Aeronautics & Astronautics

Autumn Quarter 2006

Highflight

UNIVERSITY OF WASHINGTON
COLLEGE of ENGINEERING
A Community of Innovators

In this issue

Extravehicular Activity

Most engineers are handy at fixing things. They change batteries, hang mirrors, and install insulation. However, few perform such tasks in outer space. As shuttle pilot of the next Hubble Space Telescope Mission, A&A alumnus **Gregory C. Johnson (BS 77)** will help deliver a team of astronauts to do just that.

Photo by NASA

Launch of the Space Shuttle Atlantis, STS-106, Sept. 8, 2000

Hubble's fate was uncertain until a recent announcement by NASA that it would send a final mission to the observatory in 2008. No one could be better qualified to pilot this mission than Greg Johnson. While Greg attended the UW, he piloted seaplanes to Canada and was a flight instructor with Kenmore Air Harbor. After graduation from the UW, Greg received his commission through the Naval Aviation Officer Candidate Program in Pensacola, Florida. In 1984, he attended the US Air Force Test Pilot School at Edwards Air Force Base, then served at the Naval Weapons Center in China Lake, California, and the Naval Air Station on Whidbey Island, Washington. He is currently a Captain in the US Navy Reserves. In 1990, Greg accepted a position with the NASA JSC Aircraft Operations Division as an aerospace engineer and research pilot, and in 1998 was selected as an astronaut candidate. He received intensive instruction in shuttle and international space station systems.

Photo by NASA

Dust cloud around unusual star V838 Mon

Photo by NASA

Gregory C. Johnson

On the upcoming mission, Greg's piloting skills will be put to the test as the shuttle comes within 30 feet of Hubble, using a robotic arm to lock on to the telescope and lower it to a berthing platform. The astronaut team will then perform equipment maintenance and repairs, and install state-of-the-art scientific instruments during five space walks (or "extravehicular activities"). Once the upgrades have been made the telescope will be oriented for release. When Hubble is set free, the shuttle will fire its jets and move slowly away, with the crew filming the departure. You can see Hubble's images from deep space on NASA's Web site: http://www.nasa.gov/mission_pages/hubble/main/index.html

We wish Greg and the team a safe and successful mission.

Photo by NASA

Hubble orbiting the Earth

Save the Date:
A&A Spring Banquet
Friday
May 11, 2007

Message from the Chair

Adam Bruckner

We all know that neither sleet nor snow will deter the delivery of mail. It's also true that it doesn't keep construction workers from the restoration of Guggenheim Hall. While November 2006 will be marked in Seattle's record books for its overabundance of rain and snow, great progress is being made in updating the home of the Department of Aeronautics and Astronautics. As I write this, the interior demolition is completed, the shear walls are in place, and the dirt floor of the basement is covered with a concrete pour. While Condon Hall is serving us well, we will be more than excited to return to Guggenheim in the late summer of 2007. Its classrooms and laboratory space will enhance the excellent teaching and learning that is the hallmark of aerospace education at the UW.

Matt O'Donnell joined the College of Engineering as our new Dean on August 1st (see article below). He met with the A&A faculty and staff in September to learn more about us, and also attended our annual department retreat to talk about his vision for the College.

Our graduate program has grown to nearly 140 students, 1/3 of whom are part–time. In addition, we have hosted visiting graduates from around the world (see the article on p. 5), and want to encourage our own students to take advantage of opportunities to live and study abroad.

Last summer we added a new certificate program to the Master of Aerospace Engineering Degree: the Global Integrated Systems Engineering (GISE) program, which was offered jointly by the College of Engineering and the Business School, with initial funding from Boeing. As a result of its initial success, GISE will be offered anually during the regular academic year. We will also offer a senior-level course in Systems Engineering starting winter 2007.

As part of our strategic planning we are working to establish two new research centers, the Center for Autonomous Systems and the Space Systems Center, the latter with seed-funding by Aerojet in Redmond. We are excited about the development of these centers and look forward to reporting on them in detail in our next newsletter.

We wish you a happy Holiday Season, and a Happy 2007!

Dean Matthew O'Donnell Joins the College of Engineering

Matthew O'Donnell is an energetic, straightforward and good-humored leader with a clear vision for the success of the College of Engineering (COE). As its new dean, these traits will serve him well. O'Donnell, who was chair of the University of Michigan's Department of Biomedical Engineering, joined the College in August. He was drawn to the UW because of its strong interdisciplinary culture and the possibilities that such a tradition implies. "To truly be a leader in the 21st century, an engineering school is going to need a complete university with all the major components that go into that—a top medical school, a strong arts and sciences program, a solid business school, good public policy and public health programs," he said. "Those will be critical for top engineering schools, and the UW has them all."

O'Donnell and his wife Catherine, a journalist, share a passion for reading and learning with friends. "We'll be looking for a good book group to join," O'Donnell said. He also looks forward to the outdoor pursuits the Seattle area offers.

A physicist by training with undergraduate through doctoral degrees from Notre Dame, O'Donnell is a scientist-engineer who works across disciplines. He joined the University of Michigan faculty in 1990 as a professor of electrical engineering and computer science. In 1998, he was named the Jerry W. and Carol L. Levin Professor of Engineering and was appointed chair of the Biomedical Engineering Department in 1999. He also won several engineering teaching awards at Michigan.

