



Letter from the Interim Director



Daan Liang, Ph.D., P.E., Interim Director, NWI.

“An Era of Uncertainty” was the theme of 2016 Property Casualty Insurers (PCI) Annual Conference I attended in Dallas this month. It speaks to the unease caused by a convergence of factors including downward price pressure, increasing regulation, and disruptive forces from InsurTech startups like Lemonade.

As one executive said, the industry was well designed to take on other people’s risk but was slow dealing with its own. For example, thanks to regulations and business practices, companies often hold on to their own datasets and seldom share them with anyone. Data unavailability and fragmentation have made it difficult to develop high-fidelity physics/ engineering based catastrophe (CAT) models and to quantify the benefit of mitigation.

As the result, the industry looks powerless when battling the rising losses from both major hurricanes as well as from other severe weather events (e.g. hail). Could research centers like NWI contribute to future solutions? The answer is absolutely yes, considering our unique capabilities and knowledge in many related disciplines. As a matter of fact, forming an industry-sponsored program has been in the works for the past two years and will continue.

On November 4, NWI hosted its External Advisory Board (EAB) meeting at Research Park. This annual gathering allowed EAB members to critically review the progress NWI has made to help to guide its future.

Thanks to Anna, we put together an excellent agenda, including presentations by faculty and remarks by university administrators and deans. A week later, we welcomed a group of senior executives from Sandia National Laboratories to discuss how the partnership with Texas Tech University can be further expanded.

I will be happy to report back to you in the November issue of the newsletter on these two important meetings.

In the meantime, November holds the promise of several important occasions for the National Wind Institute. We are inviting the External Advisory Board members to campus for our annual meeting, we are celebrating the opening of the 100th station in the West Texas Mesonet network, and we will be hosting a signing ceremony with West Texas College to formalize our 2+2 agreement with their graduates.

Details to come!

Go Raiders!

Daan Liang, Interim Director

New Skyline to Come at NWI Field Site

Text credit: David Mitchell (SNL).

The skyline is going to be changing for Texas Tech's National Wind Institute field site at Reese Technology Center. Sandia National Laboratories (in conjunction with TTU, NWI, and Group NIRE) are going to be erecting a third wind turbine in November.

This activity is in conjunction with Sandia's Scaled Wind Farm Technology (SWiFT) site at Reese, an experimental test bed for the project with the U.S. Department of Energy and with private industry.

This new turbine will play a critical role in moving forward the understanding of turbine-to-turbine interaction as part of the Department of Energy's Atmosphere to Electrons (A2e) program.

The overall goal of the A2e program is to ensure future wind plants are sited, built and operated in a way that produces the most cost-effective, usable electric power.



WiSE Wednesday: Dr. Chris Weiss, ATMO/Geosciences

NWI believes in providing the best education on campus, and our WiSE Wednesday series continues to support that mission.

October's series featured **Dr. Chris Weiss**, Associate Professor in Geosciences (right), whose lecture was titled "Cold Pools and Tornadoes: Field Observation and Predictability."

Other WiSE Wednesday speakers for October have included Dr. Arindam Gan Chowdhury (Florida International University) and WiSE Ph.D. student, **Changda Feng**.



Ph.D. student Changda Feng.



*Dr. Arindam Gan Chowdhury,
Florida International University.*



Dr. Chris Weiss, Associate Professor, Geosciences.

NWI Faculty Affiliate Leads Tour for U.S. Congress Representative

NWI faculty affiliate **Dr. Brian Ancell** recently received a visit from U.S. House Representative Lamar Smith.

Representative Smith (R-TX) was visiting and interested in learning more about Dr. Ancell's new museum exhibit at the TTU Museum, "How the Weather Works: Our Place Between the Sun and a Storm."

According to the museum's website, Dr. Ancell's exhibit takes visitors through a set of interactive stations that building on each other to provide a more well-rounded experience for visitors.

This family-friendly exhibit is the result of an Faculty Early Career Development Program (CAREER) grant which Dr. Ancell received from the National Science Foundation (NSF) and which is one of the NSF's most prestigious awards in support of junior faculty members.

(Right L-R) - Dr. Gary Morgan (TTU Museum), Rep. Lamar Smith, and Dr. Brian Ancell (ATMO) stand in front of one of the exhibition displays at the TTU Museum.



Photo Credit: Kristina Butts, TTUS Chancellor's Office.

The NWI Education Team is Here to Serve You...



With the recent promotional activities on campus for Homecoming, it's always good to be reminded of people who are on the right team.

