NEWSLETTER

National Weather Association

No. 08 – 9 September 2008

33rd NWA Annual Meeting: Where You Need to Be!

Louisville, Ky., Oct. 11 - 16

An Enchanted Monday Night

Spend the evening on an Ohio River Cruise — step aboard the 93-year-old Belle of Louisville paddle wheel river boat as she hosts our meeting's ice breaker! This grand event is sponsored by Midland Radio, Baron Services, Vaisala, Inc., Weatherbug, and the NWA.

www.belleoflouisville.org

Our River Cruise Sponsors

www.baronservices.com
www.midlandradio.com
www.vaisala.com
http://weather.weatherbug.com/about-us.html

7th Annual NWA Scholarship Golf Outing

Shawnee Golf Course; Saturday, Oct. 11 (details on back)

www.shawneegolfcourse.com/golf/proto/playshawneegolf/

Don't Get Stranded: Reserve an Airport Shuttle to the Hotel

Sandollar Limousine Service

www.sandollarlimo.com/AirportShuttle.htm

President's Message: Join in on the Excitement!

The 33rd Annual Meeting of the National Weather Association is upon us, literally and figuratively. The excitement is building at NWA World Headquarters and apparently for many of you as evidenced by the record number of submitted abstracts. NWA Executive Director Steve Harned tells me all available rooms at the Galt House were sold out in anticipation of our October gathering. The vision I offered nine months ago of an annual meeting designed to improve the future of operational forecasting through discussion and analysis of historical weather events is a reality thanks to the Herculean efforts of the Annual Program Committee chaired by John Gordon (NWS MIC in Louisville).

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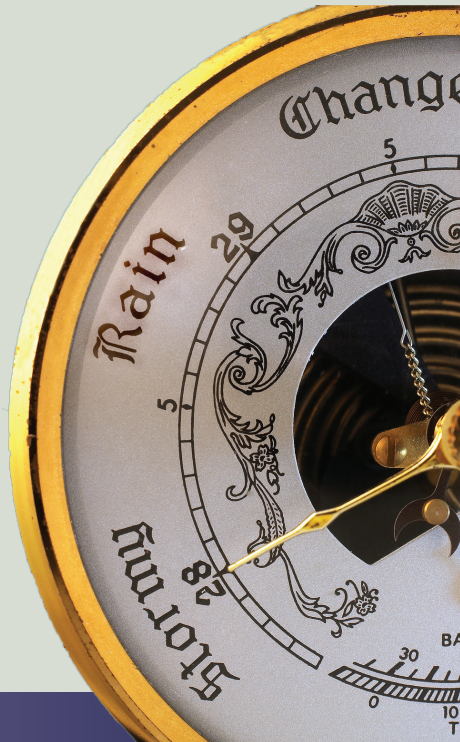
Inside This Edition



Benjamin R. J. Schwedler Awarded the Arthur C. Pike Scholarship in Meteorology

Benjamin R. J. Schwedler of LaCrosse, Wis., is awarded the Arthur C. Pike Scholarship in Meteorology. A senior at Iowa State University, he is one of those truly gifted and talented individuals who has excelled in all aspects of life.

Ben has earned a 4.0 GPA in his meteorology studies and has an overall 3.99 GPA. The reason he does not hold a 4.0 in all university courses was the result of "only" earning an "A-" in partial differential equations! He is a NOAA Hollings Scholar, has made the Dean's List all semesters, ranks among the highest 2 percent of all students in the College of Liberal Arts and Sciences, is a member of Phi Beta Kappa, a recipient of the Iowa State University Award for Competitive Excellence since his freshmen year and is listed in "Who's Who Among Students in American Universities and Colleges.

His excellent performance is by no means limited to the classroom. Professional activities outside of his studies have focused on operational meteorology activities. He has been very active in both the Central Iowa NWA Local Chapter and in the Iowa State AMS student chapter. He has served as webmaster for both chapters and was very involved in the planning of last spring's Severe Storms and Doppler Radar Conference hosted by the Central Iowa NWA Chapter. Ben has been very involved in community outreach by participating in weather safety and awareness events, school talks, and science nights at local schools.

