



2017 Symposium

September 26 - 29, 2017

Scheman Building - Ames, IA

Tuesday, September 26, 2017 – Pre-Meeting Activities

7:00 - 8:00 am	Registration	2 nd Floor Lobby
8:00 - 10:00 am	Training session: NREL FAST Solver	Room 220
10:00 - 12:00 pm	Training session: NREL SOWFA Solver	Room 220
12:00 - 1:00 pm	Lunch (on your own)	
1:00 - 3:00 pm	NAWEA Board Meeting	Room 080
3:00 - 6:00 pm	Registration	2 nd Floor Lobby
3:00 - 6:00 pm	Graduate Student Poster Competition	2 nd Floor Lobby
4:00 - 6:00 pm	Welcome Reception & Registration	2 nd Floor Lobby

Dinner on your own

Wednesday, September 27, 2017

7:30 - 8:30 am	Registration and Continental Breakfast	2 nd Floor Lobby
8:30 - 9:00 am	Welcome by Surya Mallapragada <i>Iowa State University Associate Vice President for Research</i>	Room 220-230
9:00 - 10:00 am	Modeling Wind Farms Actuator Line Theory Turbulence, and Wind Power Fluctuations <i>Professor Charles Meneveau</i>	Room 220-230
10:00 - 10:15 am	Mid-Morning Refreshments	2 nd Floor Lobby
10:15 - 11:00 am	Integration of High-Penetration Renewable Energy Into Future Power Systems <i>Professor Nadaona Chokani</i>	Room 220-230
11:00 - 11:45 am	Opportunities and Challenges – Road to High Share of Wind Power in China <i>Professor Xiaodong Wang</i>	Room 220-230
11:45 - 1:00 pm	Lunch	2 nd Floor Lobby
12:00 - 1:00 pm	NAWEA Education Committee Meeting	Room 080

Wednesday, September 27, 2017 - Continued

Aerodynamics – I

Room 220

1:00 – 2:30 pm

Chair: Mingming Zhang

mmzhang@iet.cn

Comparison of LES Research Codes for Wind Energy Applications

Luis Martinez

The Role of Vortex Structures in the Stability of a Floating Offshore Wind Turbine Rotor Near-Wake

Steven Rodriguez

Reducing Wind Turbine Simulation Time

Matthew Fischels

Experimental Investigations of Reynolds Number Effects on Performance of Thick CAS-W2 Airfoils for Wind Turbines

Xingxing Li

Numerical Flow Analysis of Azimuth Dependent Smart Rotor Control

Mingming Zhang

A Comparative Experimental Study of Upwind and Downwind Turbines

Pavithra Premaratne

Structural Health Monitoring & Reliability - I

Room 240

1:00 – 2:30pm

Chair: Norbert Myendorf

norbertm@iastate.edu

Experimental Wind-Tunnel Study of a Sensing Skin for Damage Detection on a wind Turbine Blade

Austin Downey

Proactive Monitoring of an Onshore Wind Farm through LiDAR Measurements, SCADA Data and a Data-Driven RANS Solver

Giacomo Valerio Iungo

Automatic Crack Recognition and Classification of Wind Turbine Blade

Huiyi Zhang

Condition Monitoring of Rotor Blades and Foundations of Wind Turbines

Norbert Myendorf

2:30 - 3:00 pm

Mid-Afternoon Refreshments

2nd Floor Lobby

Guest internet access privileges for Iowa State University lasts for seven days

1. Open a web browser and enter netreg.iastate.edu if the ISU NetReg page does not appear automatically.
2. If you are attending a specific event, select it from the list and click "Register Here", otherwise click "Guest Registration Here".
3. Enter your local contact information and click "Next".
4. Read the terms and check "I Agree".
5. When instructed, close your browser and reboot your computer to complete the registration process.
6. When you re-open your browser you will be connected to the ISU network.
7. If you have problems or questions, contact the Solution Center, 515-294-4000.