Dean Matthew O'Donnell

Before arriving at the UW, O'Donnell reviewed "state–of–the–department" documents from the entire College. In addition, he met with department faculty and staff to learn about their activities, plans and concerns. We welcome Matt O'Donnell to the UW College of Engineering, and look forward to working closely with him in the coming years.

Guggenheim Hall Update

Distinguished Alumnus Richard Scherrer (BS 42) visited campus in the spring from Port Townsend, and toured Guggenheim Hall with department chair, Professor Adam Bruckner

Because it was their "home," too, the A&A department has made an effort to connect with our alumni about the renovation of Guggenheim Hall. We know that updating the 75+ year-old building makes sense, and we also know there is much affection for the place where one worked hard to complete a degree.

Beginning with farewell events last winter, we have continued bringing news to alumni about the changes by conducting small construction tours on campus. For alumni living outside the area, we have been bringing updates about the restoration.

The time spent with alumni who visit with us about their student days in Guggenheim Hall has been very special. We have gathered many personal reminiscences, and will place these stories into a compilation to share.

The renovation of Guggenheim will bring in state-of-the-art educational technologies. Today's and tomorrow's students will certainly appreciate the modernization. As education becomes increasingly hands-on, having the right facility for learning is important. In this way students will have the educational experience that will make the transition to a career successful.

While the majority of this restoration is funded by the State of Washington, 15% of the project, or approximately $5 million, must be raised through private gifts. Many of our alumni and friends have already responded with gifts ranging from $100 to multi-year five- or six-figure pledges of support. Creating a state-of-the-art facility that meets safety standards, addresses access issues, and improves how we teach and conduct research is our highest priority. You can make a genuine difference for A&A students by joining us in making a "renewed" Guggenheim Hall a reality.

For a brochure about the campaign to renovate Guggenheim Hall, or to make a gift, please contact Paul Julin at julin@engr.washington.edu or 206-685-1927.

Research Updates

Professor Jim Hermanson spent four weeks this autumn quarter conducting microgravity combustion experiments in NASA Glenn Research Center's 2.2-second Drop Tower in Cleveland, Ohio, as part of a larger NASA-supported study in A&A on pulsed, turbulent jet flames. The work extended drop tower research performed at NASA last year by PhD student Mathieu Fregeau.

The removal of buoyancy in microgravity provides a unique environment for combustion studies and can reveal important details of flame behavior not observable in the laboratory in normal gravity. The resulting new understanding can lead to improvements in efficiency and to lower levels of exhaust emissions in combustion systems, including aeropropulsion, power generation, and domestic and industrial heating applications.

Professor Hermanson in the NASA Glenn Drop Tower

The A&A Autonomous Flight Systems Laboratory (AFSL) has teamed up with Northwind Marine to develop and demonstrate the capability for autonomous cooperative behavior among Unmanned Surface Vehicle (USVs). The US Navy has identified a need for search capability by a team of USVs. The primary limitation to concurrent operation of multiple unmanned vehicles is the lack of autonomy. For example, the lack of autonomy severely restricts "out-of-sight" operations, making cooperation between multiple vehicles practically impossible. Based on preliminary work performed by the AFSL, Washington Technology Center has awarded it significant phase two funding for the project, ranking it first among its invited proposals.

Sea Fox USV

The cooperative USV system will be flexible enough to include the support of Unmanned Air Vehicles (UAVs) for which the AFSL developed a suite of programs for autonomous task and path planning.

Departures

Scott Eberhardt

Professor D. Scott Eberhardt left the UW in January for a leave of absence to work at Boeing. In September, he decided to stay at Boeing permanently, and resigned his position in A&A, where he had served for 20 years. Scott, an expert in computational fluid dynamics, served as the undergraduate faculty advisor for many years in addition to teaching. One of his notable contributions was to develop AA 101, A&A's popular introductory course, "Air and Space Vehicles." He also co-authored the book *Understanding Flight*.We wish Scott well in his "second" career!

Dan Lotz, A&A Research Engineer, retired in August. Dan contributed to a variety of important projects during his 31 years here, but was particularly instrumental in work he performed for the Fusion group. He is an expert in electronics whose skills were utilized by faculty, staff and students alike.

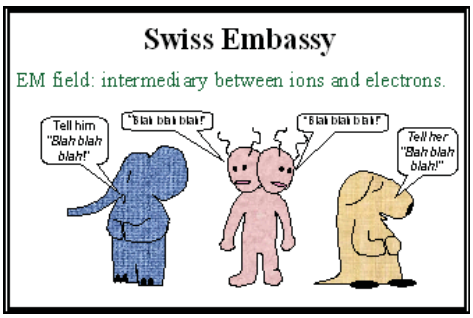
We knew Dan was a talented engineer, but he is also a talented

artist. He is now able to spend more time with such "right-brain" activities as painting (especially seascapes, as shown here).

We thank Dan for his many years of hard work and dedication, and wish him smooth sailing in his retirement.

