Mike **Optis**

Atmospheric and Data Scientist Specializing in Renewable Energy

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Core Capabilities and Skills

- Senior scientist with 15 years experience in renewable energy data analysis
- Experienced manager and mentor for junior scientists and post-doctoral candidates
- Successfully proposed and received $2M in project funding over last 2 years
- Expertise in Python programming language, machine learning, and uncertainty quantification

Work Experience

EDF Renewables — *San Diego, CA*

Senior Data Scientist — *Sept. 2021 - Present*

- Offshore wind resource characterization, numerical weather prediction, wake modeling, wind plant performance analysis

National Renewable Energy Laboratory — *Boulder, CO*

Senior Scientist — *Sept. 2017 - Aug. 2021*

- Mentored 2 post-doctoral students and 3 interns
- Expertise in wind energy meteorology, offshore wind resource characterization, numerical weather prediction, wind plant performance analysis, and machine learning and uncertainty quantification

AWS Truepower, a UL Company — *Albany, NY*

Senior Analyst — *May 2015 - Aug. 2017*

- Resource and energy assessment uncertainty, wind turbine performance analysis, portfolio benefit analysis, wind and solar operational energy assessments

Climate Change Branch, Government of British Columbia, Canada — *Victoria, British Columbia, Canada*

Policy analyst — *Sept. 2008 - December 2009*

- CO_2 emissions reporting, carbon cap and trade design, emission factor development

Education

Ph.D. in Atmospheric and Oceanic Sciences — *Victoria, British Columbia, Canada*

University of Victoria — *2015*

Dissertation: The modeling of the wind profile under stable stratification at heights relevant to wind power: A comparison of models of varying complexity

Masters in Applied Science — *Victoria, British Columbia, Canada*

University of Victoria — *2008*

Thesis: Incorporating Life Cycle Assessment into the LEED Green Building Rating System

Bachelors in Honors Physics — *Waterloo, Ontario, Canada*

University of Waterloo — *2005*

Thesis: Solid Oxide Fuel Cell Technologies: A Review

Project Management

Validated National Offshore Wind Resource Dataset with Uncertainty Quantification — *Aug. 2020 - Aug. 2021*

Budget: $1,500,000

Funder: National Offshore Wind Research and Development Consortium

Best Practices for Offshore Wind Resource Validation — *Sept. 2019 - Nov. 2020*

Budget: $200,000

Funder: Bureau of Ocean Energy Management

Scientific and Technical Services for the Pacific Region Outer Continental Shelf — *Sept. 2019 - Nov. 2020*

Budget: $200,000

Funder: Bureau of Ocean Energy Management

Journal Articles

Detecting and Characterizing Sea Breezes Over the US Northeast Coast with Implication for Offshore Wind Energy — *In review*

G Xia, C Draxl, **M Optis**, S Redfern

Wind Energy Science Discussions, 1-23

The Sensitivity of the Fitch Wind Farm Parameterization to a Three-Dimensional Planetary Boundary Layer Scheme — *In review*

Rybchuk, A., Juliano, TW., Lundquist, JK., Rosencrans, D., Bodini, N., **Optis, M.**

Wind Energy Science Discussions, 1-39

Opportunities for the coupling of offshore wind and hydrogen technologies - Exploration of system configurations — *In review*

Constant, C., C. Kreutzer, A. Cooperman, **M. Optis**, J. Nunumaker, J. Paige

Renewable and Sustainable Energy Reviews

A Twenty-Year Analysis of Winds in California for Offshore Wind Energy Production — *In review*

Rybchuk, O., **M. Optis**, J. Lundquist, M. Rossol, W. Musial

Geophysical model development

Can Reanalysis Products Outperform Mesoscale Numerical Weather Prediction Models in Modeling the Wind Resource in Simple Terrain? — *In review*

V Pronk, N Bodini, **M Optis**, JK Lundquist, P Moriarty, C Draxl

Wind Energy Science Discussions, 1-22

New methods to improve the vertical extrapolation of near-surface offshore wind speeds — *2021*

Optis, M., N. Bodini, M. Debnath, P. Doubrawa

Wind Energy Science, https://wes.copernicus.org/preprints/wes-2021-5/

Assessing boundary condition and parametric uncertainty in numerical-weather-prediction-modeled, long-term offshore wind speed through machine learning and analog ensemble — *2021*

N Bodini, W Hu, **M Optis**, G Cervone, S Alessandrini

Wind Energy Science 6 (6), 1363-1377

OpenOA: An Open-Source Codebase For Operational Analysis of Wind Farms — *2021*

Perr-Sauer, J., **M. Optis**, M. J. Fields, N. Bodini, L. Williams, J. C. Y. Lee, A. Todd, C. Phillips, M. Lunacek, A. Craig, T. Kemper, N. Agarwal, S. Sheng, E. Simley, J. Meissner

Journal of Open Source Software

Lowering post-construction yield assessment uncertainty through better wind plant power curves — *2021*

Bodini, N., **M. Optis**, J. Perr-Sauer, E. Simley, M. Fields

Wind Energy

Extreme wind shear events in US offshore wind energy areas and the role of induced stratification — *2021*

M Debnath, P Doubrawa, **M Optis**, P Hawbecker, N Bodini

Wind Energy Science 6 (4), 1043-1059

Quantifying sensitivity in numerical weather prediction modeled offshore wind speeds through an ensemble modeling approach — *2021*

