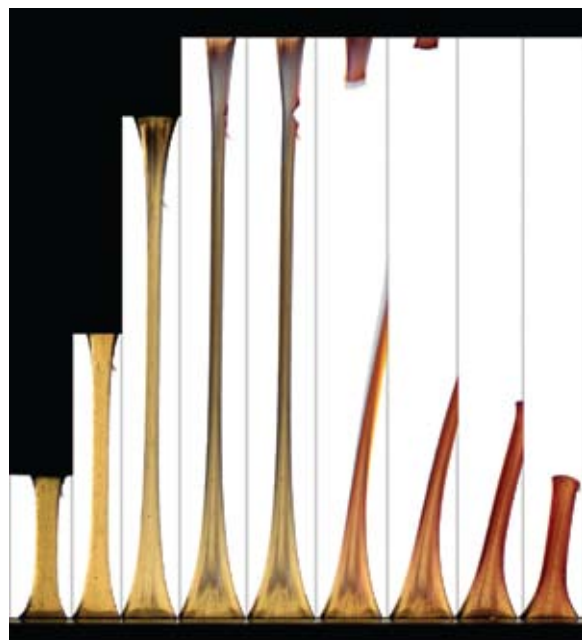
Mechanophores Makes Popular Mechanics' Top Ten

"Mechanophores"—polymers that change colors when under stress—were among the top ten concepts *Popular Mechanics'* website says you'll need to know for 2011.

The concept originated from the Autonomous Materials Systems Research group of AE Prof. Scott White and his collaborators.

According to the website, <http://www.popularmechanics.com/technology/engineering/news/10-tech-concepts-you-need-to-know-for-2011-2>, "America's infrastructure needs renewal, but we can't just rebuild everything at once: We need effective ways to figure out which structures are closest to failure. One approach is to integrate tiny wireless sensors into new construction. Another is to incorporate "mechanophores," a class of materials recently developed at the University of Illinois that change color when they are stressed. Mechanophores could give an engineer a quick visual indication of whether a bridge is at risk and where the trouble lies. The researchers are currently working to tune the reaction so that it can occur at any desired level of stress. They also hope to develop new mechanophores that undergo a self-healing response when they are damaged."

White conducts the research with AE affiliate Nancy Sottos, a materials science professor, Jeffrey Moore, a chemistry professor, and Paul Braun of materials science.



Mechanically-active molecules in polymer materials, mechanophores undergo specific chemical reactions when pushed or pulled with a certain force. In critical material systems, such as polymers used in aircraft components, self-sensing and self-reinforcing capabilities could be used to report damage and warn of potential component failure, slow the spread of damage to extend a material's lifetime, or even repair damage in early stages to avoid catastrophic failure.

White Addresses AAAS on Self-Healing Prospects for Lithium Ion Batteries

AE Prof. Scott R. White addressed fellow scientists in February 2011 in Washington, D.C., during a major meeting to consider solutions to electrical energy storage challenges, particularly in batteries.

White was invited to speak about his group's research at the annual meeting of the American Association for the Advancement of Science (AAAS) as part of the *Pillars, Polymers, and Computers: Creative Approaches to Electrical Energy Storage* program. White's talk was titled *Enabling Concepts for Safe, Self-Healing Lithium Ion Batteries*.

White and Profs. Nancy R. Sottos and Jeffrey S. Moore, colleagues in Beckman Institute's Autonomous Materials Systems group, have pioneered many advances in self-healing materials. They now are applying self-healing concepts to electrical energy storage issues with funding from the Department of Energy's Center for Electrical Energy Storage (CEES) effort.

continued on page 10

Vascular Composites Enable Dynamic Structural Materials

WRITTEN BY LIZ AHLBERG, UI NEWS BUREAU

CHAMPAIGN, Ill.—Taking their cue from biological circulatory systems, University of Illinois researchers have developed vascularized structural composites, creating materials that are lightweight and strong with potential for self-healing, self-cooling, metamaterials and more.

“We can make a material now that’s truly multifunctional by simply circulating fluids that do different things within the same material system,” said Scott White, the Willet Professor of aerospace engineering who led the group. “We have a vascularized structural material that can do almost anything.”

Composite materials are a combination of two or more materials that harness the properties of both. Composites are valued as structural materials because they can be lightweight and strong. Many composites are fiber-reinforced, made of a network of woven fibers embedded in resin—for example, graphite, fiberglass or Kevlar.

The Illinois team, part of the Autonomous Materials Systems Laboratory in the Beckman Institute for Advanced Science and Technology, developed a method of making fiber-reinforced composites with tiny channels for liquid or gas transport. The channels could wind through the material in one long line or branch out to form a network of capillaries, much like the vascular network in a tree.

“Trees are incredible structural materials, but they’re dynamic too,” said co-author Jeffrey Moore, the Murchison-Mallory professor of chemistry

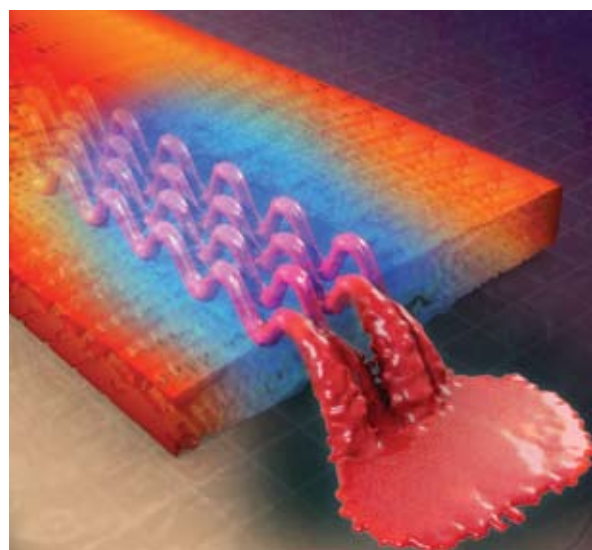


Image by Piyush Thakre, Alex Jerez, Ryan Durdle and Jeremy Miller, Beckman Institute, U of I. ‘A vascularized fiber-reinforced composite material. Illinois researchers developed a class of sacrificial fibers that degrade after composite fabrication, leaving hollow vascular tunnels that can transport liquids or gases through the composite.’

and a professor of materials science and engineering. “They can pump fluids, transfer mass and energy from the roots to the leaves. This is the first step to making synthetic materials that have that kind of functionality.”

The key to the method, published in the journal *Advanced Materials*, is the use of sacrificial fibers.



From left, Nancy Sottos, professor, Materials Science and Engineering; Scott White, professor, Aerospace Engineering; and Jeffrey Moore, Chemistry.

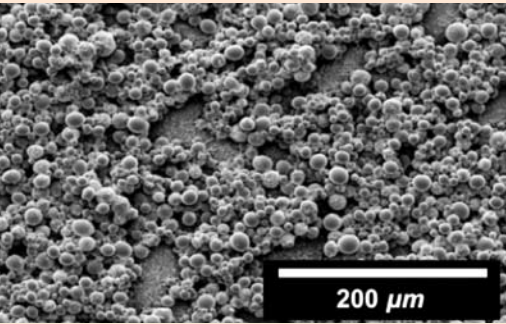
The team treated commercially available fibers so that they would degrade at high temperatures. The sacrificial fibers are no different from normal fibers during weaving and composite fabrication. But when the temperature is raised further, the treated fibers vaporize—leaving tiny channels in their place—without affecting the structural composite material itself.

“There have been vascular materials fabricated previously, including things that we’ve done, but this paper demonstrated that you can approach the manufacturing with a concept that is vastly superior in terms of scalability and commercial viability,” White said.

In the paper, the researchers demonstrate four classes of application by circulating different fluids through a vascular composite: temperature regulation, chemistry, conductivity and electromagnetism. They regulate temperature by circulating coolant or a hot fluid. To demonstrate a chemical reaction, they injected chemicals into different vascular branches that merged, mixing the chemicals to produce a luminescent reaction. They made the structure electrically active by

continued on page 11

White Addresses AAAS, continued from page 8



Electron microscope image of self-healing polymers.

“Energy storage is one of the key technical challenges for the future, especially for electric vehicles,” White said. “Batteries have been, and remain, the most versatile and widely used technology in response to this technical challenge. Future electric and hybrid vehicles require tremendous scientific and engineering advancements in terms of energy density, charging rates, and service life compared to the current state of art.”

“Inspired by biological systems that routinely accomplish self-healing, thermal regulation, regeneration, and other autonomic responses, we believe that new materials and concepts integrated within the battery cell can enable a variety of critical features including fail-safe or autonomic shutdown, self-healing of battery performance, and greatly extended lifetimes.”

Previous work by the researchers involving autonomic healing polymers produced self-healing coatings, used for commercial applications such as paint, that automatically repair cracks and other failures using microencapsulated agents. The researchers will consider lessons learned from their past work and apply them to new developments in batteries.

“We had to come up with completely new triggering mechanisms and materials that are used in self-healing,” White said. “That is all quite new stuff, but the concepts flow from what we’ve demonstrated before in other materials systems. We are early on in the process and one of the first things that we did was basically to play around with lots of different approaches and different materials systems just to get an idea of what *might* work down the road.”

With White, Sottos, an AE affiliate and Material Sciences and Engineering professor, and Moore, a Chemistry professor, are experimenting with different microencapsulated systems to test their effectiveness at restoring conductivity and enhancing safety. The microencapsulated system works when stress induced by mechanical, chemical, or thermal factors rupture the capsules, releasing a healing agent. The researchers have demonstrated conductivity restoration in systems using encapsulated carbon nanotubes, silver binders, graphite particles, and liquid metal.

The liquid metal method has shown the most promise. The core of the egg-like liquid metal microcapsules is a liquid gallium-indium alloy. White said the method has demonstrated conductivity restoration within 40 microseconds of capsule rupture.

“It is almost immediate. We get 100 percent restoration of conductivity in a few microseconds,” he said. “This kind of performance that we see *far* outshines anything that we’ve tried before. It looks incredibly good right now.”

The microcapsule technology has another advantage for manufacturing purposes: it can be integrated into existing technologies. “Another aspect of taking what we’ve done in the past and applying it here is making capsules over multiple length scales,” White said. “We can make them small enough to integrate with current battery designs so that it’s a seamless addition.”

The group is also dedicated to creating safer battery technology. This includes creating a method for applying self-healing coatings to the anode/separator/cathode elements of the electrochemical cell so a battery shuts down when overheated, work that is performed by AE graduate student Marta Baginska.

“We either coat the anode or the separator with *solid* microcapsules, which in this case are polyethylene and we do that through a process called spin-coating,” White said. “If you make a battery this way with our capsules integrated, you get the same kind of charge density cycling performance that you would see normally.”

“What happens is that under a thermal cycle, if we heat it up to a critical point where it melts, then it coats the entire surface and the capacity of the battery drops to zero. It won’t conduct ions through that layer anymore, so the battery shuts down.”

White said most of the work in the research line is focused toward increasing the performance of energy storage devices so hybrid and electric vehicles will become a common sight on roadways.

“The DOE is particularly challenging the centers that they have set up to do the necessary science and innovation to allow electric vehicles to become a reality,” he said. “We are challenged to improve energy storage to the level you need in order to have fully electric vehicles. Not only cars, but buses, airplanes, all kinds of things.”

White expects the technology to be applicable to other energy storage systems besides lithium ion batteries.

“The fundamental technology that we are developing works for lithium and will work for other battery systems as well,” he said. “Batteries of the future are going to be ones that adapt to their environment and have some kind of higher-level function to them.”

Freund Elected as APS Fellow

AE Prof. Jonathan B. Freund has been elected as a Fellow of the American Physical Society.

Freund has been cited for “his pioneering and incisive numerical simulation studies of atomic-scale and biological flows, free shear flow turbulence, and jet aeroacoustics.”

His group investigates mechanical phenomena in a range of systems. Current and recent research activities include:

- jet noise control
- simulation and analysis of aeroacoustic resonances in jet engine test cells
- tissue injury during shock-wave lithotripsy
- the dynamics of atomically thin liquid films
- the flow of large numbers of blood cells in the microcirculation
- simulation of advanced solid rocket motors
- thermal transport at crystal lattice boundaries
- self-healing hydrodynamics in autonomic composites
- and ion machining of semiconductor materials

Most of the group’s investigations utilize advanced computer simulations tools coupled with detailed analysis. Freund and his colleagues design many of the simulations tools they use.

On faculty in the College of Engineering at Illinois since 2001, Freund has a joint appointment in AE and Mechanical Sciences and Engineering. He also is a Computer Science Department affiliate and a part-time faculty member of the Beckman Institute.

Before coming to Illinois, Freund was an assistant professor at the University of California, Los Angeles. He earned three degrees in mechanical engineering from Stanford University: a bachelor’s in 1991, a master’s in 1992 and a PhD in 1998.

Freund’s other honors and awards include:

- Kritzer Faculty Scholar, 2011–present
- Xerox Award for Faculty Research, College of Engineering, 2010
- Francois Frenkiel Award, APS Division of Fluid Dynamics, 2008
- UIUC List of Teachers Ranked Excellent by Their Students, 2004, 2008, 2009
- Engineering Council Award for Excellence in Advising, 2008
- Winner, APS Division of Fluid Dynamics Gallery of Fluid Motion, 2000

Freund has been an associate editor of the *Physics of Fluids* journal since 2010 and is serving on the *Annual Review of Fluid Mechanics* Editorial Committee.



Freund

Vascular Composites Enable Dynamic Structural Materials, *continued from page 9*

using conductive liquid, and changed its electromagnetic signature with ferrofluids—a key property for stealth applications.

Next, the researchers hope to develop interconnected networks with membranes between neighboring channels to control transport between channels. Such networks would enable many chemical and energy applications, such as self-healing polymers or fuel cells.

“This is not just another microfluidic device,” said co-author Nancy Sottos, the Willett professor of materials science and engineering and a professor of aerospace engineering. “It’s not just a widget on a chip. It’s a structural material that’s capable of many functions that mimic biological systems. That’s a big jump.”

This work was supported by the Air Force Office of Scientific Research.

IEEE Elects Voulgaris as Fellow



Voulgaris

AE Prof. Petros G. Voulgaris has been elected a Fellow of the Institute of Electrical and Electronics Engineers (IEEE).