Plasma Relaxation: the Super Comic Edition

Every summer the Los Alamos National Laboratory hosts the Plasma Physics Summer School for undergraduate students to engage in hands-on work with the scientists. One facet of the summer school is a series of lectures on basic plasma physics concepts and an introduction to "emerging fusion concepts." **Dr. Loren Steinhauer (BS 66, PhD 70)** of the Redmond Plasma Physics Laboratory, who has been active in field reversed configuration research since the late 1970's, was invited to give one of the lectures this year. His topic was "Plasma Relaxation." The lectures are expected to both "stretch" the students and be geared at a level they can reach. Recalling his own grasp of mathematics as an undergraduate in the A&A department many years ago, Steinhauer realized that outreach to these students, bright as they are, would be a serious exercise in 'downreach.' "The



mathematics of plasma relaxation is pretty sophisticated; they would gain nothing if I snowed them," he said. A hobby cartoonist, Steinhauer decided to adapt some characters he had developed as comics for his grandchildren, one of which is shown here. Not only did it reach out to the students but also to the "hardened" scientists who attended the lecture. The cartoons proved to be a helpful medium for communicating the subtle concepts of the lecture topic, as well as energizing otherwise dry mathematics.

ASC Conference at UW

The 22nd Annual Technical Conference of the American Society for Composites will be held at the University of Washington September 17-19, 2007. The conference, "Composites: Enabling a New Era of Civil Aviation," will feature technical paper sessions, panel discussions, and keynote speakers highlighting advances in the analysis, design, manufacturing, and applications of advanced composites. Please contact conference chairs A&A **Professor Paolo Feraboli and Dr. Patrick Stickler** of Boeing 787 Technology Integration at: ASC2007@aa.washington.edu Conference website: http://www.asc2007.com

COE Community and Innovation Awards

Acting Dean Mani Soma and Carmela Halos

Carmela Halos, A&A Fiscal Specialist II, received Honorable Mention as an outstanding staff nominee for the College of Engineering 2006 Community Innovation Awards. It was noted that Carmela effortlessly and cheerfully tackles any projects given to her.

Graduate student **Keith Munson** was nominated as an outstanding teaching assistant. Both were recognized at the awards ceremony in April attended by College staff, faculty and students.

International Programs and Exchanges

Partnerships facilitated by the UW International Programs and Exchanges Office allow students from universities outside the US to study here, and our students to go to foreign universities. We have had several students from Ecole Nationale Supérieure de Mécanique et d'Aérotechnique, and Ecole Nationale de l'Aviation Civile in France, and the University of Stuttgart, in Germany; but the majority of our student exchanges have been with the Technische Universität Berlin (TUB). During the last ten years, two of our graduates have studied there, and 11 TUB students have visited our department. Students taking part in the exchange generally perform research under the supervision of a faculty member, and may take classes as well.

Henning Kroll

"We hope to encourage more of our students to participate in these exchanges," says A&A Chair, Adam Bruckner. "Living and studying abroad is an invaluable experience, particularly in light of today's global economy."

A&A Prof. Jim Hermanson seconds that sentiment. He recently represented the UW at the TUB on the occasion of the 10th anniversary of the Reinhardt-Abraham Memorial Foundation, which provides much of the funding for these educational exchanges.

Henning Kroll, a visiting graduate from TUB says, "The UW is one of the nation's outstanding teaching and research institutions, and immediately struck me as an ideal choice. The A&A Department offers a very interesting program highly relevant to my area of specialization. I am very excited to have the opportunity to gain from the collaboration and contact with students from different countries and backgrounds and thus broaden my cultural and academic horizons."

Students interested in participating in an international exchange should contact Professor Bruckner at: bruckner@aa.washington.edu

Photo by James Hermanson

Brandenburg Gate in Berlin

Student Research Presentations

A&A Graduate students have been busy this year presenting the results of their research at conferences around the world.

Space Technology and Applications International Forum, Albuquerque, NM: Sean Knecht (Prof. Shumlak), *Propulsion and Power Generation Capabilities of a Dense Plasma Focus (DPF) Fusion System for Future Military Aerospace Vehicles*

Information Storage Industry Consortium, LaJolla, CA and Ft. Collins, CO: Yuko Hatano (Prof. Devasia), *Seek Control for Dual-Stage Hard Disk Drives,* and *Pre and Post-Actuation for Minimum-Energy Seek Control in Dual-Stage Hard Disk Drives*; Dhanakorn Iamratanakul (Prof. Devasia), *High-speed, Nano-positioning in Dual-stage Servo Systems*

2006 American Control Conference, Minneapolis, MN: Dhanakorn Iamratanakul (Prof. Devasia), *Optimal Seek-Trajectory Design for Dual-Stage Systems*; Amirreza Rahmani (Prof. Mesbahi), *On the Controlled Agreement Problem*; Daniel Klein (Prof. Morgansen), *Controlled Collective Motion for Trajectory Tracking*; Ben Triplett (Prof. Morgansen), *Abbreviated Zero Order Hold for Formation Control in the Presence of Communication and Sensing Delays*

33rd Annual IEEE International Conference on Plasma Sciences, Traverse City, MI: Bhuvana Srinivasan (Prof. Shumlak), *A Comparison Between the Discontinuous Galerkin Algorithm and the High Resolution Wave Propagation Algorithm for the Full Two-Fluid Plasma Model*

IEEE COMPEL Conference, Troy, NY: Carlos Gonzalez (Prof. Mesbahi), *On the Distributed Circuit Simulations*

