Nicholas Hamilton

Research Leadership, Renewable Energy, Fluid Mechanics

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Education

2013–2016 **Doctor of Philosophy, Mechanical Engineering**,
DISSERTATION: Wake character in the wind turbine array: (Dis-)organization, spatial and dynamic evolution, and low-dimensional modeling,
Methodological development of nested modal decomposition strategies describing spatial evolution of wake modes and leads to reduced order modeling of dynamical systems.
Portland State University, Portland, Oregon

2012–2014 **Master of Science, Mechanical Engineering**,
THESIS: Anisotropy of the Reynolds stress tensor in the wakes of wind turbines in Cartesian arrangements with counter-rotating rotors,
Experimental correlation between wind turbine array performance and momentum balance with the anisotropy of turbulence field.
Portland State University, Portland, Oregon

2010–2012 **Master of Science, Computational and Experimental Turbulence**,
THESIS: Characterization of wake dynamics for aligned and staggered wind turbine arrays via low-dimensional modeling,
Extensive power production analysis for model-scale wind turbine array, numerical decomposition of turbulence in wind turbine canopy, separation of modes for furture modeling.
École Nationale Supérieur d'Ingenieurs de Poitiers, Poitiers, France
École Nationale Supérieur de Mathematique et Aérotechnique, Poitiers, France
École Centrale de Lille, Lille, France

2004–2010 **Bachelor of Science, Mechanical Engineering**,
Summa Cum Laude.
Portland State University, Portland, Oregon

Professional Experience

2017–*present* **Senior Research Engineer & Principal Investigator**, NATIONAL LABORATORY OF THE ROCKIES (FORMERLY KNOWN AS NREL),
Golden, CO.
Direct $65M+ research portfolio spanning wind energy, atmospheric science, and grid integration through multi-institutional collaborations.

- Led AWAKEN ($28M+, 5-year campaign, 12+ institutions) simulation working group creating collaborative research teams and connecting them with DOE supercomputing resources; directed uncertainty quantification working group developing systematic protocols for quality control across heterogeneous sensor types and federated data access; produced 200+ TB of benchmark data now used internationally
- Directed RAAW campaign ($8M+, GE Vernova, Sandia) developing instrumentation strategies and validation frameworks for utility-scale turbines; developed generative AI methods for reconstructing turbulent inflows from sparse measurements
- Develop proposals advancing wind energy science and technology, securing, advancing remote sensing and measurement for renewable energy, suporting infrastructure modernization at NREL Flatirons Campus, and developing innovative modeling and machine learning methods for fluid-structure systems
- Maintain strategic relationships with federal program managers across DOE (Water Power, Wind Energy, Grid Modernization), NSF (Engineering, Geosciences), NASA (JPL, EOS), and NOAA to shape funding priorities and position collaborative teams
- Sustained collaborations with PNNL (grid integration, marine systems) and Sandia (survivability modeling, uncertainty quantification, simulation tools) through co-authored publications, co-developed proposals, and embedded student internships and postdoctoral positions
- Support offshore wind survivability standards for BSEE and BOEM, demonstrating stakeholder engagement while maintaining research independence and scientific rigor

2014–2017 **Research Associate**, Wind energy and Turbulence Laboratory,
Portland State University.

Led a team of researchers working in an academic fluid mechanics research laboratory to investigate emerging science and engineering problems relating to aerodynamics and wind turbine arrays.

- Investigate high-Reynolds number fluid flows, including design of experiments, optical measurement systems, calibration and automation
- Computational fluid dynamics studies to complement experimentation including analytical models, RANS and LES modeling
- Mentored students and researchers including training on lab procedure, experimentation, analysis and technical writing

2009–2014 **Research/Teaching Assistant**, Mechanical Engineering Department,
Portland State University.

Supported teaching and research activities in the student thermal/fluids laboratory. Appointment concurrent with advanced studies.

