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NSSL Briefings

Bob Staples (left) and Doug Forsyth (right) were given the honor of "Topping Off" the new National Weather Center by attaching the U.S. flag to the 50 ft. tower (the highest point on the building)

In this issue:

National Weather Center heroes

NSSL's Doug Forsyth, along with others, had a vision. What would it be like to have all of the weather research in Norman housed in one building? Consolidating staff and students could potentially facilitate some of the most advanced and cutting-edge research in the world. Back in 1994, the Norman Consolidation Project was formed to create the best design to help all groups achieve their goals, and Doug was the NOAA Program Manager. His involvement progressed to spending countless hours developing diagrams and floor-plans--all this in addition to his day job. Doug worked tirelessly on behalf of all the NOAA units during design, construction and managing the move to the National Weather Center (NWC).

Bob Staples was Doug's right-hand-man, working on-site for the past three years, including weekends, holidays, and nights. Bob was the troubleshooter, dealing with water in the auditorium and skunks in the building, in addition to conducting tours for visitors, politicians, government officials and others during the entire building process.

Both Doug and Bob attended weekly planning and constructions meetings, and an infinite number of negotiations with architects, construction personnel, and NOAA and OU future tenants. We appreciate their dedication and good-natured way of handling crises.

Many others, including NSSL's IT department, Dena Grose, Linda Skaggs, Paul Griffin, and NSSL technician staff made herculean efforts to make the transition as smooth as possible for NSSL employees. The staff worked nights and weekends preparing for and accomplishing the move that included a long list of tasks.

The NWC building was dedicated on September 29, 2006, attended by Deputy Secretary of Commerce David A. Sampson, Assistant Administrator for the National Weather Service David L. Johnson and Rick Spinrad, Assistant Administrator for Oceanic and Atmospheric Research. ◆

The recently completed National Weather Center (left) and a view to the north from the NWC of the research radars still located at the old site (right).

NOAA's Hazardous Weather Testbed

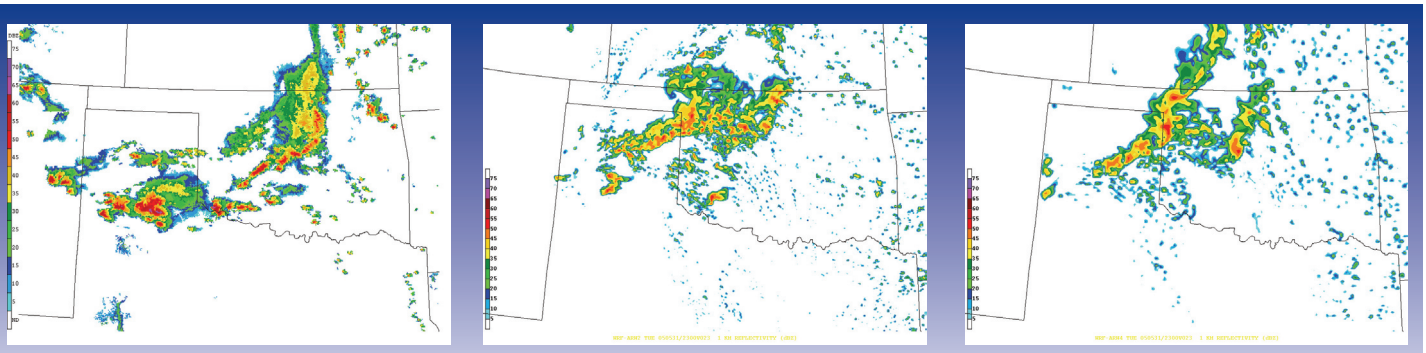
The success of the Hazardous Weather Testbed in Norman has inspired numerous groups to adopt the same collaborative spirit and innovative approach

The Hazardous Weather Testbed (HWT) in Norman rose up from a grassroots level after the Storm Prediction Center (SPC) moved its operations to the National Severe Storms Laboratory (NSSL) facility in 1997. The mutual interests of forecasters from the SPC, researchers from NSSL, and collocated joint research partners from the Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) inspired the formation of the HWT. The testbed's activities have been varied, ranging from daily map discussions involving imminent severe weather to loosely-related research projects involving 2-3 collaborators to periods of intensive collaboration.

