



TEXAS TECH UNIVERSITY National Wind Institute™

February 2016—Issue 80

Letter from the National Wind Institute Interim Director



February was a busy month for NWI as several job openings were posted and interviews were scheduled and conducted. Based on the feedback from our researchers, we created a superintendent position to work as an understudy to Jeff Livingston, learning from him both technical skills and management procedures that have served the institute well over the years. This person, who will be paid largely on grants, will enable us to better support ever-expanding field operations and the West Texas Mesonet. We look forward to announcing the new individual soon and his/her vast capabilities.

At the same time, we have had interviews to replace Jodie Stone, our Senior Accountant, who will retire at the end of March. This is such a critical position within the Institute and we have been extremely pleased with the qualifications of candidates and their work ethics. We are hoping to hire one of them to continue providing a high level of customer service that Jodie has maintained and to expand the Senior Accountant also into new areas such as proposal budgeting. I hate to say goodbye to Jodie but wish her the best with retirement.

NWI, as a research center, is not supported by IT Central and we have struggled for some time over our IT needs. Right now, we are negotiating with IT Central to hire a dedicated person splitting his/her time between NWI and Texas Tech Neuroimaging Institute (TTNI) to address technical problems with office and lab computers when they arise. This is a new type of agreement being piloted on campus and we are excited to be a part of it. On another note, Tammy Pitzer, the office manager for Debris Impact Facility, has transitioned into a part-time position in order to spend more time with her young kids at home.

Thanks to President's Strategic Hire Initiative and Whitacre College of Engineering, we are seeking a Research Scientist with a strong background in computational wind engineering to support our wind hazard group. We will need all of you to help with recruitment given your various levels or expertise, knowledge, and connections. Please direct prospective applicants to the TTU career portal (<http://www.texastech.edu/careers/>) and search for Requisition ID 6711BR.

For our interdisciplinary wind science and engineering doctoral program, we have a pool of strong applicants this year and will admit up to four new students starting in the fall of 2016. Funding will be provided from teaching assistantship, research assistantship, the Mehta Endowed Fellowship, and other sources. These students, with diverse interests, will help grow the program into a sustained and organic place of continued excellence of interdisciplinary education.

Please enjoy the rest of the newsletter to learn more about new and exciting things taking place at NWI.

Go Raiders!

NWI McDonald-Mehta Lecture Series invites WiSE Co-Founder

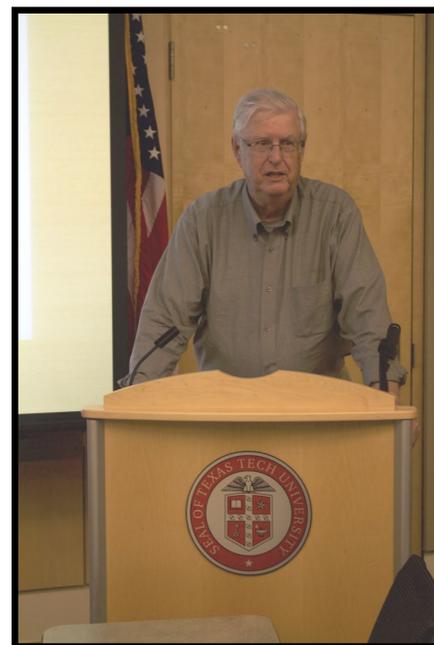
This month, NWI invited former TTU Wind Science and Engineering Research Center (WiSE) co-founder Dr. Joseph Minor to travel to Lubbock to give a presentation about some of the experiences that he had during his time at TTU and when the foundation of NWI was being laid.

Dr. Minor served as faculty at TTU for more than 20 years and was recognized as a Horn Professor Emeritus. Now retired from holding a faculty position at the Missouri University of Science and Technology after his tenure at TTU, Dr. Minor currently works as a consultant in the wind engineering field.