31st International Symposium on Combustion, Heidelberg, Germany: Mathieu Fregeau (Prof. Hermanson), *Large-scale Structure Dynamics and Buoyancy Effects in Strongly-Pulsed Turbulent Jet Diffusion Flames*, and *CO and NO Emissions of Strongly-Pulsed Turbulent Jet Diffusion Flames*

48th Annual Division of Plasma Physics, American Physical Society, Philadelphia, PA: Keith Munson (Prof. Shumlak), *ZaP Flow Z-pinch EUV Light Source for Lithography;* Paul Sieck (Prof. Jarboe), *Spheromak Formation by Steady Inductive Helicity Injection*; Jonathan Wrobel (Prof. Jarboe), *Feedback Stabilization for the HIT-SI Device;* Rabih Aboul Hosn (Prof. Jarboe), *HIT-SI Injector Voltage Measurements Using Injector Langmuir Probes;* Will Hamp (Prof. Jarboe), *Current Drive Experiments in the Helicity Injected Torus II*; Eric Meier (Profs. Jarboe and Shumlak), *Boundary Conditions in MH4D, a Tetrahedral Mesh MHD Code*; Sean D. Knecht (Prof. Shumlak), *Modified Cathode Design for the ZaP Flow Z-Pinch Experiment;* Bhuvana Srinivasan (Prof. Shumlak), *Applying Asymptotic Approximations to the Full Two-Fluid Plasma System to*

continued on p. 7

2006 Student Capstone Design Projects

Space Design

The moon's lack of atmosphere and relative freedom from man-made interference, particularly on the far side, makes it an ideal base for astronomy. The low gravity allows the use of lightweight structures even for very large telescopes and it has been an enduring dream of astronomers to establish an observatory on the moon. This year's Senior Space Design class, under the guidance of **Professor Tom Mattick**, developed a mission to emplace and operate a 2-meter ultraviolet telescope on the moon's far side and to implement infrastructure for future expansion of the base for radioastronomy. The observatory would provide capabilities comparable to the Hubble telescope, which will retire around 2013. The mission included design of a vehicle to transport and land the observatory, infrastructure for providing power and communications, and facilities to interface with future missions to the site.

Seniors (l-r) Ben Stuart, Sasha MacDonald, Amanda Horike, Elof Peitso, Marleen Martinez

Novel elements included a nuclear power system to keep the observatory running during the 14-earth-day lunar night, and placing a communications satellite in a halo orbit around the "L2" Lagrange point to enable constant contact between the moon's far side and earth. A highlight of the course was the attendance by five of the students and Professor Mattick at the 2006 RASC-AL conference in Cape Canaveral in May. Attendees **Amanda Horike, Marleen Martinez, Sasha MacDonald, Ben Stuart** and **Elof Peitso** presented the mission before the RASC-AL steering committee and several other undergraduate and graduate space design teams, and were invited to tour the Kennedy Space Center.

Airplane Design

The challenge was for students to design a 12 passenger, 4000-mile range, low-sonic-boom supersonic business jet (SSBJ), then scale it down dynamically and build a flying UAV for researching low-speed flight characteristics and handling qualities. Twenty-eight seniors in the capstone airplane design courses tackled this challenge, guided by **Professor Eli Livne, Chet Nelson from Boeing Commercial** and **Paul Robertson from Aeronautical Testing Service (ATS)**.

During the two-quarter span of the course, students learned airplane design fundamentals, selected a design challenge, carried out conceptual design studies, selected a final configuration and proceeded to work on it in detail. This included computer aided design, geometry generation, commercial-quality wind tunnel model and tests, construction of the composite-airframe UAV and its systems, and, finally, ground tests and flight tests. Analyses of the vehicle using commercial computational tools covered aerodynamics, stability and control, performance, structures, aeroelasticity, weight and balance, and propulsion integration. Correlation of numerical results with test results was emphasized to help the students build experience regarding the capabilities and limitations of computer models. Sixty-six test runs were carried out over one and a half weeks, including flow visualization and engine power-on runs.

SSBJ Model in the Kirsten Wind Tunnel

The very demanding schedule for this ambitious effort (about 15 weeks from start to finish after an initial 5 weeks of introductory design fundamentals) brought students to the end of the academic year with a completed vehicle but with little time left for flight tests. A first flight attempt was aborted in June due to electromagnetic interference between the antenna, the graphite/epoxy internal structure, and the telemetry system, as well as missing landing gear safety pins that led to landing gear malfunction. After the required modifications the UAV is now being readied for its flight tests.

Strong and generous support by Boeing and ATS makes our airplane design course unique in terms of scope and resources available for our students. Our thanks to them, and congratulations to the students in the 2006 capstone airplane design class.