The cornerstone of the testbed is the SPC/NSSL Spring Program, a series of annual experiments that attracts 50-60 researchers and forecasters to Norman each year. Each Spring Experiment provides forecasters with a first-hand look at the latest research concepts and products, while immersing research scientists in the challenges, needs, and constraints of front-line forecasters. The goal of this program is to give forecasters direct access to the latest research developments while imparting scientists with the knowledge to formulate research strategies that will have practical benefits. The end result is not only better severe-weather forecasts, but important contributions to the scientific literature as well.

As the Norman meteorological community consolidates its diverse workforce in a common building, numerous groups are adopting the collaborative spirit and innovative approach of the HWT. At the same time, the HWT is expanding to embrace these groups and provide the framework for development and implementation of new technologies in different areas, particularly those focusing on shorter-time - scale forecasting challenges. For example, NSSL's Severe Weather Warning Applications and Technology Transfer (SWAT) team and the NWS Norman Weather Forecast Office (WFO) are stepping into important contributing roles within the HWT.

We anticipate that the proof of concept established through the SPC/NSSL Spring Program and the early years of the HWT will play an important role in bringing together the diverse elements of the Norman meteorological community and like-minded meteorologists from across the country. In fact, Congress recently provided seed funding to help foster a collaboration between the HWT, the University of Alabama at Huntsville, and NASA's Short-term Prediction Research and Transition center (SPoRT), a joint center staffed by NASA research meteorologists also located in Huntsville, and the Huntsville WFO. This new partnership capitalizes on the uncommon passion in both of these communities for operationally relevant research and the rapid infusion of research results into operations. These efforts provide unique and valuable contributions to our understanding and prediction of hazardous convective weather events, leading to improved severe-thunderstorm and tornado watches and warnings for the public. ◆



Images like these provided the basis for evaluation of model predictions by researchers and forecasters during the 2005 Spring Experiment. The left panel shows observed base reflectivity while the other two show corresponding simulated reflectivity forecasts from the WRF model at 2 km (middle) and 4 km (right) grid spacing.

Project CI-FLOW

Coastal and Inland FLood Observation and Warning

NOAA wants to improve responses to flooding events through the work of CI-FLOW, the Coastal and Inland FLooding Observation and Warning Project, focused on the Tar-Pamlico River Basin in North Carolina. CI-FLOW is a research and demonstration program for the evaluation and testing of new technologies and techniques to produce accurate and timely identification of inland and coastal floods and flash floods. Partners in the project include NSSL, North Carolina State University (NCSU), North Carolina Sea Grant Extension and the National Weather Service.

NSSL's technical and scientific capabilities will be leveraged in CI-FLOW towards enhancing models that will improve responses to flooding events. NSSL's NMQ/Q2 system will be tested as part of the project. The NMQ/Q2 is a prototype real-time computing system that generates three-dimensional mosaics of radar reflectivity and a suite of derived products including multiple rainfall products. The system has also been designed to ingest all relevant grids for rainfall estimation such as multiple radar, rain gauges, satellite imagery, model output, and lightning flashes. The reflectivity mosaics and derived products are interpolated to a 1-km CONUS grid mesh on 31 vertical layers and are updated every 5 minutes.