When Lubbock's tornado hit on May 11, 1970, Dr. Minor was working alongside Drs. Kishor Mehta, James MacDonald and others and, as a result of this collaboration over the years, the Institute of Disaster Research (IDR) was founded. The IDR evolved into the Wind Science and Engineering Research Center (or WiSE), and WiSE evolved into the National Wind Institute in 2012.

Dr. Minor discussed several landmark findings that proved both fascinating and entertaining as Drs. Keisling, Mehta, McDonald and Minor made their marks in the annals of Texas Tech wind science and engineering.

NWI is now one of the leading wind researchers worldwide, and we are proud to look back at our history and thank those who came before us.



(ABOVE) - Dr. Joseph Minor gives his presentation on campus on February 12, 2016.

NWI welcomes: Dr. Yin Lu



(Above) Dr. Yin Lu, Research Associate with NWI.

NWI is happy to announce that **Dr. Yin Lu** has joined our team to support GLEAMM-related activities as a Research Associate.

Dr. Lu graduated from TTU in 2015 with his doctoral degree in Computer Science.

Current research interests include:

- High-performance computing and distributed computing
- Parallel I/O and data intensive I/O middleware
- Data-focused scalable cyberinfrastructure

Dr. Lu's interests also include running marathons, swimming and hiking with friends. He was also the champion of the 2014 TTU Computer Science Department Invitational Ping Pong Tournament.

WELCOME ABOARD!

HAWKS project continues under Dr. Westergaard's watchful gaze

Wind farm output can be significantly improved by implementing wake control strategies. However, state of the art control development and testing tools are deficient and of limited practical value. Computational Fluid Dynamics-based simulations have coarse resolution and are simply not able to resolve the complete flow physics. Conversely, field campaigns are expensive, laborious and limited by instrumentation technology. An NWI research group led by Dr. Carsten Westergaard is currently working on building a wind tunnel based platform that will allow testing myriad wind farm control parameters in real time.

The "Hybrid Accelerated Wind-Farm Kinematic-Control Simulator" (HAWKS) will consist of fully controllable scale wind turbine models to study the dynamics of inter-turbine wake interaction and the effect on the net output power. The simulator is being built in the wind tunnel located at the Reese Center.

Individual turbines will have pitch, yaw and rpm controls that will be operated from a command center similar to a full scale wind farm operation. Turbine characteristics such as power and rpm will be measured. Currently, the pitch and rpm measurement and control system has been implemented. In addition, wake characteristics will be obtained using Particle Image Velocimetry (PIV) which is a high resolution, laser-based measurement technique. This technique provides a detailed map of the wake which would allow observing the control effects in real time. This platform will emulate the wind farm dynamics and can be utilized as a training platform for future wind farm managers in addition to research. This interdisciplinary effort has several NWI affiliated graduate and undergraduate students involved in addition to faculty.

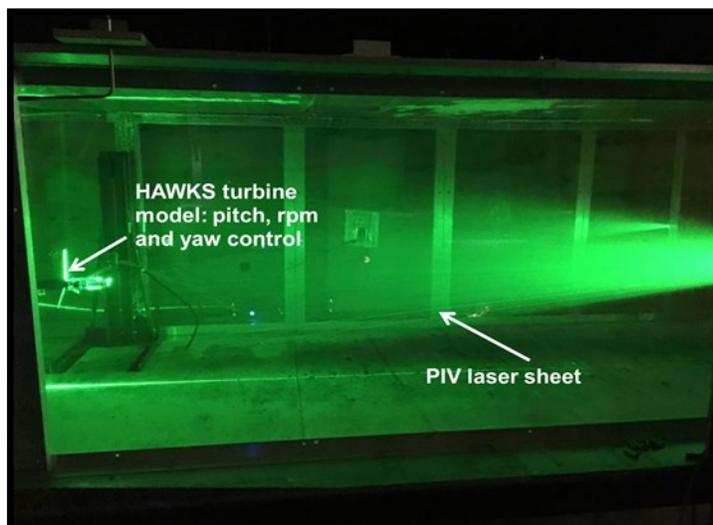
Undergraduate Students: Travis Monk (NWI) and Stephanie Vasquez (NWI). **Graduate Students:** Ricardo Castillo (EE) and Yeqin Wang (ME). **Faculty:** Drs. Ren Beibei, Fazle Hussain, Suhas Pol, Andy Swift, and Carsten Westergaard (PI).