The IEEE Fellow is one of the organization's most prestigious honors, and is bestowed upon a very limited number of Senior Members who have made outstanding contributions to the electrical and information technologies and sciences for the benefit of humanity and the profession.

Voulgaris was cited for contributions to decentralized, distributed, and multiobjective control. His 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.

Voulgaris started his career in AE at Illinois in 1991 as an assistant professor. He was promoted to associate professor in 1997, and full professor in 2004.

Voulgaris received the National Science Foundation Research Initiation Award in 1993, and the Office of Naval Research Young Investigator Award in 1995. He has been an Associate Editor for the *IEEE Transactions on Automatic Control* and for the *ASME Journal of Dynamic Systems, Measurement, and Control*. He also received the Xerox Award for Faculty Research from the College of Engineering in 1996.

A native of Greece, Voulgaris earned a degree in mechanical engineering from National Technical University of Athens, in 1986. He earned a master's degree and PhD in aeronautics and astronautics from the Massachusetts Institute of Technology in 1988 and 1991, respectively.

New AE Professor Focuses on Nanomechanics Studies



Chew

New AE Assistant Prof. Huck Beng Chew conducts computational-based nano and micromechanics studies of small-scale material structures.

Most recently at Brown University as a postdoc and research assistant professor, Chew studies the mechanics of nanoscale surface instabilities and patterning, and the damage, fracture and failure processes of nanomaterials. He uses multi-scale modeling and simulations to bridge the nanomechanical properties of nanostructured materials to the macroscopic failure response.

"I try to see how changing the material's nanostructure can influence its upper-scale mechanical properties, and conversely how deformation of the material at the upper-scale can induce changes in the material's nanostructure," he said.

Currently, he is interested in the nanomechanics of graphene, an element that is 10 times stronger than steel despite being 1,000 times thinner than a

human hair. The material holds considerable promise for aerospace applications as graphene's strength and minimal weight could provide fuel-efficient cost savings. It also has many potential applications in nanocomposites, nanotransistors and in biomedical applications.

For example, Chew believes the material could be a potential energy storage solution to replace current lithium ion batteries. "(Lithium batteries) in laptop computers now can hold seven hours of power," he said. "With nanomaterials for energy storage rather than lithium, there are interesting possibilities, from 10 to 100 times the current storage capacity.

"Graphene is the strongest two-dimensional structure in the world. To exploit its full potential, we need to discover ways to manipulate its structure. The most promising means is by deforming graphene at the upper scale," Chew continued. For example, one

continued on next page

AE Researchers Earn SEM's Hetényi Award

AE faculty members Ioannis Chasiotis and John Lambros, along with recent PhD graduate Krishna Jonnalagadda and current graduate student Sivakumar Yagnamurthy, are the 2012 winners of the M. Hetényi Award from the Society for Experimental Mechanics (SEM).

The award is bestowed for the Best Research Paper published in 2010 in *Experimental Mechanics*, the journal SEM has produced the past 51 years. The four AE scientists' paper, "Experimental Investigation of Strain Rate Dependence of Nanocrystalline Pt Films," was produced with collaborators from the Army Research Laboratory in Adelphi, Maryland.

Chasiotis said the team was able to make a breakthrough in microscale measurement methods to study the mechanical behavior of nanocrystalline thin metal films used in micromachines, such as radio frequency switches, mechanical capacitors and cell phones.

He explained that, when loaded, nanocrystalline metallic films tend to creep and stretch over time. The rate of this mechanical behavior depends upon how quickly the specimens are loaded. Complicating the issue is that the samples are very small, at 100 to 500 times thinner than a human hair, and so their behavior is difficult to measure.

For years, other researchers had tried to decorate the films with fine particles and had used elaborate measurement techniques, Chasiotis said. His group

designed a method to filter then deposit fine particles on the miniature and fragile specimens' surface without having an intrusive effect upon them or damaging them. By using this technique, the group was able to show for the first time that the mechanical behavior of nanocrystalline thin metal films varies dramatically with the loading time even at room temperature.

"An important part of the experimental method was the development of a testing apparatus that could measure the behavior of these films with nanometer resolution and at time scales that vary from a 1/1000th of a second to hours long," Chasiotis said.

The award-winning paper resulted from research that began in 2006. The National Science Foundation and the Army Research Office have supported the work.

This is the second Best Paper Award for Jonnalagadda, who also won for a paper published in 2007 in the *Journal of Fatigue & Fracture of Engineering Materials & Structures*. Jonnalagadda, who earned his PhD in AE in 2008, is now on faculty at the India Institute of Technology in Bombay.

The Hetényi Award was established in 1967 in honor of Dr. Miklos Hetényi, one of SEM's four founders. Hetényi wrote over 70 scientific papers on analytical and experimental mechanics and on the theory of structures.

way to induce structural changes on the ultra-thin material is to deposit it on a rubber substrate that is pre-stretched then released. "The two materials will buckle together, and periodic wrinkled patterns of graphene can be obtained."

At Brown, Chew studied the underlying mechanisms for cutting graphene nanotubes by sonication in water. "The study I undertook was to discover how this happens," Chew said. "Essentially, the variation of sound waves causes microbubbles in water to grow and collapse. During the collapse, the near sonic speed of water flow over the nanotube crushes it,

and causes atoms in the middle to be forced out. That was the discovery."

Chew will study further manipulations of graphene while at Illinois.

Chew earned his bachelor's, master's and PhD in mechanical engineering in 2002, 2003 and 2007, respectively, from National University of Singapore. He is a Institution of Mechanical Engineers Chartered Environmental Engineer and a National University of Singapore President Graduate Fellow. He also has been named to the university's Vice Chancellor's List.



Jonnalagadda



Yagnamurthy



Chasiotis



Lambros

ABET Announces 2010 Linton E. Grinter Distinguished Service Award



Ormsbee

AE Emeritus Prof. Allen I Ormsbee has been named the 2010 recipient of ABET, Inc.'s prestigious Linton E. Grinter Distinguished Service Award.

Ormsbee has been cited for dedication to the principles of ABET that went above and beyond the normal call of duty and for shepherding the fiscal policies and procedures of ABET as Treasurer and Member of the Finance Committee through the governance changes of that period; his assured and responsible control of ABET's finances created and maintained an aura of trust between ABET and its members.

ABET is the recognized accrediting body for college and university programs in applied science, computing, engineering, and technology. This award, the organization's highest honor, is named for Linton E. Grinter, a pioneer in engineering and technology education and the first individual to receive the Distinguished Service Award from ABET's predecessor, the Engineers' Council for Professional Development (ECPD). The award recognizes ABET volunteers who follow in Grinter's footsteps and surpass even the highest service expectations of the organization.

Ormsbee began his ABET service in 1970 as a program evaluator for the American Institute of Aeronautics and Astronautics (AIAA), joined the ABET Engineering Accreditation Commission (EAC) in 1985, became a member of its Executive Committee in 1990, and was EAC Chair and Past Chair in 1993 and 1994. He became a Fellow of ABET in 1995.

After service in the EAC, AIAA chose Al to be its Representative Director to the ABET Board from 1994 to 2000. During that period of service, he was on the Finance Committee, which he also chaired (1996-1998), Public Member Committee (1997-1998), and

Secretary of the Board (1998-2000). At that time, the Secretary simultaneously served as a Representative Director.

In 2000, he was selected to be the ABET Treasurer, an Office that he held until he retired from the Board in 2006. As Treasurer, he also served on the Finance Committee, the Executive Review Committee, and, naturally, the Executive Committee.

Earning a bachelor's degree in 1946, Ormsbee was the second person to graduate from the AE Department. He earned a master's degree in mathematics from the Urbana campus in 1949, then earned a PhD in aeronautics and mathematics from the California Institute of Technology in 1955.

Ormsbee worked for the AE Department from the time he earned his bachelor's, starting as an instructor and working his way up to full professor in 1957. He retired in 1992.

Throughout his career Ormsbee did consultant work for a number of aeronautics companies. He is a member of the American Institute of Aeronautics and Astronautics, the American Society for Engineering Education, and the Sigma Xi National Scientific Honor Society. He is a 1974 winner of the AE Distinguished Alumni Award, and a 1994 winner of the ASEE Distinguished Service Award.

Ormsbee concentrated his research work on aerodynamics. Among his students, Ormsbee advised alumnus Robert Liebeck, BS 61, MS 62, PhD 68, on his work with airfoils. Liebeck, now a Professor of the Practice of Aerospace Engineering at the Massachusetts Institute of Technology, was cited for that work in his recent selection as the recipient of the Daniel Guggenheim Medal.

AE Celebrates Ki D. Lee Career

AE commemorated the 38-year career Emeritus Professor Ki D. Lee has had with the department during a retirement celebration held April 13. Attending were Lee's family, AE colleagues and several students.

Lee's association with the University of Illinois at Urbana-Champaign began when he became an AE graduate student in the early 1970s. Having earned a bachelor's degree in aeronautical engineering from Seoul National University in Korea in 1967, he earned an MS in 1973 and a PhD in 1976 from AE at Illinois.

Rising in the ranks of the university hierarchy, Lee became a full professor in AE in 1995, and was also an affiliate professor in what is now Mechanical Science and Engineering.

Lee's research activities focused on aerodynamic design optimization, grid generation, and computational algorithms. Projects included the development of convergence acceleration methods, high-resolution algorithms for the Navier-Stokes equations, hypersonic flow analysis, transonic drag reduction, high-lift design in take-off and landing configurations, transonic turbomachinery design, multi-block grid generation for complex configurations, solution-adaptive grid generation, and grid-quality improvement. Companies and organizations including McDonnell-Douglas, Boeing, Texron Defense Systems, NASA Ames and NASA Lewis funded Lee's research.

Having graduated at the top of his class from Seoul National University, Lee continued his association with his homeland throughout his years at Illinois. He was an invited lecturer at the Korean Institute of Science and Technology in 1983. Lee was honored as Man of the Year by the Kyunggi High School Alumni Association in 1998, then was installed as an Overseas Member of the National Academy of Engineering of Korea in 1999. He returned to Seoul National University as an Invited Professor in 2001.

Among other honors, Lee received the 1981 Medal for International Cooperation from Donier Aircraft Co., in Germany; was named by the Department of Defense and Boeing as the Team Leader of the Best IR&D Team in 1983 and 1984; and received NASA's 2001 Award for Turning Goals into Reality.



AE Emeritus Prof. Ki Lee and former AE Department Head J. Craig Dutton



AE Emeritus Prof. Ki Lee with his family, from left, daughter, Angie Lee; wife, Jay Lee; granddaughter, Josie Lee (stroller); grandson, Jacob Lee; daughter, Joyce Lee; and son-in-law, Hank Lee.

AE Offers Systems Engineering Master's Degree

“What we had was like driving a tack with a sledgehammer. (Our company) gained a lot of insight through our relationship with the department.”

AE Alumni Board member Steven J. D’Urso has joined the Department to administer the new Aerospace Systems Engineering (SE) master’s degree program that began in Fall 2011.

Finishing the non-thesis curriculum in one year, students in the program will receive a good foundation in the methods and tools involved in defining and managing complex, multidisciplinary aerospace design projects. “We want to get engineers to consider total system thinking: the big picture instead of ‘I’ll just do my part and pass it on,’” D’Urso said. He said the program is one of the first of its kind offered in U.S. universities.

D’Urso, BS 78 mechanical engineering and MS 89 AE, comes to the Department after gaining over 30 years experience in St. Louis aerospace industries, having

what we are doing and how to judge what’s a good requirement.”

D’Urso said students who entered the program this fall will produce a set of requirements for a large, complex aerospace system or space exploration system, then will write a systems engineering master plan to carry out the project. The students will work in integrated teams, with individuals performing pieces of the puzzle.

The requirements the program’s students develop could be passed to the following academic year’s AE seniors for use in their design course.

Students entering the new SE program need to have completed a capstone design-oriented course, and have to take graduate-level courses in the three core areas of aerospace engineering.

D’Urso earned his own master’s degree in AE through a distance-learning program while he was working in St. Louis. He continued his relationship with the Department in the 1990s, working with Kenneth R. Sivier, now an AE emeritus associate professor, to teach a once-a-week lecture series to AE students.

Through the course and collaborating with Professor Sivier’s capstone design class, D’Urso assigned each student with the task of designing a multi-mission, tactical aircraft. The result was individual designs unique to each of the 70-some students. D’Urso took the students’ experiences back to his team in St. Louis as they considered real criteria and implementation for developing a multi-role air vehicle configuration design.

“Working with the U of I allowed us to do something that scope would not allow us to do ourselves,” D’Urso said. “We didn’t have the quickie tools and methods available—what we had was like driving a tack with a sledgehammer. (Our company) gained a lot of insight through our relationship with the department.”

Excited about the new program’s possibilities, D’Urso shares with the students his own real-life experiences gained by spending the past 11 years of his career as a systems engineer and systems engineering manager. D’Urso, an Associate Fellow of the American Institute of Aeronautics and Astronautics, is also a member

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D’Urso

worked for both The Boeing Company and the McDonnell Douglas Company.

With the help of AE graduate student Drew Ahern, D’Urso runs the new master’s program as a mock professional experience for the students. “I will deal with the students as though I am an engineering manager in a company and they’re the engineers. They’ll have to give a report in the class. When they have completed the course, they’ll have to have some idea of what requirement analysis is. They will need to understand the theory behind why we are doing

Dutton, Tankersley Honored as Teacher, Staff Member of the Year

AE Prof. J. Craig Dutton and Program Coordinator of Graduate Programs Staci Tankersley have been recognized as Teacher and Staff of the Year, respectively, for 2011.

Ryan Smoot, 2010–11 President of the American Institute of Aeronautics and Astronautics student chapter, said AIAA members chose Dutton by a wide margin.

“Professor Dutton did an excellent job in explaining difficult material in his AE 312 Compressible Flow Course. He was attentive to student questions and efficiently used class time to go over course material. Outside of the classroom he held regular office hours that were very well attended and he had a genuine care for actually teaching students the course material,” Smoot said. “All in all he cared about his students and it showed.”

Dutton had served as AE Department Head for four years before stepping down in September 2011. Previously, he had been a faculty member in the Mechanical Sciences and Engineering (MechSE) Department at Illinois from 1985 to 2004, when he became Chair of the Department of Mechanical and Aerospace Engineering at the University of Texas at Arlington.