Optis, Mike, A. Kumler, J. Brodie, T. Miles

Wind Energy, https://doi.org/10.1002/we.2611

The importance of round-robin validation when assessing machine-learning-based vertical extrapolation of wind speeds — *2020*

Bodini, N. and **M. Optis**

Wind Energy Science, 5, 489–501, https://doi.org/10.5194/wes-5-489-2020

Operational-based annual energy production uncertainty: are its components actually uncorrelated? — *2020*

Bodini, N. and **M. Optis**

Wind Energy Science 5 (4), 1435-1448

Can machine learning improve the model representation of turbulent kinetic energy dissipation rate in the boundary layer for complex terrain? *2020*

Bodini, N., J.K. Lundquist, **M. Optis**

Geoscientific Model Development 13 (9), 4271-4285, https://doi:10.5194/gmd-2020-16

How accurate is a machine learning-based wind speed extrapolation under a round-robin approach *2020*

Bodini, N., **M. Optis**

Journal of Physics: Conference Series 1618 (6), 062037, https://doi.org/10.1088/1742-6596/1618/6/062037

Short-term wind forecasting using statistical models with a fully observable wind flow *2020*

Perr-Sauer, J., C. Tripp, **M. Optis**, J. King

Journal of Physics: Conference Series 1452 (1), https://www.nrel.gov/docs/fy20osti/74237.pdf

The importance of atmospheric turbulence and stability in machine-learning models of wind farm power production *2019*

Optis, M., Perr-Sauer, J.

Renewable and Sustainable Energy Reviews, doi:10.1016/j.rser.2019.05.031

Uncertainty quantification in the analyses of operational wind power plant performance *2018*

Craig, A., **M. Optis**, M. Fields, P. Moriarty

Journal of Physics: Conference Series 1037 (5), https://www.nrel.gov/docs/fy18osti/71397.pdf

A comparison of equilibrium and time-evolving approaches to modeling the wind profile under stable stratification *2017*

Optis, M.. A. Monahan

Journal of Applied Meteorology and Climatology, 56 (5), 1365-1382

The extrapolation of near-surface wind speeds under stable stratification using an equilibrium-based single-column model approach *2016*

Optis, M.. A. Monahan

Journal of Applied Meteorology and Climatology, 55 (4), 923-943

Limitations and breakdown of Monin-Obukhov similarity theory for wind profile extrapolation under stable stratification *2015*

Optis, M.. A. Monahan, F.C. Bosveld

Wind Energy, 19 (6), 1053-1072

On the offshore advection of boundary layer structures and its influence on offshore wind conditions *2015*

Dörenkämper, M, **M. Optis**, A. Monahan

Boundary-Layer Meteorology, 155 (3), 459-482

Moving beyond Monin-Obukhov similarity theory in modelling wind speed profiles in the lower atmospheric boundary layer under stable stratificatio *2014*

Optis, M.. A. Monahan, F.C. Bosveld

Boundary-Layer Meteorology, 153, 497-514

Mold growth in on-reserve housing: the need for research, education, policy and funding *2012*

Optis, M., K. Shaw, P. Stephenson

Journal of Environmental Health, 74 (6), 14-21

A participatory process for the design of housing for a First Nations community *2012*

MacTavish, T., M. Marceau, **M. Optis**, K. Shaw, P. Stephenson, P. Wild

Journal of Housing and the Built Environment, 27 (2), 207-224

Inadequate documentation in published life cycle energy reports on buildings *2010*

Optis, M., P. Wild

International Journal of Life Cycle Assessment, 15 (7), 644-651

Technical Reports

Airborne Wind Energy *2021*

J Weber, M Marquis, A Cooperman, C Draxl, R Hammond, J Jonkman, **M Optis** ...

National Renewable Energy Lab.(NREL), Golden, CO (United States)

The Costs and Feasibility of Floating Offshore Wind Energy in the O'ahu Region *2021*

M Shields, P Duffy, W Musial, M Laurienti, D Heimiller, R Spencer, **M Optis**

National Renewable Energy Lab.(NREL), Golden, CO (United States)

Wind Plant Performance Prediction Benchmark Phase 1 Technical Report *2021*

MJ Fields, **M Optis**, J Perr-Sauer, A Todd, JCY Lee, J Meissner, E Simley

National Renewable Energy Lab.(NREL), Golden, CO (United States)

2020 Offshore Wind Resource Assessment for the California Pacific Outer Continental Shelf *2020*

Optis, M., O. Rybchuk, N. Bodini, M. Rossol, W. Musial

National Renewable Energy Laboratory, NREL/TP-5000-77642, https://doi:10.2172/1677466

The Cost of Floating Offshore Wind Energy in California Between 2019 and 2032 *2020*

Beiter, P., W. Musial, P. Duffy, A. Cooperman, M. Shields, D. Heimiller, **M. Optis**

National Renewable Energy Laboratory, NREL/TP-5000-77384, https://doi:10.2172/1710181

Best Practices for the Validation of U.S. Offshore Wind Resource Models *2020*

Optis, M., N. Bodini, M. Debnath, P. Doubrawa

National Renewable Energy Laboratory, NREL/TP-5000-78375, https://doi:10.2172/1755697

Validation of RU-WRF, the Custom Atmospheric Mesoscale Model of the Rutgers Center for Ocean Observing Leadership *2020*

Optis, M., A. Kumler, G. Scott, M. Debnath, P. Moriarty

National Renewable Energy Laboratory, NREL/TP-5000-75209, https://www.nrel.gov/docs/fy20osti/75209.pdf