CI-FLOW leverages NSSL's technical and scientific capabilities towards enhancing models that will improve responses to flooding events

Within NOAA, there are currently two other primary research activities focused on the production of near-real-time high resolution multi-sensor QPE. The Office of Hydrologic Development's Multisensor Precipitation Estimator (MPE) and NESDIS's Hydro-Estimator (HE). CI-FLOW will develop and identify the optimum set of techniques and algorithms from all three research activities to serve as a state-of-the-science NOAA multi-sensor QPE. ◆

International collaborations:

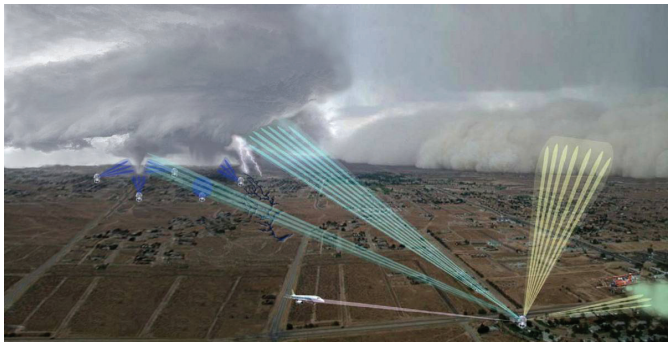
HMRG-IHR (China) scientific exchange program

Beginning in 2004, NSSL's HydroMet Research Group in collaboration with the Institute of Heavy Rain of the China Meteorological Administration established a scientific exchange program focusing on radar applications in quantitative precipitation estimation and forecast (QPE/F) towards improving the accuracy of flood and flash flood warnings. The ongoing program includes the exchange of visiting scientists, joint scientific workshops, and academic lectures. Through this exchange, scientists from both the USA and China gain a better understanding of continuing efforts in the two countries to address the scientific and operational challenges of flood warnings and water resource management. The collaboration also facilitates scientific contributions in the development and refinement of the National Mosaic and QPE system. ◆

Flooding in China (above) and Taiwan (below).

NSSL-Central Weather Bureau (Taiwan) High-Resolution QPE and QPF (HRQ2) system

NOAA's NSSL and Earth System Research Laboratory (ESRL) collaborated with the Central Weather Bureau (CWB) and Water Resources Agency (WRA) of Taiwan to develop a High-Resolution QPE and QPF (HRQ2) system for Taiwan. The four-year collaboration began in 2002 to help improve Taiwan's capabilities to issue flash flood and flood warnings and to improve river and reservoir water management. The HRQ2 system has been running in real-time at the CWB and at more than ten other government agencies in support of their severe weather and flood/flash flood warnings, water resource management, soil conservation and other weather-related decisions. In 2006, NSSL and ESRL started a new 4-year plan with the CWB and WRA of Taiwan to continue the development and enhancements of the HRQ2 system. ◆



Multi-mission Phased Array Radar update

Multi-mission Phased Array Radar (MPAR) is NSSL's newest radar frontier, a technology with the potential to significantly increase warning lead times and the capability to perform multiple functions. The National Weather Radar Testbed (NWRT) was created in Norman, OK, by a government/university/industry team consisting of NOAA's NSSL, the Tri-agency (Departments of Commerce, Defense and Transportation) Radar Operations Center (ROC), the United States Navy's Office of Naval Research, Lockheed Martin Corporation, the University of Oklahoma's Electrical and Computer Engineering Department and School of Meteorology, the Oklahoma State Regents for Higher Education, the Federal Aviation Administration's (FAA) William J. Hughes Technical Center and Basic Commerce and Industries, Inc. (BCI) to investigate the application of the PAR's electronically steerable antennas to weather observations. The NWRT became operational in 2003.

PAR has multi-mission potential

Recent PAR developments include the capability to operate the PAR remotely from any location with Internet, allowing the NWRT to be a truly national facility. Researchers from across the nation can remotely access the NWRT in support of their research. Beam multiplexing has also been recently implemented, a feature that allows an increase in scanning speed by a factor of two.

One of the most exciting features of the PAR is its potential to be used for weather and aircraft surveillance, simultaneously. NSSL and its partners along with the Office of the Federal Coordinator of Meteorology have developed an ambitious plan to explore the transition from a multitude of radar systems, used for aircraft surveillance and weather observations, to the single MPAR (Multi-mission Phased Array Radar). Significant cost savings are anticipated in addition to increased functionality. As a first step, the FAA/BCI has installed an aircraft tracking system on the NWRT for testing the multifunction capabilities of the radar. They are exploring the PAR aircraft tracking capabilities and have found that the PAR aircraft tracks were consistent with data obtained from air traffic control reports for flights into and out of Will Rogers World Airport in Oklahoma City, OK. Plans to build a early-prototype MPAR are underway. ◆

Can short-wavelength radars improve blind spots in the current operational radar network?

