

Autumn 2006

Atmospheric Circulation

Newsletter of the University of Washington Atmospheric Sciences Department

Department Alumni Lead Wind Energy Prediction

by Cliff Mass

*The answer, my friend, is blowin' in the wind,
The answer is blowin' in the wind -
Bob Dylan*

Wind power is a rapidly growing contributor to worldwide energy supplies and UW Atmospheric Sciences alumni have been leaders in this nascent industry. Take Ken Westrick, B.S. '95 and M.S. '98, CEO of 3TIER Environmental Forecast Group of Seattle. Ken's thesis research led to the creation of a real-time hydrological prediction system. After working as a research meteorologist with his graduate advisor Cliff Mass '78 for a few years, Ken joined Pascal Storck, another UW Alum (Civil Engineering) and department staff member, to form 3TIER in 1999. Initially directed towards hydrological prediction, the firm rapidly moved into the new field of wind energy prediction, using a sophisticated suite of numerical models and statistical post processing. 3TIER has grown to over a dozen scientists and staff and is the largest wind energy prediction firm in the U.S.



Justin Sharp '05 explores the upper reaches of a massive wind turbine over Colorado

A number of other UW alumni have joined 3TIER over the years, including Jim McCaa '01, Kristin Larson '02, Scott Eichelberger '05, Mark Maciver '98, and Eric Gritmit '04. Currently, the firm is forecasting for more than 2,000 MW of wind energy turbines across the U.S., representing nearly one-third of the total installed wind energy capacity in the country.

Another alum in the wind energy business is Justin Sharp '05, who received his Ph.D. in the department for his work on high-resolution modeling of the flow in the Columbia Gorge. After a year of predicting the weather for the Bonneville Power Administration, he moved to PPM Energy, a leading wind energy producer owned by Scottish Power. At PPM, Justin is one of their lead meteorologists, responsible for wind turbine siting and wind source prediction. Ironically, PPM has hired 3TIER to provide wind energy prediction services, so our alumni are on both sides of the deal! Finally, Ken Jaffe '82, who received his M.S. under Dick Reed, is a wind energy representative for Airtricity, Inc., a firm that develops and operates wind farms in Ireland, Scotland, England, Wales and the United States.

With the recent extension of federal tax credits for wind energy investments, the wind generation business is booming. Private (cont. on page 5)

Kristina Katsaros Honored as College Alum of 2006

by Dennis Hartmann



*Alumni at the Celebration of Distinction Banquet
Tim Liu '78, Serhad Atakturk '91, Janice DeCosmo '91,
Kristina Katsaros '69, Lynn McMurdie '89, Gad Levy '87,
and Gary Geernaert '83*

Kristina Katsaros was honored at the Celebration of Distinction Banquet in the Husky Union Ballroom on May 18, 2006 as the 2006 Distinguished Alum of the College of Arts and Sciences in the area of natural sciences. Events on that day included breakfast with the Dean and honorees from the arts, humanities and social sciences, lunch with current students, and a lecture by Kristina reflecting on her scientific career of trying to understand air-sea interaction by direct measurements using buoys, ships and satellites. Many friends, family and former students attended the lecture and banquet to honor Kristina's achievements.

Kristina came from her native Göteborg, Sweden for a one-year exchange program in 1957. She received the Best Senior Award in 1960. In 1962 she returned from Sweden and began graduate study in Professor Konrad Buettner's group. Her initial research experiences were in the mountain valley winds project, which involved packing equipment up trails in the Carbon Gla- (cont. on page 5)

Chair's Column

We continue to strive to make our undergraduate major in atmospheric sciences a high quality experience and a launching pad for successful careers. This includes both recruiting outstanding students and improving the curriculum and facilities. We maintain a computer lab with up-to-date hardware and software that students can use for classes, research and general use. Through required computer courses and computer work as part of other classes, students acquire advanced skills that are critical in today's world.

