

AE Alumni Earn Departmental Honors

Bruce K. Donaldson, PhD 68, has been named the 2008 AE Distinguished Alumnus; and Joyee (Qi) Zhu, PhD 01, and Justin B. Berman, BS 91, MS 93, PhD 01, are the 2008 AE Outstanding Recent Alumni.

The Department recognized the three during the AE Awards Dinner held Thursday, April 24.

Bruce K. Donaldson

Donaldson was an aviator for the U.S. Navy in the mid 1950s before working for Boeing Company and Beach Aircraft Company as a structural dynamics engineer. He earned a bachelor's degree in engineering from

Columbia University and a master's from Wichita State University.

After earning his PhD, Donaldson spent his academic career at the University of Maryland, retiring from the Civil and Environmental Engineering Department in

2003. To his credit are two books, *Analysis of Aircraft Structures, An Introduction (2nd Edition)*, and *Introduction to Structural Dynamics*.

Joyee (Qi) Zhu

Zhu is a senior engineer in the Advanced Material Systems Applications Lab for GE Global Research in Niskayuna, N.Y. Since 2001 she has been the project leader for braided composite fan case design, analysis, material modeling and FAA certification. Zhu has earned several awards for her work at GE, including most recently the 2007 Management Award recognizing her outstanding performance and commitment on the GENx-1B Composite Fan Case Design, Analysis, Containment Test Correlation, and FAA Certification. As a student in 2000, she was presented the Strehlow Award for outstanding research accomplishment and the Amelia Earhart Fellowship for outstanding female students in aerospace engineering.

Zhu has had eight research papers published, and holds a 2007 patent for Integral Puncture-Resistant Liners for Impact Protection. She earned a master's in structural engineering from Nanyang Technological University in Singapore; and a bachelor's in engineering mechanics from Shanghai Jiao Tong University in the People's Republic of China.

Justin B. Berman

Berman is Chief of the Research & Engineering Division at the US Army Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, New Hampshire. With a workforce of over 160 employees and an annual obligation authority of \$86 million, he serves as senior advisor to the CRREL Director on all research and engineering initiatives and assists in strategic planning and program development in CRREL's eight technical areas. He serves on the Army Materials Science Coordinating Group where he actively develops and shapes Army-funded Materials Science research needs to support Military Engineering applications.

Berman has been honored with the CRREL Investing in People Award and the ERDC Award for Outstanding Team Effort in 2006 and 2002, respectively. In 1997 he received the US Army Construction Engineering Research Lab R&D Product Team Award. That same year he was selected as a USACE Emerging Leader where he participated in the ERDC's Emerging Leaders Advisory Group (ELAG) for several years.

He has served as Adjunct Faculty for the University of Alabama at Huntsville and has over 35 publications including eight refereed journal articles.

College Honors Hill with Distinguished Alumni Award

A leader in ground and in-flight icing research, AE Alumnus Eugene G. Hill, BS 57, has received the 2008 Alumni Award for Distinguished Service from the College of Engineering at the University of Illinois at Urbana-Champaign.

Hill, who also earned an MBA in 1973 in international finance from Seattle University, was cited for seminal contributions to aircraft safety as a researcher, designer, manager, and international leader in commercial aviation.



Berman and Donaldson and Zhu



Eugene G. Hill

Hill has a distinguished record of nearly 50 years of service to the advancement of aeronautics through improved flight safety. He worked for the Federal Aviation Administration from 1996 until his retirement in early 2007. In this role, he served as a recognized national and international expert and consultant in the field of aircraft icing protection.

Hill has worked with meteorological research organizations such as the National Center for Atmospheric Research (NCAR) and the Meteorological Service of Canada (MSC) to ensure the proper execution of vital weather research. His effort to foster and encourage collaboration among these groups has been key to the recent success enjoyed in weather research and forecasting capabilities for icing.

Before joining the FAA, Hill worked for The Boeing Company for 37 years. There, he managed ground and in-flight icing programs and was responsible for Boeing policies, plans, and strategies for addressing in-flight icing and related regulatory issues. This research led the field and defined and presented, for the first time, a clear understanding of icing effects and its quantified impact on aircraft operations.