In this case, it's NWI's **Dr. Chris Pattison** (top left) and NWI Instructor **Andrew Buchok** (bottom right) who are out to save the day.

If you are a Wind Energy student (or thinking about becoming one), please contact our team of Educational Super Heroes:

- Lead Advisor: **Kacey Young Marshall**
- Advisor: **Maggie Gilchrest**
- Assistant Director: **Dr. Chris Pattison**
- Associate Director, Education: **Dr. Andy Swift**

The team is here to serve you and to help to make your time at TTU in the BSWE program as smooth as possible.

McDonald-Mehta Lecture Series: Dr. Tim Doggett (Berkshire Hathaway Insurance Insurance)



As part of the continuing program, the McDonald-Mehta Lecture Series recently welcomed Dr. Tim Doggett, Director of Atmospheric Perils at Berkshire Hathaway Specialty Insurance, on Wednesday, October 26.

Titled “Catastrophe Modeling: Applications in Multidisciplinary Wind Science and Engineering,” Dr. Doggett’s lecture discussed how catastrophe models have become an integral tool used by the insurance industry for quantifying risk to their business from natural disasters.

Dr. Doggett oversees natural catastrophe risk assessment to their book of business from tropical cyclones, severe thunderstorms, wind storms, and storm surge.

Dr. Doggett is no stranger to TTU as he earned his M.S. (1992) and Ph.D. (1996) in Atmospheric Science here. Additionally, he was an Assistant Professor with the TTU Geoscience Group until 2003.

(Left) - Dr. Tim Doggett, visiting speaker for the McDonald-Mehta Lecture Series at NWI.

TTU Hurricane Research Team Deploys to Study Hurricane Matthew

Texas Tech’s Hurricane Research Team recently deployed the StickNet instrumentation platform along the eastern coast of Florida in advance of landfall of Hurricane Matthew.

There was a 14-probe array that stretched from Volusia County, FL, southward to near Stuart, FL, and the team stayed safe and sound when they retreated to Orlando to wait out the severe weather event.

Hurricane Matthew eventually made landfall on October 08 southeast of McClenanville, SC, and the hard-working researchers and team arrived safe and sound back on campus a few days later.

(Right) - One of the StickNet instrumentation platforms deployed in advance of Hurricane Matthew’s landfall. (Photo credit: TTU Hurricane Team.)



RECENT PUBLICATIONS and PROCEEDINGS (as reported by Web of Science)

Chen, X. (2016). "Extreme Value Distribution and Peak Factor of Crosswind Response of Flexible Structures with Nonlinear Aeroelastic Effect." *Journal of Structural Engineering* 142(9):10.1061. (ASCE)ST.1943-541X.0001634. September 2016.

Krupar, R. J., III, J. L. Schroeder, D. A. Smith, S-L. Kang, and S. Lorsolo (2016). "A Comparison of ASOS Near-Surface Winds and WSR-88D-Derived Wind Speed Profiles Measured in Landfalling Tropical Cyclones." *Weather and Forecasting* 31(4):1343-1361. 10.1175/WAF-D-15-0162.1. August.

Munoz-Ferreras, J. -M., Z. Peng, Y. Tang, R. Gomez-Garcia, **D. Liang,** and **C. Li** (2016). "A Step Forward Towards Radar Sensor Networks for Structural Health Monitoring of Wind Turbines." *2016 IEEE Radio and Wireless Symposium (RWS)* 65(9). 23-25.

Zhuang, Y., C. Song, F. Lin, Y. Li, **C. Li,** and W. Xu (2016). "On the Feasibility of Non-contact Cardiac Motion Sensing for Emerging Heart-based Biometrics." *2016 IEEE Radio and Wireless Symposium (RWS)* 65(9). 204-206.

Chen, X. (2016). "Analysis of Crosswind Fatigue of Wind-Excited Structures with Nonlinear Aerodynamic Damping." *Engineering Structures* 125 91-91. 10.1016/j.engstruct.2016.06.010. October 15.

Munoz-Ferreras, J-M., Z. Peng, Y. Tang, R. Gomez-Garcia, **D. Liang,** and **C. Li** (2016). "Short-Range Doppler-Radar Signatures from Industrial Wind Turbines: Theory, Simulations, and Measurements." *IEEE Transactions on Instrumentation and Measurement* 65 (9):2108-2119; 10.1109/TIM.2016.2573058. September.