During his summer breaks, our scholarship recipient served as a student volunteer at the LaCrosse, Wisconsin National Weather Service Weather Forecast Office, interned at WKBT-TV in LaCrosse and worked this past summer at the NOAA/NWS Hydrometeorological Prediction Center in Camp Springs, Maryland. While at HPC, he worked on a real-time object-base precipitation forecast verification system.

This proven leader has served as the Vice President of the Inter-Residence Hall Association and acted as liaison between students and the Department of Residence.

Benjamin's accomplishments are best summarized in a quote from one of his faculty recommendation letters: *"Very few students can claim this amount of high quality academic, extracurricular, and leadership experience so early in their academic careers."*

Welcome New NWA Corporate Members

The National Weather Association would like to welcome our two newest corporate members:

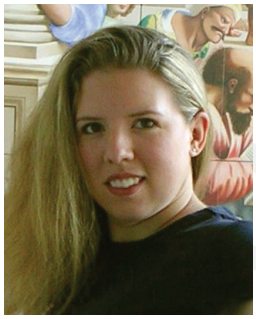
Millersville University – Meteorology Department, Millersville, Penn.

WCNC-TV, Charlotte, N.C.

Corporate members, through their Points of Contact (POC), receive *National Weather Digests*, NWA monthly Newsletters, reduced registration and exhibit fees at the NWA Annual Meetings and reduced prices for NWA Monographs and Publications. They receive precedence for advertising space in NWA publications and for exhibit space at NWA annual meetings. Each are also listed in each *Digest* issue and on the NWA Web site.

Leejah R. Ross Awarded the Dr. Roderick A. Scofield Scholarship in Meteorology

Leejah R. Ross of Arden, N.C., is awarded the Dr. Roderick A. Scofield Scholarship in Meteorology. A senior at the University of North Carolina - Asheville, she is an outstanding student who brings a depth of "real-world" experiences to the classroom. Prior to entering the Atmospheric Science Department at UNC-Asheville, she served on active duty in the U.S. Air Force as a weather forecaster for the 36th Rescue



Squadron. As a result of key decisions made by her and her team members, she was awarded the Air Force Commendation Medal for the highly successful evacuation of millions of dollars of helicopter assets from the path of Hurricane Katrina. This and other military experiences convinced her to focus on a meteorological career in tropical weather research.

While completing her undergraduate studies, she is conducting an undergraduate research project on the structure and development of Atlantic hurricanes. As a part of the NASA Ocean Vector Winds research project, she is working to reduce the uncertainties involved in tropical forecasting by enhancing satellite retrieval of hurricane winds. She readily acknowledges the great role Rod Scofield's ground-breaking accomplishments in satellite research have played in her decision to pursue her chosen path in the science of meteorology. Her professors are most impressed with not only her academic abilities (3.88 GPA) but also with her very strong leadership and interpersonal skills.

Kristen L. Gore Awarded the David Sankey Minority Scholarship in Meteorology

Kristen L. Gore of Aiken, S.C., is a senior at North Carolina State University. She is awarded the David Sankey Minority Scholarship in Meteorology.

Kristen is a two-time winner of a NWA scholarship as she was also awarded the Sankey Scholarship in 2007. Her demonstrated and multi-faceted accomplishments led to this extraordinary accomplishment.

She is an outstanding, double-major student who has earned a 4.00 GPA at NCSU. She is not only the highest ranked student in the Department of Marine, Earth, and Atmospheric Sciences but also ranks first of all students in the College of Physical and Mathematical Sciences! Her well focused plan to enter the climate change arena resulted in her decision to double-major in both meteorology and statistics. She understands the great need to bring good science into the debate and is eager to begin.

Kristen is recognized by faculty members as a student leader who also volunteers for numerous university activities. She has been inducted into the Phi Beta Kappa and the Gamma Beta Phi Honor Societies. She is also a very active member of the Statistics Club, Society of African American Physical and Mathematical Scientists, the National Weather Association, and the American Meteorological Society. Additionally she is a member of the Air Force ROTC and its honor guard.