2006 STUDENT AWARDS

UNDERGRADUATE

A&A Design Award for Aeronautics
Loren Bench and Anish Taylor
A&A Space Design Award
Adam Hendricksen and Amanda Horike
Bishop-Fleet Foundation Scholarship
Tom Culver
Clayton and Helen Danner Scholarship
Leslie Newberry
Clyde L. and Ursula A. Crawford Scholarship
Chad Rider
Dale and Marjorie Myers Scholarship
Joey Duncan and Matt Heikell
Engineering Alumni Association Scholarship
Angela Stickle
George E. Solomon Prize for Exceptional Performance
Takashi Maruo
Lance Erik Fogde Endowed Scholarship
Eric Bruun
Robert J. Helberg Memorial Award
Sasha MacDonald
Robert Max Reynolds Endowed Scholarship
Elof Peitso and Josh Proctor
Roy E. and Irene C. Grossman Scholarship
Riana Ignacio, David Peters, and Kimberlee Shish
Rudolph H. Reichel Memorial Award
Elishka Jackson
Dr. Walter F. Hiltner Award
Linh Nguyen

GRADUATE

Achievement Rewards for College Scientists
Bret Stewart
Aeronautics and Astronautics Alum Fellowship
Travis Bryce
Andris Vagners Memorial Fellowship
Daniel Zelazo
The Boeing Company Fellowship
Randall Svac
Clairmont L. Egtvedt Fellowship
Elof Peitso
George and Anita Snyder Fellowship
Davud Kasparov
Gordon C. Oates Memorial Endowed Fellowship
Robert Grothe
Graduate School Top Scholars Award
Andres Eguinlian
Louis and Katherine Marsh Fellowship
Ryan Biggs
Ruth Hertzberg Endowed Fellowship
Aurelie Heritier
William M. and Marilyn Conner Fellowship
Gaetano Settineri

Students Fly in ZeroG

Michael Frostad and Annamarie Askren

The Students for the Exploration and Development of Space-UW Chapter arranged with the Zero Gravity Corporation for a group flight. When funding by the national chapter fell through, they were able to gain support and generous contributions from: Andrews Space, AIAA, Vista Engineering Technologies, Space Generation Advisory Council, FSRI, the National Space Society, the Kirsten Wind Tunnel, GenCorp, AeroJet, NASA Space Grant, the Research Institute for Space Exploration and the A&A Department.

Under the guidance of **Professor Robert Breidenthal,** the students developed an experiment to study varying accelerations on generalized Rayleigh-Taylor flow. They were joined on the trip by students from Pasco High School who won a competition to promote math and science to economically disadvantaged schools. When they arrived in Florida, they learned that equipment for the experiments was destroyed during shipping. Nonetheless, they held a brainstorming session, came up with a plan for a modified research experiment, and they all had a chance to fly in zeroG.

Student Research Presentations

(continued from p. 5)

Study Reduced Fluid Models; Robert Lilly (Prof. Shumlak), *Numerical Implementation of the 10-Moment Two Fluid Model,* and *Study of the Flow Z-Pinch Fusion Concept*

59th American Physics Society, Division of Fluid Dynamics, Tampa Bay, FL: Mazyar Amin (Prof. Dabiri), *Effect of Various Parameters on Evolution of 2D Free Jets and Their Associated Entrainment Rates;* undergraduate Andree Susanto (Prof. Dabiri), *Statistical Methods for Post-Correlation PIV Outlier Detection*; David Schmitt (Prof. Dabiri), *Development of a 3D Digital Particle Image Thermometry and Velocimetry (3DDPITV) System;* Wei-Hsin Tien (Prof. Dabiri), *Development and Application of a Modified Single-Camera 3DDPIV System*

2006 UW Undergraduate Research Symposium: Joni DeBoever, *Plasma Space Thrusters: The Way of the Future;* Amanda Horike, *Ionic Wind Lifter*
Joshua Proctor, *Averaged Models for Passive Mode-Locking Uusing Nonlinear Mode-Coupling,* Gregory Quetin, *High Powered Helicon;* Kimberlee Shish, *Nonlinear Mode Coupling in Dual Core Fibers and Waveguide Arrays: Theory and Application*

2006 Distinguished Alumnus

Stanley Beckelman was born in Minneapolis, Minnesota and completed his public schooling in Seattle, Washington. Graduating from the University of Washington in 1958 with a Bachelor of Science in aeronautical engineering, Beckelman later completed the Executive Management Program and the Executive Marketing and Sales Programs at Columbia University.

In 1958 Beckelman joined The Boeing Company as an engineer doing astrodynamics development work on Department of Defense missile programs. Beckelman quickly earned distinction as the Boeing Program Manager of the NASA Saturn V Systems Engineering and Integration effort during the Apollo Lunar Landing program. With a staff of 2000, he was responsible for assuring that the Saturn V booster was capable of placing the Apollo command module carrying NASA astronauts onto the flight path to the moon.

Beckelman continued his career with several management and engineering positions at Boeing. He was responsible for Boeing Computer Services Marketing and Sales, including thirty sales offices across North America. As General Manager of Boeing Government Information Services, he captured and operated several large, complex systems integration projects working for agencies such as NASA, Department of Defense, Department of Energy, and others. As general manager of Boeing Computer Services Western Region, he managed a staff of 3000 employees and several large-scale computer centers serving Boeing Commercial Airplane Group and Boeing Defense and Space Group.

Stanley Beckelman

In 1993 Beckelman became President of Boeing Information Services which designed, developed and operated a large, complex, integrated information and telecommunications system. This enterprise, headquartered in the Washington DC area, provided information and services to government and commercial customers and had operations around the world.

In addition to the positions he held at Boeing, Beckelman served on a United States Presidential Commission, the National Security Telecommunications Advisory Committee. He also served on the Armed Forces Communications & Electronics Association Board as a director and as an international officer.