- Graduate instructor in the mechanical engineering curriculum with regular interaction with a large and diverse student body
- Managed the student fluid mechanics laboratory, designed laboratory exercises, student performance reporting and feedback

Core Competencies

Research Leadership

Multi-institutional program coordination, federal funding strategy ($65M+ collaborative portfolio), stakeholder management across government, industry, and academic sectors, interdisciplinary team building spanning atmospheric science, fluid mechanics, and energy systems

Federal Programs & Strategic Partnerships

Strategic relationships with federal agencies (DOE, NSF, NASA, NOAA, BSEE, BOEM), national laboratory partnerships (NREL, PNNL, Sandia), industry partnerships (turbine OEMs, wind developers), navigate organizational transitions and evolving agency priorities

Experimental Methods

Utility-scale turbine certification and testing (GWO certified: work at heights, fire safety, CPR/first aid), wind tunnel experimentation, remote sensing (LiDAR, thermodynamic profiling, acoustic tomography, PIV/DIC), data acquisition systems, mechanical integration and field deployment

Modeling & Simulation

Multiphysics modeling of coupled fluid-structure systems, CFD for complex flows (Ansys, Star-CCM+, FLUENT, OpenFOAM), turbulence closure models (RANS, LES, hybrid methods), reduced-order modeling and modal decomposition, data assimilation and inverse modeling, uncertainty quantification and sensitivity analysis, HPC workflows and large-scale simulations (OpenFAST, SOWFA, TurbSim), validation against experimental observations

Software Engineering & Data Science

Data engineering for scientific workflows (ETL pipelines, distributed systems, petabyte-scale data management), machine learning for physical systems (surrogate modeling, physics-informed neural networks, uncertainty quantification), GPU-accelerated computing, high-performance computing (HPC) resource optimization, real-time data assimilation and monitoring systems

Teaching & Workforce Development

Prepared to teach fluid mechanics, turbulence, energy systems, numerical methods, and experimental techniques; project-based learning using field campaign data; support workforce development from coastal community technician training through graduate education

Grants and Funding

Total Research Funding: $65M+ as PI, Co-PI, and Area Lead across national laboratory, DOE Office of Science, and DOE WETO programs. In addition to the selected programs below, I have contributed to numerous successful proposals as senior personnel and key contributor.

2024–*present* **ENDURA: Ensuring Data Usage from RAAW and AWAKEN**, *DOE WETO Lab Call*, $7.8M,
Principal Investigator.
Leading multi-laboratory initiative to maximize scientific impact of unprecedented wind energy field campaign datasets. Coordinating data quality control, benchmarking frameworks, and community engagement across 12+ institutions.

2024–*present* **M5 Meteorological Tower Improvement Project**, *NREL Facilities & Operations*, $450K,
Co-Investigator.
Major infrastructure and processing software upgrades at Flatirons Campus to modernize measurement capabilities and ensure research leadership for wind energy R&D for the next decade.

2023–2026 **FLOWMAS: Floating Offshore Wind Modeling and Simulation**, *DOE Office of Science Earthshot*, $19M,
Co-Investigator.
Collaborative project with the DOE national lab system and HBCUs developing exascale algorithms spanning multiple scales and physics to predict floating offshore wind turbine response in ocean environments, addressing DOE's goal to reduce levelized cost of energy by 70% by 2035.

2022–2024 **Foundational AI for Wind Energy: Strategic Vision and Planning**, *DOE WETO Lab Call*, $760K,
Principal Investigator.
Establishing roadmap for artificial intelligence integration in wind energy research and development.

2021–2024 **High-Resolution Remote Sensing of Turbulent Velocity and Temperature**, *NREL LDRD*, $350K/year,
Principal Investigator.
Development of acoustic tomography system for three-dimensional turbulent temperature and velocity field reconstruction advancing remote sensing temporal and spatial resolution.

2021 **ARM Mobile Facility Deployment for AWAKEN**, *DOE ARM Program*, $500K,
Co-Investigator.
Collaborated with PNNL and DOE Atmospheric Radiation Measurement program. Integrated advanced atmospheric measurement systems into large-scale wind farm study.

2020-2025 **American WAKE experimeNt (AWAKEN)**, *DOE WETO Lab Call*, $28M+ total,
Co-Investigator.
Multi-institutional campaign producing 200+ TB of benchmark observational data on wind turbine wake interactions and aerodynamics to validate wind plant models, test wind farm control strategies for increased power production, and enable the international research community to advance wind energy science.

