



May 23rd – 25th

International colloquium on wind-power plants

The University of Texas at Dallas

Richardson, Texas



May 23rd

8:30 - 8:45 am

Opening remarks: Stefano Leonardi & Charles Meneveau

Modeling I (Invited session) chairman: Charles Meneveau

8:45 - 9:25 am

LES-based optimal control and optimization of wind farms

Meyers, Johan; Munters, Wim; Bokharaie, Vahid

9:25 - 10:05 am

An Overview of the SWiFT Wake Experiment and Supporting Computations

Churchfield, Matthew

10:05 - 10:45 am

Flow adjustment in a finite size wind farm in a neutral ABL - an LES study

Calaf, Marc; Atlaschian, Omid; Cortina, Gerard; Sharma, Varun

10:45 - 11:05 am

Coffee Break

Modeling II Chair: Johan Meyers

11:05 - 11:25 am

Validation of Boundary and Inflow Conditions for LES over Real Complex Terrain using SOWFA

Han, Yi; Stoellinger, Michael

11:25 - 11:45 am

Towards LES Modeling of the Diurnal Cycle from Field Data Inputs

Nielson, Jordan; Bhaganagar, Kiran

11:45 am - 12:05 pm

Modeling space-time correlations of wind farms

Lukassen, Laura; Stevens, Richard; Meneveau, Charles; Wilczek, Michael

12:05 - 12:25 pm

Mean Kinetic Energy Fluxes within Wind Farms through a Diurnal Cycle

Cortina, Gerard; Sharma, Varun; Calaf, Marc

12:25 - 12:45 pm

Optimal Body Force Projection for Actuator Line Model of Wind Turbine Blades

Martinez Tossas, Luis A.; Churchfield, Matthew J.; Meneveau, Charles

12:45 - 1:45 pm

Lunch



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May 23

Electricity markets I (Invited session) Chair: Benjamin Hobbs

1:45 - 2:25 pm

Integrating Large Penetrations of Wind Power into Bulk Power Systems and Electricity Markets

Ela, Erik

2:25 - 3:05 pm

Wind variability and impact on markets.

Lee, Duehee; Baldick, Ross

3:05 - 3:45 pm

Analysis of Operation Reserves in a Hydrothermal Electric System with High Wind Power Share under Demand and Wind Power Uncertainties

Ramos, Andres; Morales-España, German; Rivier, Michel; Garcia-Gonzalez, Javier; Latorre, Jesus M.

3:45 - 4:05 pm

Coffee Break

Electricity markets II Chair: Andres Ramos

4:05 - 4:25 pm

Initial Modelling and Examples of Electrical-Mechanical-Control Interactions in Wind Power Plants

Merz, Karl

4:25 - 4:45 pm

Wind Power Ramping Products for Increasing Power System Flexibility

Cui, Mingjian; Zhang, Jie; Wu, Hongyu; Hodge, Bri-Mathias

4:45 - 5:05 pm

Windfarm Design Effects on Electricity Markets

Bothwell, Cynthia; Hobbs, Benjamin

5:05 - 5:25 pm

Model-based receding horizon control of wind farms for secondary frequency regulation

Shapiro, Carl R.; Bauweraerts, Pieter; Meyers, Johan; Meneveau, Charles; Gayme, Dennice F.

5:25 - 5:45 pm

A Collage of Wind with Demand Response

Cardell, Judith; Anderson, Lindsay

5:45 - 6:05 pm

Design of closed loop control strategy for optimal performance of a wind turbine system coupled to a CV transmission operating in the West Texas region.

Novoa, Santiago; Srivastava, Nilabh; Castillo Luciano

6:15 - 8:15 pm

Reception, Lobby ECSS Lobby



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May 24th

Atmospheric turbulence and wakes I (invited session) chair: Giacomo Valerio Iungo

8:30 - 9:10 am

Non Steady forcing of the wind turbine drivetrain by the passage of daytime atmospheric turbulence eddies

Brasseur, James G.; Nandi, Tarak; Lavelly, Adam; Vijaykumar, Ganesh

9:10 - 9:50 am

Compressibility effects in wind turbine wakes

Archer, Christina L.

9:50 - 10:30 am

Downwind Impacts of Wind Energy: Measurements and Simulations of Wakes

Lundquist, Julie

10:30 - 10:50 am

Coffee Break

Atmospheric turbulence and wakes II chair: Julie Lundquist

10:50 - 11:10 am

Characterization of the wind field around and within an on-shore wind farm through LiDAR measurements: effects of the atmospheric stability

Zhan, Lu; Iungo, Giacomo Valerio

11:10 - 11:30 am

Data-driven RANS solver for predicting wake interactions of a wind turbine column

Santhanagopalan, Vignesh; Ciri, Umberto; Viola, Francesco; Rotea Mario A.; Leonardi, Stefano; Iungo, Giacomo Valerio

11:30 - 11:50 am

Performance of a Wind Turbine on a Wavy Terrain

Santoni, Christian; Ciri Umberto; Anderson William; Leonardi, Stefano

11:50 AM - 12:10 am

Effect of bio-inspired micro-pillars on the drag of a wing section

Bocanegra Evans, Humberto; Hamed, Ali M.; Gorumlu, Serdar; Chamorro, Leonardo P.; Aksak, Burak; Doosttalab, Ali; Castillo, Luciano

12:10 - 12:30 am

Why the Coriolis force turns a wind farm wake to the right in the Northern Hemisphere

van der Laan, Paul M.; Sørensen, Niels N.