A radar sends out a straight beam of energy, but the earth curves away underneath the radar beam, causing loss of critical data

The lowest mile of the atmosphere is a blind spot for the current NWS operational radar network because the effective height of the radar beam increases due to the curvature of the Earth. Unfortunately, it is in the lowest mile where we think tornadoes form. NSSL is participating in an NSF-sponsored Engineering Research Center called the Center for Collaborative Adaptive Sensing of the Atmosphere (CASA) to explore sensing the lower atmosphere with a network of many short-wavelength (3cm) radars. These smaller and less expensive radars will be spaced much closer together than those in the current operational radar network to provide data in these blind spots. CASA will initiate a new observation methodology termed DCAS (Distributed Collaborative Adaptive Sensing). DCAS samples the atmosphere in a focused manner, where and when the need is greatest for end users.

The system of radars that are part of the Oklahoma testbed (called Network Radars or NetRAD) are spaced 30km from each other and are one-fifth the size of a NEXRAD radar. Assembly and integration of the radar transceivers, pedestals, radomes, node-level computation and communication electronics of the radars took place at NSSL. In March, 2006, the four NetRAD radars were installed in Rush Springs, Lawton, Cyril, and Chickasha, OK. NSSL's WDSS-II will ingest and process NetRAD data for detection algorithms. The goal of the Oklahoma testbed is to demonstrate DCAS concepts for high temporal and spatial resolution sensing of winds in the lower atmosphere and detecting, tracking, and predicting severe storms, especially tornadoes. ◆

NetRAD radars being installed on-site in southwest Oklahoma.

Employee Spotlight: Don Burgess

In his yearly pilgrimage to a lonely stretch of mountain water in southern Colorado with a fly rod in his hand, Don Burgess finds his soul restored. "I am haunted by waters," broods Norman MacLean in one of Don's favorite books/movies *A River Runs Through It.* "Fish, sleep, eat," says Don, "Now that's a great day." Fly fishermen understand each other.

Don is as passionate about fly fishing as he is about his family and the weather. Born "a weather freak" in Okmulgee, Oklahoma, he watched storms in fear during early childhood but curiosity took over as he got older. It became a question not about WHAT he was going to do when he grew up, but HOW he was going to do it. Don attended OU for his undergraduate work, and came on board at NSSL after doing odd jobs for them and asking to be hired "15 times." "I wore them out," he grins. He was assigned to the newly-formed Doppler Radar Group tasked with learning about warning/forecast applications of Doppler radar. After earning his B.S. in 1971, he became a full-time NSSL employee while doing graduate work (earning his M.S. in 1974). During the early and mid-70's, the NSSL team of which he was a member collected the first Doppler radar data on tornadic storms. From that data, and most significantly the Union City, OK tornado of 1973, the team discovered that the NSSL research Doppler radar could see mesocyclone and tornado signatures, sometimes 20-30 minutes before the tornadoes formed. "We were at the right place at the right time." From then on, Don just enjoyed the ride—having so much fun he never worried about the path.

As he and others realized the potential value of Doppler radar, other government agencies began to take notice. Don was appointed the Chief Meteorologist in the Joint Doppler Operational Project (JDOP), a project testing and ultimately proving that Doppler radar had great potential towards improving warnings. These results launched the government's NEXRAD program, and during this time Don worked with others to develop computer algorithms to detect and display output from Doppler radar. Their work was folded into the NEXRAD program, and in the late 80's Don became Chief of the NSSL Forecast Application Research Group where they developed Doppler techniques and applications for the NWS, the FAA, and the DoD. "Better radar was part of that," he says.