A current priority is to improve the quality of the facilities and equipment in the undergraduate instruments laboratory. We want our students to gain experience not only in the virtual world of the computer, but also in the world of field and laboratory measurements with equipment that is comparable to what they might encounter in their professional life. We would like them to be able to use not only bulk volumetric rain gauges, but also instruments that measure precipitation particle sizes and fall speeds using laser technology. We want them to not only understand how temperature and pressure are measured, but also to experience modern techniques for measuring nitrogen oxides, ozone and other constituents of air that define air chemistry. We are committed to making the investments that will make our lab classes state-of-the-art.

It is a pleasure to again acknowledge major gifts from our emeritus faculty and their spouses. In the past year Bob Fleagle and Conway and Jan Leovy have given endowed student support. Bob Fleagle has also established an endowment for a Visiting Faculty Fellowship in Atmospheric Sciences Policy.

Margaret Holton has started an endowed Graduate support fund in the name of her late husband James R. Holton. Jim's former students have also made significant contributions to build the fund, which we hope will grow through additional donations in the coming years.

Best Wishes for the Coming Year,
Dennis Hartmann

Featured Professor: Dale R. Durran

Prof. Dale Durran has served as Graduate Program Coordinator for our department since Summer 1995 and is finishing a term of 11 years in this role. During his term Dale has worked tirelessly for the benefit of grad students and the department as a whole. Dale shepherded the department through the change from Qualifying Exam to COGS as routes to the Ph.D. He instituted the program for paid Lead TAs, served as its mentor, and encouraged the development and documentation of laboratory demonstrations for the ATMS 101



Professor Dale Durran

quiz sections. He worked individually with prospective students in order to find the optimal fit between the goals of the students and the research portfolio of the department, and supervised the overall graduate recruitment process. He began the 2nd Friday Club, a once a month after hours gathering that brings faculty and students together more frequently for informal conversation. It was Dale's idea to have an Annual Distinguished Lecturer, selected by the graduate students. He led the effort to establish a UW ATMS alumni reception at the AMS annual meeting. He kept his door open, always available for advice or a needed chat. Our thanks to him for an outstanding turn at the wheel of the graduate program as he transfers the responsibilities to Professor Greg Hakim.

Fleagle Visiting Faculty Fellowship



Emeritus Professor Robert G. Fleagle has given the UW a gift to establish the Fleagle Endowed Visiting Faculty Fellowship in Atmospheric Sciences Policy. The purpose of the endowment is to broaden understanding by students, faculty and the broader public of the interaction of the atmospheric sciences with national policy. The visiting faculty fellows will be individuals with outstanding achievements in both science and policy, who will visit the UW to give a series of lectures and meet with students and faculty. The department is very grateful to Bob for this major gift that will greatly enhance the breadth and quality of the UW experience for students and also serve to educate the general public about the role of atmospheric sciences in public welfare. Bob has also endowed a graduate student support fund.

Bob Fleagle received his PhD from New York University before joining the UW faculty in 1948, shortly after the Department of Meteorology and Climatology was formed. His initial strong focus on atmospheric research gradually broadened to embrace a growing interest in the application of the science to issues of public policy. He served in the Office of Science and Technology during the Kennedy Administration in 1963 and 1964 to oversee atmospheric research by the government agencies. In later years he served as Chair of the Department of Atmospheric Sciences, Chair of the Committee on Atmospheric Sciences of the National Academy of Sciences, Chair of the Board of Trustees of the University Corporation for Atmospheric Research, and President of the American Meteorological Society. Bob's experiences are recounted in his book: *Eyewitness: Evolution of the Atmospheric Sciences*.

Featured Alum: Byron Boville '79



Byron Arthur Boville received his BS degree in meteorology from McGill University and came to the UW to study with Jim Holton in 1975. Byron's father was also a meteorologist who was a professor at McGill and York Universities who did important work on the stratosphere and the ozone layer. Byron's PhD thesis was on wave, mean-flow interaction in the troposphere and baroclinic wave vacillation.