His research on anti-icing fluids, in collaboration with Thomas Zierten, was the basis for the "aerodynamic acceptance test"—an important contribution to operational safety. The Society of Automotive Engineers adopted the test that is still used in industry. Earlier in his career at Boeing, Hill helped invent and holds two patents on reconfigurable leading-edge flap systems for high-lift wing configurations. He was responsible for the aerodynamic configuration and performance of the Next-Generation 737. Also, while he was at Boeing, Hill managed testing development at the Boeing Aerodynamic Laboratory and helped develop the Boeing models 707, 720, 727, and 767. He was further involved in those models' certifications for U.S. and foreign agencies.

Since 1998, Hill has served on the Department of Aerospace Engineering Alumni Advisory Board. AE awarded him the Department's Distinguished Alumnus Award in 1999. The Society of Automotive Engineers honored Hill with the 2004 Franklin W. Kolk Air Transportation Progress Award in recognition of his leadership in the field of aircraft icing and broad, outstanding contributions to SAE and to aviation safety. The SAE Technical Standards Board recognized Hill in 2007 for his outstanding contributions to that organization.

AE Alums Gather in Seattle, Houston



Several AE alumni enjoyed the Engineering at Illinois Seattle Area Reception, held July 20 at the Boeing Museum of Flight.



Astronaut alumni were drawn to the Aerospace at Illinois Houston Reception held July 18 at the Space Center Houston. From left are Col. Lee Archambault, AE Department Head Craig Dutton, Joseph Tanner and Capt. Scott D. Altman.

McDonald among National Scholar-Athlete Class



Ryan McDonald

Ryan McDonald, a graduate student in aerospace engineering and starting center on the varsity football team, has been named a 2008 National Scholar-Athlete as announced by the National Football Foundation and College Football Hall of Fame. The 15 class members each win \$18,000 postgraduate scholarships as finalists for the 2008 Draddy Trophy, celebrating half-a-century of NFF National Scholar-Athletes.

McDonald, who holds a 3.81 GPA, was named to the Dean's List or better every semester of his undergraduate career. McDonald was also a three-time Academic All-Big Ten choice. A recipient of the Coach Lou Saban National Scholar-Athlete Award (funded by George M. Steinbrenner III), McDonald is the eighth Fighting Illini player named an NFF National Scholar-Athlete.

A 2007 ESPN The Magazine First Team Academic All-America selection, McDonald was named the 2008 Anson Mount Scholar-Athlete Award recipient. As a four-year starter at Illinois, the Holland, Mich., native is on pace to break the school record for most starts in a career.

A vital part of the Illini offense that led the Big Ten in rushing in 2006 and '07, McDonald led Illinois to a record-breaking 2007 season and the team's first trip to the Rose Bowl since 1984. He was key to an offensive line that set the school record for fewest sacks allowed in a season (16) in 2007.

In honor of his mother, who suffers from multiple sclerosis, McDonald organized a team of fellow players for the 2008 MS Walk, raising \$1,500 for the charity. He is also a member of the Fellowship of Christian Athletes.

The NFF's National Scholar-Athlete program, launched in 1959, is recognized as the first and most prestigious initiative in the history of college sports to honor football players for their combined athletic ability, academic success and civic leadership.

Candidates must be a senior or graduate student in their final year of eligibility, have a grade point average of at least 3.2 on a 4.0 scale, have outstanding football ability as a first team player and have demonstrated strong leadership and citizenship. Selected by the NFF Awards Committee, the 15 National Scholar-Athlete Award recipients will

be honored at the 2008 NFF Annual Awards Dinner December 9 at the Waldorf-Astoria in New York City. The event will also include the induction of the 2008 College Football Hall of Fame and the presentation of several major awards.

Each will receive an \$18,000 post-graduate scholarship, and one of the 15 will be announced as the recipient of the 2008 Draddy Trophy, presented by HealthSouth, which recognizes an individual as the absolute best scholar-athlete in the nation. Established to honor former NFF Chairman Vincent DePaul Draddy, a Manhattan College quarterback who developed the Izod and Lacoste brands, the award comes with a 24-inch, 25-pound bronze trophy and increases the winner's scholarship to \$25,000.