Stan Beckelman left Boeing in 1998 after 43 years of service.

He and his wife, Jennifer, reside in Bellevue, Washington. Beckelman continues his legacy of Astronautical Engineering by participating on the boards of directors of information technology firms.

An Alumnus Remembers

June 2006 is one of those notable dates, for 65 years ago, the AE class graduated in 1941 to the tune of "Wreck of Georgia Tech." In 1941, our AE Professors were Eastman, Eastwood, Farquarson, Kirsten and Martin. In my junior and senior years, I worked in the Wind Tunnel 12 hours a week. That year there were several places of employment: Boeing, Lockheed, Douglas, and a new NACA Lab at Moffett Field, California. Six of us went to NACA-Ames Research Lab. They were: Robert Barnes, Myles Erickson, Victor Ganzer, Ralph Holtzclaw, Victor Stevens and myself. We were joined by grads from Stanford and UC Berkeley to man the new wind tunnels. Coming from green Washington, it was hard to get used to the parched hills and scrub oak trees all around the lab.

At Ames, I seldom had the same assignment twice. I tested the F-82 and B-36, helped to develop the transonic wind tunnel, then jumped into hypersonics and the space race. The last few years I was associated with Alan Faye, a UW graduate. I retired in 1979.

As happens with single men, we met local girls. I was best man for Robert Barnes, and Victor Ganzer stood up with me when I married a San Jose State Grad. We have been married for 62 years. Our time is spent between a home in the Sierras and a retirement complex in Fresno. We cross-country ski and play tennis and bridge, plus travel.

I had a great career after my U of W education.

— Joseph L. Anderson, Class of 1941

Joseph Sutter (BS 43) has written his autobiography, titled, *747: Creating the World's First Jumbo Jet and Other Adventures From a Life in Aviation*. The book, written with Jay Spenser, will be on many people's holiday wish list! Joe has been a strong supporter of A&A over the years, most recently in fundraising for the Guggenheim Hall remodel.

Dale Jensen (BS 56) came from California to the College of Engineering Open House this year, and arranged a reunion with some of his A&A classmates from '56.

Yvonne (Lysne) McCarty (BS 90) is a senior associate with Point B Solutions Group in Seattle.

Dan Bannerman (BS 92) has been at Boeing for the past ten years, working mainly in structures. However, earlier this year he moved to a delivery support team that performs flight tests on all 737 and as a flight test engineer with The Boeing Commercial Airplane Group.

Quinn Smithwick (MS 92, PhD 02) and his wife, Lilly, had a son, Jeffrey Yuhang Zhen on May 15. Jeff joins his two-year-old brother Andy. Quinn is at Schepens Eye Research Institute at Harvard.

Jon Rue (MS 97) is back at the UW—as a staff member this time. Jon accepted a position as a senior computing specialist in Microbiology this year.

Eric Schultz (MS 97) was the recent recipient of a Ten Outstanding Young Americans Award presented by the US Junior Chamber of Commerce. Eric, an Air Force Captain, received his PhD at Caltech.

Chris Aberle (BS 98, MS 04) accepted an engineering position at Advatech Pacific, Inc. in California.

Baby Eva Aevlina surprised **Matt Schneider (BS 98, MS 01)** and his wife, Leah arriving a month early on January 25th.

Spot and Yang Sze Yee

Sutthiphong "Spot" Srigrarom (MS 98, PhD 01) who is an assistant professor in thermal and fluids engineering at Nanyang Technological University in Singapore, married Yang Sze Yee, a medical doctor, this summer.

Bogdan Udrea (PhD 99) stopped by earlier this year on a break from his job at the European Space Agency.

Matt Craw (BS 00, MS 02) is engaged to be married. Matt, who works at Edwards Air Force Base in CA, and his fiancée Katie (a teacher) will be married in March 2007.

Krystal and Ben

Krystal ParkerMeyer (BS 00, MS 02) and her husband, Ben, bought a home in the Santa Cruz Mountains, near Krystal's job as a mechanical/manufacturing test engineer at Lockheed Martin, working with the THAAD components of flight tests.

C.B. Cain (MS 01) is a Captain in the US Air Force, serving as C-17A aircraft commander. CB is currently assigned to the Pentagon as part of the Air Force Intern Program, with the Office of the Assistant Secretary of the Air Force for Acquisition. Starting in January, he'll begin work in either the Office of the Secretary of Defense or on the staff of the Joint Chiefs of Staff, after which he'll return to flying the C-17A.

Joshua Lanman (BS 01) is a stress engineer at D3 Technologies, which provides engineering support as a subcontractor to Lockheed Martin in the design and analysis of the F-35 Joint Strike Fighter.

Judy (Fahoum) Merancy (BS 01) received a NASA Top Space Flight Achievement Award for her work on the International Space Station's guidance, navigation and control systems.

Satomi (Ohno) Tajima (MS 01) will be receiving her PhD in Mechanical Engineering at UC Berkeley and has accepted a position with General Electric in Ohio.

Chris Keeler (MS 02) and his wife Joelle welcomed baby Garren, on July 20. Chris is a senior propulsion engineer with General Dynamics C4 Systems/Spectrum Astro Space Systems.