After receiving his PhD Byron moved to the National Center for Atmospheric Research in Boulder, Colorado where he made his career. His earliest work there was on the effect of the stratospheric polar night jet on tropospheric weather, a topic that has returned to prominence in recent years. He then became intimately involved with the development of the NCAR Community Climate System Model and became a leader in the development of CCSM and its vertically extended version, the Whole Atmosphere Community Climate Model (WACCM), which he pronounced "whack'em". Byron made fundamental contributions to understanding Earth's atmosphere and climate, while devoting substantial effort to model development. In May he was given the 2006 CCSM Distinguished Achievement Award *in recognition for Byron's critical leadership of the CCSM project at its inception, for his numerous contributions to the design and physics of the atmospheric model, and for his initiative in the collaborative development of the Whole Atmosphere Community Climate Model (WACCM), where WACCM*

represents a major move toward realizing NCAR's strategic goal of developing a comprehensive Earth System Model. Byron is a Fellow of the American Meteorological Society. He was one of the invited speakers at the Holton Symposium in Atlanta this year.

On June 6, 2006 Byron died at home after a long and valiant struggle with cancer. He was 52. During his years as a research scientist at NCAR, Byron visited our department many times to collaborate with Jim Holton, and he generously served on the PhD supervisory committees for a number of students. It was always fun to have Byron visit, not only because of his scientific expertise, but also because of his personal warmth, his wit, and for his generally positive outlook on science and on life in general. We'll miss him.

Art Rangno Retires



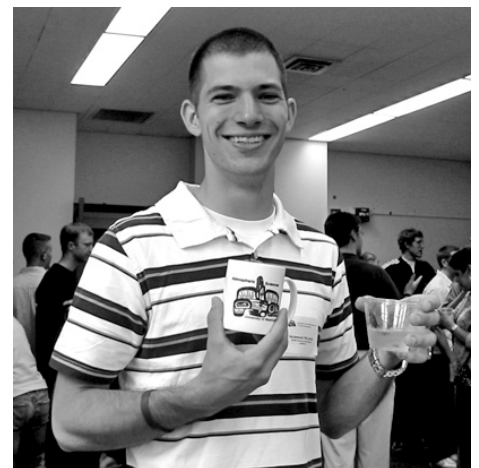
Art Rangno has announced his retirement after 30 years with the department. He has been with the Cloud and Aerosol Research Group (CARG) since 1976 and has filled the position of flight meteorologist or flight scientist on more than 700 research flights. He is one of the world's most experienced scientists in airborne studies of clouds. He has co-authored many publications with the late Professor Peter V. Hobbs concerning cloud microstructure, and in particular, on the origins and concentrations of ice particles in clouds.

Art also has an abiding interest in cloud seeding, and has looked closely at a series of cloud seeding experiments published in the peer-reviewed literature and found that they were not the successes they were re-

ported to be by the experimenters who conducted them. In 2005 Art and Peter Hobbs received a prize from the World Meteorological Organization and the United Arab Emirates for their work in weather modification and their critiques of cloud seeding experiments.

During his time here Art has pursued several unusual extracurricular activities including a regular gig throwing batting practice for the Seattle Mariners, and two different radio shows in which he forecast the hour that precipitation would start, sometimes using an excited baseball play-by-play shtick to enliven his forecasts of approaching storms. Art's intense love for the atmosphere and his witty sense of humor will be sorely missed.

Victor Morris (B.S. '82) worked as a research assistant with the UW Astronomy Department until 1983 when he was hired by the Pacific Northwest National Laboratory (PNNL) in Richland, Washington. During the past 23 years, he has conducted research for the U.S. Department of Energy's Wind Energy, Atmospheric Chemistry, and Atmospheric Radiation Measurement programs. Currently he is a Technologist in PNNL's Atmospheric Sciences and Global Change Division of the Fundamental Science Directorate. He and his wife, Jennifer, have raised four beautiful daughters and are now enjoying two grandchildren.



Norman Wilson '06 shows off his departmental mug at the reception for 2006 Bachelor of Science recipients and their families.

AMS Annual Meeting

by Dennis Hartmann

The American Meteorological Society Annual Meeting in Atlanta this year was of particular significance to UW Atmospheric Sciences. The James R. Holton Symposium and Banquet were held to celebrate Jim's life and career. Speakers and poster presenters at the symposium included Jim's distinguished colleagues and five of his PhD students: Byron Boville '79, Tim Dunkerton '80, Phil Mote '94, Brian Potter '94 and Karen Rosenlof '94. Margaret Holton traveled to Atlanta for the symposium and dinner.