2020-2024 **Rotor Aerodynamics, Aeroelastics and Wake (RAAW) Experiment**, *DOE WETO Lab Call*, $8M+ total,
Principal Investigator.
Intensive validation campaign in partnership with GE Vernova and Sandia Natinoal Laboratories producing validation-quality experimental data on inflow, turbine response, and wake dynamics across a utility-scale 2.8 MW turbine, with a public benchmark dataset released to advance wind turbine modeling validation from actuator disk to blade-resolved fidelity levels.

Publications

Overview

Authored 90+ peer-reviewed publications spanning wind energy, atmospheric science, turbulence, and fluid mechanics, including 50+ journal articles, conference proceedings, technical reports, and book chapters. Significant contributions to field campaign benchmark datasets (AWAKEN, RAAW, SWiFT) now used internationally for model validation and uncertainty quantification.

Impact Metrics

As of January 2026:

Citations: **1,200+** | $h-$index: **21** | $i10-$index: **32**

See full publication list at end of CV or online on my **Google Scholar Profile**

Notable Contributions

Field Campaigns — Lead author on validation frameworks for AWAKEN and RAAW campaigns; co-authored 15+ publications using AWAKEN benchmark datasets across atmospheric boundary layer physics, wake modeling, and turbine response

Remote Sensing	Pioneering work in acoustic tomography for atmospheric measurements in wind energy; advanced LiDAR uncertainty quantification methods adopted internationally through IEA Wind Task 32
Turbulence Physics	Fundamental contributions to understanding wake meandering, modal decomposition of turbulent flows, and reduced-order modeling of wind turbine arrays
Validation Methodology	Established protocols for uncertainty quantification in heterogeneous sensor networks; developed quality control frameworks enabling federated data access for multi-institutional campaigns

Teaching

Teaching Experience

2012–2016	Graduate Teaching Assistant, Mechanical Engineering Department, Portland State University — instructed undergraduate fluid mechanics laboratory, designed experiments, managed assessment and feedback for diverse student populations
2023–*present*	Guest Lecturer, "Wind Energy Systems," University of Colorado Boulder — delivered lectures on wind turbine aerodynamics, wake physics, and field measurement techniques to graduate students
2022–*present*	Mentor, NREL Graduate Student Programs — supervised capstone projects using field campaign data for hands-on learning in data science, fluid mechanics, and renewable energy systems

Student Mentoring

Mentored 12 graduate students (M.S. and Ph.D.), 4 postdoctoral researchers, 20+ undergraduate researchers, and 11 junior staff researchers, leading to more than 20 peer-reviewed publications with mentees as lead authors. Mentees now hold faculty positions at research universities, lead research programs at national laboratories and occupy senior technical roles in wind energy industry. Served on 6 thesis and dissertation committees. Mentored first-generation college students and scholars from underrepresented groups through NREL diversity programs (SULI, RPP, GEM). Advocate for experiential learning opportunities connecting academic preparation with industry needs.

Teaching Philosophy

Committed to project-based learning connecting theoretical foundations to real-world applications. Leverage field campaign datasets (AWAKEN, RAAW) to create authentic research experiences for students at all levels. Emphasize inclusive pedagogy supporting diverse learners through multiple modes of engagement: hands-on experimentation, computational modeling, and data-driven discovery. Prepared to teach fluid mechanics, turbulence, energy systems, numerical methods, and experimental techniques at both undergraduate and graduate levels.

