



## Letter from the Interim Director



*Daan Liang, Ph.D., P.E.*

In the month of March, NWI was quite successful in filling several important positions.

Lee Wilks has been hired as superintendent to better support NWI's ever-expanding field operations and the West Texas Mesonet. He immediately jumped into action demonstrating his technical skills and enthusiasm by assisting with the field installation of the DOE radar and with the instrumentation of sensors for TxDOT. We also feel lucky to have found Angela Beikmann to replace our Senior Accountant Jodie Stone. We wish Jodie the best with her retirement.

We were also successful in bringing over John Geesling who has come to NWI as our new research associate. His background and experience in Linux server and security will significantly strengthen NWI's cyber infrastructure and have an immediate impact on several ongoing research projects (e.g. the West Texas Mesonet network and the lightning mapping project). I'm also excited about John's contributions to future proposals and grants pertaining to big data and cyber security.

The addition of these positions (and specifically with John's) clearly reflects NWI's commitment to its strategic goals and would not be possible without support from the Dean of the College of Arts and Sciences Dr.

Brent Lindquist, and from Dr. Jeff Lee of the Department of Geosciences. It's a perfect example of how resources can be leveraged effectively and sends out a positive and powerful message to our researchers.

Lastly, Texas Tech University and Louisiana State University are teaming together on establishing a NSF Industry/University Cooperative Research Center (I/UCRC) for Wind Hazard and Infrastructure Performance (C-WHIP). The Center will pursue research with guidance of industry to reduce economic damage and mitigate loss of life. We are inviting insurance, construction, and engineering companies to join and support the Center. In the meantime, we are reaching out to government agencies such as NIST, FEMA and state wind pools in Texas, Louisiana, and Florida, informing them about our efforts and gauging their interest to be members as well. Since coming back from NSF, Dr. Kishor Mehta has been providing leadership to this effort and helping to make the Center a reality.

I'm glad to report that we have accepted three new students to our Wind Science and Engineering (WiSE) doctoral program and that one of this select group has been awarded the prestigious Presidential Graduate Fellowship. I'd like to thank the many faculty members who participated in this year's application evaluation and look forward to additional growth over the next year.

*Go Raiders!*

## NWI McDonald-Mehta Lecture Series invites Jonathan Naughton

This semester's final speaker for the Spring 2016 McDonald-Mehta Lecture Series was Dr. Jonathan Naughton from the University of Wyoming. The title of Dr. Naughton's lecture was "Wind Plant Simulation and Validation" and covered the issue of wind plant underperformance and how the University of Wyoming is addressing some of the challenges.

Dr. Naughton is a Professor in the Department of Mechanical Engineering where he has been a faculty member since 1997. He obtained his B.S. from Cornell University in 1986, and his doctoral degree from Pennsylvania State University in 1993.

Dr. Naughton's areas of interest include unsteady flows (including turbulence), the instrumentation required to measure such flows, and the analytical technical skills critical to interpreting those measurements.

The McDonald-Mehta Lecture Series invites nationally-known scientists and experts in wind-related fields to speak about ongoing research around the world. It is funded and endowed by Dr. Kishor C. Mehta and Dr. James R. McDonald, co-founding members of NWI (formerly WISE).

**Please note:** The scheduled final speaker for the series was Dr. Andrew S. Whittaker from the University of Buffalo. Bad weather led to the postponement of that talk and it will be rescheduled at a later date.



*(Above) - Dr. Jonathan Naughton (University of Wyoming) was an invited speaker at TTU-NWI on March 02.*

## NWI welcomes Angela Beikmann



*(Above) Angela Beikmann, Senior Accountant with NWI.*

NWI is happy to announce that **Angela Beikmann** has joined our team in the position of Senior Accountant (to replace Jodie who retired recently).

Angela has a lengthy history as a Red Raider, graduating with her degree in Education, and then working at Tech developing her skills and finally coming to NWI from the position as a Senior Analyst in the Office of Research Accounting. In that position, Angela gained strong experience in post-award research administration which will help in her new position here at NWI.

Angela is very active in her church and the Lutheran Women's Missionary League where she is committee chair of the Host Committee for the upcoming 2016 Texas District Convention to be held here in Lubbock in early summer.

Angela is an avid puzzle solver and enjoys being with her family. She has a three-year old grand-daughter and the family is expecting another little girl any day now. Her eldest son is a current Red Raider, and she has both a daughter and a son studying at Lubbock High School.

**WELCOME ABOARD!**

## NWI Ph.D. Student Awarded Internship

James Duncan, a third-year Wind Ph.D. student, will be joining GE this summer in Greenville, South Carolina, as a summer intern within their Renewable Energy division.