Academic Press held a well-attended reception and book signing at the AMS meeting to celebrate the release of the second edition of *Atmospheric Science: An Intro-*

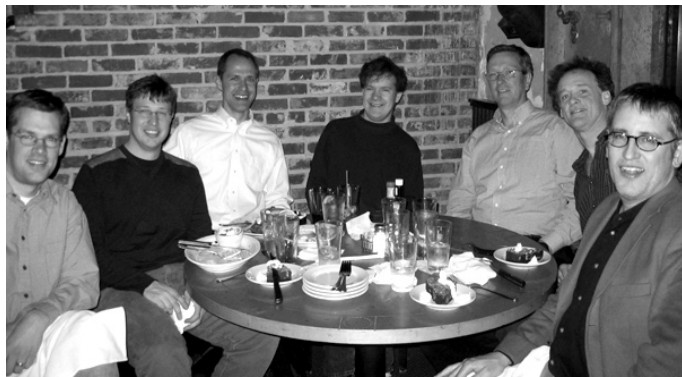


Phil Mote '94 and Jennifer Francis '94 at the Holton Symposium Banquet

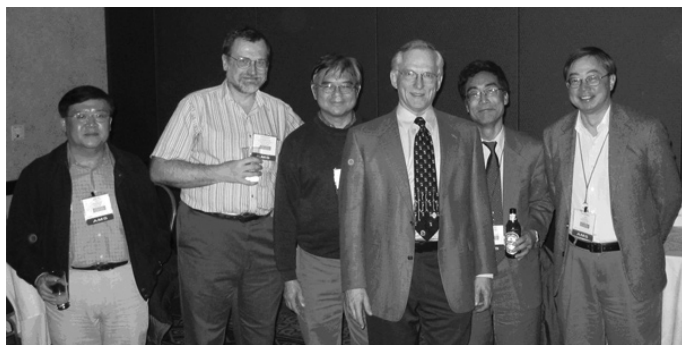
The third annual reception for the UW Atmospheric Sciences alumni and friends was also held in Atlanta and was well attended. Remember to look for us in San Antonio in January 2007.

The AMS Awards Banquet was a highlight for the UW this year as three awards were given to UW faculty. Professor Robert Houze was awarded the Rossby Research Medal, the highest award for research excellence given by the AMS. The citation reads: *Professor of Atmospheric Sciences, University of Washington, Seattle, Washington. For fundamental and enduring contributions towards the understanding of the broad spectrum of precipitation systems, their interactions with the larger scale circulations, and for his insightful leadership of field programs.*

Professor Peter Hobbs was made an Honorary Member of the AMS. Honorary Members are persons of acknowledged preeminence in the atmospheric or related oceanic or hydrologic sciences. Sylvia Hobbs accepted the award for her husband. In her acceptance speech she quoted from John Donne, "No man is an island unto himself" and thanked Peter's many students, collaborators and colleagues for their contribu-



Dan Vimont '00, Rob Elleman (GS), Ian Kraucunas '05, Dave Lorenz '03, Dennis Hartmann, David Battisti '88, and Todd Mitchell '90 caucus before the AMS Meeting



Jin-Yi Yu '93, Tim Dunkerton '80, Tim Liu '78, Bob Houze, T. Nakazawa, and Gabriel Lau '78 at the Alumni Reception

ductory Survey by Mike Wallace and Peter Hobbs. Mike Wallace was present to autograph copies, and Peter was represented by his wife Sylvia and son Rowland Hobbs. The first edition of Wallace and Hobbs has been the leading introductory survey of atmospheric sciences since its publication in 1977, so a second edition is very welcome.

tions to the success of his research group. Professor Mark Stoelinga was given the AMS Editor's Award *for consistently providing many in depth and thorough reviews, and for providing special assistance to the editors on controversial manuscripts* for the Monthly Weather Review.