12:30 - 1:30 am

Lunch



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Control I chair: Mario Rotea

1:30 - 1:50 pm

Closed-loop wind farm control for power maximization by wake deflection: a wind tunnel study

Campagnolo, Filippo; Petrović, Vlaho; Bottasso, Carlo Luigi

1:50 - 2:10 pm

Large-Scale Wind Farm Optimization and Uncertainty Quantification

Ning, Andrew

2:10 - 2:30 pm

Reduced order modeling for wind farm design and control

Gayme, Dennice F.; Meneveau, Charles

2:30 - 2:50 pm

Large Wind Farm Layout Upgrade Optimization Considering Commercial Turbine Selection and Hub Height Variation

Abdulrahman, Mamdouh; Wood, David

2:50 - 3:10 pm

PIV measurements in the wake of a dynamically controlled model wind turbine

Castillo, Ricardo; Wang, Yeqin; Monk, Travis; Vasquez, Stephanie; Pol, Suhas; Ren, Beibei; Swift, Andy; Hussain, Fazle; Westergaard, Carsten H.

3:10 - 3:30 pm

Data-Driven Reduced-Order Modeling for Wind Farm Control

Annoni, Jennifer; Seiler, Peter

3:30 - 3:50 pm

Coffee Break

Control II chair: Dennice Gayme

3:50 - 4:10 pm

A Fault Tolerant Controller for Wind Turbine Using Adaptive Model Reference Schemes and Cascade Control Structure

Bashir, Hosseini Jafari; Heydarzadeh, Mehrdad

4:10 - 4:30 pm

Extremum-Seeking Control for Power Production Optimization

Ciri, Umberto; Rotea, Mario A.; Santoni, Christian; Leonardi, Stefano

4:30 - 4:50 pm

A Multiscale Wind Farm: New Concept for Large-Scale Power Generation

Chatterjee, Tanmoy; Peet, Yulia T.

4:50 - 5:10 pm

Cluster Designs for Vertical Axis Wind Turbine Farms

Hezaveh, Seyed Hossein; Bou-Zeid, Elie; Dabiri, John; Kinzel, Mathias; Martinelli, Luigi



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Poster session 2 minutes presentations

5:10 - 5:12 pm

A Data-driven Multi-model and Multidisciplinary Short-term Wind Power Forecasting Framework

Feng, Cong; Zhang, Jie

5:12 - 5:14 pm

Reduced order models of wind farms using Dynamic Mode Decomposition

Thomas, Vaughan; Meneveau, Charles; Gayme, Dennice

5:14 - 5:16 pm

A Restricted Nonlinear Large Eddy Simulation Model for Turbulent Boundary Layers and Wind Farm Applications

Bretheim, Joel U.; Meneveau, Charles; Gayme, Dennice F.

5:16 - 5:18 pm

Assessment of wind farm performances coupling meso- and micro-scale models

Garcia Cartagena, Edgardo J.; Santoni, Christian; Ciri, Umberto; Anderson, William; Iungo, Giacomo Valerio; Leonardi, Stefano

5:18 - 5:20 pm

Quantification through SCADA, Meteorological, and Wind LiDAR Data of Power Losses due to Wake Interactions

El-Asha, Said; Zhan, Lu; Iungo, Giacomo Valerio

5:20 - 5:22 pm

Hub Vortex Instability within Wind Turbine Wakes: Effects of Incoming Wind Turbulence, Loading Conditions and Blade Aerodynamics

Ashton, Ryan; Viola, Francesco; Camarri, Simone; Gallaire, François; and Iungo, Giacomo Valerio

5:22 - 5:24 pm

Microstructure of a Low Level Jet

Gutierrez, Walter; Ruiz-Columbie, Arquimedes; Tutkun, Murat; Castillo, Luciano

5:24 - 5:26 pm

Design and construction of a smart wind turbine model for wind tunnel testing

Alumoottil, Thomas; Bekheet, Moustafa; El-Asha, Said; Whisenant, Kurt; Overton, Ken; Iungo, Giacomo Valerio

6:00 - 9:00PM

Conference Dinner, Dining Hall



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Experiments I: chair: Stefano Leonardi

8:30 - 9:10 AM **On the small- and large-scale control strategies for enhanced wind turbine power**
Tobin, Nicolas; Hamed, Ali M.; Chamorro, Leonardo P.

9:10 - 9:50 AM **A Representation of the Canonical Wind Turbine Array Boundary Layer via Low Order Descriptors**
Hamilton, Nicholas; Tutkun, Murat; Cal, Raúl Bayoán

9:50 - 10:10 AM **Coffee Break**

Experiments II chair: Leonardo Chamorro

10:10 -10:30 AM **Power output variability of a micro-wind farm - a wind tunnel study**
Bossuyt, Juliaan; Howland, Michael F.; Meneveau, Charles; Meyers, Johan

10:30 - 10:50 AM **Collective Dynamics and Power Variation of an Offshore Floating Wind Farm**
Shoele, Kourosh; Meneveau, Charles; Mittal, Rajat

10:50 - 11:10 AM **Improving Offshore Wind Energy Resource Estimates Using Doppler Wind Lidar: Research To Operation**
St. Pé, Alexandra; Tippett, Shelbi; Liu, Qin; Rabenhorst, Scott; Delgado, Ruben

11:10 - 11:30 AM **New Experimental Method for Full-Scale Similarity on Model Wind Turbines**
Miller, Mark A.; Kiefer, Janik; Westergaard, Carsten; Hultmark, Marcus

11:30 - 11:50 AM **A Scalable Platform for Gearbox Monitoring in Wind Turbines**
Heydarzadeh, Mehrdad; Nourani, Mehrdad

11:50 am- 12:10 pm **Reduced Order Model for Prediction of Dynamic Loads on Downstream Waked Turbines**
Debnath, Mithu; Santoni, Christian; Leonardi, Stefano; Iungo, Giacomo Valerio

12:10 - 12:20 PM Adjourn: Stefano Leonardi & Charles Meneveau

Lunch bags