As the first operational NEXRAD radars were about to be installed, Don was offered the unique and satisfying chance to follow his research through to actual forecast operations, "Like having a dream and seeing it through to reality," he says. He moved to the NEXRAD Radar Operations Center as Chief of the Operations Branch, and eventually as Chief of the Training Branch. While the change to operations was good, Don found his heart rooted in research – "I am an observationalist." He had the opportunity to return to NSSL as the Chief of the Warning Research & Development Division, where he stayed until retiring in the fall of 2003 after 32 years of Federal service. The transition is slow, as he continues to work half-time through CIMMS, managing the ROC MOU, working on NEXRAD network enhancements and improvements, and helping when asked. He also feels compelled to create an environment that allows others to be successful. "People ran interference for us," he reflects. "I want to do that for others." During this time in his life he is enjoying taking things easier, traveling more, and doing work that interests him. He and his wife of 34 years, Fran, have two grown children and two grandchildren. He very much enjoys having time to play with the grandkids (photo at right shows Don with grandson Carson showing off his first trout). ◆

Noteables:

Born:
Okmulgee, OK

Education:
M.S., University of Oklahoma, 1974

Specialty: Research concentrating on severe weather and on techniques for improving warnings of weather hazards, particularly techniques using Doppler radar to detect and help forecasters warn of tornadoes

Current position: CIMMS employee, retired Federal, manages ROC MOU, and works on NEXRAD and other radar-related projects

Hobbies: Grandkids and fly-fishing

NSSL's Native American connection

NSSL hydrometeorologist Suzanne Van Cooten, believed to be the first Native American female Ph.D. meteorologist in the U.S., strives to encourage more Native Americans to consider careers in the atmospheric sciences, civil engineering (hydrology) and computer science. Van Cooten, from the Chickasaw tribe, is working with the Chickasaw Nation on outreach and student opportunities. "I see the geosciences as inextricably linked to the Native American community," says Van Cooten. "Native Americans have always been connected to the Earth and its environment. As a student, you can begin to bring these geosciences to your communities and engage Native Americans as our nations's environmentalists."

Suzanne VanCooten was profiled in the"Winds of Change" magazine

Suzanne was recently profiled in the "Winds of Change" magazine for her passion for her profession and for encouraging Native American students to consider a career in science. ◆

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Since 1995, NSSL Briefings has been published from the National Severe Storms Laboratory to provide federal managers, staff, and other colleagues in the meteorological community with timely information on our activities. This newsletter also contains information about NSSL's scientific collaborations with the OU Cooperative Institute for Mesoscale Meteorological Studies (CIMMS). To receive NSSL Briefings by mail, email, or to change your address, please forward requests to Kelly Lynn, NSSL, 120 David L. Boren Blvd., Norman, OK 73072, by phone: (405) 325-6907 or by email: kelly.lynn@noaa.gov.

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Comings and goings

Mary Meacham has retired from Federal service after working as the NSSL Librarian for 22 years. During her career at NSSL, Mary not only helped locate resources for our research, but she responded to and provided services for thousands of requests received by the lab from the public, school children, lawyers and others.

Daphne Thompson has joined NSSL as our Educational Outreach Coordinator. Daphne previously worked at NSSL for several years, and now coordinates NSSL tours for visitors.

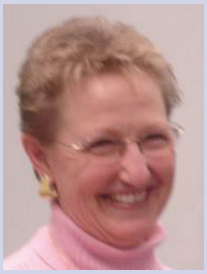
Mike Baldwin joined former NSSL/CIMMS scientist Jeff Trapp at Purdue in the Department of Earth and Atmospheric Sciences in a tenure track position.

William Agent has joined the IT group.

Erin McKinney, NSSL receptionist avoided the chaotic move to the NWC and is looking forward to the birth of her second child.

NOAA Research Employee of the Year

Linda Skaggs was recognized as one of five NOAA Research Employees of the Year for her outstanding leadership during the relocation of NSSL to the new NWC facility. The award is granted to an individual or team who has had a significant impact on the promotion of NOAA Research in the last calendar year. The awards were presented in a ceremony in Silver Spring, MD in December. Linda has been NSSL's Adminstrative Officer since November, 2004 and an NSSL employee since 1996.