The ATG Lawn



The ATG Building from the NE in July 2006, showing the new elliptical lawn where sunbathing has been reported

The ATG building was completed in 1968 and has been the home of the Department of Atmospheric Sciences since then. In January of 2006 renovations were completed to the adjoining Johnson Hall and the quadrangle between them was also renovated. The mound above the underground Carbon-14 facility was removed and a new elliptical green was installed with a surrounding walkway and benches. This provides an improved space for playing catch with baseballs and Frisbees. One baseball has already passed the glove of Art Rangno and found its way through a window into a ground floor office. ATG is lined up with the major diagonal (throwing axis) of the ellipse. It has been proposed that we purchase a departmental Bocce ball set to reduce the threat to life and property. The combination of the new green and global warming has led to sunbathing in the ellipse, creating a distraction for students and consequent concern among the faculty. :-)

Untersteiner Reflects on Time as Chapman Chair

by Norbert Untersteiner



In 1983 the Alaska State Legislature endowed a Chair in Physical Science at the University of Alaska, Fairbanks. It was named after Sydney Chapman (1888-1970), famous British geophysicist and one of the “Fathers of the International Geophysical Year” (1957-58).

Fairbanks may not be everyone’s Paradise Island, but on my many trips to the North I learned to love the endless hills of central Alaska and its bone-chilling winters, and the environment in which everything is a standard deviation (or two) off the norm. So it took only a modest amount of persuasion to make me accept a three-year appointment to the Chapman Chair in 1999. Since I was not prepared to move my family and entire household to Fairbanks, the UAF generously agreed to limit my appointment to 4 months per year.

After teaching graduate courses on polar climatology during two spring semesters I decided that the small population of students interested in such matters would be far better served by a succession of guest lecturers. The budget attached to the Chapman Chair allowed me to invite a series of lecturers, for one week each, from many institutions in the United States and several other countries. In 2002, encouraged by the popularity of these lectures, we decided to upgrade them to eight-lecture short courses. By 2005 my initial 3-year appointment had been extended twice to a total of seven years. I was almost 80, it was time to quit.

In retrospect, these seven years as Chapman Chair were one of the many lucky breaks of my professional career, working with old and new friends, doing something useful for my host institution, skiing the mogul-free runs of Moose Mountain, and enjoying life in an environment that I love.

Katsaros, *cont. from page 1*

ciar Valley of Mount Rainier and releasing and tracking weather balloons. She eventually became a professor in the department.

For 13 summers while on the faculty, Kristina ran a very successful summer course that brought graduate students to the UW from Europe and Asia to learn how to measure the interaction between the atmosphere and the ocean. In 1997 she received the Sverdrup Gold

Medal from the American Meteorological Society, and was named to the National Academy of Engineering in 2001. Her citation for the Sverdrup Gold Medal Reads *for pioneering research, leadership during field experiments, and dedication to international education of air-sea interaction.*

From 1991-97 Kristina served as Director of the Department d’Oceanographie Spatiale in Brest, France. In 1997 she was appointed as Director of NOAA’s Atlantic Oceanographic and Meteorological Laboratory in Miami, Florida. In 2003 she retired from NOAA and returned to the Northwest.

Academic Assistant Professor Rob Wood

The department of Atmospheric Sciences is happy to announce the appointment of Rob Wood as Academic Assistant



Professor. Rob has been a Research Assistant Professor in the department since January 2004. He looks forward to teaching a broad range of classes from Atmospheric Sciences 101 to graduate level cloud physics.

Rob became interested in Cloud Physics when he visited the department of Atmospheric Physics, University of Manchester Institute of Science and Technology. Professor Peter Jonas told him “there were many unsolved problems in the field of cloud physics”. For Rob, “unsolved problems always sound intriguing” – later Jonas became his thesis advisor.

Rob grew up around Manchester, England and though he says he will always be a Mancunian at heart he has taken to the



Conway Leovy, Margaret Holton, Bob Fleagle, and Rosemary Brodie at the Celebration of Distinction Banquet

Northwest United States. When not working he likes music, scuba diving, snowboarding, playing the guitar and traveling.