Dong, J., F. Shen, Y. Dong, Y. Wang, W. Fu, H. Li, D. Ye, B. Zhang, J. Huangfu, S. Qiao, Y. Sun, **C. Li,** and L. Ran (2016). "Noncontact Measurement of Complex Permittivity of Electrically Small Samples at Microwave Frequencies." *IEEE Transactions on Microwave Theory and Techniques* 64(9):2883-2893. 10.1109/TMTT.2016.2588487. September.

Klees, A. M., Y. P. Richardson, P. M. Markowski, **C. Weiss,** J. Wurman, and K. K. Kosiba (2016). "Comparison of the Tornadoic and Nontornadoic Supercells Intercepted by VORTEX2 on 10 June 2010." *Monthly Weather Review* 144 (9):3201-3231. 10.1175/MWR-D-15-0345.1. September.

Chen, J., **B. Ren,** and Q-C. Zhong (2016). "UDE-Based Trajectory Tracking Control of Piezoelectric Stages." *IEEE Transactions on Industrial Electronics* 63(10):6450-6459; 10.1109/TIE.2016.2542780. October.



Photo Credit: The Daily Telegraph.



TEXAS TECH UNIVERSITY
National Wind Institute™

NWI GRANTS AND CONTRACTS — OCTOBER 2016

Awarded:

PIRE: USA/Europe Partnership for Integrated Research and Education in Wind Energy Intermittency: From Wind Farm Turbulence to Economic Management (WISE-IND)

NSF/Johns Hopkins University		10/01/2016 - 09/30/2017
Schroeder, J. L. (Geosciences)	25%	\$36,545
Swift, A. S. (NWI)	25%	\$36,545
Castillo, L. (Mechanical Engineering)	50%	\$73,090

NWI: Burns & McDonnell Tower Monitoring in Pampa, TX

Burns & McDonnell Engineering Company, Inc.		06/01/2016 - 06/24/2017
Morse, S. M. (Civil, Environmental and Construction Engineering)	34%	\$105,075
Smith, D. A. (Civil, Environmental and Construction Engineering)	33%	\$101,985
Zuo, D. (Civil, Environmental and Construction Engineering)	33%	\$101,945

NWI: Natural Hazards Engineering Research Infrastructure: Network Coordinating Office

NSF/Purdue University		07/01/2016 - 06/30/2021
Zuo, D. (Civil, Environmental and Construction Engineering)	100%	\$19,548

NWI: Critical Infrastructure Resilience Institute

U.S. DHS/University of Illinois of Champaign-Urbana		07/01/2015 - 12/31/2016
Na, C. (Civil, Environmental and Construction Engineering)	25%	\$25,329
Rainwater, K. (Civil, Environmental and Construction Engineering)	25%	\$25,329
Reible, D. (Civil, Environmental and Construction Engineering)	25%	\$25,329
Swift, A. (Civil, Environmental and Construction Engineering)	25%	\$25,329

NWI MOVERS & SHAKERS

- Ph.D. student **Yeqin Wang** was recently invited to post on the Texas Instruments blog about his research on the Hyper Accelerated Wind Farm Kinematic-Control Simulator (HAWKS) project. [See the blog post here.](#)
- NWI's Wind Energy Student Association (WESA) recently volunteered some time to educate local school children on wind dynamics when the TTU Museum held its annual Museum Day. *(Image on right L-R) - WESA President (and NWI Student Assistant) **Eric Garcia**, **Maggie Gilchrest** and **Dr. Chris Pattison** stand side by side behind the wind energy exhibit at the Museum.*



- NWI Senior Advisor **Maggie Gilchrest** recently presented at the annual conference for the National Academic Advising Association (NACADA) Annual Conference held in Atlanta, GA, from October 5-8. *(Image on left) - Maggie stands 2nd on left in large group of Advisors who were also representing TTU at the event.*

Save the Date!

November 02, 2016	WiSE Wednesday Lecture Dr. Brandon Ennis, Wind Energy Technologies, Sandia National Labs	4:00 p.m.	EXP 120
November 09, 2016	WiSE Wednesday Lecture Dr. John Schroeder, Professor, Geosciences	4:00 p.m.	EXP 120
November 16, 2016	McDonald-Mehta Lecture Series Dr. Amber E. Emory (NASA Goddard Space Flight Center)	3:30 p.m.	EXP 120
November 23-27, 2016	Thanksgiving Break		
December 9-14, 2016	Finals		
December 16-17, 2016	Commencement		
December 23-January 02, 2016	Holiday Break		



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!