Megham K. Mee Awarded the AccuWeather, Inc. Undergraduate Scholarship in Meteorology

Meghan K. Mee of Biloxi, Miss., received the AccuWeather Inc., Undergraduate Scholarship in Meteorology. A junior at the University of South Alabama, Meghan is an outstanding student (4.0 GPA) who has a demonstrated record of leadership and participation in "above and beyond" activities.

She chose the University of South Alabama carefully and was drawn by not only academic excellence but also by opportunities to be able to participate in field work and even commercial meteorological activities. She completed all university requirements to be invited to participate in scientific storm chasing program offered by USA. She also has been active in attending all available weather related conferences and has been asked by the USA Meteorology Department to be the 2009 convention coordinator of the USA sponsored Southeast Coastal & Atmospheric Processes Symposium (SEACAPS).

For her senior project, she will work with the university's Coastal Weather Research Center which provides specialized weather forecasting and consulting services to a wide variety of commercial concerns. A goal for this involvement will be to retain a new client for the Center. Few universities offer such a real-world, commercial meteorological opportunity.

Meghan does not take summers off. She participated in a NASA Development Program this past summer, conducting research of interest for NASA. She presented her findings to NASA at the end of the program. Next summer, she will be working with the National Weather Service on a research project and will present findings in Silver Spring, Maryland. She also participates in numerous professional, leadership, and social organizations.

The NWA Education Committee is proud to announce this year's extraordinary scholarship winners selected from an amazing pool of nationwide applicants. The committe received 14 applications for the Arthur C. Pike Scholarship in Meteorology; 19 applications for the Dr. Roderick A. Scofield Scholarship in Meteorology; six applications the David Sankey Minority Scholarship in Meteorology and 23 applications AccuWeather, Inc. Undergraduate Scholarship in Meteorology.

Best Wishes to all individuals who applied and congratulations to Benjamin, Leejah, Kristen and Meghan!

Rapid science and technology infusion for the advancement of operational forecasting requires direct, focused interactions between operational forecasters, research scientists, numerical model developers, and information technology specialists. The National Oceanic and Atmospheric Administration's (NOAA) Hazardous Weather Testbed (HWT) provides a unique setting to facilitate such interactions and allows participants to better understand the scientific, technical, and operational challenges associated with the prediction and detection of hazardous weather events.

The HWT is a joint facility managed by the National Severe Storms Laboratory (NSSL), the Storm Prediction Center (SPC), and the NWS Oklahoma City/Norman Weather Forecast Office within the National Weather Center building on the University of Oklahoma South Research Campus. This joint facility is composed of two primary overlapping program areas: the Experimental Forecast Program (EFP) and the Experimental Warning Program (EWP). The EFP branch of the HWT is focused on predicting hazardous mesoscale weather events on time scales ranging from a few hours to a week in advance, and on spatial domains ranging from several counties to the CONUS. More information about the EFP is available at www.nssl.noaa.gov/hwt/ .

The EWP branch of the HWT is concerned with detecting and predicting mesoscale and smaller weather hazards on time scales of minutes to a few hours, and on spatial domains ranging from several counties to fractions of counties using real-time observations, including data from a variety of radar platforms (http://ewp.nssl.noaa.gov). The objectives of the EWP and its three spring projects are the focus of this article. The EWP has two primary objectives: 1) to evaluate the accuracy and the operational utility of new science, technology, and products, and 2) to foster collaboration between NSSL scientists and operational meteorologists.