In Memoriam

Jan Leovy, M.A., February 7, 2006. Educator and reading specialist, she was Professor Conway Leovy’s wife, mother of three children and grandmother of five grandchildren. A survivor of breast cancer for thirteen years, she was a literacy activist and nature lover.

Sue Ann Ferguson, PhD. ‘84, December 18, 2005. Geophysicist and Atmospheric Scientist. Ferguson was a forecaster in Alaska, Utah Avalanche Center, NW Weather and Avalanche Center, and the USDA Forest Service. She participated in many sports and published several instructional books on avalanches and glaciers.

Wind Energy, *cont. from page 1*

sector wind energy firms have expressed interest in cooperation with several of the department’s major research projects. For example, the current effort to run high-resolution simulations of Northwest weather under a variety of global warming scenarios by Eric Salathé, Rick Steed, ‘95 and M.S. ‘99, Patrick Zahn, and Cliff Mass could aid in predicting the future wind energy potential of the region. A proposed project on the improvement of boundary layer schemes in numerical models currently being planned by Chris Bretherton, Tom Ackerman ‘76, Cliff Mass and others could contribute to enhanced real-time prediction of wind energy resources.

As suggested by Bob Dylan, part of the answer to the world’s overdependence on fossil fuels might be blowin’ in the wind and our department is playing a major role in making such wind power a reality.

Congratulations to Graduates

Doctor of Philosophy

Chih-Chieh (Jack) Chen, *Transient Mountain Waves in an Evolving Synoptic-Scale Flow and Their Interaction with Large Scales* (Durrant/Hakim)

Kimberly Comstock, *Mesoscale Variability and Drizzle in Southeast Pacific Stratocumulus* (Bretherton/Yuter)

Ioana Dima, *An Observational Study of the Tropical Tropospheric Circulation* (Wallace)

Scott Eichelberger, *The Effects of Meridional Heating Gradients on the Atmospheric General Circulation and Its Variability* (Hartmann)

Matthew Garvert, *An Observational and Modeling Study of a Heavy Orographic Precipitation Event Over the Oregon Cascades* (Mass)

Ian Kraucunas, *The Influence of Hemispheric Asymmetry and Realistic Basic States on Tropical Stationary Waves in a Shallow Water Model* (Hartmann)

Socorro Medina, *Orographic Enhancement of Mid-Latitude Cyclone Precipitation* (Houze)

Tomislav Maric, *The Applicability of Hydraulic Theory to Gap Winds Observed in the Wipp Valley* (Durrant)

Master of Science

Marie Ammerman, *Radiative Impacts of Thin Cirrus on the Mesoscale Dynamics Near Tropical Tropopause* (Durrant)

Joseph Casola, *Identifying Weather Regimes in the North Pacific 500-hPa Field Using a Limited Contour Clustering Technique* (Wallace)

Jasmine Cetrone, *Characteristics of Tropical Convection over the Ocean Near Kwajalein* (Houze)

Stephen Hudson, *A Look at the Surface-Based Temperature Inversion on the Antarctic Plateau* (Warren)

Yi Jiang, *Reconciling a Widely Used Analytic Formula for Direct Aerosol Radiative Efficiency with the Fu-Liou Radiative Transfer Model* (Anderson)

Louise Leahy, *A Synthesis of Single Scattering Albedo Values of Biomass Burning Aerosol, Observed over Southern Africa during the SAFARI 2000 Field Campaign* (Anderson)

David Reidmiller, *Aerosol Optical Properties and Particle Size Distributions on the East Coast of the United States as Derived from Airborne In Situ and MISR Remote Sensing Measurements* (Jaffe)

Patrick Alex Reinecke, *Topographic Blocking in Flows with Non-Uniform Upstream Static-Stability Profiles* (Durrant)

Sarah Strode, *Global Simulation of Air-Sea Exchange of Mercury* (Jaeglé)

Ellen Sukovich, *Characteristics of Baroclinic Systems Crossing the Oregon Cascades during IMPROVE II* (Houze)

Michael Town, *Spectral and Broadband Longwave Downwelling Radiative Fluxes, Cloud Radiative Forcing, and Fractional Cloud Cover Over the South Pole* (Warren)