ATMO FACULTY LEAD STUDENT TEAM IN VORTEX-SE PROJECT

Drs. Chris Weiss and Eric Bruning (Atmospheric Science Group) are leading a team of students to the southeastern U.S. for the Verification of the Origin of Rotation in Tornadoes Experiment - Southeast (VORTEX-SE), which will take place in March and April across northern Alabama and southern Tennessee. The purpose of the project is to better understand how tornadoes develop and propagate in this region of the country.

Texas Tech is one of a handful of universities that has been awarded funding to participate in VORTEX-SE. Specifically, TTU will bring three observation platforms to the field: StickNet, an array of 24 in situ probes instrumented to make critical measurements of temperature, pressure, humidity and wind near developing tornadoes; portable lightning mapping array stations which will gather the characteristics of lightning flashes within these storms, and a mobile ballooning facility that will provide data on the vertical structure of the atmosphere near target storms.

Dr. Johannes Dahl (Atmospheric Science Group) will additionally carry out numerical simulations of tornadic thunderstorms in an attempt to better understand how the frictional effects of the earth's surface influence the development of tornadoes.



(Text credit: Dr. Carsten Westergaard and students.)

(ABOVE) - HAWKS turbine in the wind tunnel at NWI research facilities at Reese Technology Center. The illustration shows a picture of a single test HAWKS turbine in the wind tunnel. The laser light sheet represents the measurement plane of the PIV system.



(Above) - ATMO graduate student Abby Kenyon prepares equipment for the project.

Text credit: Dr. Chris Weiss, ATMO/Geosciences.

WEST TEXAS MESONET NETWORK CONTINUES TO GROW...



The West Texas Mesonet (WTM) Network has added one more station to its collection—this one in Vigo Park, 17 miles northeast of Tulia and 8 miles west of the western edge of Palo Dura Canyon.

Special thanks to the National Weather Service in Amarillo and Lubbock, and to Patricia Gardner for allowing the station on her land.

Photo credit: Wes Burgett, WTM Manager.

NWI/WiSE Co-founder celebrates 80th birthday family-style

Dr. Kishor Mehta, one of the co-founders of the National Wind Institute (and its predecessors) celebrated his 80th birthday in February.

His family of four children (plus spouses) and ten grandchildren had traveled across states (in some cases) to spend time with Dr. Mehta at a large party organized by the family.

Congratulations to Dr. Mehta on your birthday. May you have many more.



Photo credit: Anna Mehta Damian.

(RIGHT) - Dr. Kishor Mehta (center) stands with his family who had gathered for his special day.



NWI Researchers make progress on DOE Radar Project

NWI faculty affiliates Drs. John Schroeder and Brian Hirth, along with NWI Research Associate Jerry Guynes (left image), continue their fast-paced 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.

Be sure to see the March edition of the NWI Monthly Newsletter for more details.

(LEFT) - Research Associate Jerry Guynes tightens up some screws on the new radar platform in preparation for the next step in the process.

NWI SCHOLARLY UPDATE: FEBRUARY 2016



(Above) - Dr. Clint Boal, Natural Resources Management and NWI faculty affiliate.

- Research Associate **Jerry Guynes** has been selected as the radar expert on a 5-person panel review of a workshop sponsored by the U.S. Department of Energy (DOE) on “Assimilation of Wave Imaging Radar Observations for Real-Time Wave by Wave Forecasting. The workshop was hosted from the Golden Field Office, and DOE’s Wind and Water Power Technologies Office on February 16th.
- **Clint Boal** (and his students) presented a poster presentation at the Annual Meeting of the Texas Chapter of the Wildlife Society in San Antonio, TX during the month of February. The presentation title was “Nest Box Use and Productivity of American Kestrels on the High Plains of Texas.” Undergraduate student C. K. Gulick was the lead presenter.
- **Clint Boal** presented an oral presentation primarily based on the SWiFT site research at the Annual Meeting of the Texas Chapter of the Wildlife Society in San Antonio, TX, during the month of February. The presentation title was “Migration of Swainson’s Hawks through Regions of Different Wind Energy Potentials between Texas and Argentina.” Co-authors included J. D. Ray and TTU graduate student L. Groen.