Joel Lohrmeyer, (BS 02, MS 04), who accepted a position as project engineer at Aerojet in Redmond after graduation, is now in his second year of law school at the University of Oregon. Patent law and technology law are his primary areas of focus.

Marcus Holzinger (BS 03, MS 05) was home for Thanksgiving, and stopped by the department. He is a controls analyst working on internal R&D at Northrop Grumman Space Technology. He's enjoying being a Californian, and living in Manhattan Beach.

Sarah Musi (BS 04), whose day job is at Boeing, was director of Yuri's Night Global Seattle, planned a "Global Space & Future" party at the Musuem of Flight to celebrate the 45th anniversary of the first human space flight by Yuri Gagarin.

Peter Norgaard (BS 04) stopped by to say hello on a visit home from Princeton, where he is completing his PhD in computational plasma dynamics.

Kristen Pilawski (BS 04) and **Jason Smith (BS 04)** were married in September in a beautiful ceremony in Redmond. Kristen works

Kristen and Jason

continued on back cover

CAMPAIGN UW: CREATING FUTURES

Gifts, cash, and in-kind contributions were received from the following alumni and other friends between 1/1/06 - 6/30/06. We thank our alumni, corporate donors, and friends for their support. All gifts count toward A&A's share of the Campaign UW Initiative.

Steven Aarnio
Harlow & Radha Ahlstrom
Jaihong Ahn
Joseph Anderson
Mr. & Mrs. Stephen P. Ash
Christopher Beck
Mr. & Mrs. Bernard F. Beckelman
Stanley Beckelman
Emilio Beltran
Adam P. Bruckner
Christopher & Elizabeth Burns
Stanley Butchart
Robert Cahn
Abhijit Chakravarty
R. Alexander Chermside
Paul Christensen
Paul Clement
Levent Coskuner
Robert Breidenthal & Susan Crane
Natalie W. Crawford
Suzanna & Jack Darcy-Hennemann
Antonio Deleo
Sue K. Derry
Kamalkumar Desai
Henry Duvall
Laila Elias & David Cutler
Paolo Feraboli
Eric Forbes
Wanda Frederick
Anita Gale & Richard Edwards
Brian & Joan Geppert
Carmela A. Halos
James Hermanson
Keith Holsapple
Andrew Hooker
Jeffrey & Cristina Huff
Albert Hwang
Dean &Amie Jacot
James A. Joki, M.D., P.S.
Dale Jensen
Tyler & Tami Johnson
William Kaseburg
David Kerzie
Ralph & Mary Kiger
Steven Killion
Daniel & Judith Klein
Carl Knowlen
Kazuo Kumasaka
Robert Larson
Kuen-Yuan Lin
Chad Lloyd
Daniel & Joyce Lotz
Robert Lowy
Uy-Loi Ly
Lawrence G. Malcom
Arthur T. Mattick
Andrew McComas
Gary Moir
Kristi A. Morgansen
Dale & Marjorie Myers
Timothy & Debra Nelson
Stephen Nickels
Leland & Carolyn Nicolai
Joan Oates
Wayne Olson
Carl Pearson
Scott Eberhardt
Hugh & Robin Poling
Ivan Popov
Donald & Erline Reha
Estate of Helen A. Reynolds
Jerry & Linda Rising
Kenneth V. & Ritchie Saunders, Jr.
Richard Scherrer
Heidi Schubert
Uri Shumlak
Estate of Margaret Frances Skelton
Michael Smith
Richard Smith
Paul & Alee Soderman
George Soli
Joseph Sutter
P. Steinberg & M. Sweeney
David & Catherine Taflin
Reid & Angela Templin
Frederick & Bessie Torgerson
William Tymczyszyn
Michael Ungs
Juris Vagners & Linda Christianson
Thomas Walker
Lisa Wetherbee
James Wolf
Oktay Yesil
Tomoyasu Yoshika

Corporate Donors

The Boeing Company
ERC, Inc.
Ford Motor Company Fund
GE Foundation
Goodrich Corporation
Hood Technology
The Insitu Group, Inc.
Lockheed Martin Corporation
Microsoft Corporation
MSNW
Northrop Grumman Foundation
Northwind Marine
San Diego Foundation
Stirling Dynamics, Inc.
United Technologies Corporation
United Way of King County

Please Add A&A to Your Giving List

Aeronautics & Astronautics is benefiting from the generous support of alumni and friends whose donations help us to educate students, advance research, and shape the future. Some specific funds to which you might consider giving are:

- The Guggenheim Hall Restoration Fund
- The AERO/ASTRO Fund (which provides us with the greatest flexibility for addressing a variety of needs)
- Scholarship and Fellowship Programs.

We invite you to help create futures in Aeronautics and Astronautics. Please contact Paul Julin in the College of Engineering at 206.685.1927, or by e-mail: julin@engr.washington.edu.

In Memoriam

Emeritus Professor Robert Clark passed away at home in January 2006. He came to A&A late in his career (in 1994—nearly forty years after he began as an Assistant Professor in the Department of Electrical Engineering). He joined EE after completing his MSEE from the University of Michigan, and later received his PhD as a National Science Faculty Fellow at Stanford University. In 1976, he served as a Visiting Fellow at Fraunhofer Gesellschaft in Karlsruhe, Germany, and later as a guest professor at the University of Duisburg. In addition to being an outstanding professor, he was an avid private pilot, logging more than 1,600 hours in 23 different aircraft. He was also a builder who, with his family, designed and constructed two houses on Orcas Island. Our thoughts are with his wife, Mary, and their children. He will be missed by his students and colleagues, but his kindness, intelligence and humor will live in our memories.