Darren Wilton, *South Asian Monsoon Convection as Viewed by the TRMM Precipitation Radar* (Houze)

Bachelor of Science

David Carey

Brian Clark

Natalie Denio

Timothy Downing

Todd Enders

Kyle Fitch

Erica Kuhn

Josiah Mault

Christopher Miller

Brandon Ongna

Cynthia Peacock

Ryan Sanfilippo

Eric Schoening

Norman Wilson

Reid Wolcott

Undergraduate and Faculty Research

The following undergraduate students and faculty members worked together during the past year:

David Carey / Gregory Hakim: *Ensemble-Based State Estimation for a Next-Generation Weather Forecasting*

Brett Carlson / Dennis Hartmann: *Spatio-Temporal Structure of Poleward Eddy Heat Flux*

Katherine Condit / Theodore Anderson: *Acquiring and Integrating Satellite Data on Atmospheric Aerosols*

Timothy Downing / Robert Wood: *Elevated Pollution Layers as Seen by GLAS*

Chung (Anna) Moon / Joel Thornton: *Modeling and Development of A Photochemical Acyl Peroxynitrate Calibration Source*

Mike Warner / Cliff Mass: *Westerly Surges Through the Strait of Juan de Fuca*

Scholarships and Awards

NSF Graduate Research Fellows:
Aaron Donohoe Justin Minder

NASA ESS Graduate Student Fellows:
Deanna Hence Mark Zelinka

Reed Scholarship Recipients:
**Alfredo Arroyo Katie Boyd
Matt Jeglum Matt White**

American Geological Institute Minority Scholarship:
Alfredo Arroyo

Phi Beta Kappa Initiates:
Katie Boyd Mike Soltow

Phil Church Award:
Eric Schoening

NOAA Hollings Scholar:
Jennifer Chang



Welcome to New Graduate Students for 2006 - 2007

Daniel Alrick, Valparaiso University
Daniel Allman, University of Wisconsin
Anthony Didlake, Jr., Yale University
Phuong-Tra Dinh, U. of Canterbury, New Zealand

Ryan Eastman, University of Washington
Emily Fischer, U. of New Hampshire

Jennifer Fletcher, U. of Washington
Rhea George, U. of California - Berkeley
Paul Hezel, Boston College

Pu Lin, Peking University
Angeline Pendergrass, U. of Miami

Sandra Penny, University of Oregon
Brian Smoliak, Creighton University

Rick Steed, University of Washington
Marshall Stoner, Lyndon State College
David M. Teetzen, University of Nebraska

Katrina Virts, University of Oklahoma

Donor Recognition

The Department of Atmospheric Sciences gratefully acknowledges the donors who have generously supported us during the past fiscal year July 1, 2005 through June 30, 2006

Maureen Barrett	Imke Durre	Ben Jong-Dao Jou	Rajul E. Pandya	Mark Torrance
James & Carol Bassett	Charles E. Elderkin	Philip H. Kahn	Eric Redman	G. Leonard & Joanne Tyler
Robert G. Baughman	Robert A. Elleman	John N. Karamanian	Richard J. & Joan M. Reed	Norman K. Wagner
Robert S. Berkovitz	Brad S. Ferrier	Michael & Kristina Katsaros	Robert W. Reeves	Stephen G. Warren & Phoebe Caner
Harold Bernard, Jr. & Ms. Hilland Bernard	Robert Fleagle & Rosemary Brodie	Thomas J. Kleespies	Jeffrey B. Renner	Richard & Jean Weick
Thomas J. Borda	Peter & Jennifer Francis	Stephen A. Klein	Arthur Rangno & Judy Rossman	William Whitcomb
S. Edward Boselly, III	Qiang Fu & Muyin Wang	Kevin R. Kodama	David F. Rowe	Troy Eugene Wilcox
Christopher Bretherton & Alison Cullen	Scott A. Guhin	Dennis Lamb	Steven A. Rutledge	Michael Winton & Gretel LaVieri
Richard A. Brintzenhofe	Gregory J. Hakim	Chih P.F. Hsu & Ngar-Cheung Lau	S.A. Schoenberg & W.R. Potteet	Ming-Jen Yang
Chih-Pei Chang	Halstead Harrison	Margaret A. Le Mone & Peter Gilman	J.R. Sims & E. Patashnik	Shigeo Yoden
Robert Charlson	Dennis & Lorraine Hartmann	Conway B. Leovy	Raymond Clarence Staley	Xiaoli Zhu & Lixin Zeng
Eugene E. Chermack	Francis W. Hatch	William H. Lipscomb	Penrose V. & Kathryn Stout	
Wookap Choi	James W. Holcomb, Jr.	Steven L. Mullen	Ronald K. Surface	
Dr. & Mrs. Dean Shervin Churchill	Joshua Z. Holland	James R. Murphy	John Duane Thompson	
Todd Christian Dankers	Margaret P. Holton	Frederick N. Murray	Robert M. Thompson, Jr.	
Paul A. Davis	Charlotte Hopper	Thomas R. Newbauer	James E. Tillman	
Clara Deser	Huang H. Hsu	Janice Obuchowski & Albert Halprin		
Jean M. Dewart	Ronald S. & Gail Irving	Teresa & Donal O'Sullivan		
Dale R. Durran & Janice Tervonen	Roy L. Jenne			
	Richard H. Johnson			