- **Anna T. Young**, Associate Managing Director for NWI, was recently commended by members of the National Organization of Research Development Professionals (NORDP) for her dissertation as “work of great relevance to research development professionals.” The dissertation is titled “Multidisciplinary Research Teams: A Quantitative Analysis of Interventions and Barriers to their Success.”
- **Stephen Bayne**, Ph.D. students Tyler Flack and Bejoy Pushpakaran recently had a paper accepted for publication by the Journal of Electronic Materials titled “GaN Technology for Power Electronic Materials.” DOI: 10.1007/s11664-016-4435-3.

UPCOMING CONFERENCES/WORKSHOPS:

- The next speaker for the Spring 2016 McDonald-Mehta Lecture Series is scheduled for 03/02 at 3:30 p.m. in Experimental Sciences Building 120. Dr. Jonathan Naughton from the University of Wyoming will be speaking and his lecture is titled: “Wind Plant Simulation and Validation.”
- The final speaker for the Spring 2016 McDonald-Mehta Lecture Series is scheduled for 03/09 at 3:30 p.m. in Experimental Sciences Building 120. Dr. Andrew Whittaker from the University of Buffalo will be speaking and his lecture is titled: “Seismic Isolation of Structures, Components and Systems in Safety-Related Nuclear Facilities.”
- 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.

VORTEX-SE PREPARATIONS UNDERWAY



(Above) - ATMO Ph.D. student Aaron Hill and Master’s ATMO student Abby Kenyon check the StickNet instrumentation platform prior to the TTU team leaving for the VORTEX-SE project. (See other article for details.)

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). Go Red Raiders!

NWI GRANTS AND CONTRACTS — FEBRUARY 2016

Investigator	Unit	Credit	Award Amount Credited	Title	Agency	Project Period
Bruning, E.	Geosciences	100%	\$124,136.00	(NWI) Texas Tech Support to GOES-RGLM Validation	NASA	01/06/2016-01/05/2019
Schroeder, J.	Geosciences	47%	\$95,607.87	NWI: SNL TTU Experiential Wind Farm	DOE/Sandia National Labs.	07/01/2014-12/31/2016
Liang, D.	Civil, Env. And Construction Eng.	6%	\$12,205.67	NWI: SNL TTU Experiential Wind Farm	DOE/Sandia National Labs.	07/01/2014-12/31/2016
Young, A.	National Wind Institute (NWI)	47%	\$95,607.87	NWI: SNL TTU Experiential Wind Farm	DOE/Sandia National Labs.	07/01/2014-12/31/2016
Reible, D.	Water Resources Center	50%	51,742.00	NWI: Advancing Resiliency in Critical Power and Industrial Control Infrastructure through Workforce Education and Real-World Testing	U.S. DHS/Univ. of Illinois of Champagne-Urbana	07/01/2015-06/20/2016
Swift, A.	National Wind Institute (NWI)	50%	51,742.00	NWI: Advancing Resiliency in Critical Power and Industrial Control Infrastructure through Workforce Education and Real-World Testing	U.S. DHS/Univ. of Illinois of Champagne-Urbana	07/01/2015-06/20/2016



Owlie's in town!

(LEFT L-R) - NWI student assistant Tanner Pletcher and Jeff Livingston, Senior Superintendent, stand beside Owlie, the national mascot of the National Weather Service (and ably played by ATMO graduate student Jenn Daniel who is inside the costume).

Owlie was in town to promote National Severe Weather Awareness Week, a week to bring community awareness to severe weather and how to prepare for the worst.