Leadership, Honors, and Professional Service

Leadership and Strategic Roles

2024–*present*	Scientific Committee Lead, North American Wind Energy Academy (NAWEA) 2026 Conference — organizing premier international conference bringing together academic, industry, and government stakeholders
2024–*present*	Scientific Subject Matter Expert, NASA Multi-Sensor Worldwide Ocean Winds (MWOW) Data Product Development advising on remote sensing validation strategies for marine applications
2023–*present*	Research and Innovation Board Member, TWAIN (The Wind energy science, technology, And Innovation Network) Project informing scientific objectives, research priorities and technology transfer strategies
2021–*present*	Community Engagement Lead, AWAKEN and RAAW Field Campaigns — organized stakeholder meetings at international conferences and events with DOE program managers, industry partners, and academic collaborators across more than a dozen institutions
2022–*present*	Contributor, IEA Wind Technology Collaboration Programme — contributing to international Tasks on Aerodynamics, Remote Sensing, Wake Model Benchmarking, and Instrumentation Development across 10+ countries
2019–*present*	Associate Editor, *Journal of Renewable and Sustainable Energy* — curate special topic issues, coordinate peer review for journal advancing wind and renewable energy science; guest editor for four special collections on field campaigns, wind plant controls, hybrid energy systems, and wake modeling

2017–*present* Invited Seminars at Oregon State University, Portland State University, University of Texas at Dallas, University of Colorado, University of Wyoming covering subjects in wind energy, applied mathematics, and field experiments

2016–*present* Regular Session Chair, in wind energy, fluid-structure interaction, and reduced-order modeling, American Physical Society Division of Fluid Dynamics Annual Meeting

Recognition

2022 NREL President's Award for Outstanding Achievement in Field Campaign Planning and Execution (AWAKEN & RAAW Projects) — recognizing multi-institutional coordination and stakeholder engagement

2018, 2020, 2023 NREL Outstanding Mentor Award — honoring top mentors nominated by postdoctoral researchers, Research Participant Program (RPP) interns, and Science Undergraduate Laboratory Interns (SULIs)

2020 National Renewable Energy Laboratory Employee of the Month

2015–2016 Maseeh Fellowship — awarded to outstanding graduate students in engineering and computer science, Portland State University

2013–2015 NSF IGERT Doctoral Fellowship, Ecosystem Services for Urbanizing Regions (ESUR) — interdisciplinary training program emphasizing stakeholder engagement and policy translation

Professional Associations

2009–*present* American Physical Society — Division of Fluid Dynamics (DFD)

2010–*present* American Society of Mechanical Engineers — Oregon Chapter

2010–*present* Tau Beta Pi Engineering Honor Society — Oregon Beta Chapter

Software and Intellectual Property

2024 NREL Software Record: **Acoustic Tomography Processing Suite** - Signal processing and inverse methods for three-dimensional atmospheric wind field reconstruction

2024 NREL Software Record: **Field Measurement Design and Quality Control Toolbox** - Instrument placement optimization, data validation, and campaign planning tools

Published work

Journal Articles

Abraham, A.: *Operational wind plants increase planetary boundary layer height: an observational study*. In: *Wind Energy Science* 10.8 (2025), pp. 1681–1705.

Bodini, N.: *A perspective on lessons learned and future needs for wind energy field campaigns*. In: *Journal of Renewable and Sustainable Energy* 17.3 (2025).

Bortolotti, P.: *Upwind vs downwind: Loads and acoustics of a 1.5 MW wind turbine*. In: *Wind Energy Science Discussions* 2025 (2025), pp. 1–39.

Hamilton, N., Bay, C. J., Zhang, J., *Hybrid renewable energy systems*. In: *Journal of Renewable and Sustainable Energy* 17.1 (2025).

Hamilton, N., Bidadi, S., *Wake-resolving acoustic tomography: advances through numerical covariance methods*. In: *Wind Energy Science Discussions* 2025 (2025), pp. 1–34.

Hamilton, N., Doubrawa, P., Moriarty, P., Letizia, S., Thedin, R., *Modal dynamics of wind turbine wake meandering from lidar observations*. In: *Renewable Energy* (2025), p. 123555.

Hamilton, N., Iungo, G. V., Lundquist, J. K., Moriarty, P., *Editorial for the collection "Preparatory Work for the American Wake Experiment (AWAKEN)"*. In: *Journal of Renewable and Sustainable Energy* 17.5 (2025).

Maric, E., Lee, B., Thedin, R., Quon, E., **Hamilton, N.,** *Acoustic Tomography of the Atmosphere: A Large-Eddy Simulation Sensitivity Study*. In: *Remote Sensing* 17.11 (2025), p. 1892.