Wednesday, September 27, 2017 - Continued

Aerodynamics - II

Room 220

3pm – 4:15 pm

Chairs: Leonardo Chamorro & James Baeder

lpchamo@illinois.edu baeder@umd.edu

On the Structure of Power Fluctuations of Wind Farms

Leonardo Chamorro

Inverse Design of Single- and Dual Rotor Horizontal Axis Wind Turbine Blades

Behnam Moghadassian

Wind Turbine Simulations Using CPU/GPU Heterogeneous Computing

Yong Su Jung

Rotational Effects and Transport in Transient, Separated Flow

Kevin Wabick

Doppler Radar Measurements of Wind Turbine Wake Structure and Evolution across Varying Atmospheric Stability Regimes

James Duncan

Structural Health Monitoring & Reliability - II

Room 240

3:00 – 4:15pm

Chair: D.Todd Griffith

tgriffith@utdallas.edu

Toward Smart Wind Turbines based on Wireless Sensor Networks

Mathew Wymore

Motivating Small-Scale Wind Turbine Recurrence Failure Modeling as a Function of Dynamic Covariates

Michael Czahor

Quantifying Uncertainty in Material Properties through High-Fidelity Structural Analysis of Wind Turbine Blades

Emily Johnson

Frequency Domain Analysis for Offshore Wind Structures Subject to Multi-Hazard Loading

Andrew Summerfield

4:30 - 5:30 pm

Poster Committee Meeting

Room 220

6:00 - 7:00 pm

View Reiman Gardens – On Your Own

This is free to symposium attendees

7:00 - 9:00 pm

Banquet Dinner

Best student poster award announced

Reiman Gardens

Direction to Reiman Gardens from the Scheman Building

Head east on Center Drive

Turn right onto S. University Blvd.

Turn right on S 16th Street; this is the second stop light.

Reiman Gardens will be on your left.

Thursday, September 28, 2017

7:30 - 8:30 am	Continental Breakfast	2 nd Floor Lobby
8:30 - 9:30 am	The Research Challenge of Enabling Wind Energy to Supply a Major Portion of the US Electricity Needs <i>Dr. Paul Veers</i>	Room 220-230
9:30 - 10:00 am	Mid-Morning Refreshments	2 nd Floor Lobby

Aerodynamics – III

Room 220

10:00 – 11:30 am

Chairs: Charles Meneveau & Artem Korobenko

meneveau@jhu.edu artem.korobenko@gmail.com

CFD Simulation of Smooth and Rough NACA 0012 Airfoils at Low Reynolds Number

Yunjian Li

Numerical Simulation of Wind Turbine Airfoil Flow Field Based on an IDDES Method

Ming Zhao

Experimental Analysis of Wind Turbine Airfoils at Complete 360-Degree Incidences

Nanyaporn Intaratep

Performance and Sizing Tool for Quadrotor-Biplane-Tailsitter UAS

James Baeder

Simulation of Multiple Wind Turbines Operating in Atmospheric Boundary Layer Flow: from Aerodynamics to Fatigue Damage

Artem Korobenko

Resources & Forecasting - I

Room 240

10:00 – 11:30 am

Chair: Tom Acker

Tom.Acker@nau.edu

Distributed Wind Resource Assessment for a Residential-Scale Wind Turbine Using Meteodyn WT

Tom Acker

Wind Speed Forecasting using Neural Network

Biswanath Samanta

Scale Dependence of Analog Search Criteria for RTO-level Wind Generation Forecast Bias Correction

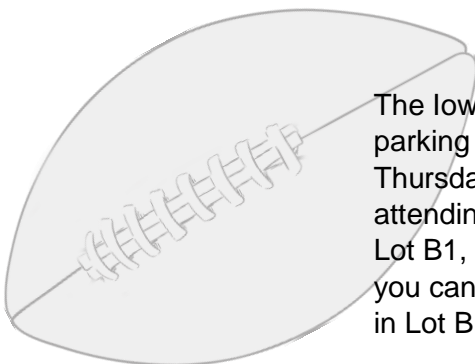
Daniel Kirk-Davidoff

Wind Turbine Blade Reference Model for the U.S. Low Wind Resource Regions

Brandon Ennis

Preliminary Trends from Two Tall Meteorological Towers in Central Iowa

Kristy Carter



Football & Parking

The Iowa State Cyclones host the Texas Longhorns at 7pm on Thursday. All parking lots surrounding the Scheman Building will be controlled beginning early Thursday morning. Upon arrival, please let the parking attendant know you are attending the NAWEA Symposium in Scheman, which will allow you to park in Lot B1, north of Scheman. No parking permit is required for Lot B1; however, you cannot park in any other lot that day or your vehicle may be towed. Vehicles in Lot B1 need not move for the game.

