Dennis van der Meer

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Research interests

Probabilistic forecasting, online optimisation, grid integration, renewable energy sources.

Education

Uppsala University — Uppsala, Sweden
PhD in Civil Engineering — Jul. 2016 – Jan. 2021
Mentors: Professors Joakim Widén, Joakim Munkhammar.

Technical University Delft — Delft, Netherlands
MSc in Sustainable Energy Technology — Sept. 2014 – Jun. 2016
Mentors: Professors P. Bauer, G. R. Chandra Mouli.

Technical University Delft — Delft, Netherlands
BSc in Mechanical Engineering — Sept. 2007 – June 2013

Employment

MINES Paris – PSL University — Sophia Antipolis, France
Postdoctoral Fellow — March. 2021 – present

Uppsala University — Uppsala, Sweden
Researcber — Jan. 2021 – March. 2021

Uppsala University — Uppsala, Sweden
PhD Fellow — Jul. 2016 – Jan. 2021

Honors and scholarships

Best Paper Award (IEEE Industrial Electronics Society) 2019
Finalist in Best Student Paper Award Competition (IEEE PVSC) 2018
Master thesis prize, 2nd place (QPark) 2017

Journal publications

Infinite hidden Markov model for short-term solar irradiance forecasting
Âzeddine Frimane, Joakim Munkhammar, **Dennis van der Meer**.
Solar Energy, Vol. 244: pp. 331-342 (2022).

Post-processing in solar forecasting: Ten overarching thinking tools
Dazhi Yang, *et al.*
Renewable and Sustainable Energy Reviews, Vol. 161: 112348 (2022).

Infinite hidden Markov model for short-term solar irradiance forecasting
Marco Pierro, Damiano Gentili, Fabio Romano Liolli, Cristina Cornaro, David Moser, Alessandro Betti, Michela Moschella, Elena Collino, Dario Ronzio, **Dennis van der Meer**.
Renewable Energy, Vol. 189: pp. 983-996 (2022).

A benchmark for multivariate probabilistic solar irradiance forecasts
Dennis van der Meer.
Solar Energy, Vol. 225: pp. 286-296 (2021).

Post-processing in solar forecasting: Ten overarching thinking tools
Dazhi Yang, **Dennis van der Meer**.
Renewable and Sustainable Energy Reviews, Vol. 140: 110735 (2021).

An alternative optimal strategy for stochastic model predictive control of a residential battery energy management system with solar photovoltaic
Dennis van der Meer, Guang Chao Wang, Joakim Munkhammar.
Applied Energy, Vol. 283: 116289 (2020).

Very short term load forecasting of residential electricity consumption using the Markov-chain mixture distribution (MCM) model
Joakim Munkhammar, **Dennis van der Meer**, Dazhi Yang.
Applied Energy, Vol. 282 (A): 116180 (2020).

Smart charging of electric vehicles considering photovoltaic power production and electricity consumption: a review
Reza Fachrizal, Mahmoud Shepero, **Dennis van der Meer**, Joakim Munkhammar, Joakim Widén.
eTransportation, Vol. 4: 100056 (2020).

Probabilistic solar forecasting benchmarks on a standardized dataset at Folsom, California
Dazhi Yang, **Dennis van der Meer**, Joakim Munkhammar.
Solar Energy, Vol. 206: pp. 628-639 (2020).

Probabilistic forecasting of high-resolution clear-sky index time-series using a Markov-chain mixture distribution model
Joakim Munkhammar, **Dennis van der Meer**, Joakim Widén.
Solar Energy, Vol. 184: pp. 688-695 (2020).

Verification of deterministic solar forecasts
Dazhi Yang, Stefano Alessandrini, Javier Antonanzas, Fernando Antonanzas-Torres, Viorel Badescu, Hans G. Beyer, Robert Blaga, John Boland, Jamie M. Bright, Carlos F. M. Coimbra, Mathieu David, Âzedinne. Frimane, Christian A. Gueymard, Tao Hong, Merlinde J. Kay, Sven Killinger, Jan Kleissl, Philippe Lauret, Elke Lorenz, **Dennis van der Meer**, Marius Paulescu, Richard Perez, Oscar Perpiñán-Lamigueiro, Ian M. Peters, Gordon Reikard, Dave Renné, Yves-Marie Saint-Drenan, Yong Shuai, Ruben Urraca, Hadrien Verbois, Frank Vignola, Cyril Voyant, Jie Zhang.
Solar Energy, Vol. 210: pp. 20-37 (2020).

Clear-sky index space-time trajectories from probabilistic solar forecasts: Comparing promising copulas
Dennis van der Meer, Dazhi Yang, Joakim Munkhammar, Joakim Widén.
Journal of Renewable and Sustainable Energy, Vol. 12: 026102 (2020).

Probabilistic forecasting of solar power, electricity consumption and net load: Investigating the effect of seasons, aggregation and penetration on prediction intervals
Dennis van der Meer, Joakim Munkhammar, Joakim Widén.
Solar Energy, Vol. 171: pp. 397-413 (2018).

Residential probabilistic load forecasting: A method using Gaussian process designed for electric load data
Mahmoud Shepero, **Dennis van der Meer**, Joakim Munkhammar, Joakim Widén.
Applied Energy, Vol. 218: pp. 159-172 (2018).

Probabilistic forecasting of electricity consumption, photovoltaic power generation and net demand of an individual building using Gaussian Processes
Dennis van der Meer, Mahmoud Shepero, Andreas Svensson, Joakim Widén, Joakim Munkhammar.
Applied Energy, Vol. 213: pp. 195-207 (2018).

Review on probabilistic forecasting of photovoltaic power production and electricity consumption
Dennis van der Meer, Joakim Widén, Joakim Munkhammar.
Renewable and Sustainable Energy Reviews, Vol. 81: pp. 1484-1512 (2018).