Radünz, W.: *Influence of simple terrain on the spatial variability of a low-level jet and wind farm performance in the awaken field campaign*. In: *Wind Energy Science Discussions* 2025 (2025), pp. 1–38.

Rybchuk, A.: *Ensemble-Based, Large-Eddy Reconstruction of Wind Turbine Inflow in a Near-Stationary Atmospheric Boundary Layer Through Generative Artificial Intelligence*. In: *Wind Energy* 28.5 (2025), e70020.

Yalla, G. R.: *Spectral proper orthogonal decomposition of active wake mixing dynamics in a stable atmospheric boundary layer*. In: *Wind Energy Science Discussions* 2025 (2025), pp. 1–36.

Abraham, A.: *Operational wind plants increase planetary boundary layer height: An observational study*. In: *Wind Energy Science Discussions* 2024 (2024), pp. 1–34.

Brown, K.: *One-to-one aeroservoelastic validation of operational loads and performance of a 2.8 MW wind turbine model in OpenFAST*. In: *Wind Energy Science* 9.8 (2024), pp. 1791–1810.

Krishnamurthy, R.: *Observations of wind farm wake recovery at an operating wind farm*. In: *Wind Energy Science Discussions* 2024 (2024), pp. 1–37.

Letizia, S., Santos Thedin, R., **Hamilton, N.,** *FIEXTA (FIeld EXperiments Tool Arsenal)[SWR-24-129]*. In: *US Department of Energy (DOE) Software* (2024), p. 420.

Moriarty, P.: *Overview of preparation for the American WAKE ExperimeNt (AWAKEN)*. In: *Journal of Renewable and Sustainable Energy* 16.5 (2024).

Scott, R., **Hamilton, N.**, Cal, R. B., *Graph network heterogeneity predicts interplant wake losses*. In: *Journal of Renewable and Sustainable Energy* 16.6 (2024).

Scott, R., **Hamilton, N.**, Cal, R. B., Moriarty, P., *Wind plant wake losses: Disconnect between turbine actuation and control of plant wakes with engineering wake models*. In: *Journal of Renewable and Sustainable Energy* 16.4 (2024).

Hulsman, P., Martínez-Tossas, L. A., **Hamilton, N.**, Kühn, M., *Implementation of a Near-Wake Region within the Curled-Wake Model*. In: *Wind Energy Science Discussions* 2023 (2023), pp. 1–26.

Letizia, S.: *Characterization of wind turbine flow through nacelle-mounted lidars: a review*. In: *Frontiers in Mechanical Engineering* 9.PNNL-SA-179377 (2023).

Rybchuk, A.: *Ensemble flow reconstruction in the atmospheric boundary layer from spatially limited measurements through latent diffusion models*. In: *Physics of Fluids* 35.12 (2023).

Rybchuk, A.: *Generating Initial Conditions for Ensemble Data Assimilation of Large-Eddy Simulations with Latent Diffusion Models*. In: *arXiv preprint arXiv:2303.00836* (2023).

Sadek, Z., Scott, R., **Hamilton, N.**, Cal, R. B., *A three-dimensional, analytical wind turbine wake model: Flow acceleration, empirical correlations, and continuity*. In: *Renewable Energy* 209 (2023), pp. 298–309.

Scott, R., Martínez-Tossas, L., Bossuyt, J., **Hamilton, N.**, Cal, R. B., *Evolution of Eddy Viscosity in the wake of a wind turbine*. In: *Wind Energy Science* (2023).

Bastankhah, M., **Hamilton, N.**, Cal, R. B., *Wind tunnel research, dynamics, and scaling for wind energy*. In: *Journal of Renewable and Sustainable Energy* 14.6 (2022), p. 060402.

Hamilton, N., Gayme, D., Cal, R. B., *Wind plant controls*. In: *Journal of Renewable and Sustainable Energy* 14.6 (2022), p. 060401.

Scott, R., Martínez-Tossas, L., **Hamilton, N.**, Cal, R. B., *Evolution of Eddy Viscosity in the Wake of a Wind Turbine*. In: *Wind Energy Science Discussions* (2022), pp. 1–22.