Thursday, September 28, 2017 – Continued

11:30 - 12:45 pm

Lunch

2nd Floor Lobby

11:45 - 12:30 pm

Workshop: PSU-XTurb (webinar)

Room 230

Aerodynamics – IV Room 220

12:45 – 2:15 pm

Chairs: Robert Thresher & Pankaj Jha

robert.thresher@nrel.gov

pankaj.jha@envision-energy.com

Evaluation of Active Wake Steering Using Large-Eddy Simulations

Umberto Ciri

Wind Turbine Blade Design Optimization using High-Fidelity Isogeometric Structural Analysis

Austin Herrema

Development of a LIDAR Array to Study and Classify Wakes at the DOE/Sandia SWiFT Facility

Tassia Penha Pereira

Wind Plant Power Optimization and Control Under Uncertainty

Pankaj Jha

Resources & Forecasting – II Room 240

12:45 – 2:15 pm

Chairs: Corey Markfort & Matt Churchfield

corey-markfort@uiowa.edu

matt.churchfield@nrel.gov

A Strategy for Performing Mesoscale-Driven Microscale Simulations in Complex Terrain

Matthew Churchfield

On the Potential of Windbreaks for Wind Farm-Scale Power Production

Leonard Chamorro

Environmental Boundary Layer Turbulence Measurement and Prediction for Wind Energy Development

Corey Markfort

Coupling the Mesoscale to the Microscale using Momentum Budget Components

Caroline Draxl

An Evaluation of Wind Energy Production in Iowa at Elevated Hub Heights

Bin Cai

2:15 pm - 2:45 pm

Mid-Afternoon Refreshments

2nd Floor Lobby

Thank you to our Sponsors

The support provided is greatly acknowledged



National Renewable Energy Laboratory

Iowa State University's Department of Aerospace Engineering

Thursday, September 28, 2017 – Continued

**Aeroacoustics
Room 220**

2:45 – 4:15 pm

Chairs: Nathan Alexander & Seongkyu Lee
alexande@vt.edu skulee@ucdavis.edu

Finlets: Application in a Rotating System and Field Testing
 Nathan Alexander

Numerical Investigation of Bio-Inspired Blade Designs at High Reynolds Numbers for Ultra-Quiet Aircraft and Wind Turbines
 Andrew Bolding

Predictions and Challenges of Airfoil Trailing Edge Noise with Semi-Empirical Models
 Seongkyu Lee

Aerodynamic and Aeroacoustic Behaviors of Spanwise Wavy Trailing Edge Modified SNL 100-meter Blade
 SeungJoon Yang

Prediction of Wind Turbine Noise Propagation
 Biswanath Samanta

**Electrical Power
Room 240**

2:45 – 4:15 pm

Chair: James McCalley
jdm@iastate.edu

Deformation Processed Al/Ca Nano-filamentary Composite Conductors for HVDC Applications
 Charles Czahor

Modeling of Phosphorous Acid Fuel Cell in PSCAD
 Sundari Ramabhotla

Wind Farms Control for Secondary Frequency Regulation: Actuation by Pitch and Generator Torque
 Carl Shapiro

GeneratorSE: NREL's New Design Optimization Tool for Variable Speed Wind Generators
 Latha Sethuraman

Wind Capacity Growth in the Northwest US: Co-optimized vs Sequential Generation and Transmission Planning
 Patrick Maloney

Review on Fuel Cell Technologies
 Sundari Ramabhotla

4:30 pm

Load buses to travel to ISU Campus, Howe Hall
Buses will depart the west side of the Iowa State Center, near CY Stephens

5:00 pm - 7:00 pm

Tour of ISU AERE facilities

ISU Campus

7:00 pm - 7:30 pm

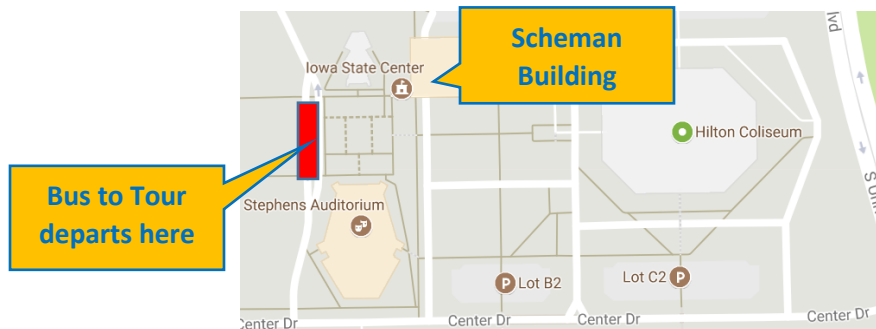
Travel to back the Scheman Building
Note: You will not be able to re-enter the Scheman Building