Dutton was named the W. Grafton and Lillian B. Wilkins Professor in MechSE from 1998 to 2003, and was named a Donald Biggar Willett Professor in the College of Engineering from 2003 to 2004. He was awarded the College’s Abel Bliss Professorship upon returning to Illinois in 2007.

AE presents the Staff of the Year Award based on overall excellence in service to the students and faculty of the department. Tankersley excelled in administering the graduate program from admissions to thesis deposit, and in serving as the department’s personnel liaison.

Tankersley has been working in the College of Engineering since April 1991, when she started as an assistant to the AE Department Head. From August 1994 to February 2003 she coordinated research programs for the Electrical and Computer Engineering Department, then was an assistant to the College of Engineering Dean. She has been in her current position since August 2004.



Dutton presenting the Staff of the Year Award to Tankersley.



Dutton and Ryan Smoot, President of the University of Illinois chapter of the American Institute of Aeronautics and Astronautics.

AIAA Meeting Includes Sentman Tribute; Scholarship Honoring Late Professor Awarded in Spring 2011

Colleagues of the late AE Emeritus Prof. Lee H. Sentman III paid tribute to him during the American Institute of Aeronautics and Astronautics (AIAA) Aerospace Sciences Meeting in January 2011 in Orlando.

David L. Carroll, Vice President and Chief Operating Officer of the aerospace tech company, CU Aerospace in Champaign, Illinois, and Wayne Solomon, former AE Department Head and CU Aerospace President, authored the Sentman tribute. Attending were the late professor's widow, Jan Sentman, and his daughter, Jeanne Griswold.

The presentation told of Sentman's early connections with the University of Illinois. Both he and his father, Lee H. Sentman, Jr., were college athletes: the younger in fencing and the elder, in track and field. They were the first father-son pair to win the Big Ten conference Medal for Achievement in Academics and Athletics.

The audience was told of Sentman's recreational passions: University of Illinois basketball, hunting and flying. Sentman died in March 2010 in a midair collision while flying an aircraft he had built.

The presenters also told about Sentman's contributions to aerospace engineering, with research contributions in rarefied gas dynamics; chemical kinetics and chemical lasers; and experimental and theoretical laser physics.

Carroll said he was pleased to respond when members of the AIAA plasma, dynamics and technical committee asked him to put the tribute together. "(Lee) was a great man. He was my Ph.D. advisor, my mentor, my colleague, and my friend." Sentman was also instrumental in encouraging Solomon to come to Illinois and serve as AE department head, Carroll said.

Meanwhile, the endowed AE scholarship in Sentman's honor has grown, and the first undergraduate award was presented in April 2011 to Jason B. Allen of Arlington Heights, Illinois, and Gabrielle E. Wroblewski of La Salle, Illinois. Alumni and friends wishing to honor Professor Sentman can contribute to the scholarship in his name by going online to <http://www.ae.illinois.edu/alumni/giving.html>.



Lee H. Sentman, Jr. and Emeritus Prof. Lee H. Sentman III

Sentman's contributions to aerospace engineering included research contributions in rarefied gas dynamics; chemical kinetics and chemical lasers; and experimental and theoretical laser physics.

Sladek Gift Creates AE Scholarships

Thanks to a generous gift from the estate of AE alumnus Richard R. Sladek, BS 50, the AE Department has awarded scholarships of \$4,000 each to four undergraduates.

A total gift of \$270,000 has been made available for an endowment for the AE Department. The university Office of Student Financial Aid will disburse Sladek scholarships to AE students on a needs basis. Inaugural beneficiaries of the philanthropy are freshmen Brandon M. Vlach of Chicago, Illinois, and Michael A. Passaro of Elk Grove Village, Illinois, and continuing undergraduates Shannon M. Weber of Westmont, Illinois, and Kelaine P. Patterson of Sugar Grove, Illinois.

"In these times of increasing tuition costs, the ability to provide scholarships to our students is critical, and we are truly thankful to the Sladek family to give us the opportunity to provide support to these four undergraduates," said Philippe Geubelle, Interim AE Department Head. "This will undoubtedly help us attract and retain top quality students in our undergraduate program."

The contribution to AE was one third of the total gift benefiting the University of Illinois at Urbana-Champaign. Another third was given to the Department of Communication, and the remaining third to the College of Agricultural, Consumer and Environmental Sciences.

Born June 19, 1920, Richard R. Sladek enjoyed an engineering career at Boeing Corporation that took him all over the world, despite his profound speech and hearing disabilities. He was a World War II veteran, and attended Navy Pier in Chicago while a University of Illinois student. Sladek died on May 25, 2006.

His father, Robert B. Sladek, also was a University of Illinois graduate, earning a BS in 1918 in General Agriculture.

AE to Offer Systems Engineering Master's Degree, *continued from page 16*

and past director of the St. Louis Section of the International Council on Systems Engineering.

In addition to his own experiences, D'Urso teaches the students lessons other aerospace engineers have learned throughout the past. "Lessons of history will come up with all this operations context. I want to make this real," he said.

"A lot of people think that design is an art, because there's not one answer. (Systems engineering) takes the art part out and puts order to the chaos," D'Urso maintains. "Design is not a process; design is a strategy. You use tools and processes that you have along the line that work." Systems Engineering provides some of those tools and processes.

Students interested in enrolling in the new program can learn more online at <http://www.ae.illinois.edu/academics/grad/systems-eng.html> or can contact D'Urso, sjdurso@illinois.edu, or Program Coordinator, Graduate Programs, Staci Tankersley, at tank@illinois.edu.

"A lot of people think that design is an art, because there's not one answer. (Systems engineering) takes the art part out and puts order to the chaos."

AE Honors Outstanding Students



AE Prof. Gregory Elliott with Austin K. Nicholas

AE has recognized several of the Department's undergraduate and graduate students this spring with awards for their scholastic achievement and other contributions.

AIAA Scholastic Achievement Award, to the senior graduating in May 2011 with the highest class GPA—**Austin K. Nicholas of Naperville, Illinois**, and **Ryan Merriman of Park Forest, Illinois**.

H.S. Stillwell Memorial Award, to students showing outstanding scholastic achievement and contributions in extracurricular activities—**Jared S. Daum of Decatur, Illinois**, and **Austin K. Nicholas of Naperville, Illinois**.

The H.S. Stillwell Memorial Award was established in honor of Professor H.S. (Shel) Stillwell. At the age of 27 Professor Stillwell founded the Department of Aeronautical Engineering at the University of Illinois in 1944. He served as department head at Illinois for 32 years. A graduate of the University of Minnesota, he served as Head of the Aeronautical Engineering Department at the University of Kansas prior to coming to Illinois. Professor Stillwell was influential in the design of the first ramjet-powered missile and was highly respected for his contributions to aerospace engineering education.



AE Prof. Gregory Elliott with Jared S. Daum



AE Prof. Gregory Elliott with Austin K. Nicholas



Erik P. Babcock with AE Prof. Gregory Elliott



David W. Slaby with AE Prof. Gregory Elliott

Robert W. McCloy Memorial Award, to a junior or first-semester senior student in recognition of outstanding academic performance—**Erik P. Babcock of Palatine, Illinois**, and **David W. Slaby of Edwardsville, Illinois**.

Professor McCloy was the first faculty member hired in the new Dept of Aeronautical Engineering. He was known for his research and teaching in propulsion and for his pioneering work in jet propulsion.

Dale Margerum Memorial Award, to the AE undergraduate who exemplifies outstanding leadership qualities by participation in departmental extracurricular activities—**Coralie D. Jackman of Palatine, Illinois.**

Dale Margerum was a 1979 graduate who died in an accident the summer after graduation. He was very involved in extracurricular activities.

Jo Ann Haynes Platt & Daniel Wall Platt Memorial Award, to the AE sophomore, junior or senior female undergraduate James Scholar and/or Chancellor's Scholar studying AE—**Coralie D. Jackman** of Palatine, Illinois.

H.S. Stillwell Problem-Solving Scholarship, to a junior-level student majoring in aerospace engineering who exhibits exemplary problem-solving skills—**Erik P. Babcock** of Palatine, Illinois.

This scholarship was set up by a generous alum as a tribute to H.S. Stillwell and the role he played as a mentor to students.

Lee H. Sentman Memorial Scholarship, awarded to AE undergraduate students in recognition of outstanding academic performance—**Jason B. Allen of Arlington Heights, Illinois, and Gabrielle E. Wroblewski of La Salle, Illinois.**

These are the initial scholarships awarded from this fund, created by Professor Sentman's family and supported by AE alumni in honor of Professor Sentman, who died in a midair collision in March 2010.

Roger A. Strehlow Memorial Award, to a graduate student in recognition of outstanding research accomplishment—**Craig G. Merrett of Ottawa, Canada, and Enric Xargay of Barcelona, Spain.**

The award is presented annually to honor Professor Strehlow, who joined the aero faculty in 1961. His background was in chemistry, and he was an acknowledged expert in the field of detonations and explosions. He also made significant contributions toward the understanding of the structure, stability, and extinction of laminar premixed flames. He was an early advocate of microgravity combustion research and successfully characterized the extinction and flammability states of flames under microgravity conditions. Professor Strehlow was the first AIAA Fellow in the Department of Aerospace Engineering.

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Coralie D. Jackman with AE Prof. Gregory Elliott



Coralie D. Jackman with donor Rob Chappell



Erik P. Babcock with AE Assistant Director of Advancement Brett Clifton



Jason B. Allen with AE Assistant Director of Advancement Brett Clifton



Gabrielle E. Wroblewski with AE Assistant Director of Advancement Brett Clifton



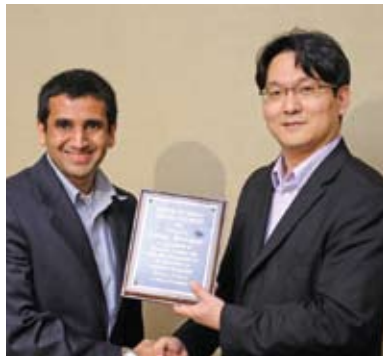
Craig G. Merrett with his advisor, AE Emeritus Prof. Harry H. Hilton



Enric Xargay with his advisor, MechSE Prof. Naira Hovakimyan



AE Emeritus Prof. Wayne Solomon with Brian S. Woodard



Aditya A. Paranjape with AE Assistant Prof. Soon-Jo Chung

Faculty Outstanding Graduate Award, in recognition of outstanding contributions to the Department's teaching and/or research missions—**Brian S. Woodard of Harristown, Illinois.**

Kenneth Lee Herrick Memorial Fellowship, presented annually to a graduate student in recognition of outstanding research and academic performance—**Aditya A. Paranjape of Mumbai, India.**

AE students also recently have garnered awards from several other organizations.

Illinois Space Grant Scholarships, awarded to undergraduate students by the NASA Illinois Space Grant Consortium based on the student's academic performance —

Erik P. Babcock of Palatine, Illinois.

Brandon P. Boyce of Crystal Lake, Illinois

Brandon E. Copp of Lawrenceville, Illinois

Michelle M. Diaz of Chicago, Illinois

Nicolas F. Parilo of Alton, Illinois

Rogelio D. Rincon of Chicago, Illinois

Ryan A. Smoot of Bloomington, Illinois

Gary R. Weber, Jr., of Crystal Lake, Illinois



AE Coordinator of External Relations Diane Jeffers with, from left, Gary R. Weber, Jr.; Ryan A. Smoot; Erik P. Babcock; Brandon E. Copp; and Brandon P. Boyce

Illinois Space Grant Fellowships, awarded to entering and continuing graduate students by the NASA Illinois Space Grant Consortium based on academic and research performance—

Bradley G. DeBlauw of Rockford, Illinois

Angelo A. Herrera of Champaign, Illinois

Miles J. Johnson of Urbana, Illinois

Daniel J. Morgan of Urbana, Illinois

Christopher M. Ostoich of Urbana, Illinois



AE Coordinator of External Relations Diane Jeffers with, from left, Daniel J. Morgan and Bradley G. DeBlauw

Bronze Tablet, awarded to the top 3 percent of undergraduate students across campus—**Austin K. Nicholas of Naperville, Illinois.**

The names of this select group of undergraduate students are inscribed on bronze tablets that are displayed on the first floor of the University of Illinois Main Library.

American Institute of Aeronautics and Astronautics Foundation National Scholarship, awarded based on grade point average, essay and letters of recommendation—**Jonathan Z. Yong of Singapore**.

Anne Elizabeth Suratt Memorial Scholarship, honoring Suratt who was a student at the University of Illinois from 1994 to 1997—**Kaitlin R. Vahling of Newton, Illinois**.

Suratt died in a tragic airplane crash in May 1997 at Willard airport, where she was training to acquire flight instrument ratings. She was scheduled to leave the following week to work at the NASA Goddard Space Flight Research facility in Maryland. Suratt was involved in campus programs to promote space studies, especially remote sensing of the environment. She gave numerous talks to elementary and secondary schools, as well as on campus, to promote awareness of remote sensing and how useful the technologies were to studying environmental problems. The scholarship fund was created by Suratt's parents, relatives and friends to fund annual scholarships designated for a junior, senior or fifth year undergraduate interested in space studies and/or earth sciences, and whose major field of study includes at least one of these areas.

Society of Hispanic Professional Engineers Advancing Hispanic Excellence in Technology, Engineering, Math and Science General Scholarship—**Joseph F. Gonzalez of Chicago, Illinois**.

American Helicopter Society Vertical Flight Foundation Scholarship for promising undergraduate and graduate students who plan to pursue careers in vertical flight—**Jonathan Z. Yong of Singapore**.

NSF Graduate Research Fellowship for graduate study leading to master's or doctoral degrees, related to NSF research and development, in the fields of science, mathematics and engineering—

Marta Baginska of Champaign, Illinois

Joseph F. Gonzalez of Chicago, Illinois

Austin K. Nicholas of Naperville, Illinois

Brent W. Pomeroy of Mechanicsburg, Pennsylvania

College of Engineering at Illinois Support for Under-Represented Groups in Engineering (SURGE) Fellowship, aimed at increasing the number of persons qualified for engineering faculty and research positions from groups currently under-represented in engineering—**Joseph F. Gonzalez of Chicago, Illinois**.