James will be joining fellow researchers in examining the dynamic relationship between the atmosphere and wind turbine generation. The power output of multi-megawatt turbines assumes a standard set of atmospheric conditions along with neutral stability. Variabilities in the atmosphere, however, directly affect the efficiency of wind turbines.

While this is known, exactly how and the magnitude to which atmospheric stability and wind structure affect turbine output is not fully understood. Through the course of the internship, James hopes to use his background in the atmospheric sciences to help GE gain a more comprehensive knowledge of this synergy.



*(Above) - James Duncan, third year WISE Ph.D. student.*

## 2015 Graduate Receives Award for Highest GPA



*(Above) - Jason Pigg was recognized by the TTU Alumni Association for his academic achievement.*

A Texas Tech graduate from the December 2015 BSWE class was recently recognized for earning the highest GPA among his peers. Jason Pigg was awarded a plaque and recognition from the Texas Tech Alumni Association for his academic results, and took a break from his current life to pick up the plaque.

## Lessons from 2014 Mayflower Tornado

When an EF-5 tornado struck the city of Mayflower, AK, in 2014, Don Greer did the right thing and he and his wife ducked into their storm shelter.

Once the storm had passed, Mr. Greer's wife had been killed and he had sustained severe injuries. The storm shelter door had failed and Mr. Greer sent the failed door to TTU National Wind Institute's Debris Impact Facility where NSSA Executive Director Dr. Ernst Kiesling and Research Assistant Professor Larry Tanner resolved to find out why.

After this study was completed, the forensic analysis showed that the failed door, although well-built, was not appropriate for tornado safe room application. The lesson is learned that only products that have been proven capable of reaching standards should be installed in tornado safe rooms.

Mr. Greer is now protecting himself and his family by installing a tested safe room provided by Vaughn Concrete Products, a company run by Mike Vaughn who is also an NSSA member.



# Wind Researchers Continue Developing New Custom Radar System

NWI faculty affiliate Dr. John Schroeder, and research professors Dr. Brian Hirth and Jerry Guynes continue their work on a \$1.4 million grant from the Department of Energy (DOE) to develop a new type of radar prototype that will provide better measurements of the complex flow in wind plants.

Titled *The Incubation of Next-Generation Radar Technologies to Lower the Cost of Wind Energy*, the team is building on its earlier findings that use radar technology in wind farms to develop a new prototype that enhances data availability and provides proactive controls to minimize turbine-to-turbine interaction and maximize power generation.

Dr. John Schroeder, Professor in Atmospheric Sciences and Principal Investigator for the project, said that it is common for many wind farms to underperform. Using radar to gain a better understanding of how turbines interact with each other, it's possible that wind farm design could be improved through strategic turbine spacing and placement.

Additionally, a semi-autonomous operation is also required for long-term deployments at varying onshore and offshore locations around the world. The project complements the U. S. Department of Energy's ongoing *Atmosphere to Electrons (A2e)* Initiative which aims to improve wind farm performance and support innovative renewable energy technologies.

The team has been developing the radar for over a year, and just recently lifted all of the major components into place at the NWI's field site. With this step, the project is within a few weeks of turning on the radar system and collecting its first measurements.

Beyond the co-PI's, NWI Senior Superintendent Jeff Livingston, superintendent Lee Wilks, research associate Scott Gunter, and doctoral student James Duncan have all contributed to the project.



Photo credit: John Schroeder, TTU-ATMO.

## NWI Staffer Gives Female STEM Retention Presentation

NWI Unit Coordinator Maggie J. Gilchrest (*right*) presented research on increasing female students in STEM fields at the 2016 *Regional Symposium for Student Success and Retention* on February 29th at Texas Tech University.

The presentation, *Luck Be a Lady: Promoting Persistence and Retention of Female STEM Students*, discussed issues concerning female completion of STEM degrees despite initial higher enrollments.

Gilchrest discussed college gender development theories and practical applications for STEM faculty and staff to use in their interactions with female students in the classroom, via policy creation, when advising, mentoring, coaching, and instructing females.

NWI Associate Director of Education Dr. Andrew Swift, and Wind Energy instructor Dr. Chris Pattison attended the symposium as well. The NWI faculty and staff are committed to promoting gender diversity within the Wind Energy degree program to help females engage, persist, and graduate.



(Above) - NWI's Unit Coordinator Maggie J. Gilchrest.