Energy Management System With PV Power Forecast to Optimally Charge EVs at the Workplace
Dennis van der Meer, Gautham Ram Chandra Mouli, Germán Morales-España, Laura Ramirez Elizondo, Pavol Bauer.
IEEE Transactions on Industrial Informatics, Vol. 14: pp. 311-320 (2018).

Conference publications

Seamless intra-day and day-ahead multivariate probabilistic forecasts at high temporal resolution
Dennis van der Meer, Simon Camal, Georges Kariniotakis.
2022 17th International Conference on Probabilistic Methods Applied to Power Systems (PMAPS) (2022).

Data-Enabled Reactive Power Control of Distributed Energy Resources via a Copula Estimation of Distribution Algorithm
Dennis van der Meer, Hamed Haghi, Jan Kleissl, Joakim Widén.
2022 17th International Conference on Probabilistic Methods Applied to Power Systems (PMAPS) (2022).

Generalising renewable energy forecasting using automatic feature selection and combination
Dennis van der Meer, Simon Camal, Georges Kariniotakis.
2022 17th International Conference on Probabilistic Methods Applied to Power Systems (PMAPS) (2022).

End-to-end Learning for Hierarchical Forecasting of Renewable Energy Production with Missing Values
Akylas Stratigakos, **Dennis van der Meer**, Simon Camal, Georges Kariniotakis.
2022 17th International Conference on Probabilistic Methods Applied to Power Systems (PMAPS) (2022).

Direct forecast of solar irradiance for EV smart charging scheme to improve PV self-consumption at home
Reza Fachrizal, **Dennis van der Meer**, Joakim Munkhammar.
2021 IEEE PES Innovative Smart Grid Technologies Europe (ISGT Europe) (2021).

Probabilistic forecasting of the clear-sky index using Markov-chain mixture distribution and copula models
Joakim Munkhammar, **Dennis van der Meer**, Joakim Widén.
Proceedings of the 2019 IEEE Photovoltaic Specialist Conference, Chicago, Illinois, June 16-21 (2019).

Probabilistic clear-sky index forecasts using Gaussian process ensembles
Dennis van der Meer, Joakim Munkhammar, Joakim Widén.
Proceedings of the 2018 World Conference on Photovoltaic Energy Conversion, Waikoloa, Hawaii, June 9-15 (2018).

A comparison of strategies for net demand forecasting in case of photovoltaic power production and electricity consumption
Dennis van der Meer, Joakim Widén, Joakim Munkhammar.
Proceedings of the 34th European Photovoltaic Solar Energy Conference, Amsterdam, The Netherlands, September 25-29 (2017).

Investigating the effect of aggregation on prediction intervals in case of solar power, electricity consumption and net demand forecasting
Dennis van der Meer, Joakim Widén, Joakim Munkhammar.
Proceedings of the 7th Solar Integration Workshop, Berlin, Germany, October 24-25 (2017).

Predicting hosting capacity of photovoltaic power production in low-voltage grids using regressive techniques
Dennis van der Meer, Jonas Andersson, Vendela Bernstr om, Joakim T ornqvist, Joakim Widén.
Proceedings of the 7th Solar Integration Workshop, Berlin, Germany, October 24-25 (2017).

Research experience

Smart4RES: Data science for renewable energy prediction

Coordinators: G. Kariniotakis, S. Camal (MINES Paris) 2019 – 2023
This project aims to develop and validate the next generation tools that jointly enable (i) an increase of at least 15% in RES forecasting performance, and (ii) leverage the economic value of RES forecasting by considering the whole value chain from weather forecasting to end-use applications.

Development and evaluation of forecasting models for solar power and electricity use over space and time
Mentors: J. Widén, J. Munkhammar (Uppsala University) Jul. 2016 – Jan. 2021

This project developed and evaluated forecasting methods for solar power and electricity use. The project evaluated existing methods in order to further develop these and completely new methods in the research frontier of forecasting. These new methods were based on probabilistic forecasting, and contained both statistical and machine learning methods. Summary of findings available here.

Center for Energy Research
Mentor: J. Kleissl (UCSD) Feb. 2019 – May 2019
During this research visit, a probabilistic optimization model was developed that aims to minimize the voltage increase through reactive power control of smart photovoltaic inverters. The research is a departure from the main work of the PhD dissertation, which primarily revolved around forecasting, and was intended for horizon broadening.

Teaching experience

Teaching assistant (Uppsala University) Spring 2021

1TE773: Project in Infrastructure Systems
Student supervision.

Teaching assistant (MINES Paris) Fall 2021
ENR: Project in Renewable Energy Forecasting
Student supervision.

Teaching assistant (Uppsala University) Fall 2020
1TE726: Analysis of Power Distribution Grids
Student supervision and lecturer.

Teaching assistant (Uppsala University) Fall 2020
1TE028: Solar Energy - Technology and Systems
Student supervision and lecturer.

Industry experience

Greenlytics Stockholm, Sweden
External consultant Nov. 2019 – Present
Researching the potential of satellite imagery to enhance photovoltaic power production forecasts at high latitudes.

Talks and tutorials

Space-time trajectories from probabilistic forecasts August 2020
International Solar Energy Society webinar.

Clear-sky index space-time trajectories from probabilistic solar forecasts: Comparing promising copulas March 2020
International Energy Agency PVPS Task 16 Expert Meeting.

Skills

Programming
Proficient in: R, Python.
Familiar with: Matlab, Julia.

Languages
Dutch, English (fluent), Swedish (advanced).

Professional memberships

IEEE Student Member Sept. 2016 – Present
Graduate student assistant at IEEE PVSC 45.

Other interests

Avid motorcyclist and fitness enthusiast.