College of Engineering at Illinois Mavis Future Faculty Fellowship, to facilitate the training of the next generation of great engineering professors—**Phillip J. Ansell of York, Pennsylvania**.

H.S. Stillwell Fellowship—

Nicholas Fasanella of Urbana, Illinois

Mohith Manjunath of Bangalore

Brent Pomeroy of Mechanicsburg, Pennsylvania

Viktoria Shikova of Palatine, Illinois

Ankit Verma of Urbana, Illinois

AE Boeing Scholarships—

Jason B. Allen of Arlington Heights, Illinois

Brandon P. Boyce of Crystal Lake, Illinois

Bradley J. Buniak of Schaumburg, Illinois

Tucker J. Gritton of Moline, Illinois

Ashley N. Guebert of St. Charles, Missouri

Michael C. Looby of Niles, Illinois

Ryan J. Merriman of Park Forest, Illinois

Nicolas F. Parilo of Alton, Illinois

Rogelio D. Rincon of Chicago, Illinois

Jonathan M. Sass of Cincinnati, Ohio

Scott P. Tuttle of Naperville, Illinois

Kaitlin R. Vahling of Newton, Illinois

Robert F. Waymel of Bensenville, Illinois

Jospeh Wilkerson of Crete, Illinois

Gabrielle E. Wroblewski of LaSalle, Illinois

Emily R. Zavala of Cicero, Illinois

Spacecraft Swarm Research Earns AE Graduate Student NASA Fellowship

AE graduate student Daniel J. Morgan has been awarded a fellowship from the National Aeronautics and Space Administration (NASA) for his research into swarms of small spacecraft.

Morgan's project, "Dynamics and Controls of Swarms of Femtosatellites," was successful in securing one of the highly competitive NASA Space Technology Research Fellowships, awarded to projects showing significant promise for future application toward NASA missions and strategic goals. Selected candidates are required to perform research on their campuses and spend some time at NASA Centers and/or not-for-profit research and development laboratories. AE Assistant Prof. Soon-Jo Chung is advising Morgan.



Formation flying is the use of several, small spacecraft for a mission rather than a single, large spacecraft. This method has become popular over the past decade because it is cheaper to launch smaller spacecraft. Missions requiring space telescopes are examples of those in which formation flying would be a preferable alternative. While launching a large telescope can be either very expensive or impossible to do, several smaller telescopes can be launched and placed close together in order to imitate a larger telescope.

Recently, Morgan and Chung have been working with Dr. Fred Hadaegh's team at NASA Jet Propulsion Laboratory to develop the idea of spacecraft swarms, consisting of hundreds to thousands of very small spacecraft, about the size of an iPhone. By using so many identical spacecraft, the cost of each and the overall cost of the mission decrease. Another advantage of flying so many spacecraft is that the loss of a single spacecraft is much less significant.

Spacecraft swarms provide new challenges that have not existed in previous space missions. First, the large number of spacecraft working together in a small area greatly increases the probability that some will collide. Additionally, the spacecraft must be extremely small in order for the mission to be more cost effective than flying a single craft. The small

size of the spacecraft results in limited computing and communication capabilities.

Morgan's goal for the project is to develop guidance (going from one formation to another) and control (maintaining the current formation) methods that prevent collisions and minimize the amount of fuel used. Preventing collisions is especially challenging because the probability of collisions increases in ratio to the large number of spacecraft. Also, it is difficult for individual spacecraft to know where all the other spacecraft are at any given time. Finally, the methods must be fuel-efficient because the small crafts are limited in the amount of fuel they can carry.

The Space Technology Research Grants Program will accelerate the development of "push" technologies to support the future space science and exploration needs of NASA, other government agencies and the commercial space sector. Innovative efforts with high risk and high payoff are encouraged.

Formation flying is the use of several, small spacecraft for a mission rather than a single, large spacecraft. This method has become popular over the past decade because it is cheaper to launch smaller spacecraft.

AE Undergrads Take Exchange Journey to France

Seven AE undergraduates attended a six-week summer study abroad exchange program at the Institut Supérieur de l'Aéronautique et de l'Espace in Toulouse, France.

The students were Erin Hallerberg, Joseph Wilkerson, Aamir Hasanali, Naja Edwards, Kapil Varshney, Prateek Arora, and Aditya Binaykia.

The first four weeks of the exchange were spent in Toulouse, one full week was in Poitiers, and two four-day field trips were taken to the Basque country and Paris, visiting the famous French "Paris Air Show" at Le Bourget.



AE students Erin Hallerberg, Joseph Wilkerson, Aamir Hasanali, Naja Edwards, Kapil Varshney, Prateek Arora, and Aditya Binaykia, stand outside Le Capitole in Toulouse.

Merrett Wins Lockheed Student Paper Award

Recent AE PhD Craig G. Merrett has won the Lockheed Martin Student Paper in Structures Award from the 52nd American Institute of Aeronautics and Astronautics Structures, Structural Dynamics, and Materials Conference (AIAA SDM 2011).

With his advisor, Emeritus Prof. Harry H. Hilton, Merrett presented "Aero-servo-viscoelastic flutter and torsional divergence alleviation for a wing in subsonic, compressible flow."

Merrett said he studied a rectangular, viscoelastic, cantilever wing, representative of a typical unmanned aerial vehicle (UAV) wing fabricated from high polymer composite materials. The motivation for this problem was to produce a mathematical model of a UAV wing in the subsonic, compressible flow regime and test that model to find the flight speeds when the wing would twist to the point of failure—torsional divergence—and when the wing would oscillate—flutter. The model also included servo controls to examine the effect of those controls on the flight speeds for torsional divergence and flutter.

Developed by another researcher, the aerodynamic model of the subsonic, compressible flow is fairly new. Merrett's paper was the first application of the aerodynamic model to a viscoelastic wing.

The study confirmed that incompressible aerodynamic models may overestimate the torsional divergence and flutter speeds. New results are that viscoelastic effects of the structure dominate the compressibility correction of the aerodynamics so the change in aerodynamic model is not noticeable, and that the servo controllers offer a slight improvement of the torsional divergence and flutter speeds.

Merrett has finished his PhD studies and recently accepted a position as assistant professor of mechanical and aerospace engineering at Carleton University, Ottawa, Canada.



Merrett

NASA Honors AE Grad Students for Inlet Design

The National Aeronautics and Space Administration has recognized AE graduate students Michael Rybalko and Thomas G. Herges for their contributions to the design and fabrication of a large-scale low-boom inlet model for testing at the NASA Glenn Research Center in Cleveland, Ohio.

The NASA Aeronautics Research Mission Directorate Associate Administrator's High Potential Group Award was presented to the students in April at NASA's Washington, D.C., headquarters. The award acknowledged the students' roles in the inlet design project, one step needed in the larger effort to develop a new class of low sonic boom civilian aircraft. The work conducted is part of an ongoing, three-year project involving AE at Illinois, NASA, Gulfstream Aerospace Corporation, Rolls-Royce, and the University of Virginia.

Rybalko and a collaborator performed computational fluid dynamics analysis. Rybalko applied several new modeling techniques using the Wind-US 2.0 software package to enable rapid parametric analysis of vortex

generator configurations intended for inlet flow control. The optimized vortex generator test matrix he specified was adapted for use in the inlet tests, and its specification allowed the hardware model vendor to initiate mechanical design on schedule.

Herges led the development and implementation of surface flow visualization and pressure-sensitive paint flowfield diagnostic techniques internal to the inlet—the first time this had been done in the harsh environment of the 8 foot by 6 foot supersonic wind tunnel. Herges had to overcome numerous obstacles in designing the housing for an internal camera and light source used to collect the surface flow and pressure data that enabled characterization of the flowfield and physics associated with the vortex generator devices.

Designed to provide the high performance and low boom characteristics required by a potential civil supersonic aircraft, the Mach 1.7 inlet was successfully tested in the Fall of 2010.



Photographed at the awards ceremony in Washington, D.C., are, from left, Jaiwon Shin, Thomas Irvine, Glen Bigelow, Anita Garg, Gary D. Roberts, Marla E. Perez-Davis, Joseph Rossoll, Michael Rybalko, and Tommy Herges.

AE Students Win Best Paper Award at AIAA Plasmadynamics and Lasers Conference

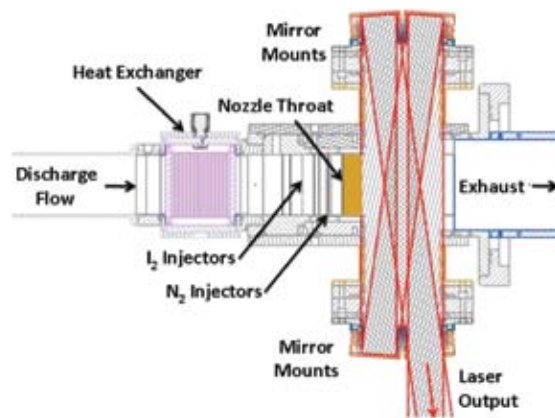
AE students under Emeritus Prof. Wayne Solomon's advisement have won a 2010 Best Student Paper Award for their work expanding the capabilities of the Electric Oxygen-Iodine Laser (ElectricOIL) device.

The award was presented at the 41st American Institute of Aeronautics and Astronautics (AIAA) Plasmadynamics and Laser Conference held in Chicago over the summer.

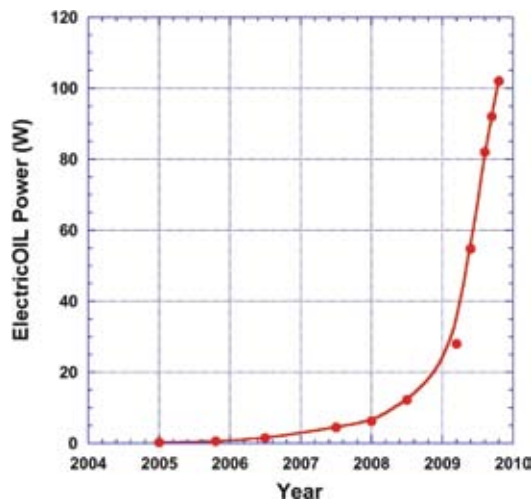
The group, including graduate students Joseph W. Zimmerman, Gabriel F. Benavides, Brian S. Woodward and Michael T. Day, developed a sixth generation ElectricOIL device, capable of greater than 100 watts of laser power output. Authors also included Solomon; AE Visiting Prof. David L. Carroll; CU Aerospace Partner and Senior Physicist Andrew D. Palla; and CU Aerospace consultant Joseph T. Verdeyen, who is also professor emeritus of the Electrical and Computer Engineering Department at Illinois.

The high-power laser community has long desired a hybrid laser system combining advantages of electrically driven, solid-state lasers with the high beam quality gas lasers provide. The ElectricOIL has been considered a potential candidate for over 30 years. The AE group and Champaign, Illinois-based CU Aerospace researchers, working with colleagues from Emory University; Physical Sciences, Inc.; Iowa State University; and the Air Force Institute of Technology, were the first to demonstrate the technology in 2004.

The students' recent paper covered various aspects of ElectricOIL system development, including radio-frequency discharge scaling for large singlet-delta oxygen flow rates; diagnostic development for excited atomic and molecular species measurements; thermal management; and laser resonator performance characteristics.



ElectricOIL Cav6 system with a multi-pass X-resonator using four 50.8 mm optics.



Power output of the ElectricOIL devices between the initial demonstration in 2004 and 2010.

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AE Team Garners First Place in Space Design Competition

Designing the best method for cleaning up trash in space has led to a first place win for AE students in the 2010–11 American Institute of Aeronautics and Astronautics Foundation undergraduate team space design competition.

The AE team, Sayonara Space Systems, won the top honor for their project, “ADIOS: Agile Debris-in Orbit Solution.” The contest required teams to design a spacecraft capable of removing large-sized debris that orbits around Earth at an altitude between 540 and 600 miles high, and an inclination between 82 and

- Jason Hewkin, in charge of the debris removal system
- Philip Hornstein, in charge of propulsion systems
- Coralie Jackman, in charge of avionics systems
- Tucker Gritton and Nathan Dostart, freshmen interns
- Daniel Morgan and Dushyant Rao, course teaching assistants
- Prof. Soon-Jo Chung, project advisor and course instructor



83 degrees. Spacecraft were required to feature a robotic arm, capable of placing “deorbiting packs” on individual pieces of debris.

The AE team began the work in Fall 2010 as their senior design project. Members are

- Devin Bergman, in charge of orbital mechanics, navigation and control
- Jason Goerlich, in charge of structures and thermal protection system
- Christopher Habib, in charge of the overall mission architecture, systems analysis and cost model

As the first-place team, Sayonara is invited to participate in the AIAA Space 2011 Conference & Exposition to be held in Long Beach, California, September 27-29. Hewkin is the team’s representative.

The U.S. Space Surveillance Network tracks space debris, ranging from large, spent launch vehicles, to tiny flecks of paint. The network follows about 19,000 objects larger than 10 centimeters; 500,000 particles that are 1 to 10 centimeters in diameter; and tens of millions of particles smaller than 1 centimeter. In addition to littering outer space, the debris can pose a danger of colliding with satellites, rockets and other craft sent into space on missions.

The AE team prioritized retrieving spent rocket bodies—each weighing 1½ tons—and removing them from orbit through the most cost-efficient means possible. “I think we won because we (designed a plan to get) the most mass down with the least amount of money,” said Hornstein, speaking for the team.

The team arrived upon a clever, cost-efficient solution, but only after they scrapped original plans on which they had worked the first full semester.

“The first semester we looked at using a propellant (to bring the captured debris back to earth),” Hornstein said, “but we came to the conclusion that nothing that could be used would be efficient enough: an electrical system would require too much power for the size (of spacecraft) we wanted, and a chemical system would require too much fuel.”

“Our first review, we did have an electrical propellant system. Coralie (in charge of avionics) concluded

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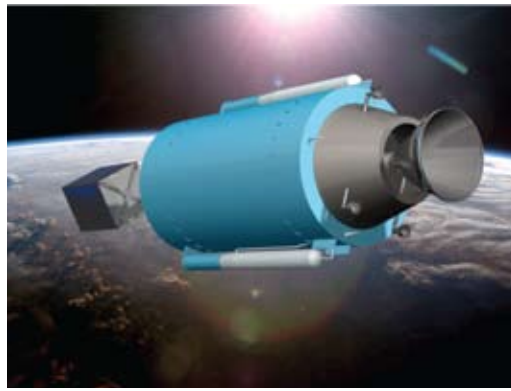
there was not enough power to run it. We had to go back to the drawing board.”