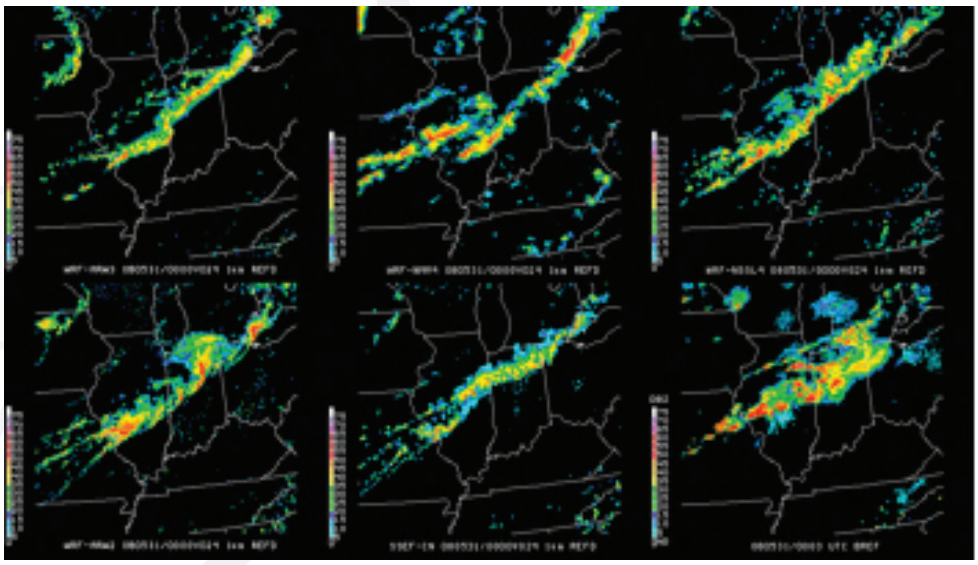


Figure 1. Daily forecasts from five different convection-allowing WRF model configurations were tested and examined as part of EFP activities. Shown here are 24 hr forecasts of model simulated reflectivity (lower left, lower middle, and upper row) and observed radar reflectivity (lower right) valid 03 UTC 24 May 2008.

2008 Experimental Forecast Program

The HWT EFP conducted the 2008 Spring Experiment from mid April through early June. More than 60 participants, including a mix of research scientists, operational forecasters, numerical model developers, university faculty and graduate students, from across the U.S. and multiple foreign countries spent up to one week in the EFP. As in the last four Spring Experiments, the primary focus was on the examination of convection allowing (grid spacing = 2–4 km) configurations of the WRF model covering approximately the eastern three-fourths of the U. S. in a simulated severe-weather-forecasting environment. Output from various configurations of the WRF model were provided to the HWT during the experiment by the University of Oklahoma Center for Analysis and Prediction of Storms (CAPS), the NCEP Environmental Modeling Center (EMC), the National Center for Atmospheric Research (NCAR), and the NSSL.

As in previous experiments, these simulations were evaluated on their ability to predict the location and timing of thunderstorm initiation and evolution, and offer useful information on thunderstorm morphology and intensity (Fig. 1; Table 1). In addition, the experiment continued testing and refining a real-time, three-fourths U.S. domain 10-member convection-allowing storm scale ensemble forecast (SSEF) system provided by CAPS to gauge technical issues related to high performance computing, networking, data transfer and processing, product creation, and workstation display requirements for future high impact weather forecasting initiatives, and the potential benefits of uncertainty information provided by the SSEF.

New endeavors this year included 1) an exploration of the impact of assimilating radar reflectivity and velocity data into SSEF members on short-term forecasts of hazardous convective weather; 2) a real-time test of the NCAR WRF data assimilation system, and 3) a more detailed examination of the relationship between model forecasts of convective storms and model predictions of the mesoscale environment, focusing on boundary-layer thermodynamic structure, air mass boundaries, and sub-synoptic scale features in the free atmosphere. The goal of these endeavors is to provide specific information to model developers that can guide their efforts to improve various components of the WRF model.

2008 Experimental Warning Program

During 28 April – 6 June 2008, 26 visiting forecasters (4 – 5 per week) participated in three projects focused on preliminary testing of experimental radar platforms and ideas for severe weather warning applications, including 1) the National Weather Testbed Phased Array Radar (NWRT PAR), 2) the Collaborative Adaptive Sensing of the Atmosphere (CASA) radar network, and 3) Gridded Probabilistic Hazard Information Project (Fig. 2).