Ryan McDonald plays offensive line at Illinois, just like his dad, Phil, did in the 1970s.

AE Teams Sweep Space Design Competition

Aerospace Engineering teams from the University of Illinois swept all awards in the recent 2007-2008 Undergraduate Team Space Design Competition, sponsored by the American Institute of Aeronautics and Astronautics Foundation.

The competition requires teams to design a space vehicle to complete a specified task, focusing both on mission completion and on the total costs. This year's competition asked entrants to design a vehicle to retrieve various artifacts from Apollo moon missions and return them from the moon to the Earth. Eligible Apollo mission artifacts were those from Apollo 12 through Apollo 17; artifacts from Apollo 11 were off-limits.

Advised by AE Prof. Victoria Coverstone, five Illinois teams competed, doing the work as their senior design projects. Three teams took home prizes. "Each team conceptualized a unique approach to completing the mission," Coverstone said. "Our students are innovative and technically savvy. It comes as no surprise that they swept the national competition. They are simply the best and I'm very proud of them."

The first prize, \$2,500 from the AIAA Foundation and an opportunity to present the work at the recent AIAA Conference in San Diego, went to Team Lunatics, whose members were: leader Joel Nordness; members William Andrews, Brianna Aubin, Seth Baynar, Josh Birnbaum, Abdul Rahman El Fouly, Michael Larsen and Charles Spellman.

Second prize and a \$1,500 award went to Team Epimetheus, whose members were: leader Steven Moran; members Elizabeth Bozek, Peter Clark, Thomas Herges, Greg Sabina, Matthew Star, William Wheeler, and Robert Wilson.

Third prize and a \$1,000 award went to Team ARO (Artifact Recovery Operation), whose members were: leader Aaron D'Souza; and members Ryne Beeson, Kelly Cole, Justin Heppe, Jonathan Huffman, Adam Molski, Christopher Re, and Zaki Sheikh.

AIAA set up the contest as though a mysterious entrepreneur was offering a \$1 billion prize for teams

to recover items ranging in value from 100 to 500 points. The first team to return items worth 250 points would be the winners. Among the items were a U.S. flag, a moon buggy antenna, Alan Shepard's golf ball, and other discarded items.

Aubin said her team's goal was to recover Shepard's golf ball because it was worth the most points at 500. Aubin's team designed a landing craft that would get to the moon to release a rover to search for the artifacts. The rover was designed to then come back to a return capsule, also carried on the landing craft. The capsule would then fire and make the trip back to Earth.

The technical side of the mission involved designing a lander, rover and return capsule, planning orbital trajectories and propulsion, and determining how to bring the capsule back and recover it. Teams also had to plan the business end of the project and find the means to pay for it. Aubin said her team cited grants, advertising, loans, investors and payments to use the rover for public outreach and experiments.

Said AE Department Head J. Craig Dutton of the teams' achievements, "Obviously, the AE Department is extremely proud of its students' remarkable performance in this competition. This speaks volumes to their creativity, hard work, and dedication. Congratulations to all these students and their advisor, Prof. Coverstone."