Using tethers to allow for a passive deorbit from space arose as an alternative. Hewkin researched the use of tethers, and Hornstein employed physics to prove they could work.

In the final design, the team developed plans for a launch vehicle to carry into space 16 cube-shaped ADIOS spacecraft stacked upon each other. Each would be equipped with capture mechanisms on one end and tethers on the other. Upon the ADIOS crafts’ release, the craft would separate, and sensors would direct each to dock on the side of a spent rocket body. Claws from the ADIOS would latch onto the spent rocket, then the tethers, consisting of 7-kilometer-long cables, would release, dragging and slowing both the ADIOS spacecraft and captured debris, pulling both out of orbit, and, eventually, bringing them back to Earth.

The team estimated the whole process would take about 6 months and cost about \$17,000 per kilogram of mass deorbited, for a total project budget of \$385 million. In addition to designing the craft, the team had to design a business plan, estimating costs for manpower needed to conduct the mission, and estimating costs of components, based on several calls to aerospace companies. The AIAA’s requirements limited budgets to no more than \$400 million.

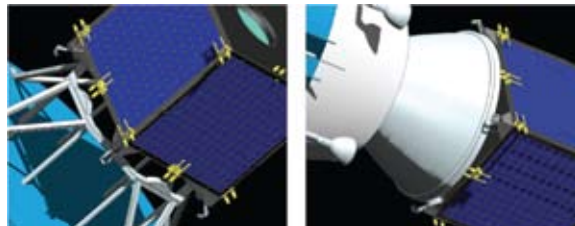
Every year the AIAA Foundation sponsors several design competitions that ask students to solve real-world design problems. These respected competitions give America’s best student designers a chance to put their talent front and center for the aerospace world.



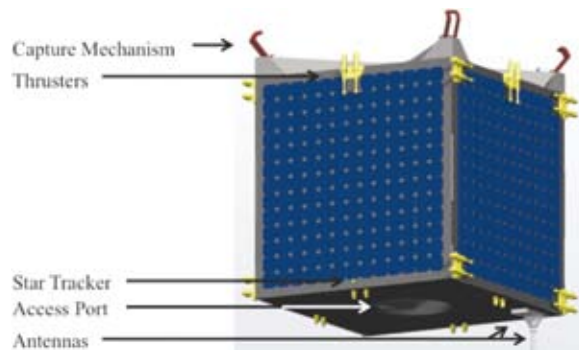
ADIOS Spacecraft (on left) preparing to capture COSMOS 3M upper stage rocket body (on right)



All 16 ADIOS Spacecraft arrayed before separation



ADIOS Spacecraft is capable of capturing COSMOS 3M rocket body from both payload adapter and nozzle



ADIOS Spacecraft

Arlington News Website Features AE Student's Astronaut Dream

“It was a great experience, but it definitely reinforced that the whole reason I got into aerospace was because I’m interested in space and spacecraft.”

AE student Samantha McCue was featured on the *Arlington Daily Herald* website this summer for her work as intern at the National Aeronautics and Space Administration (NASA) and her dream of being an astronaut.

McCue’s grades, flight experience, attitude and passion for NASA helped land her a coveted internship at the agency’s Johnson Space Center during the spring semester. She worked at the Extravehicular Activity Office, which is responsible for spacewalks and the development of spacesuit systems and support equipment.

At NASA, she expanded a database of all the failures the spacesuit ever had—from leaks in the water system to tears in a glove—to assist in designing the next generation suit. She also had opportunities most of the other interns didn’t. Perhaps the biggest highlight of Samantha’s spring internship was getting to try on the equipment she got to know so intimately: the spacesuit.

The 100-plus-pound suit was customized to McCue, who had to undergo a physical due to the liability. She wore an undergarment filled with a football field’s worth of tubing for cooling and ventilation. NASA even pressurized the suit as if she were in space doing an EVA.

“It gives you such an appreciation for all the work everyone does,” she said.

“It was a great experience, but it definitely reinforced that the whole reason I got into aerospace was because I’m interested in space and spacecraft,” McCue said.

Read more: <http://www.dailyherald.com/article/20110824/news/708249747/#ixzz1WQvYffTE>





Illinois Space Society's technical team with their rocket, "Chambana Banana," just before their final competition launch for NASA's University Student Launch Initiative at Marshall's Space Flight Center in April 2011.



Illinois Space Society Educational Outreach team member, Erik Lopez, lectures on introductory rocketry, Newton's first law, and the current space programs at NASA to 5th graders at Holy Cross Middle School in Champaign.



Illinois Space Society members with NASA Administrator Charlie Bolden at the American Astronautical Society's Goddard Symposium in Greenbelt, MD, in March 2011.



Illinois Space Society members at the Smithsonian National Air and Space Museum in Washington, D.C., in March 2011.

Hall of Fame Inductee Liebeck Delivers Dean's Distinguished Leadership Lecture



Liebeck

Named as a 2011 inductee of the College of Engineering at Illinois Hall of Fame, AE alumnus Robert H. Liebeck also was chosen to deliver the Fall 2011 Dean's Distinguished Leadership Lecture.

Liebeck, BS 61, MS 62, PhD 68, Manager of the Blended-Wing-Body Airplane Program at Boeing, spoke on "The Future of Flight" to a room packed with students, faculty and alumni on October 13, in the National Center for Supercomputing Applications Auditorium on the Urbana campus.

The College's Leadership Lecture brings eminent leaders and foremost experts to the campus to share knowledge and facilitate discussions among students, faculty, alumni, and the community on important challenges impacting global society.

On October 14, Liebeck joined ten other honorees as they were inducted into the College's Hall of Fame. The honor recognizes Illinois engineering alumni and others affiliated with the College who have made significant achievements in leadership, entrepreneurship, and innovation of great impact to society.

As a world-renowned authority in the fields of aerodynamics, hydrodynamics, and aircraft design, Liebeck leads his Boeing team in developing a 500-passenger

flying-wing advanced-concept subsonic transport aircraft that reduces fuel burn by 30 percent in comparison to a conventional tube and wing configuration. Boeing is collaborating with NASA in developing the BWB X-48B, a subscale prototype with a 21-foot wingspan. In the Leadership Lecture, Liebeck presented details of the design and fabrication of the X-48B, along with a video of the first flight at the NASA Dryden Flight Research Center on July 20, 2007.

Time magazine named the futuristic X-48B, an 8-percent sub-scale flight demonstrator of the Boeing Blended Wing Body (BWB) subsonic transport, one of the top inventions of 2007. Recognized for its innovative design and potential to be more fuel efficient and environmentally friendly than today's airplanes, the research aircraft is providing data that will transform air transportation.

To date, 93 test flights have established that the X-48B flies like a normal airplane. Five test pilots (three from Boeing and two from NASA) have observed, "It is a very nice airplane to fly." Edge-of-the-flight envelope testing also has been successful.



Caption



Caption

The X-48B is a joint project between the Boeing Company, NASA, and the Air Force Research Laboratory in Dayton, Ohio. Cranfield Aerospace of United Kingdom constructed the airplane.

Liebeck also contributed to advances in propeller design, windmill analysis, wing design for supersonic transports, and the design of high-altitude aircraft. In his 49 years at Boeing, he served as program manager on several classified advanced-concept airplane programs. He has an extensive list of technical publications, and his airfoil work is discussed in several textbooks on aerodynamics. He attained world recognition starting in the 1970s with his novel designs for high-lift "Liebeck airfoils."

Liebeck holds the position of Professor of the Practice of Aeronautics at the Massachusetts Institute of Technology and teaches courses in aerodynamics, flight mechanics, and airplane design as an adjunct professor at the University of California, Irvine.

As a consultant, he has designed wings for racing cars that won in Indianapolis 500 and Formula One races, and his wing was selected for the NASCAR "Car of Tomorrow" recently. He also designed the keel section for the yacht that won the America's Cup in 1991, and he designed the wing for a World Championship aerobatic airplane.

Liebeck received the Daniel Guggenheim Medal, one of the most prestigious awards in aviation, in 2010. He is a member of the National Academy of Engineering and a Boeing Senior Technical Fellow, AIAA Honorary Fellow, and a Fellow of the Royal Aeronautical Society. He is a recipient of the AIAA Aerodynamics Award, AIAA Aircraft Design Award, AIAA Wright Brothers Lectureship in Aeronautics, ASME Spirit of St. Louis Medal, and the ICAS Award for Innovation in Aeronautics. He received the Engineering at Illinois Alumni Award for Distinguished Service in 1994.

"We just completed an ERA (environmentally-responsible aircraft) study for NASA. (The X-48B) reduced fuel (consumption) by 50 percent and had a 40 decibel reduction in noise."

Members of the student chapter of the American Institute of Aeronautics and Astronautics making junk rockets.



AIAA students showing off the final junk rocket.



AIAA students getting ready to launch their junk rocket from the middle of the Bardeen Quad on the Engineering campus.

Engineering at Illinois Honors Astronaut Altman



Altman

Capt. Scott D. Altman, space shuttle pilot and mission commander, was among seven College of Engineering alumni presented the Alumni Award for Distinguished Service in a convocation held April 16.

Altman was cited for his decorated service in the United States Navy, for his contributions to the NASA space program, and for his continued support of the University of Illinois.

Having earned his bachelor's in AE at Illinois in 1981 and a master's in aeronautical engineering in 1990 from the Naval Postgraduate School, Altman's career has taken him literally "out of this world," first as a distinguished Naval aviator and, most recently, as an astronaut.

After receiving his degree at Illinois, Altman joined the United States Navy and was commissioned as an ensign in 1981; he received his Navy wings of gold two years later. In 1987, he was selected to attend the Navy Test Pilot School, from which he graduated in 1990. Altman was awarded the Navy Air Medal for his role as a strike leader flying over southern Iraq in support of Operation Southern Watch. A decorated military pilot, he also earned the Distinguished Flying Cross, Defense Meritorious Service Medal, Navy Commendation Medal, and Navy Achievement Medal among other awards. Altman's flying experience also landed him on the big screen as he performed many of the aerial stunts in the movie *Top Gun*.

In 1995, he was chosen as an astronaut, piloting two NASA shuttle missions and serving as mission commander on a third. Recently, Altman was the shuttle commander for the fifth and final servicing mission to repair the Hubble Space Telescope. All told, he logged more than 50 days in space during his various missions.

Altman has become a champion of Engineering at Illinois in recent years. He serves on the Department of

Altman and College of Engineering Dean Ilesanmi Adesida



Aerospace Engineering Alumni Advisory Board, and, in 1999, he received the Department of Aeronautical and Astronautical Engineering's Distinguished Alumni Award. He is a featured alumnus in a television commercial that airs during Illinois sporting events. On a recent mission to the Hubble Space Telescope, he was photographed wearing a bright-orange Illini shirt as he floated inside the shuttle.

Hometown Honors Astronaut Altman with Statue

PEKIN—A bronze bust of AE alumnus and former NASA astronaut Scott Altman has been unveiled at the Tazewell County Museum in Altman's hometown of Pekin, Illinois.

Attending the unveiling ceremony on March 13, 2011, Altman said he hopes the bust "will be an inspiration to the next generation." The \$8,000 statue was covered with a black cloth, which artist Morgan Elser pulled off to reveal the bust.

The bust shows Altman in his flight suit with an American flag on his left shoulder and an F-14 jet on the back. The bust will be part of a special exhibit on space exploration and Altman's career.

Altman graduated from Pekin High School in 1977.



JONI ANDREWS/PEKIN DAILY TIMES STAFF

Scott Altman talks about what his hometown community of Pekin, Illinois, has done for him, during the Scott Altman's Bust unveiling on Sunday, March 13, 2011, at the Tazewell County Museum and Educational Center on Court Street.

Henne Wins AIAA Aerodynamics Award

Gulfstream executive Preston A. Henne, BS 69, is the 2011 winner of the Aerodynamics Award of the American Institute of Aeronautics and Astronautics (AIAA).

The award was presented for meritorious achievement in the field of applied aerodynamics, recognizing notable contributions in the development, application, and evaluation of aerodynamic concepts and methods. Henne was recognized for outstanding leadership and contribution in the aerodynamic field of low boom supersonics research.

As senior vice president of Programs, Engineering and Test, Henne oversees Gulfstream's product program management, engineering, and flight operations. His organization led the development of the Gulfstream 550, recognized with the Collier Trophy in 2003, and the Gulfstream 450. Henne's organization leads the development of the new large-cabin, mid-range G280 and the new ultra-large-cabin, ultra-long-range G650, both currently in flight test. Henne also directs advanced design and technology development for future product consideration.

He began his aerospace career in 1969 at McDonnell Douglas, where he managed several advanced programs in aerodynamics and acoustics for both military and commercial aircraft. Known for his work in advanced aerodynamic technology, he was responsible for the aerodynamic design of the wing on the C-17, considered the most versatile aircraft in airlift history and winner of the 1994 Collier Trophy for aeronautical achievement.

Henne later served as chief design engineer for the MD-80 aircraft. In 1991, he became vice president and general manager of the MD-90 Program at McDonnell Douglas' Long Beach Douglas Aircraft facility, where he oversaw the aircraft's complete development and certification process.

Joining Gulfstream in 1994, Henne is credited with the design, development, test, and certification of the Gulfstream V aircraft, awarded the 1997 Collier Trophy. He became a vice president of General Dynamics in July 1999 when the company acquired Gulfstream.

Henne earned his bachelor's degree with highest undergraduate honors from AE at Illinois. He earned a master's degree in engineering from California State University at Long Beach in 1974.

Henne is Embry Riddle Aeronautical University Engineering Advisory Board member, an AIAA Fellow and a Royal Aeronautical Society Fellow.

His awards include the AIAA Engineer of the Year Award in 1996 and the AIAA Hap Arnold Award in 2001 for excellence in aeronautical program management. He was elected to the National Academy of Engineering in 2003. In 2005, the University of Illinois recognized Henne with the Alumni Award for Distinguished Service. In 2010, he received the Aviation Leader of the Year Award at the Living Legends of Aviation Awards presentation.