NWRT PAR Project

The NWRT PAR project invited visiting forecasters to evaluate the operational utility of S-band PAR technology during simulated and real-time operational warning situations. Simulated warning situations provided forecasters with the opportunity to gain experience interpreting rapid-update (≤ 1 min), volumetric PAR data from archived cases prior to real-time operations. To help forecasters better assess the potential operational use of PAR in their county warning area, simulated warning situations showed weather events common to regions outside of the Southern Plains, such as wet microbursts and mini-supercells that formed in a tropical environment. Forecasters completed questionnaires evaluating 1) the strengths and limitations of PAR and NEXRAD data in the analysis of severe storms, 2) how characteristics of PAR scanning strategies might improve the understanding of severe storms, 3) how using PAR data to make warning decisions might increase severe weather warning lead-time, and 4) how PAR data may be of benefit to NWS operational responsibilities and to the public. Information about the findings from this experiment and related PAR research are available at www.nssl.noaa.gov/projects/pardemo .

Figure 2. Visiting forecasters and project leads participating in the CASA (far left), PAR (corner), and Gridded Probabilistic Severe Weather Warning Guidance Projects.

CASA Project

The primary objective of the CASA Project (http://www.casa.umass.edu) was to evaluate the operational utility of CASA radar networks which consist of densely spaced, low power, X-band radars with overlapping coverage that can observe the lower troposphere at high spatial (100's of meters) and temporal (60 s) resolution, and provide 3DVAR-derived wind fields. To achieve this objective, forecasters analyzed data from the 4-node CASA X-band radar network located in southwest Oklahoma, between the Twin Lakes and Frederick NEXRAD weather radars, through playback of archived cases and real-time observations. CASA scientists observed and recorded forecasters as they analyzed CASA data and compared it to NEXRAD data. Forecasters also completed questionnaires evaluating how CASA data might improve severe weather warning decision-making, the strengths and limitations of CASA's technical capabilities and adaptive scanning strategies, and how forecasters might incorporate real-time 3-DVAR-derived wind fields into warning decision making.

Continued page 6

MODEL	GROUP	CORE	GRID	VERTICAL LEVELS	IC	LBC	RADAR DATA
ARW3	NCAR	ARW	3 km	39	12h WRF 3DVAR cycle	12 Z GFS forecast	NO
NMM4	EMC	NMM	4 km	35	32 km NAM	00Z NAM forecast	NO
NSSL4	NSSL	ARW	4 km	35	40 km NAM	00Z NAM forecast	NO
SSEF-CN	CAPS	ARW	4 km	51	12 km NAM + 3DVAR	00Z NAM forecast	YES
ARW2	CAPS	ARW	2 km	51	12 km NAM + 3DVAR	00Z NAM forecast	YES

Table 1. Some characteristics of the five different convection-allowing WRF model configurations exhibited in the Figure above. The core refers to the two dynamic cores available from the model, either the advanced research WRF (ARW) core or the Non-hydrostatic Mesoscale Model (NMM) core. All models used various forms of the operational North American Model (NAM) analyses and forecasts for the initial and lateral boundary conditions, except for the ARW3 from NCAR, which used a 12 h data assimilation system using the 12 Z Global Forecasting System (GFS) analysis and forecast as a background. The two models provided by CAPS shown above assimilated radar reflectivity and radial velocity data into the NAM initial conditions.

HWT, continued from page 5

Gridded Probabilistic Hazardous Information Project

The main objective of the Gridded Probabilistic Hazardous Information Project was to evaluate the utility and effectiveness of high temporal and spatial resolution severe convective weather guidance before consideration into NWS warning operations. To attain this objective, forecasters were asked to evaluate and provide feedback about uncertainty information (Fig. 3) for different severe weather threats such hail, wind, and tornadoes. The interaction between researcher and forecasters during the early stages of this project will guide how this information may eventually be implemented into NWS services. Forecasters also provided feedback on the best uses of uncertainty information in the short-fused NWS warning environment, and how gridded probabilistic information may be of benefit to users of severe convective weather hazard information.