7:00 pm - 9:00 pm

ASME Wind Energy Technical Committee Meeting

Howe Hall 1235

Dinner on Your Own



Friday, September 29, 2017

7:30 - 8:30 am	Continental Breakfast	2 nd Floor Lobby
8:30 - 9:30 am	Creating a Renewable Energy Future <i>Michael C. Fehr</i>	Room 220-230
9:30 - 10:00 am	Mid-Morning Refreshments	2 nd Floor Lobby

Aeromechanics

Room 220

10:00 – 11:45 am

Chairs: Xiaodong Wang & Paul Veers

wangxd@ncepu.edu.cn paul.veers@nrel.gov

Impact of the Low-Level Jets Negative Wind Shear on the Wind Turbine's Low-Speed and High-Speed Shafts

Walter Gutierrez

Large Scale Strength Testing of Hexcrete Segment Design for Tall Wind Towers

Sri Sritharan

Improvement of Jensen Wake Model using CFD Simulations for Wind Farm on Complex Terrain

Xiaodong Wang

Study on Wake-Induced Fatigue on Wind Turbine Blade based on Elastic Actuator Line Model and Two Dimensional Finite Element Model

Hang Meng

Instrumentation Development for Surface Pressure Measurement on a Wind Tunnel-Scale Wind Turbine Blade

Arash Hassanzadeh

Effects of Rotating Wind Turbine Blades on Aerodynamic Forces Acting on Tower

Takaaki Kono

Offshore

Room 240

10:00 – 11:45 am

Chairs: James Baeder & Jonathan Naughton

baeder@umd.edu naughton@uwyo.edu

On the Interaction of Turbine Wake and Offshore Wind-Wave Field in Offshore Wind Farm: Large-Eddy Simulation with Actuator Models

Pin Lyu

Assessment of Fresh-Water Wind Resources on Lake Erie

Xiong Yu

Assessment of Offshore Wind Turbine with Friction Wheel Foundation under Lateral Load Using Centrifuge Tests

Jerry Li

Integrated Design Optimization of a Floating Offshore Wind Turbine Rotor and Structural Controller

Gaertner, Evan

Characterization of Offshore Wind Resources in the Contiguous United States

Caroline Draxl

11:30 - 12:45 pm	Lunch	2 nd Floor Lobby
11:45 - 12:45 pm	WISDEM Training	Room 230

Friday, September 29, 2017 - Continued

Educational & Environmental/Social Impacts Room 220

12:45 – 1:30 pm

Chairs: Tom Acker & John Madsen

Tom.Acker@nau.edu jmadsen@udel.edu

U.S. Wind Energy Education Programs at the University Level: A Path Forward

Tom Acker

Preparing University Students for Professional Careers in the Wind Industry: An Innovative Convergence Model for Education

John Madsen

Experimental Investigation of Aerodynamic and Impact Characteristics of Bats for Modeling Bat- Turbine Interaction

Shivendra Prakash

New Concepts Session

Room 220

1:30 – 2:15 pm

Chair: Xiong Yu

xxy21@case.edu

An Experimental Study of Wind Turbine Icing Process under Freezing Rain Conditions

Linyue Gao

Analyses of the Performance of Bio-Inspired Wind Turbine Blade

Xiong Yu

Conceptual Development of an Unmanned Aerial Vehicle Powered by Regenerative Soaring

Pavithra Premaratne

Design & Optimization

Room 240

12:45 – 2:15 pm

Chairs: Jason Jonkman

Jason.Jonkman@nrel.gov

Development and Validation of FAST.Farm: A New Multiphysics Tool for Wind Farm Design and Analysis

Jason Jonkman

Wind Plant Layout Optimization Considering Atmospheric Stability

Ryan King

Mesh Generation Best Practices and Automation Strategies for Wind Turbine Farm Applications

Claudio Pita

Operation and Maintenance Cost Optimization with Respect to the Availability of a Microgrid

Sundari Ramabhotla

A Quasi-coupled Wind Wave Experimental Framework for Testing Offshore Wind Turbine Floating Systems

Michele Guala

2:15 pm

Symposium Adjourns