Farrell, A.: *Design and analysis of a wake model for spatially heterogeneous flow*. In: *Wind Energy Science* 6.3 (2021), pp. 737–758.

Martínez-Tossas, L. A.: *The curled wake model: a three-dimensional and extremely fast steady-state wake solver for wind plant flows*. In: *Wind Energy Science* 6.2 (2021), pp. 555–570.

Doubrawa, P.: *Multimodel validation of single wakes in neutral and stratified atmospheric conditions*. In: *Wind Energy* 23.11 (2020), pp. 2027–2055.

Farrell, A.: *Design and analysis of a spatially heterogeneous wake*. In: *Wind Energy Science Discussions* 2020 (2020), pp. 1–25.

Hamilton, N.: *Atmospheric condition identification in multivariate data through a metric for total variation*. In: *Atmospheric Measurement Techniques* 13.2 (2020), pp. 1019–1032.

Hamilton, N., Bay, C. J., Fleming, P., King, J., Martínez-Tossas, L. A., *Comparison of modular analytical wake models to the Lillgrund wind plant*. In: *Journal of Renewable and Sustainable Energy* 12.5 (2020), p. 053311.

Martínez-Tossas, L. A.: *The curled wake model: A three-dimensional and extremely fast steady-state wake solver for wind plant flows*. In: *Wind Energy Science Discussions* 2020 (2020), pp. 1–16.

Ali, N., **Hamilton, N.**, Calaf, M., Cal, R. B., *Classification of the Reynolds stress anisotropy tensor in very large thermally stratified wind farms using colormap image segmentation*. In: *Journal of Renewable and Sustainable Energy* 11.6 (2019), p. 063305.

Ali, N., **Hamilton, N.**, Calaf, M., Cal, R. B., *Turbulence kinetic energy budget and conditional sampling of momentum, scalar, and intermittency fluxes in thermally stratified wind farms*. In: *Journal of Turbulence* 20.1 (2019), pp. 32–63.

Hamilton, N.: *Total variation of atmospheric data: covariance minimization about objective functions to detect conditions of interest*. In: *Atmospheric Measurement Techniques* (2019).

Quon, E. W., Doubrawa, P., Annoni, J., **Hamilton, N.**, Churchfield, M. J., *Validation of Wind Power Plant Modeling Approaches in Complex Terrain*. In: (2019), p. 2085.

Ali, N., **Hamilton, N.**, Cortina, G., Calaf, M., Cal, R. B., *Anisotropy stress invariants of thermally stratified wind turbine array boundary layers using large eddy simulations*. In: *Journal of Renewable and Sustainable Energy* 10.1 (2018), p. 013301.

Ali, N., **Hamilton, N.**, DeLucia, D., Bayoán Cal, R., *Assessing spacing impact on coherent features in a wind turbine array boundary layer*. In: *Wind Energy Science* 3.1 (2018), pp. 43–56.

Hamilton, N., Viggiano, B., Calaf, M., Tutkun, M., Cal, R. B., *A generalized framework for reduced-order modeling of a wind turbine wake*. In: *Wind Energy* 21.6 (2018), pp. 373–390.

Ali, N., Cortina, G., **Hamilton, N.**, Calaf, M., Cal, R., *Turbulence characteristics of a thermally stratified wind turbine array boundary layer via proper orthogonal decomposition*. In: *Journal of Fluid Mechanics* 828 (2017), pp. 175–195.

Hamilton, N., Tutkun, M., Cal, R. B., *Anisotropic character of low-order turbulent flow descriptions through the proper orthogonal decomposition*. In: *Physical Review Fluids* 2.1 (2017), p. 014601.

Hamilton, N., Tutkun, M., Cal, R. B., *Low-order dynamical system model of a fully developed turbulent channel flow*. In: *Physics of Fluids* 29.6 (2017), p. 065107.

Ali, N., **Hamilton, N.**, Cal, R. B., *Assessing Spacing Impact on the Wind Turbine Array Boundary Layer via Proper Orthogonal Decomposition*. In: *Wind Energy Science Discussions* (2016), pp. 1–21.