Pam Heinselman, Steve Weiss, Mike Coniglio, David Andra, Greg Stumpf, Travis Smith, Brenda Philips and Jerry Brotzge

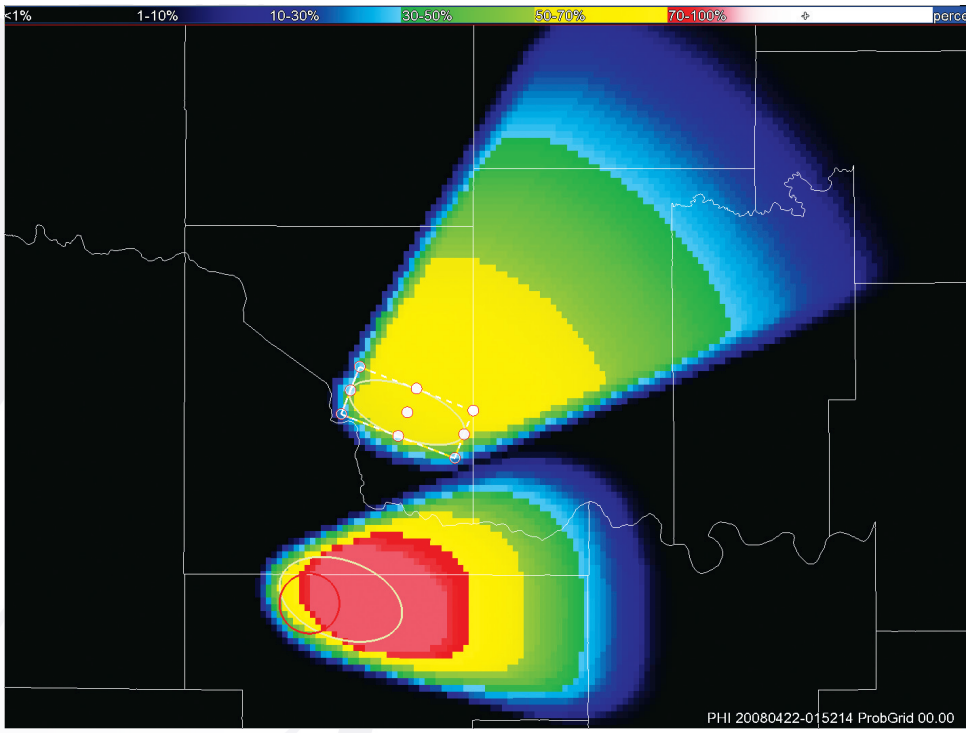


Figure 3: Probabilistic hail threat information for a hail storm in central Oklahoma that occurred during the spring EWP experiment. The light-green polygon shows the outer boundary of the threat area issued by a forecaster, and the probability of hail occurring during the next 60 minutes is shown by the yellow (50% to 70%), green (30% to 50%) and blue (10% to 30%) imagery overlaid on radar reflectivity data.

President's Message, continued from front

Head over to the NWA home page and take a look at the agenda (www.nwas.org/meetings/nwa2008/prelim_agenda.pdf) for the Broadcaster's Workshop and the rest of the week's activities or consult the August *Newsletter*. I am confident that you will find a schedule filled with a myriad of opportunities guaranteed to awe and enlighten unlike any meeting offered previously. The breadth of topics, the historical significance of these remarkable events which continue to capture our imagination and an unparalleled look into the future of forecasting headline our week. Get ready, but be advised that seatbelts are not standard issue at the Galt House.

The 33rd Annual Meeting will also afford our membership a unique forum to contemplate serious questions facing our discipline and our society. For example, the 2000 census indicated that 40 percent of the U.S. population lives in coastal regions or areas at risk for a natural disaster. In addition, a large percentage (~67 percent) of our population occupies urbanized zones accounting for *only* 2 percent of the land mass (Office of the Federal Coordinator for Meteorology). We want that stunning Gulf Coast view, the privacy of a western Mountaintop retreat or the tranquility of a bubbling brook running through our property — but we remain ill prepared for the consequences when these enviable settings are transformed by nature's fury; ask the thousands who refused to follow a mandatory evacuation order in Galveston.