Henne

Butler Named Executive Vice President and Provost at University of Iowa



Butler

UNIVERSITY OF IOWA NEWS RELEASE

IOWA CITY—AE alumnus Barry Butler has been named executive vice president and provost at the University of Iowa.

Butler, who has served in the role on an interim basis since November, was one of three finalists for the position. He replaces Wallace Loh, who resigned in October to become president of the University of Maryland.

"I can't think of anyone better suited to this position or more committed to the University of Iowa than Barry Butler," University of Iowa President Sally Mason said in making the announcement. "As dean of the College of Engineering, interim provost, and as a world-class engineer and educator, Barry has my every confidence that he will be an excellent leader of our institution's faculty and academic programs."

Said Butler, "I have spent my entire academic career at the University of Iowa and have developed a deep understanding of and great respect for the institution. Under the leadership of President Mason, the University of Iowa has an opportunity to build on existing strengths and to develop strategic areas that have the potential to further distinguish us on a national and international level. I am honored to be a part of her leadership team."

Prior to his appointment as interim provost, Butler was dean of the College of Engineering, where he holds the rank of full professor in the Department of Mechanical and Industrial Engineering. He earned his bachelor's and master's degrees from AE at Illinois in 1979 and 1981, respectively. He received his Ph.D. in mechanical engineering in 1984, also from the University of Illinois at Urbana-Champaign.

Before entering administration in 1998, Butler served as a member of the Engineering Faculty Council, as well as the UI Faculty Senate and Faculty Council. Past administrative positions held by Butler include department executive officer of the Department of Mechanical Engineering, associate dean for academic programs, interim dean, and dean of the College of Engineering.

While he was dean, the College of Engineering experienced record growth in undergraduate enrollment, external research funding, and private support for faculty development, programmatic initiatives, facility

improvements, and student scholarships. As a result of a new curriculum that allows for a broader education, more than half of the college's graduates now supplement their engineering degree with a minor, second major or certificate from a field other than engineering.

To better prepare graduates for success in the global economy, Butler established the Hanson Center for Technical Communication, a resource center devoted to improving the oral and written communication skills of students, initiated the "Grabbing the Globe" lecture series to promote global awareness, and developed and implemented Virtual International Project Teams, an inter-institutional program that partners Iowa's students with students from other countries on global design projects.

Butler also has provided leadership in a number of graduate programs and research initiatives including the establishment of combined BS/MS programs and the creation of two highly successful, multi-college research centers, the Center for Bioinformatics and Computational Biology, and the Iowa Institute for Biomedical Imaging. He was also instrumental in establishing several combined degree programs with Iowa's community colleges and international partners.

As provost, Butler is responsible for more than 100 academic programs in the university's 11 colleges, oversees the Division of Continuing Education, the UI Library and Museum of Art, and is responsible for a general education fund budget in excess of \$440 million. He will be instrumental in advancing the university's strategic plan, is responsible for coordinating the academic components of the arts campus rebuilding effort, and provides leadership in the university's recent cluster hiring initiatives in water sustainability, aging mind and brain and digital public humanities.

Butler is active in a number of aerospace-related instructional and research activities at the UI, where he also serves as campus coordinator of the Iowa Space Grant Consortium, a statewide organization funded by NASA for the past 21 years whose mission is to coordinate and improve Iowa's future in aerospace science and technology and to stimulate aerospace research, education and outreach activities throughout the state.

Through a \$3 million grant from the Iowa Office of Energy Independence, he established a statewide

consortium (www.iawind.org) focused on research and curricular development that advances Iowa's competitiveness in the field of wind energy. His research is in the area of non-ideal reactive fluid flow modeling. For the past decade he has worked closely with the automotive industry to develop advanced computer models for use in the design, development and analysis of occupant restraint safety systems. These analyses include real-gas thermodynamics and elementary combustion of the unique high-pressure environment of gas generators used to activate occupant restraint systems.

He has experience working as a visiting research fellow for the U.S. Navy and Sandia National Laboratories and as a visiting faculty member at Universite de Provence in Marseille, France. He has served as a professional consultant with Combustion Sciences Incorporated, Princeton Combustion Research Laboratories, Iowa Public Defenders Office, TRW Vehicle Safety Systems, Automotive Systems Laboratory, Battelle Memorial Institute, and Praxair Surface Technologies. During his 26 years in academia, he has supervised 30 undergraduate students on research projects, advised or co-advised 18 master's students and eight doctoral students, and has developed and taught 14 different courses.

In 2002 he was honored as an outstanding alumnus of the Department of Aeronautical and Astronautical Engineering at the University of Illinois at Urbana-Champaign. He currently chairs one of the school's alumni boards. In addition, the Society of Automotive Engineers named him a recipient of the Ralph Teetor National Educator Award, and the Iowa student chapter of the American Society of Mechanical Engineers named him as the Outstanding Professor. He currently serves on the boards of several state and national technology-based organizations committed to economic growth and advancing science, technology, engineering and math education. Butler also serves as Iowa Gov. Terry Branstad's delegate to the Aerospace States Association.

As an active participant in Eastern Iowa's Corridor STEM (Science, Technology, Engineering and Math) Initiative, he has been a strong advocate for working with industry, community colleges and Iowa's K-12 educators to promote STEM education. Over the past decade, he has presented to more than two dozen civic groups throughout Iowa on topics ranging from

educational initiatives, faculty scholarship, and the role of higher education in advancing the well being of society and fostering economic growth.

As a student at the University of Illinois, he volunteered as a youth basketball coach, and at the Rehabilitation-Education Center as a reader/recorder of technical books and legal briefs for visually impaired students. Butler also has volunteered at the Wesley House Free Lunch Program and as a youth soccer and basketball coach in Iowa City, and he currently serves as a member of the Herbert Hoover Presidential Library Association's Board of Trustees.

He is married to Dr. Audrey Butler, a native of Keokuk, Iowa, and a lecturer in Chemical Engineering at the UI. They have three children: Ben, 19, Logan, 17 and Savannah, 15.



AIAA ASM Alumni Cocktail Reception

***Monday, January 9, 2012
Gaylord Opryland Resort
& Convention Center
Nashville, Tennessee***

Aerospace Engineering at Illinois will hold its 2012 alumni cocktail reception in January during the AIAA ASM conference in Nashville, Tennessee. The reception will be held from 6-8 p.m., Monday, January 9 (the first night of the conference), in the Crystal Gazebo of the Garden Conservatory in the Gaylord Opryland Resort & Convention Center. All University of Illinois alumni and students attending the conference are invited. A cash bar and light hors d'oeuvres are featured. Look for e-mail later this year for more details about the event, or contact Brett Clifton at bclifton@illinois.edu or 217-333-1149 for more information. Also, please see the event listing boards at the hotel on January 9th for final details of the reception.

AE Alum Completes First F-35C Flight

PATUXENT RIVER, Md.—Lt Cmdr. Eric “Magic” Buus, a Navy test pilot, had the honor of flying the carrier variant of the F-35 (CF-1) for the craft’s initial flight February 11.

Buus, BS 94, flew the F-35C for a little over two hours. His first flight in CF-1 checked the function of the flutter excitation system, designed to help measure structural loads of the airframe during various flight maneuvers.



“The aircraft flew great for more than two hours with no issues. It’s a really smooth, solid flying airplane and a joy to fly,” Buus said. “This flight was a great milestone for me, personally, and more importantly, for the Services during the 100 year anniversary of Naval Aviation. This airplane is going to give us a great leap in capability, and I’m looking forward to

putting it through the demanding carrier suitability tests required to ensure it’s ready for the Fleet.”

The F-35C is distinct from the F-35A and F-35B variants with its larger wing surfaces and reinforced landing gear for greater control in the demanding carrier take-off and landing environment. Video-tapes of the flight can be accessed from the U.S. Navy website, <http://www.navair.navy.mil/index.cfm?fuseaction=home.VideoPlay&key=08D4D1B7-482C-46C4-A064-2BFD214AB0DF>, and on YouTube at <http://www.youtube.com/watch?v=VxrvDzKBWEY>.

Buus learned to fly at Albertus Airport in his hometown of Freeport, Illinois. He was accepted into Navy flight training in 1995 and graduated from test pilot school in 2003. Buus has tested as many as 30 types of aircraft, including fighter planes, helicopters and gliders.

“Magic’s flight is a tremendous accomplishment for him and the test team, and a historic event for Naval aviation,” Capt. Thomas Huff, commodore of Naval Test Wing Atlantic, said of the February 11 test. “The determination and thoroughness of test professionals across all our programs is shaped by the education and training they receive at the United States Naval Test Pilot School and Test and Evaluation University, ensuring delivery of warfighting capability to Sailors and Marines.”

Coincidentally timed with the kickoff of the Centennial of Naval Aviation in San Diego, this milestone represents the Navy’s first hands-on experience in its future fighter aircraft with stealth capabilities.

The F-35 Lightning II Joint Strike Fighter program is in the system development and demonstration phase, focusing on delivering three different, new aircraft variants to the U.S. Marine Corps, Navy and Air Force. The integrated test force at NAS Patuxent River is focused on testing and evaluation of the F-35B and F-35C.

AE Alumni Brown, Onken and Trask Honored

All three alumni honored with AE awards this past spring have concentrated their careers in spacecraft and space travel.

Blaine Brown, BS 81, (MS 90, University of Houston), works on human spaceflight engineering and management projects with NASA's Johnson Space Center. Jay Onken, BS 89, manages the Mission Operations Laboratory at NASA's center in Huntsville, Alabama. And Aaron Trask, BS 98, MS 00, PhD 02 (MBA 07 Drexel University), advises the U.S. government on national space systems, including satellite constellation and sensor analysis, enterprise requirements, and space protection.

Brown and Onken were recognized with AE's 2011 Distinguished Alumni Awards. Trask received the 2011 Outstanding Recent Alumnus Award.

Blaine Brown

Brown serves as Director of Program Management for Lockheed Martin, focusing on NASA's Orion Program. He has been with Lockheed Martin for 29 years, working with NASA's Johnson Space Center. Currently, Brown serves as the Deputy for the Orion Crew & Service Module Integrated Product Team on NASA's Orion crewed deep space exploration spacecraft. He has responsibility for the design, development, test, and certification of both the Orion Crew Module capsule that houses the astronaut crew and the Service Module that provides propulsion and power to the spacecraft.

Previously, Brown served as the Lockheed Martin Deputy Program Manager on NASA/JSC's Science, Engineering Analysis and Test contract involving over 2,000 employees. Product responsibilities included hardware and software design, development, testing, and operation of Space Shuttle and International Space Station components. These included the Wireless Video System helmet cameras spacewalking astronauts use; the Centerline Berthing Camera System used for precision alignment of large modules being attached to the Space Station; the Aercam Sprint remotely piloted robotic vehicle; the Robonaut dexterous anthropomorphic robot; Space Shuttle tile inspection and repair hardware; the Station vibration isolated treadmill; and other crew on-orbit exercise equipment.

Duties also involved management of Space Science research and analyses such as lunar rock curation,

micrometeoroid and orbital debris modeling and testing, and operation of Johnson Space Center's large ground test laboratories used for human space-rated hardware qualification, testing, and astronaut training.

Brown has been recognized for his work with the NASA Astronaut Silver Snoopy Award, the Lockheed Martin Corporation NOVA Award, the Rotary NASA Stellar Extraordinary Achievement Award, the Lockheed Martin Top Fight Award, the NMA Manager of the Year Award, and numerous technical commendations.

Jay Onken

Onken has been named to the Senior Executive Service position of manager of the Mission Operations Laboratory at NASA's Marshall Space Flight Center in Huntsville, Alabama. The Senior Executive Service is the personnel system covering top managerial positions in some 75 federal agencies.

Onken oversees a team of 450 civil service and contractor employees in the Mission Operations Laboratory in Marshall's Engineering Directorate. The directorate supports NASA's exploration missions, and is responsible for developing the capabilities and supporting research and technology that enables America's journey to the moon. Onken directs the Payload Operations Integration Center for the International Space Station and manages operations and ground support facilities at the Huntsville Operations Support Center—a NASA technology hub for monitoring scientific research and enabling communications during space operations.



Prof. and former AE Department Head J. Craig Dutton with AE alum Blaine Brown



AE alum Jay Onken with Prof. and former AE Department Head J. Craig Dutton

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AE Assistant Director of Advancement Brett Clifton with alumnus Aaron Trask

The Marshall Center is a key player in providing ongoing support to the International Space Station—the largest and most complex international science project in history. Onken has served as acting manager for the lab since 2006 and as its deputy manager since 2004.

From 2002 to 2004, Onken was deputy project manager for the International Space Station Payload Operations and Integration Function. In that capacity, he managed planning and execution of science activities on the space station, and training of astronauts and flight controllers. He spent the previous year at NASA's Johnson Space Center in Houston, setting

up an organization to make science activities on board the station more efficient from a ground operations standpoint.

From 1999 to 2001, as payload operations director, Onken directed the preparation for two space station expeditions: Expedition 3 from August to December 2001, and Expedition 4 from December 2001 to June 2002.

From 1996-1999, Onken served as a flight director for the Chandra X-ray Observatory, the world's most powerful X-ray telescope. Onken led the planning and execution of a test that verified that the Operations Control Center at the Smithsonian Astronomical Observatory in Cambridge, Massachusetts, could command the observatory and process data. He also led the effort to plan the 45-day post-launch activation and checkout period. He then served as a console flight director for the observatory's activation and checkout in 1999.

Onken joined the Marshall Center in 1989 as an orbital analysis engineer, supporting six Spacelab

missions. Spacelab was a facility where science experiments were carried out in the space shuttle's payload bay.

Among Onken's honors have been two NASA Medals for Exceptional Service, three NASA Certificates of Appreciation, a Johnson Space Center Flight Director's Award, and several group achievement awards. He has authored and co-authored numerous American Institute of Aeronautics and Astronautics (AIAA) papers and served as the keynote speaker for two AIAA regional events.

Aaron Trask

Trask is a principal aerospace engineer for Apogee Integration LLC of Chantilly, Virginia. He joined the company in early 2007, and is responsible for advising the U.S. government on national space systems including satellite constellation and sensor analysis, enterprise requirements, and space protection.