Other awards and honors

NSSL scientists Rodger Brown and Bim Wood received the Best Poster Paper award at the 22nd Interactive Information Processing Systems (IIPS) Conference held last winter in Atlanta. The paper was, "*WSR-88D monitoring of shallow lake-effect snowstorms over and around Lake Ontario: Simulations of improvements using lower elevation angles*." Brown and Wood co-authored the winning paper with Tom Niziol from the NWS Forecast Office in Buffalo, NY, and Norman Donaldson and Paul Joe from the Meteorological Service of Canada.

The next generation of scientists

We start receiving e-mails at least a year in advance: "I am interested in an internship opportunity at the National Severe Storms Laboratory. Are there any positions available? Thank you for your time." Or, "I was curious as to if the NSSL offered any sort of employment or internships for weather-bound students such as I. After I earn my Bachelor of Science in Meteorology I plan to search for a job with the NSSL or the NWS. I figured an internship or summer job would help put "my foot in the door" with the NSSL. Please let me know. "

Students come from all parts of the U.S. just to study weather at NSSL, and some do not even expect to be paid. NSSL offers internships as part of the Hollings Scholarship Program and the Educational Partnership Program. This summer NSSL hosted and mentored six students, who worked on projects ranging from severe weather climatology to hydrology and weather forecasting and radar.

Owen Shieh, a meteorology senior from Cornell University in Ithaca, N.Y. assimilated 2003-2006 rain gauge data for use in NSSL's Tar River Basin project of North Carolina, and evaluated the biases of NSSL's multi-sensor quantitative precipitation estimation products. Markeitta Benjamin, a meteorology senior from Jackson State University in Jackson, MS collected data from 2003-2005 to see how much precipitation fell during heavy rain events in that time period. Both students said their usual studies at their East Coast schools involved hurricane research. Their research experiences in Norman gave them an added perspective on the profession. "I can take what I've learned back with me," says Benjamin.

At the end of the summer, the students formally presented their projects at NOAA headquarters. Soralis Pimental, mentored by Kurt Hondl, was awarded second place for her poster.

These opportunities develop academic excellence and scientific rigor in (NOAA/NSSL's) areas of expertise. Maybe a little passion too! Many of the students participating in these programs continue their professional careers in the sciences and work for NOAA or partner institutions. ◆

NSSL's students and mentors for 2006

Hollings Scholars

***Darren Clabo**, senior, University of Oklahoma (Dusan Zrnic and Terry Schuur)*

***Owen Shieh**, Senior, Cornell University (Suzanne Van Cooten)*

***Karyn Snider**, senior, North Carolina State University (Harold Brooks)*

***Lindsay Tardif,** senior, Plymouth State University (Bob Rabin)*

Educational Partnership Program

***Markeitta Benjamin**, senior, Jackson State University (Suzanne Van Cooten)*

***Soralis Pimental,** senior, University of Puerto Rico-Mayaguez (Kurt Hondl)*

NSSL tours resume at NWC

Daphne Thompson is now the NSSL Educational Outreach Coordinator, in charge of tours. Since March 1, Daphne has escorted over 1,000 visitors through NOAA facilities.

Reservations are required for three types of tours are offered at the National Weather Center. Public tours take place at 1 p.m. on Mondays, Wednesdays, and Fridays. The tour lasts 45 minutes and includes visits to the OU School of Meteorology, the NWC Observation Deck, classroom and laboratory facilities, as well as NOAA's Storm Prediction Center, the NWSFO, and NSSL.

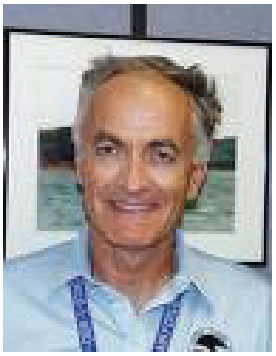
Group tours are offered for groups of 8-50 people on Tuesdays and Thursdays between 9 a.m. and 5 p.m.. These tours last from 1 hour to 1.5 hours, allowing extra time for questions.