Hamilton, N., Tutkun, M., Cal, R. B., *Low-order representations of the canonical wind turbine array boundary layer via double proper orthogonal decomposition*. In: *Physics of Fluids* 28.2 (2016), p. 025103.

Hamilton, N., Cal, R. B., *Anisotropy of the Reynolds stress tensor in the wakes of wind turbine arrays in Cartesian arrangements with counter-rotating rotors*. In: *Physics of Fluids* 27.1 (2015), p. 015102.

Hamilton, N., Melius, M., Cal, R. B., *Wind turbine boundary layer arrays for Cartesian and staggered configurations-Part I, flow field and power measurements*. In: *Wind Energy* 18.2 (2015), pp. 277–295.

Vested, M., **Hamilton, N.**, Sørensen, J., Cal, R., *More efficient wind farms by the use of different height wind turbines*. In: (2014).

Hamilton, N., Suk Kang, H., Meneveau, C., Bayoán Cal, R., *Statistical analysis of kinetic energy entrainment in a model wind turbine array boundary layer*. In: *Journal of renewable and sustainable energy* 4.6 (2012), p. 063105.

Book Chapters

Hamilton, N. M., Tutkun, M., Cal, R. B., *Turbulent and Deterministic Stresses in the Near Wake of a Wind Turbine Array*. In: *Whither Turbulence and Big Data in the 21st Century?* 2017c, pp. 255–271.

Technical Reports

Moriarty, P.: *American WAKE Experiment (AWAKEN) Field Campaign Report*. 2025.

Bodini, N.: *Lessons learned from the planning of recent Wind Energy Technologies Office field campaigns*. 2024.

Hamilton, N.: *Meteorological Tower/Raw Data*. 2024.

Hamilton, N.: *Wind Turbine-NREL-GE 1.5 MW SLE wind turbine-Reviewed Data*. 2024.

Hamilton, N., Maric, E., *ATom (Acoustic Tomography Processing Suite)[SWR-24-120]*. 2024.

Herges, T.: *Wind Energy Instrumentation Development Roadmap*. 2024.

Roadman, J.: *Comparison of Loads and Aeroacoustics Between Upwind and Downwind Wind Turbine Rotors*. 2024.

Doubrawa, P.: *RAAW*. A2EDAP (Atmosphere to Electrons (A2e) Data Archive and Portal, Pacific . . ., 2023.

Hamilton, N., Maric, E., *Acoustic Travel-Time Tomography for Wind Energy*. 2022.

Bortolotti, P.: *Validation Efforts of an Open-Source Aeroacoustics Model for Wind Turbines*. 2021.

Hamilton, N.: *Aeroacoustic Assessment of Wind Plant Controls*. 2021.

Herges, T.: *AWAKEN Instrumentation Development Roadmap*. 2020.

Moriarty, P.: *American WAKe ExperimeNt (AWAKEN)*. 2020.

Hamilton, N., Debnath, M. C., *National Wind Technology Center-Characterization of Atmospheric Conditions*. 2019.

Shaler, K., Jonkman, J., Doubrawa Moreira, P., **Hamilton, N.,** *FAST. Farm response to varying wind inflow techniques*. 2019.

Confernece Proceedings (last 5 years)

Drucker-Boisvert, T. N., Sadek, Z. A., Fercak, O., **Hamilton, N.**, Cal, R. B. B., "Wind Turbine Wake Recovery for a Downwind Configuration". In: *Division of Fluid Dynamics Annual Meeting 2025*. 2025.

Abraham, A.: "Land-based wind plant wake characterization using dual-Doppler radar measurements at AWAKEN". In: *Journal of Physics: Conference Series*. Vol. 2767. 9. IOP Publishing. 2024, p. 092037.

Abraham, A.: "Wind Plant Impacts on Planetary Boundary Layer Height". In: *104th Annual AMS Meeting 2024*. Vol. 104. 2024, p. 433575.

Bodini, N.: "An international benchmark for wind plant wakes from the American WAKE ExperimeNt (AWAKEN)". In: *Journal of Physics: Conference Series*. Vol. 2767. 9. IOP Publishing. 2024, p. 092034.