A. Scott Crossfield (BS 49, MS 50) died tragically in April when his private plane crashed in Georgia. While at the UW, Scott worked at the Kirsten Wind Tunnel. After graduation, he joined the National Advisory Committee for Aeronautics High-Speed Flight Station (a precursor to NASA) at Edwards Air Force Base, as an aeronautical research pilot. 1953, he became the first man to fly at twice the speed of sound as he piloted the Douglas Skyrocket to a speed of more than 1,320 mph (Mach 2.005). In 1955, he joined North American Aviation, first holding the position of chief engineering test pilot, later he was systems director of test and quality assurance in the Space and Information Systems Division, and then the division's technical director for research engineering and tests. In 1967, he joined Eastern Airlines, where he served as a division vice president for research and development and, subsequently, as a staff vice president working with US military and civilian agencies on air traffic control technologies.

In 1974-5, Scott worked for Hawker-Siddeley as a senior vice president supporting HS-146 activities in the United States. In 1977, he joined the US House of Representatives Committee on Science and Technology, where he served until his retirement in 1993. During his illustrious career, he received many awards and honors, including induction into the National Aviation Hall of Fame, the International Space Hall of Fame, and the Aerospace Walk of Honor. Scott was named the A&A Distinguished Alumnus in 1986.

Emeritus Professor Fred Eastman, a founder of our Aeronautical Engineering Department, who taught at the UW for 41 years, passed away in August at the age of 102.

Professor Eastman invented the electromagnetic balance system for the UW's Kirsten Wind Tunnel, which helped determine how an airplane will perform under different wind forces—factors such as lift, drag, pitch, roll and yaw. He declined to patent his invention, feeling that it should be widely available for use. He also developed the "flexure pivot," which helps separate the forces to be measured as accurately as possible.

Eastman was known by generations of aeronautical engineering students. "He was just an excellent instructor," said Joe Sutter (BS 43), who was instrumental in the development of the Boeing 747. "He could really stimulate you to do some deep thinking on a subject."

Professor Eastman visited our department in May 2005 and attended our annual banquet at The Museum of Flight. "As the word spread that he was there, a long line of people formed to pay their respects. They were absolutely thrilled to see him," Chair Adam Bruckner said.

Professor Eastman lived a long, full life, and leaves a wonderful legacy for future generations of aeronautical engineers.

Alumni Updates

works for Boeing and Jason works at Raytheon, both in California.

Sanjoy Som (MS 04) received third place in the Best Student Poster Award at AbSciCon 2006 for his submission, "Downstream Variations in the Width of Martian Channels from MOLA and Implications for Climate Evolution." Sanjoy is completing his PhD in Earth and Space Sciences and Astrobiology at the UW.

Kakani under water

Kakani Young (BS 04), who is pursuing her PhD in bioengineering at Caltech, went on a recent diving expedition to Little Cayman in the Caribbean. She plans to also visit Brazil, Croatia, Australia, and, closer to home, Friday Harbor. Kakani is designing (and testing) an apparatus she is building for her research on jellyfish swimming mechanics.

Chris Dallara (BS 05), who comes home for regular family visits, stopped by to give us updates on life as a PhD student in Aeronautics and Astronautics at Stanford University, where he is thriving.

Recent research by **Olivia Dawson (MS 05)** discovered that a turbulent boundary layer becomes laminar when stationary vortices are introduced into the flow. Previous research by students supervised by **Prof. Robert Breidenthal, Thiemo Kier (MS 99), Greg Balle (MS 94, PhD 01)** and visiting grad **Helmi Touel,** showed that such vortices are stabilized by a wall with streamwise corrugations and the resulting boundary layer exhibits laminar heat transfer. Olivia's result reveals why.

Rob Hanson (MS 05), who had been at Andrews Space, will be traveling for the next year in New Zealand. This trip is a lifelong dream for Rob. Happy travels!

Chad Lloyd (BS 05) and his wife Loren traveled all around Italy this summer. Chad, who is completing his Master's degree, has accepted a position at Boeing.

Please enter your alumni updates at: http://www.aa.washington.edu/people/alumni/submit.html, or via the enclosed envelope.
We and your fellow alums are eager to hear about your latest personal and professional endeavors.

http://www.aa.washington.edu • Tel: 206.543.1950 • Fax: 206.543.0217

UNIVERSITY OF WASHINGTON COLLEGE of ENGINEERING *Aeronautics & Astronautics*

322 Condon Hall, Box 352400
Seattle, Washington 98195-2400

RETURN SERVICE REQUESTED

64-0660

Nonprofit Organization
U.S. POSTAGE PAID
Seattle, WA
Permit NO. 62

Highflight

Wanda Frederick
Editor

Contributors:
MaLora Ann Bate
Adam Bruckner
Lynn Catlett
James Hermanson
Paul Julin
Eli Livne
Tom Mattick
Rolf Rysdyk
Loren Steinhauer

Send address corrections, questions and comments to the editor: highflight@aa.washington.edu