## NWI GRANTS AND CONTRACTS — MARCH 2016

Investigator	Unit	Credit	Award Amount	Proposal No.	Title	Agency
Louden, Elizabeth I.	Architecture	50%	\$3,400	109666	NWI: RAPID: Collaborative Research: Multi-Platform 3-D Scene Preservation of Tornado Damage to Engineered Structures.	National Science Foundation
Smith, Douglas A.	National Wind Institute (NWI)	50%	\$3,400	109666	NWI: RAPID: Collaborative Research: Multi-Platform 3-D Scene Preservation of Tornado Damage to Engineered Structures.	National Science Foundation
Bayne, Stephen B.	Ctr for Pulsed Pwr./ Pwr. Electronics	80%	\$320,000	108012	NWI: GLEAMM: Semiconductor Evaluation for High Action Applications.	U.S. Army Research Lab
Giesselmann, Michael G.	Ctr for Pulsed Pwr./ Pwr. Electronics	20%	\$80,000	108012	NWI: GLEAMM: Semiconductor Evaluation for High Action Applications.	U.S. Army Research Lab

### ATMO STUDENTS PREPARE LMA FOR VORTEX-SE



(Left) - Sam Berkseth, a graduate student working under the direction of Dr. Eric Bruning, is preparing some of the equipment that is part of the Lightning Mapping Array (LMA) just prior to the departure of the VORTEX-SE team of researcher scientists and students.

The Verification of the Origins of Rotation in Tornadoes Experiment– Southeast (VORTEX-SE) is a research program to understand how environmental factors and characteristics of the southeastern US affect the formation, intensity, structure and path of tornadoes in this region.

The South-East U.S. seems to be disproportionately impacted by dangerous tornadoes, according to the National Severe Storm Laboratories, and the project is seeking to learn more about tornadoes through a collaborative approach.

## NWI MOVERS & SHAKERS



(Above) - Dr. Frank Lombardo, WiSE Ph.D. alumni and Assistant Professor at the University of Illinois-Urbana-Champaign.



(Above) - Dr. Kevin Walter, NWI Ph.D. alumni and Vice-President of Meteorology at Tradewind Energy.

- TTU WiSE Ph.D. alum **Dr. Frank Lombardo** (left) has been successfully recruited to be an Assistant Professor by the Civil and Environmental Engineering department at the University of Illinois at Urbana-Champaign. Specializing in wind engineering, infrastructure resilience and engineering, Dr. Lombardo was previously a Research Assistant Professor at Rensselaer Polytechnic Institute (RPI) in Troy, NY. Dr. Lombardo is a 2009 graduate of the National Science Foundation IGERT multidisciplinary program at TTU.
- NWI Wind Education faculty **Dr. Arquimedes (Archie) Ruiz-Columbie** (right) has written and edited a textbook focused on the needs of the undergraduate students in the BSWE program. Called "The Essentials of Mathematical Analysis and Analytical Modeling", the textbook is planned to bridge the gap between the classical ways of learning mathematics and the new way of using computers to facilitate knowledge acquisition. It will be published by Kendall Hunt.
- NWI WiSE Ph.D. alum **Dr. Kevin Walter** (left) has been promoted from Director of Meteorology to Vice President of Meteorology at Tradewind Energy, Inc. Kevin joined Tradewind after earning his Ph.D. in Wind Science and Engineering at Texas Tech in 2007. Since then, Tradewind Energy has grown into one of the most successful project developers in the nation, having installed 1,878 MW across 18 wind and solar projects, with another 1,000 MW under contract for construction in the next 2 years.



(Above) - Dr. Arquimedes Ruiz-Columbie, NWI Wind Education faculty.

### UPCOMING CONFERENCES/WORKSHOPS:

- AWEA's national conference, WINDPOWER2016, is scheduled for May 23-26 in New Orleans, LA.
- Remember the WiSE Wednesday Lecture Series every Wednesday at 2:30 p.m. in Experimental Sciences Building Room 120. Come and learn from your colleagues and peers. Check the upcoming schedule at [www.wind.ttu.edu](http://www.wind.ttu.edu).
- The annual summer camp, *Run on the Wind*, will be open for sign-ups soon. Please check the TTU-IDEAL website for details: [https://www.depts.ttu.edu/diversity/ideal/run\\_on\\_wind.php](https://www.depts.ttu.edu/diversity/ideal/run_on_wind.php)

**Remember to drop by the NWI booth # 4855 in the main Exhibition Hall at this year's WINDPOWER conference!**

**We'd love to see you.**



*If you are interested in having your latest scholarly endeavors featured in the next NWI newsletter, please forward your information (publications, proceedings, conference/workshop attendance, or other news etc.) to Liz Inskip-Paulk (email: [Elizabeth.paulk@ttu.edu](mailto:Elizabeth.paulk@ttu.edu)). Go Red Raiders!*