Monday's final presentation T. G. Shuck, "*Severe Weather and Major Sports Venues in Kentucky: Is There a Plan to Keep Fans Safe?",* will be followed by an open discussion on the subject of planning for the evacuation and sheltering of large crowds during open air venues. As a parent, a scientist and president of a national organization, I can tell you with all honesty that the catastrophic consequences of an outdoor event impacted by severe weather are my greatest weather-related concerns. You may recall my June "President's Message" focused on the importance of promoting lightning safety, and the need to educate is just as great today. The call to go indoors when thunder roars went unheeded during a soccer training session in western Germany in early August. Thirty-two players from senior and youth amateur teams were struck by lightning, injuring nine seriously. I recently interrupted a cross-country practice in late August here in Lancaster, PA admonishing the coach to move the runners inside as a severe thunderstorm approached. Lightning struck within a mile of the school just minutes after the kids were safely inside; my daughter was one of those kids.

Session 18 on Thursday afternoon will continue the discussion of weather and societal impacts with several stimulating talks. There is one in particular that I want to bring to your attention: Tim Troutman's talk entitled "*What if the 3 April 1974 Tornado Super Outbreak in North Alabama Occurred Now?*" This talk, the Broadcaster's Workshop expertly coordinated by Bryan Karrick and his group, and more than 100 posters of outstanding quality highlight what promises to be a week of memorable discussions.

Did I mention there will be an entire session devoted to the Feb 5 - 6, 2008 Super Tuesday outbreak? And what about…well, you get the idea! See you in Louisville.

John Scala
President

Professional Development Opportunities

9th Annual Southern New England Weather Conference: Oct. 25
Offering presentations for professional scientists as well as the public, this conference will be at the Clay Center at Dexter and Southfield Schools in Brookline, Mass. The Southern New England Chapter of the NWA is one of the sponsors. More information is available at www.sneweatherconf.org/index.shtml

10th Northeast Regional Operational Workshop: Nov. 5-6
Co-sponsored by the NWS Albany, N.Y. office and the Department of Earth and Atmospheric Sciences at the University of Albany, the workshop will be held in Albany, N.Y. at the Center for Environmental Science and Technology Management Auditorium. The registration deadline is Oct. 23. Learn more at www.erh.noaa.gov/aly/NROW/nrow10.htm or 518-435-9569

Coastal Storms Conference: Nov. 12-13
The State University of New York announces a conference on coastal storms at Stony Brook University, N.Y. The conference objective is presentation and discussion of the most recent understandings of the physics, impact, prediction and future change of winter storms and hurricanes in the coastal regions. Confirmed keynote speakers include Drs. Louis Uccellini, Kerry Emanuel, Richard Rotunno, Paul Kocin, Chris Thorncroft and Burrell Montz. Access http://www.somas.stonybrook.edu/storm for details.

Next Generation Warning Services Workshop: December 2-4, 2008
Hosted by the University of Oklahoma and NOAA's NWS, the workshop brings together technical and operations experts from the private weather enterprise, the broadcast media, emergency managers and academia to determine needs for accurate, accessible, and timely watch, warning, and advisory services from the NWS . Register at http://apps.weather.gov/partners/index.php.

8th NOAA Satellite Direct Readout Conference: December 8-12
NOAA will host this conference at the Hilton Miami Airport Hotel in Miami, Fla.. Information regarding the direct readout from meteorological and environmental satellites, and changes to NOAA satellites and programs will be discussed. Learn more at http://directreadout.noaa.gov/miami08/.

89th AMS Annual Meeting: Jan. 11-15, 2009
Scheduled for the Phoenix Civic Plaza Convention Center in Phoenix, Ariz., details are at www.ametsoc.org/MEET/annual/.