Giving to the Department of Atmospheric Sciences

Please consider supporting the activities of the Department of Atmospheric Sciences. Your gift strengthens the core of the UW through recruitment and retention of world-class students and faculty. Your support of undergraduate and graduate students helps to create the next generation of scientific leaders. Help us to ensure that the department continues to be a leader in weather, climate and quality.

Yes, I want to support the Department of Atmospheric Sciences!

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 Atmospheric Sciences Graduation Education Fund
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 Seattle, Washington 98195-1640

Hurricane Experiment Exceeds Expectations

Professor Houze led the Hurricane Rainband and Intensification Experiment (RAINEX) during August 15 – September 30, 2005. Professor Houze and collaborators Professor Shuyi Chen of the University of Miami, Dr. Wen-Chau Lee of the National Center for Atmospheric Research (NCAR), and Dr. Robert Rogers of the NOAA Hurricane Research Division planned the project more than four years in advance. The goal of the experiment was to investigate processes associated with hurricane intensification, which is the most difficult-to-forecast aspect of hurricanes. Joining Professor Houze in the project were U.W. Department of Atmospheric Sciences Research Associate Professor Bradley Smull '86, staff member Stacy Brodzik, and graduate students Jasmine Cetrone, Deanna Hence, and Jessica Koury. The students worked in the operations center, and Jasmine, Deanna, and Brad flew in the hurricanes. Stacy worked with NCAR engineers and Professor Houze to implement the first-ever ground-based operations center with which the aircraft could be detected

from the ground. Jasmine, Deanna and Brad had to undergo intensive survival training for the flights. The experiment had an exciting start when the operations center was temporarily knocked out by the passage of Hurricane Katrina over Miami.

Serendipitously, two of the most intense and damaging hurricanes ever to hit the U.S. occurred during the project, and the RAINEX team obtained a historic data set including flights through Hurricanes Katrina, Ophelia and Rita. Among their most successful exploits was the best documentation obtained to date of the hurricane “eyewall replacement cycle,” which they observed in Hurricane Rita, using simultaneous Doppler radar from two aircraft. During the eyewall replacement cycle, a new eyewall forms and



Survival School for Rainex participants (circled, from left to right) Bradley Smull, Jasmine Cetrone, and Deanna Hence

suddenly reduces the intensity of the storm. RAINEX was featured in the November issue of the Bulletin of the American Meteorological Society. Professor Houze has presented the results of RAINEX in popular lectures to audiences in the Seattle-Tacoma area, and he and Professor Chen presented the preliminary results of the project at the National Science Foundation headquarters.

Contact Us

Department of Atmospheric Sciences
University of Washington
Box 351640
Seattle, Washington 98195-1640
Phone (206) 543-4250
Fax (206) 543-0308
<http://www.atmos.washington.edu>

Dennis L. Hartmann, Chair
Dagmar Patterson, Editor

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