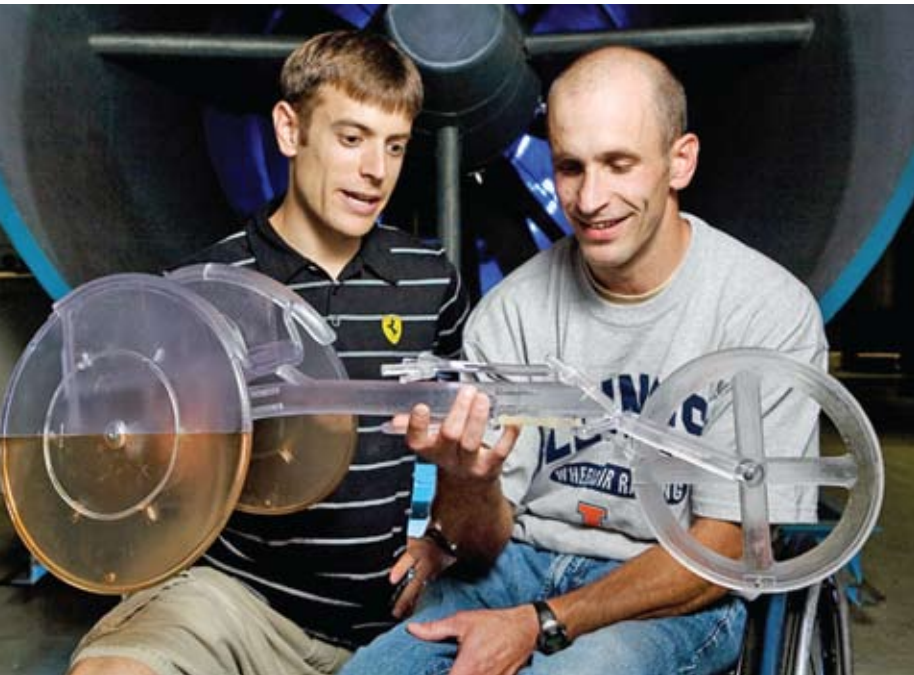
Members of AE's First Place 2007-2008 Undergraduate Space Design Competition Team: (back row, from left) Abdul Rahman El Fouly, Charles Spellman, William Andrews, Michael Larsen; (front row, from left) Joel Nordness, Brianna Aubin, Josh Birnbaum, Seth Baynar.

AE Group Works to Improve Athletes' Results in Paralympics

BY MELISSA MITCHELL, NEWS EDITOR FOR THE UNIVERSITY OF ILLINOIS NEWS BUREAU

CHAMPAIGN, Ill.—A group of aerospace engineering students worked this year to improve the racing speeds of athletes who competed in Beijing in the 2008 Paralympic Games. Those games took place in China's capital city Sept. 6-17.

For the past year, the students—under the tutelage of former department head Mike Bragg (now an associate dean in the College of Engineering) and research scientist Andy Broeren (now with NASA)—have been conducting a series of experiments with half-scale and smaller models of racing wheelchairs



Greg Busch, aerospace engineering graduate student, left, and Adam Bleakney, UI wheelchair track coach hold a racing wheelchair model that was tested in the wind tunnel on campus.

and their own mini-sized version of a crash-test dummy in the department's wind tunnel. Some of the students began working on the project in Broeren's senior design course last fall and have since formed a registered student organization called the Racing Wheelchair Aerodynamics Design Team.

The team's goal has been to figure out how the U. of I. racers—and other competitive racers—can make aerodynamic improvements that would ultimately enhance performance speeds.

"There are very few examples in the literature on wheelchair aerodynamics," said research team member Greg Busch. "There is a lot of intuitive thought on how to do it. For instance, to keep the frontal area of the chair small, or for the racers to tuck their heads."

Bleakney said some racers have tried other tricks, including taping contact paper to the undercarriage of the chair. As it turns out, "that doesn't do anything measurable," said Busch, noting that undercarriage taping was one of several theories put to the test.

A couple of the other ideas did yield noticeable, measurable results. For instance, the research team found that athletes who position their heads and torsos in a tucked, rather than upright, position, realize a 10 percent reduction in drag.

The students also have studied the effect of attaching various sizes of fairings to the scale models they've tested. Similar in function to the windshield on some motorcycles (also known as a fairing), the bullet-shaped attachment "smoothes airflow around riders, reducing aerodynamic drag," Busch said.

Their most successful attempt on that front yielded a 12 percent drag reduction.

The best overall benefit, however, appears to be combining a fairing with the racer in the tucked position. With that configuration, drag was reduced by 25 percent. "We figured we would have a few percentage-point differences," Busch said, "but 25 percent was a big surprise."

Other variables the engineering students have investigated include the design of the chairs' front wheel—spoked or solid—and positioning the rider's feet tucked under the body versus feet dangling.

U. of I. coach and Paralympics competitor Bleakney said he and the student athletes are excited about the initial findings of the engineering team because prior to this, ideas about what worked and what didn't were largely unproven.

"Because we had no scientific data, everything was ad hoc," he said. "That's what's exciting about the work and the data we've got now. It gives us a base to work off of, for starting testing on the field to see if the data in the wind tunnel correlates to the real world."

L. Brian Stauffer