Specialty tours are offered for those wanting a tour focused on a specific unit or subset of units in the NWC. Daphne handles NOAA Weather Partners tours, and University of Oklahoma units are organized by Kevin Kloesel.

A NOAA Weather Partners tour begins in the National Weather Center's Visitor's Center where Daphne gives a presentation on NSSL and shows a movie appropriate for the age of the audience. She then takes guests to the Observation Deck on the seventh floor. The one- and one-half hour tour concludes in the NOAA Hallway where the Storm Prediction Center and NWS Forecast Office are located.

The NWC is a university facility, but with the collocation of government offices; there is no public access to the building. Tours are available by appointment only. Contact Daphne at: daphne.thompson@noaa.gov or at 405-325-6892 for more information. ◆

National Weather Center tours are available by appointment only



NOAA Senior Scientist elected to National Academy of Engineering

We know him as our resident Serbian. His unmistakable, thickly-accented booming voice has been resounding through the halls of NSSL since 1973. A windsurfing board is usually strapped to the top of his Dodge Caravan (one inside the car too), and his sunglasses hang around his neck with a cork tied into the strap so they'll float when he goes straight from work to the lake. He is fearless, eccentric, and a brilliant scientist.

Dusan Zrnic, NOAA/NSSL senior scientist has received the high honor of having been elected a member of the National Academy of Engineering. Under the NAE charter, the group is directed "whenever called upon by any department or agency of the government to investigate, examine, experiment, and report upon any subject of science or art." Election to the academy is a wonderful acknowledgement of Dusan's achievements, since membership is limited to around 1400, and competition is great. "I know of few people who are equally deserving," says colleague David Atlas, instrumental in Dusan's election and also a member of the NAE.

NAE Citation:
"For the development of potent radar methods that have greatly improved operational weather detection and warning and advanced meteorological research."

Ironically, weather is not his passion. "I admire those beautiful huge storms, but I can't say that I'm a weather freak." Dusan studied Electrical Engineering in Yugoslavia, and then hopped a freighter to the U.S. when he learned "the opportunities for graduate studies in the U.S. would be better." His career in radar began when he realized the radar echoes the military considered "junk" were actually weather information that could be used to understand and predict storms. Dusan brought his ideas to NSSL and helped lead research in Doppler techniques to recognize radar signatures of hazardous weather phenomena. From his contributions to early understanding of tornado wind speeds measured by Doppler radar, to the measurements of precipitation with polarimetric radar, "His work has not only benefited the field of radar meteorology, but also the American people because of the lives saved with the technology he helped develop," says Jeff Kimpel, NSSL Director.

Besides developing technology that saves lives, Dusan inspires lives too. John Snow, OU Dean of the College of Geosciences says, "He has been an exceptional adjunct professor in the School of Meteorology and the School of Electrical and Computer Engineering. Dusan has taught numerous classes and mentored many OU students." One of the students impacted by Dusan was Robert Palmer. Dusan was one of Palmer's Electrical Engineering Ph.D. advisors. "It has been an honor to work with him as a student and now a colleague," says Palmer, who is now a Professor in the OU school of meteorology. "His attitude toward scholarly activities and personal life has been a great example of balance."

Dusan works hard and plays hard. He has co-written a book with colleague R.J. Doviak, "Doppler Radar and Weather Observations," been awarded a patent for a novel method to obtain polarimetric information, and is known to check the Doppler winds at Lake Thunderbird 17km from the KOUN1 radar for windsurfing conditions. Skiing, hiking mountains, and triathlon are other hobbies he claims, but Dusan's true passion is for art and music. "If I could have another life I would have studied painting," he muses. Dusan is a member of several art guilds at OU. He also studied piano for many years and loves folk and ballroom dancing -- and singing and character acting in musicals. "Music would be another vocation I missed," he says.

Dusan's passion and drive has benefited the entire country, and NSSL is privileged to celebrate this honor with him. ◆