After earning his PhD, Trask worked for the Naval Research Laboratory (NRL) in Washington D.C. for four years. There, he developed software for a virtual mission operations center, the TacSat satellite radio interface, and a Navy P3 aircraft emitter identification experiment. He was also project manager for the installation of a portable ground station and lead engineer for the navigation and orbit determination team of the Upperstage satellite for the DARPA MITex mission. The satellite exceeded its mission goals and design life in part due to extra fuel remaining onboard after precisely executing its 95-minute insertion maneuver.

In addition to his professional career, Trask continued his education by earning an MBA from Drexel University in 2007. He has participated in professional societies, and was elected to the Space Flight Mechanics Technical Committee of the American Astronautical Society. He currently holds the position of secretary and chair elect of that organization.

Greetings from the AE Alumni Advisory Board



Aerospace Engineering Alumni Advisory Board members pose for a photo at the end of this year's board meeting, held on campus on Friday, October 14th at the Beckman Institute.

The Aerospace Engineering Alumni Advisory Board helps provide advice and support for the Department. Through the annual campus meeting, AE “meet and greet” events at conferences, and outreach to fellow alumni, the Board engages with faculty, staff and students to enhance the reputation of the Department. As in past years our annual October board meeting on campus afforded us the opportunity to stay involved with the Aerospace Engineering Department and discuss new ideas for the future. We had 20 Board members in attendance this year, which is the highest we’ve ever had at the annual meeting.

Interim Department Head Philippe Geubelle gave an update on the status of the AE Department and College of Engineering as a whole. He reported that the Department enrolled 88 new freshman undergraduates and 28 new graduate students, with a total of 366 undergraduate and 142 graduate students now enrolled in the Department. The AE Department continues its high *US New and World Report* national rankings (ranked 7th for both undergraduate and graduate programs) and our alumni, faculty and students continue to win prestigious awards.

New faculty member Huck Beng Chew introduced himself to the Board and provided a short presentation on his background and research objectives. Student leaders from the Illinois student branch of AIAA, Women in Engineering (WIE), Illinois Space Society (ISS) and the Graduate Student Advisory Committee gave presentations updating the Board on their most recent student activities and projects. Advancement Officer Brett Clifton gave an update on the fundraising aspects for the Department and

informed the Board that the University had surpassed its goal of \$2.25 Billion for the Brilliant Futures fundraising campaign.

This year, we re-evaluated the strategic objectives of the Board and had a healthy discussion on how the Board can increase its participation with students, faculty and staff to further support the Department. Ideas on how to strengthen recruiting, how to become more involved with the student organizations, becoming more involved in student mentoring and assisting in AE-specific alumni receptions, were all discussed and they, along with other ideas, will be soon implemented and activated.

This year we welcomed two new members to the Board: Abdollah (Abdi) Khodadoust (Boeing Research & Technology—Huntington Beach, CA) and Jay Thomas (LDRA Software Technology—Denver, CO). They provided fresh ideas and enthusiasm to the Board and we’re expecting to add a few additional members in the coming years.

In June, our long serving Board member Steve D’Urso accepted a position within the AE Department after a 33-year industry career. Steve gave a short talk on his new Systems Engineering Master’s Program and the Board thanked him for his many years of active service and support to the Department and alumni and wished him well in his new position.

During the year, the AE Department reached out to alumni across the country hosting receptions at conferences and sponsoring other social gathering

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Even in lean economic times, the Department has been a constant in educating exceptional Aerospace Engineering students who move on to contribute to our industry or in academic education and research.

events. Faculty and staff met with alumni at a reception at the AIAA ASM conference in Orlando in January. Brett Clifton met with alums in Phoenix and St. Louis and on campus. In May, an alumni reception, sponsored by the College of Engineering, was held in the Washington, D.C., area and several AE alums were in attendance to meet with Professor and former Department Head J. Craig Dutton and Brett Clifton. I encourage alumni to watch for these opportunities to meet and talk with the department head, faculty, and staff when they occur.

I am also happy to report the Alumni Advisory Board Fellowship Challenge is getting close to our goal of endowing a new graduate fellowship for the department with almost \$130,000 pledged toward our \$150,000 goal. Unlike other departments with multiple graduate fellowships, AE does not have a graduate student fellowship and our challenge is to create the first. Even in lean economic times, the

Department has been a constant in educating exceptional Aerospace Engineering students who move on to contribute to our industry or in academic education and research. Please consider making a financial commitment to help your Department. Contact Brett Clifton for more information.

As your new Alumni Advisory Board president, I would like to hear from you, our alumni. Let me or other board members know of your ideas and how your Board can better serve our excellent Department, continue to enhance its exceptional reputation, and provide opportunities for you to participate and interact with Department faculty and students.

Best regards,

Michael Miller, '76
IAE Alumni Advisory Board President
mmiller@comspacedev.com

Class Notes

Robert W. Farquhar (BS 59) received an honorary doctorate from the University of Liege (Belgium) in October 2010. Farquhar plans to finish his 450-page memoir, *Fifty Years on the Space Frontier: Halo Orbits, Comets, Asteroids, and More*, in 2011. The National Air & Space Museum in Washington, D.C., has commissioned the memoir.

Former astronaut **Steven R. Nagel (BS 69)** retired from NASA in July and moved with his wife, Linda, to Columbia, MO. Nagel will be working for the Dean of Engineering at the University of Missouri, assisting in recruiting and outreach, and will also be working part-time, teaching a few classes in the Mechanical Engineering department. Linda Nagel (also a former astronaut) got her PhD in Physics at Missouri and has accepted a position with the Physics Department.

Michael P. Bogumill (BS 70) is serving as Captain of the B-777 for United Airlines. Bogumill has been with United since 1985, having flown the B-727, B-737,

B-757, B-767, and DC-10. He has over 16,000 hours of flying experience and expects to retire soon, saying "that it has been more fun flying them than fixing them."

Kenneth L. Atkins (PhD 74) participated as a member of the Science Team Principal Investigator (P.I.) Prof. Joe Veverka of Cornell University led for the Stardust NExT encounter with Comet Tempel 1 in February 2011. Atkins also is continuing advanced studies in the Kinematics of Human Executions with Calloway Devices for Maximum Impact on Titleist Follided (dimpled) Spheres under all Airflow Conditions to achieve Low Strike Numbers.

Former astronaut **Scott D. Altman (BS 81)** left NASA in September of 2010 and is now a Vice President with ASRC Research & Technology Solutions, located in Greenbelt, Maryland (just outside of Washington D.C.). Altman's role is focusing on strategic planning and new business initiatives. He was back on campus in April 2011 to receive the Alumni Award

for Distinguished Service from the College of Engineering.

Blaine W. Brown (BS 81) is working on NASA's Orion spacecraft development. The project was spared cancelation when the current Administration canceled the overall Constellation human space exploration program. Orion has morphed into what now is being referred to as the Multi-Purpose Crew Vehicle that is part of new deep space exploration plans NASA is currently developing. Brown received AE's 2011 Distinguished Alumnus Award.

Paul W. Dees (BS 81, MS 83) presented two papers at AIAA's ATIO conference in September, 2010. One was on aircraft design education and the other on hang glider design and performance. Dees is eagerly awaiting certification and deliveries of the Boeing 787-8 and 747-8.

Christopher N. D'Souza (BS 83, MS 85) is now Deputy Branch Manager, Autonomous GNC Flight Systems Branch, Aeronautics and Flight Mechanics Division, NASA Johnson Space Center.

Craig A. Barton (BS 88) recently moved back into a technical management role after 3 years running American Airline's engine and airframe overhaul businesses. Barton is developing an organization and process set to provide broad technical leadership for AA's aircraft fleets to ensure sustained, cost-effective reliability.

Grant Eaton (BS 88, MS 89) stopped by the AE Department in August as he was bringing his son to Illinois to be a new freshman in the College of Agricultural, Consumer and Environmental Sciences (ACES). For the past 10 years, Eaton has been with the Federal Aviation Administration (FAA) in Georgia, working in flight certification of Gulfstream and other aircraft.

Timothy D. Stuit (BS 89) was recognized as a Space Flight Awareness Honoree in October 2010 for his work designing the STS-134 re-encounter, used to test relative navigation sensors that are designed for the Constellation Program's Orion spacecraft. Stuit has worked in Rendezvous Flight Design at the Johnson Space Center for the last 13 years, doing pre-flight design work as well as real time support in the Mission Control Center, and working in the Flight Dynamics Officer's backroom.

David L. Carroll (BS 85, MS 86, PhD 92) was named an AIAA Fellow in May 2011. The distinction of Fellow is conferred by AIAA and its Board of Directors upon those members of the Institute who have made notable and valuable contributions to the arts, sciences, or technology of aeronautics or astronautics.

Der-Ren Taur (PhD '89) directs the guidance section for the Sky SWORD Project Office at the Chung Shan Institute of Science and Technology (CSIST) in Taiwan. His main contributions are the designs of guidance laws for missiles. Taur also heads a simulation group for mathematical modeling of navigation seeker heads for guided missiles. All of his projects have been successfully tested.

Sheridan Ross, the oldest intellectual property law firm based in the Rocky Mountain region, has selected **Craig W. Mueller (BS 93)** as a new shareholder. With experience that includes senior engineer with Lockheed Martin Astronautics, Mueller's

focus is preparation and prosecution of patent applications based on mechanical devices and related processes. His practice also includes aerospace, electro-mechanical, and civil areas of technology. Sheridan Ross was founded in 1954.

Erik L. Antonsen (BS 97, MS 01, PhD 04) started residency with the Harvard Affiliated Emergency Medicine Residency at Brigham and Women's Hospital and Massachusetts General Hospital in Boston. Antonsen did his post-doctoral research with the Center for Plasma-Materials Interactions in the Nuclear Engineering Department at UIUC. He completed medical school in 2009, including a year as a Fogarty Fellow in Africa doing AIDS research for the National Institutes of Health.

AE Emeritus Prof. John Prussing and Prof. Bruce Conway met with several AE alumni while attending the 21st AAS/AIAA Space Flight Mechanics Meeting in New Orleans, LA in February. (Prussing helped organize the first meeting in 1991.) Alumni attending were **W. Todd Cerven (BS 97, MS 99, PhD 03)** now working at The Aerospace Corp.; **Aaron J. Trask (BS 98, MS 00, PhD 02)**, working at Apogee Integration^{LLC}; **Mark S. Wallace (BS 03)**, working at Jet Propulsion Laboratory; and **Scott J. Zimmer (BS, 01)**, who worked at Aerospace Corp. and then started his own company, Optensity Inc. in Virginia. Four of Conway's current graduate students presented papers: **Brianna S. Aubin (BS 08, MS 11)**, **Jacob Englander (MS 08)**, **Pradipto Ghosh**, and **Chris Martin**. Also presenting was **Mauro Pontani** (University of Rome), who was a visiting graduate student in AE.

Andrew L. Buita (BS 99) is the Senior Manager of Boeing's Integrated Logistics Business Development Core Team. In this role, Buita leads a group of Operations Specialists, Capture Team Leads, and Market Development professionals and is responsible for managing business development operations and strategy development for Integrated Logistics, a \$7 billion business. He also acts as a subject matter expert in the areas of operational command and control for Boeing's Phantom Works business. Buita continues to serve as a Major in the Missouri Air National Guard where he is the Chief

of Dynamic Targeting for the 157th Air Operations Group at Jefferson Barracks Air National Guard Station.

Sean T. Willis (BS 99) started work at Scaled Composites as a Design Engineer in November 2010. Willis' prior Aero experience was at Woodward MPC, where he was a project engineer responsible for the design and production of electric motors used in satellite Reaction Wheels and Control Moment Gyros.

Lynn E. Craig (BS 00) works at the NASA Johnson Space Center focusing on the entry guidance system for the Mars Science Laboratory Rover, launching Nov 2011. She received her master's degree from the University of Michigan in 2001.

Tony J. Medaglia (BS 00) has been in the Air Force since graduation and is currently stationed in Germany. Medaglia has flown the F-16, T-38, T-37 and has been deployed in support of Operation Iraqi Freedom and Operation Enduring Freedom four times. Every once in a while he is able to catch an Illini game on the Armed Forces Network.

Timothy H. Franklin (BS 04) supported the Space Shuttle Program by performing aerodynamic and aeroheating analysis on the integrated vehicle during launches. Franklin is working toward his masters degree in Aerospace Engineering through Auburn University's Distance Learning program.

Karl R. Klingebiel (BS 04) has worked over the past four years at AeroVironment on a small team that is developing a robotic hummingbird under the DARPA Nano Air Vehicle program.

Jeremy L. Morrison (BS 05) is working on the structural testing of the joint strike fighter, or F-35 for Lockheed Martin. Morrison has been in charge of static and durability testing of everything from small components to full airframes and has been working for Lockheed for the last five and a half years.

Zac A. Schramm (BS 05) works as a Mechanical Engineer for General Dynamics NASSCO, a shipbuilder in San Diego, CA. NASSCO builds Navy/Commercial ships up to 1000 feet, and is currently finishing a contract of 14 489-foot T-AKE

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Logistics ships. Schramm works as a mechanical engineer, responsible for powertrain systems such as rudder/steering systems, propulsion shafting/alignment, and bow thrusters.

John M. Beschorner (BS 07) has been working in the trajectory and performance group of United Launch Alliance for the past three and a half years. During a majority of this time, Beschorner has been a design engineer for a Delta IV mission as well as supporting day of launch activities for a majority of the Delta II and Delta IV launches.

Robert S. Coatney (BS 07) is now working at the AeroVest Corporation (with Insitu founders) designing a small VTOL UAV. Coatney designed rudders and steering systems for high-end racing sailboats at Farr Yacht Design in Annapolis, Maryland, from 2008-2009.

Sylvee Walenczewski (BS 08) has been accepted into the Lockheed Martin Engineering Leadership Development Program. Walenczewski received the Lockheed Martin Special Recognition Award for uncovering and redesigning a poor missile ordnance component, and she was also elected Chairperson of the AIAA San Francisco Section.

Rachel B. Rock (BS 09) is working full time at the National Test Pilot School (NTPS) as well as working on an MSc degree in Flight Test Engineering from NTPS.

Mark A. Schaffer (BS 09) completed Aircraft Maintenance Officer School for the United States Marine Corps in July 2010. Schaffer now serves as a Maintenance and Material Control Officer for VMAQ-1, Tactical Electronic Warfare Squadron. He is deploying in October/November 2011 to Bagram Air Force Base in Afghanistan.

