NICHOLAS HAMILTON, PH.D.

Senior Research Engineer

Renewable Energy, Fluid Mechanics, Remote Sensing, Dynamical Systems

EXPERIENCE

Senior Research Engineer & Principal Investigator

National Renewable Energy Laboratory

2017 – Present Golden, CO

Lead R&D efforts within the DOE Atmosphere to Electrons initiative to advance the next generation of wind energy technology.

- Principle investigator leading more than $9M of DOE projects including instrumentation development, collaborative experimental projects, and high-fidelity modeling of turbulent atmospheric velocity and temperature fields
- Lead center-wide efforts in analytical and data-driven wind turbine wake model development, remote sensing technology and methods, and the use of field measurements for model validation
- Developed $30M+ worth of proposals for the national lab system, US DOE, NSF, and industry partners, that support new full-time research and administration positions
- Mentor more than 20 graduate and undergraduate students in projects including modeling, analysis, and instrumentation development.

Research Associate

Wind Energy and Turbulence Lab, Portland State University

2014 – 2017 Portland, OR

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
- Lead fluid dynamics method development efforts for coupled dynamical systems, reduced-order modeling, and flow control
- 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

Research/Teaching Assistant

Mechanical Engineering Department, Portland State University

2009 – 2014 Portland, OR

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
- Represented Maseeh College of Engineering and Computer Science in institution-wide transdisciplinary to advance sustainability objectives for the university

CONTACT

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200 The Lane Rd.
Golden, CO 80403

LinkedIn Profile
GitHub Profile

SKILLS

In the last decade of research, I have led complex, dynamic projects and cultivated expertise in turbulent fluid mechanics, remote sensing, and modern data science techniques. Through publishing peer-reviewed scientific journal articles and presenting at academic and professional conferences, I have developed the ability to effectively communicate results.

Professional Capability

Communication
Project Management
Problem-Solving
Leadership
Adaptability
Mentoring
Public Speaking
Team Building
Conflict Resolution

Technical Proficiencies

Applied Mathematics	●●●●●
Coding/Programming	●●●●●
Experimentation	●●●●●
Remote Sensing	●●●●●
Wake Modeling	●●●●●
Software Development	●●●●○
Model Validation	●●●●○
Uncertainty Quantification	●●●●○
Computational Fluid Dynamics	●●●○○

LANGUAGES

English	●●●●●
Spanish	●●●○○
French	●●●○○

Chef/Owner

Chance of Rain Café

2003 – 2009 Portland, OR

A neighborhood café serving exceptional espresso, local beer and wine, as well as breakfast and lunch fare.

EDUCATION

Doctor of Philosophy, Mechanical Engineering

Portland State University

2013 – 2016 Portland, OR

Dissertation: *Wake character in the wind turbine array: (Dis-)organization, spatial and dynamic evolution, and low-dimensional modeling*
Description: Novel development of the proper orthogonal decomposition along spatial coordinate yields spatial evolution of wake modes and leads to reduced order modeling of dynamical systems
Advisors: Dr. Raúl Bayoán Cal and Dr. Murat Tutkun

Master of Science, Mechanical Engineering

Portland State University

2012 – 2014 Portland, OR

Thesis: *Anisotropy of the Reynolds stress tensor in the wakes of wind turbines in Cartesian arrangements with counter-rotating rotors*
Advisors: Dr. Raúl Bayoán Cal and Dr. Murat Tutkun

Master of Science, Computational and Experimental Turbulence

École Centrale de Lille
ENSIP/ENSMA

2010 – 2012 Lille and Poitiers, France

Thesis: *Characterization of wake dynamics for aligned and staggered wind turbine arrays via low-dimensional modeling*
Advisors: Dr. Raúl Bayoán Cal and Dr. Murat Tutkun

Bachelor of Science, Mechanical Engineering

Portland State University

2004 – 2010 Portland, OR

Summa Cum Laude

AWARDS AND HONORS

- NREL's Outstanding Mentor Award, honors the top mentors nominated by postdoctoral researchers, graduate and undergraduate interns. (2018, 2022)
- President's Award at the National Renewable Energy Laboratory for outstanding contributions to mission-critical objectives (2022)
- Ecosystem Services for Urbanizing Regions (ESUR) Integrative Graduate Education and Research Traineeship (IGERT) Doctoral Fellowship, National Science Foundation and Portland State University (2013–2015)
- Maseeh Fellowship, awarded to outstanding graduate students enrolled in Master's or Ph.D. programs in Maseeh College of Engineering and Computer Science (2015–2016
- Outstanding research assistant of the year, Portland State University, Department of Mechanical and Materials Engineering (2013, 2014)

SCIENTIFIC IMPACT

Publication Metrics

Citations: **575+**
$h-$index: **14**
$i10-$index: **18**

Additional detail can be found on:

Google Scholar Profile
ORCID

Research Portfolio

Over the last 8 years of my research careers, I've lead or contributed to more than 30 peer-reviewed scientific journal articles, five technical reports, one book chapter and extensive conference papers and podium presentations. For a full list of my research output, please contact me directly or see the list **here**.

Editorial Work

Associate Editor for the *Journal of Renewable and Sustainable Energy*.

Peer Review

In the past few years I have served extensively as a peer reviewer for for scientific publications including:

- *Wind Energy*
- *Wind Energy Science*
- *Journal of Fluid Mechanics*
- *Physics of Fluids*
- *Physical Review - Fluids*
- *Journal of Renewable and Sustainable Energy*
- *Energies*