Bodini, N.: "The American Wake Experiment (AWAKEN): leveraging observations to create international benchmarks". In: *104th Annual AMS Meeting 2024*. Vol. 104. 2024, p. 434611.

Frey, Z., Calaf, M., **Hamilton, N.,** "Implementing conservation of mass to wind flow field solvers to bridge the analytical wake model physics gap". In: *APS Division of Fluid Dynamics Meeting Abstracts*. 2024, S01–033.

Hamilton, N., Maric, E., Thedin, R., Lee, B., "High-Fidelity Remote Sensing: Optimizing Acoustic Tomography for Wind Turbine Wake Measurements". In: *APS Division of Fluid Dynamics Meeting Abstracts*. 2024, pp. C13–013.

Maric, E., **Hamilton, N.**, Quon, E., Lee, B., Thedin, R., "Validation of the stochastic inversion algorithm for acoustic travel-time tomography: a large eddy simulation study". In: *Journal of Physics: Conference Series*. Vol. 2767. 4. IOP Publishing. 2024, p. 042037.

Rybchuk, A.: "Bridging Real-World Lidar Measurements and Large-Eddy Simulation for Wind Turbine Validation Through Diffusion Models". In: *104th Annual AMS Meeting 2024*. Vol. 104. 2024, p. 430252.

Abraham, A., Letizia, S., Bodini, N., **Hamilton, N.,** "Investigation of wind plant wake effects at the AWAKEN field campaign". In: American Physical Society, 2023.

Cheung, L.: "Investigations of Farm-to-Farm Interactions and Blockage Effects from AWAKEN Using Large-Scale Numerical Simulations". In: *Journal of Physics: Conference Series*. Vol. 2505. 1. IOP Publishing. 2023, p. 012023.

Letizia, S., Bodini, N., Scholbrock, A., **Hamilton, N.**, Doubrawa, P., "Holistic Scan Optimization of Nacelle-Mounted Lidars for the Rotor Aerodynamics Aeroelastics and Wake (RAAW) Experiment". In: *103rd AMS Annual Meeting*. AMS. 2023.

Maric, E., **Hamilton, N.,** "Acoustic Travel-Time Tomography for Wind Energy". In: *103rd AMS Annual Meeting*. AMS. 2023.

Maric, E., **Hamilton, N.,** "Three-Dimensional Acoustic Travel-Time Tomography for Wind Energy". In: American Physical Society, 2023.

Moriarty, P.: "Overview of the American Wake Experiment (AWAKEN)". In: *103rd AMS Annual Meeting*. AMS. 2023.

Rybchuk, A.: "A baseline for ensemble-based, time-resolved inflow reconstruction for a single turbine using large-eddy simulations and latent diffusion models". In: *Journal of Physics: Conference Series*. Vol. 2505. 1. IOP Publishing. 2023, p. 012018.

Rybchuk, A.: "Reconstructing Atmospheric Initial Conditions from Synthetic Field Measurements for Turbine Model Validation through Denoising Diffusion Probabilistic Models". In: *103rd AMS Annual Meeting*. AMS. 2023.

Debnath, M.: "Design of the American Wake Experiment (AWAKEN) field campaign". In: *Journal of Physics: Conference Series*. Vol. 2265. 2. IOP Publishing. 2022, p. 022058.

Hamilton, N., Doubrawa, P., Naughton, J., Kelley, C., "Rotor Aerodynamics, Aeroelastics, and Wake (RAAW) Campaign Overview". In: American Physical Society, 2022.

Scott, R., **Hamilton, N.**, Cal, R., "Characterizing Spatially Heterogeneous Wind Turbine Wakes Under Yaw and Tilt Misalignment". In: American Physical Society, 2022.

Hamilton, N., Doubrawa, P., Debnath, M., Brugger, P., Porté-Agel, F., "A Modal Description of Dynamic Wake Meandering". In: *APS Division of Fluid Dynamics Meeting Abstracts*. 2021, E15–006.

Sadek, Z., Cal, R. B., **Hamilton, N.,** "Mass Consistent, Analytical Near Wake Models for Wind Turbines". In: *APS Division of Fluid Dynamics Meeting Abstracts*. 2021, H15–003.

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