Jacob D. Shulkin (BS 09) works for General Energy Alternatives^{LLC}, with much of his work geared toward new solar tech installations (installers working with another manufacturer). GEA is a startup company (started while still students), with most team members being Illinois alumni.

Matthew D. Dieska (BS 10) is a Second Lieutenant in the United States Marine Corps. He recently moved to Quantico, Virginia to attend the Basic School and later Flight School in Pensacola, Florida.

Dirk E. Haller (BS 10) is currently applying for an officer commission with the United States Air Force.

Brian A. Schmidt (BS 10) is a Management Development Program Member for

Precision Castparts Corporation and is currently stationed at a Wyman-Gordon facility, which forges aircraft engine components. Schmidt is a member of a rotational program that trains members to become operations managers.

Deaths

Steven R. Berry (BS 85) of St. Louis, Missouri, died Friday, Sept. 2, 2011. He had worked 26 years for the Boeing Space Program and Boeing Aircraft as a manager and aeronautical engineer. Berry was a graduate of the International Space University and a member and alumni advisor of Gamma Mu Chapter of Sigma Nu. He earned a master's degree from the University of Houston, Clear Lake, in 1993. Berry is survived by his wife, mother, stepfather, sister, brother and aunt.

Timothy Gatzke (MS 89) of St. Charles, Missouri, died Thursday, March 17, 2011, at the age of 56. Gatzke had worked as a Boeing Associate Technical Fellow in the Advanced System Concepts & Exploration (ASC&E) group within the Boeing Integrated Defense Systems organization. Gatzke had earned a Ph.D. in Computer Science from Washington University in St. Louis, and had expertise in Computational Fluid Dynamics (CFD), particularly geometric modeling and grid generation.

Calling All Aerospace Engineering Fans!



AE encourages you to show your loyalty by becoming a fan on the Department's new Facebook page: **Aerospace Engineering at The University of Illinois**.

"Facebook is another tool for us to achieve our goal of engaging AE students and reaching out to and keeping in contact with AE alumni and friends," said Brett Clifton, Assistant Director of Advancement and Alumni Relations for the Department. "After being 'live' for just one day, we had over 120 fans of the page and we hope that number will continue to grow," said Clifton. *(By this newsletter's publication date, the number grew to about 345.)*

The page will be updated with news stories, important dates and links back to the Department's website.

For questions or comments, contact Brett Clifton, Assistant Director of Advancement & Alumni Relations, at bclifton@illinois.edu.

Thanks to Our Donors

The alumni and friends listed here contributed to Aerospace Engineering during Fiscal Year 10 (between July 1, 2010 and June 30, 2011). Thank you for your gifts! (All degrees are in AE unless otherwise indicated.)

\$20,000 and up

Richard R. Sladek, BS 50

\$10,000 to \$19,999

Preston A. Henne, BS 69
Janice Gillespie Sentman

\$5,000 to \$9,999

Mark A. Crowley, BS 83, and Nancy Jo Crowley
Steve Drum, BS 56, and Winifred Drum
Robert H. Meixner, Jr., BS 70, and Mary C. Meixner
Edward F. Thompson, BS 61, and Gail J. Thompson

\$1,000 to \$4,999

Kenneth L. Atkins, PhD 74, and Barbara A. Atkins
Thomas R. Berthold, BS 70, AB 70
General Curriculum
David S. Brach, BS 71
Michael B. Bragg, BS 76, MS 77, and Debra D. Bragg, BS 77
Vocational Home Economics Education
Max T. Braun, BS 50
Blaine W. Brown, BS 81
Steven J. D'Urso, BS 78, MS 89
Michael D. Davis, BS 76
Ronald J. Delismon, BS 59, and Janice Delismon
J. Craig Dutton, PhD 79
Mechanical Engineering
Jeff W. Fisher, BS 83, and Rita Crawford
Bruce T. Goodwin, MS 77, PhD 82, and Stephanie S. Goodwin, MS 77
Education, PhD 82
Education
John S. Kirby, BS 64, MS 67, PhD 70
William E. Kruse, BS 59, and Judith D. Kruse
Michael F. Lembeck, BS 80, MS 81, PhD 91
Robert H. Liebeck, BS 61, MS 62, PhD 68, and Cynthia E. Liebeck
Karl Lukens, BS 69
Jerry L. Lundry, BS 58, MS 59
Michael W. Miller, BS 76
Electrical Engineering, BS 76
George K. Muellner, BS 67
Benjamin P. Mui, BS 97, and Carrie A. Hartman, BS 97, MS 99
Steven R. Nagel, BS 69
Allen I. Ormsbee, BS 46, MS 49
Mathematics
Frank J. Parker, BS 81

Gary A. Rahn, BS 81, MS 82
Maido Saarlus, BS 53, MS 54, MS 57
Mathematics, and Nancy Lou Saarlus, BFA 56
Art Education, MA 58
Art Education
Wayne C. Solomon
Craig B. Sutter, BS 71, EDM 78
Education
Rudolph N. Yurkovich, BS 67, MS 68, and Leslie L. Yurkovich, BS 68
Microbiology

\$500 to \$999

Robert H. Chappell, Jr., BA 91
(LAS) Classics, MA 96
German
Robert E. Cusey, BS 64, MS 65, and Patricia L. Cusey, BA 65
Spanish, Italian & Teaching of Spanish
Martin C. deWet, BS 79, MS 82
Jack L. Gisinger, BS 71
William C. Haub, BS 73
Daniel T. Jensen, BS 88
Ronald A. Mays, BS 64
Howard F. Modjeski II, BS 74
James J. Moravec, BS 73
Mark C. Murbach, BS 81
David B. Shulman, BS 67
Carl E. Swain, BS 66, MS 67, PhD 71

\$100 to \$499

Paul S. Andrzejewski, Jr., BS 91
Lee J. Archambault, BS 82, MS 84
Ronald O. Armbrust, BS 70, MS 73
John D. Ausman, BS 89
Paul G. Baldassarre, BS 81
Robert H. Barnstable, BS 90, and Maeline A. Barnstable, BS 92
Speech & Hearing Science
James L. Beckwith, BS 57
John R. Biller, MS 69, PhD 73
Craig R. Bolt, BS 73
Stephen A. Bozek, BS 77
Physiology, and Vera D. Bozek
Blair P. Bromley, MS 98, PhD 01
Nuclear, Plasma, and Radiological Engineering
Daniel J. Burns, BS 82 and Gia L. Burns, BS 80
Business Administration
David L. Carroll, BS 85, MS 86, PhD 92
Michael J. Clemens, BS 72, and Loretta Clemens
Larry P. Cooper, BS 72, MS 74, PhD 76
Jason B. Ditman, BS 91, MS 93
Earl H. Dowell, BS 59
Robert M. Dunn, PhD 72
William G. Durtschi, BS 70
Harry B. Dwyer, BS 60, MS 62, PhD 65

Nicholas H. Evans, BS 99, and Karen D. Evans
Kedzie Davis Fernholz, BS 94
Fred K. Forster, BS 66
Robert L. Gallo, BS 76, and Debra F. Gallo, BA 76
French
Bruce D. Geddes, BS 73
Philippe H. Geubelle
Kim Ciariariello Griffin, BS 80
James Joseph Guglielmo, BS 92, MS 96 and Karen Michele Guglielmo
Michael A. Guntorius, BS 75, MS 76
H.A. Hassan, MS 53, PhD 56
Nadya N. Heinrich, BS 91, MS 93
Robert D. Hellweg, Jr., BS 66, MS 71
W. John Hoener, BS 82
Stephen J. Hoffman, BS 78, MS 80, PhD 84, and Joy P. Hoffman
Neil F. Householder, BS 61
Charles E. Hughes, Jr., BS 73
Arthur A. Ibers, BS 84
Richard W. Irwin, BS 66
John T. Kannapell and Jodi H. Kannapell
Henry Katz, BS 60, MS 62
Marvin C. Kempf, BS 61 and Susan M. Kempf
John L. Krazinski, BS 72, MS 74, PhD 78, and Lynda W. Krazinski
Kenneth D. Kugler, BS 58
Yongho Lee, MS 95, PhD 02
Karen E. Lucke, BS 88
William C. Malm, BS 78
Michael P. Mariani, BS 69, and Nancy A. Mariani
Gregory C. Mayer, BS 87, and Heidi R. Mayer
Michael L. McCleish, BS 71
John R. McGuire, BS 48
Pamela A. McVeigh, BS 93, and Raymond J. Hertel
Earl E. Meister III, BS 71, BS 75, MS 78, and Cynthia S. Meister, BS 76
Business Administration
Jason M. Merret, BS 99, MS 01, PhD 04
Robert J. Might, BS 68, MS 69
Ronald H. Miller, BS 84, and Sandra J. Miller
Christopher G. Mulcahy, BS 96 and Vernice Veranga-Mulcahy, BS 95
Teaching of Physical Science/Chemistry
Kevin P. Murphy, BS 92
Richard A. Nordsieck, BS 60
James M. Novak, BS 68, and Carmen Novak

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Ronald J. O'Malley, BS 07
 Thomas R. Oakley, BS 92, MS 95
 Robert L. Oetting, MS 71
 Richard G. Ollila, BS 60 and Nancy L. Ollila, BS 59 *Elementary Education*
 Richard C. Page III, BS 05, MS 07
 Edwin F. Perlman, BS 53, MS 63
 Lloyd G. Peterson
 John E. Prussing and Laurel L. Prussing
 Mel A. Radford, BS 68, and Marjory Radford
 Robert L. Radkey, BS 69, MS 71
 John P. Rashid, BS 80
 Ray D. Rezab, BS 84
 Brian C. Roskuski, BS 79, MS 80
 Conrad S. Rubinkowski, JD 76 Law
 David A. Scheiwe, BS 70
 Audrey I. Schien
 Charles L. Sentman
 David E. Snyder, BS 89 and Ellen E. Pastorino
 Lee A. Spacht, BS 77, MS 82
 Thomas Edward Stevens, BS 87
 Kentaro D. Sugiyama, BS 88
 Andrew Supinie, BS 81
 Steven G. Tragesser, BS 92, and Debra Tragesser
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 Andrew A. Trentacoste, BS 81 and Diane E. Trentacoste, BS 81 Painting
 Michael P. Tuitt, BS 83
 Gary M. Vance, BS 71, MS 73, and Judith A. Vance
 Richard A. Wakefield, MS 70, and Priscilla W. Wakefield
 Kevin J. Walker, BS 90, and Colleen F. Walker, BS 91 *Leisure Studies*
 James C. Watson, BS 51
 Robert D. Wendt, BS 03, MS 05
 Richard W. Whittaker, BS 64
 Joseph W. Widhalm, Jr., BS 67, PhD 85
 Allan R. Williams, BS 71
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Randal G. Abraham, BS 78
 Dean K. Ahuja, BS 90, and Lisa N. Ahuja, BS 90 *Mechanical Science & Engineering*
 Peter B. Ayoub, BS 68
 Barbara K. Baran
 Robert H. Bellman, BS 58
 Justin B. Berman, BS 91, MS 93, PhD 01

Why I Give

Why do I give you ask? Now that I'm well into my twilight years, it's certainly a fair and relevant question and having graduated in 1956 when Professor Stillwell was the department head, I've had much time for reflection. Basically it comes down to two reasons.



First, I will always feel that I'm deeply indebted to this great University and in particular, the Department of Aerospace Engineering for a life full of accomplishments and happiness. In my earning years, my two careers (the military and the oil industry) were studded with instances where just the knowledge of my University of Illinois credentials was the break point in my favor for job acquisitions and promotions. While I never worked in the engineering field, my University of Illinois background was generally an unmentioned factor in successfully propelling me through many marketing, management and political challenges.

The second reason is the need to do all I can to help move the Department forward. Through my infrequent participation in outside board activities, the need of adequate resourcing for the Department's programs becomes readily apparent. Our Department heads, past and present, have struggled through the years to keep the Department ahead of the curve and competitive, and I feel it's incumbent on me to do all possible to aid their endeavors. In this era of restricted state budgeting, it is vitally important for alumni to step forward to help fill the gap. In order to prepare our students to be competitive in facing the world, we have to continue to offer the best foundation possible and it all starts with a well funded Department. I simply view it as similar to tithing to my church.

This, my fellow alumni, is why I give and basically why you should do likewise.

Steve Drum
 BS 1956

Steve Drum served in the United States Air Force and went on to a successful career with Chevron, where he retired as the General Manager of Aviation. He and his wife, Winifred (pictured above), reside in Hillsborough, California, and also spend time on their family farm in upstate New York.

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 Michael J. Breza, BS 61
 Rodney L. Burton and Linda B. Burton
 Michael J. Caprini, BS 87
 Paul Tyson Couey, BS 86
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 Richard E. Fiscus, BS 66
 Louis M. Forman, BS 50
 Kimberly L. Gore, BS 01
 James D. Hansen, Jr., BS 66
 Kenneth A. Hemstreet, BS 68, and Nancy L. Magnus, BS 73
 Eugene G. Hill, BS 57
 Gregory D. Holm, BS 78

Charles W. Hurter, BS 48, MS 57
 William D. Isherwood, BS 72, and
 Dorothy A. Isherwood, BA 73 French
 Richard J. Krones, BS 95
 Mark R. Lawson, BS 72, MBA 74, and
 Paula J. Lawson, BS 73 Psychology,
 MS 74 Psychology
 Robert G. Lesch, BS 70
 Rimantas Liaugminas, BS 61, MS 64,
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 James D. Meyer, BS 84
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 Lowell H. Mills, BS 82 and Annette M.
 Mills, BS 86 Business Education
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 Robert A. Morstadt, BS 70
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 Gerald M. Petak, BS 64, and Mary Petak
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 James Sebastian, BS 92
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 Electrical Engineering
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 Josephine A. Stieglitz, BS 87
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 Lee Wagman, BS 66
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 Mary C. Willy, BS 63, MS 67, both
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We hope that all of you got the inaugural edition of the AE E-Newsletter, distributed in late September 2011! If not, please be sure to send us your contact information and news about yourself at <http://www.ae.illinois.edu/alumni/update.asp>, to continue to get the latest on what's happening in AE. Our E-Newsletter will be distributed periodically as our latest effort to connect with alumni and friends. You can also keep in touch with us through the Aerospace Engineering at the University of Illinois Facebook page!