9th Annual National Severe Weather Workshop: March 5 – 7, 2009
Planning is underway for this Norman, Okla., workshop. Contribute through the first-ever National Severe Weather Workshop survey — online for a limited time at https://www.surveymonkey.com/s.aspx?sm=cbcttdbgCU60u9EieQO1_2fQ_3d_3d. Survey results will be used to better design the overall workshop experience for attendees.

34th Annual Northeastern Storm Conference: March 6-8, 2009
Dr Howard Bluestein will be the banquet speaker and Wendy Abshire will be the invited speaker at the Ice Breaker. Sponsored by the Lyndon State College AMS/NWA Chapter, more info avialable at http://apollo-dev.lsc.vsc.edu/ams/index.php?page=nesc.

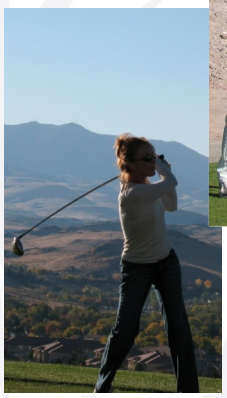
2009 Alaska Weather Symposium: March 10 – 12, 2009
This symposium will be held in Fairbanks, AK and more information is available at http://weather.arsc.edu/Events/ASW09

7th Annual Climate Predication Applications Science Workshop: March 24-27, 2009
This workshop will be held in Norman, Okla., at the National Weather Center. More information is available at http://climate.ok.gov/cpasw/ or by calling Diane Perfect at (301) 713-1970 ext. 132.

The 2009 Southeast Severe Storms Symposium: March 27-28, 2009
This is the eighth annual symposium sponsored by the East Mississippi Chapter of the NWA and AMS will be at Mississippi State University in Starkville, Miss. Learn more at www.msstate.edu/org/nwa/sympos.shtml

13th Annual Severe Storms and Doppler Radar Conference: Tentatively scheduled April 2-4, 2009
Sponsored by the Central Iowa Chapter of the NWA, conference information will soon be posted at www.iowa-nwa.com.

Inland Impacts of Tropical Cyclones Conference: June 10 – 12, 2009
Hosted by the Metro Atlanta NWA/AMS Chapter, this conference will be at the Westin Peachtree Plaza in Atlanta, Ga. Oral presentations are requested focusing around the broad theme of the inland impacts of tropical cyclones. Please submit abstracts electronically to the science committee chairperson Rob Handel (robert.handel@noaa.gov) by Feb. 6, 2009. Contact the program chairperson, Trisha Palmer (trisha.palmer@noaa.gov) or visit www.ametsoc.org/chapters/atlanta/iitc.htm for more details.



Golfin' on the River

7th Annual
NWA Scholarship Golf Outing

October 11

Shawnee Golf Course
Louisville, Kentucky
www.shawneegolfcourse.com

Photos from the 2007 Golf Outing in Reno, Nevada

$75
Covers lunch, greens fees, cart and donation to the NWA Scholarship fund!

Tee times begin at noon.

Contact Betsy Kling (betsykling@wkyc.com) to reserve your spot. (Sponsorships still available!)

Dates 2 Remember

Oct. 25: 9th Annual Southern New England Weather Conference, Brookline, Mass.

Nov. 2: Daylight Savings Time ends at 2 a.m.

Nov. 5 - 6: 10th Northeast Regional Operational Workshop, Albany, N.Y.

Dec. 2 - 4: Next Generation Warning Services Workshop, Norman, Okla.

Dec. 8 - 12: 8th NOAA Satellite Direct Readout Conference, Miami, Fla.

Jan. 11 - 15: 89th AMS Annual Meeting, Phoenix, Ariz.

See page 7 or www. nwas.org/events.php for details on these and additional Professional Development Opportunities!

NWA Newsletter (ISSN 0271-1044)

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Members receive the Newsletter and *National Weather Digest* as part of their regular, student or corporate membership privileges. Newsletter subscriptions are available for $18 per year plus extra shipping costs outside U.S. Single copies are $1.50. **Please send address, phone number, email and affiliation changes to assist@nwas.org.**

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Supporting and promoting excellence in operational meteorology and related activities since 1975.