

CV of Henrik Madsen (PhD, Professor at DTU Compute)

Born 15 October 1955

DTU COMPUTE, see <http://www.henrikmadsen.org> for more details.

- **Assoc. Prof.** (Lektor) in Mathematical Statistics at IMSOR,DTU, September 1989 - April 1999.
- **Project leader** for a number of projects. Some methods are eg in WPPT (used worldwide for wind power forecasting today), other methods are implemented in a leading software tool for modelling using stochastic differential equations (CTSM), January 1987-.
- **Professor in *Stochastic Dynamical Systems***, Section of Mathematical Statistics, DTU Informatics, DTU. April 1999 -.
- **Head of the Research Committee** at Informatics and Mathematical Modelling, 2000-2005.
- **Elected Member of ISI (International Statistical Institute) and Bernoulli Society**, 2004.
- **Head of Center for High Performance Computing at DTU** which was opened by the *Danish Minister of Research*, February 2002 - 2009.
- **Member of Group forming the Research Strategy at DTU Informatics**, 2008-2010.
- Active/significant involvement in e.g. **EERA Smart Cities, EERA Smart Grid, EERA Wind, and IEA Annexes.**
- **Member of Smart Grid Expert Group under Danish Ministry of Climate, Energy and Building**, April 2012-February 2013.
- **Section Head (Dynamical Systems, DTU Compute)**, January 2013-
- **SP leader (or co-leader) in IEA Annex 58 and Annex 66**, August 2013-
- **Head of Coordinating Committee for Smart Cities activities on DTU**, December 2013-
- **Head of CITIES; Centre for IT-intelligent Energy Systems (DSF National Centre)**, January 2014-
- **Platform Repr. for Sustainable City Systems - Nordic Climate KiC CLC**, February 2014-
- **Member of Steering group for Water DTU**, August 2014-
- Appointed **Knight of the Order of Dannebrog by Her Majesty the Queen of Denmark**, June 2016.

PhD. SUPERVISION: 46 completed PhD projects, 6 ongoing

FURTHER PROFESSIONAL ASSIGNMENTS

I am or have been the leader of - or participated in - research projects financed by the Danish Agency for Science (DSF, FTP, NABIIT, SPIR projects), EU FP7, NordForsk, Technical Research Council, Danish Agricultural and Veterinary Research Council, NATO, The Industrial PhD Programme, Nordic Council, Ministry of Environment and Energy, Danish Research Academy, Danish Academy for Technical Sciences (ATV) and a large number of private companies. The total budget for the research projects I am involved in now is more than DKK200 mill. with partners from Denmark, a number of European countries and US.

PUBLICATIONS

More than 480 publications including 191 papers in journals, 11 research monograph. The latest books (including nearly finished book projects) are:

H. Madsen, *Time Series Analysis*, Chapman and Hall, 392 pp., 2008

H. Madsen and P. Thyregod, *An Introduction to General and Generalized Linear Models*, Chapman and Hall, 320 pp., 2011.

J.M.M. Gonzáles, A.J. Conejo, H. Madsen, P. Pinson, M.Zugno, *Integrating Renewables in Electricity Markets, Operational Problems*, Springer, 429 pp., 2014.

E. Lindström, H. Madsen, J.N. Nielsen, *Statistics for Finance*, Chapman and Hall, 365 pp., 2015.

P. Pinson, H. Madsen, P. Bacher, *Renewable Energy Forecasting*, Wiley, approx. 300 pp., 2016

Sample of other newer publications:

B.Bach, R. Schülz, A. Wyckmans, H. Madsen, P. Franz, M.P.G. Ramón: SET-plan Education and Training Initiative. Assessment report for 'Smart Cities' prepared for the European Commission, 2012.

H. Madsen, J. Parvizi, R. Halvgaard, L.E. Sokoler, J.B. Jørgensen, L.H. Hansen, K.B. Hilger: Control of Electricity Loads in Future Electric Energy Systems, in Handbook of Clean Energy Systems, Wiley, 2015.

Citations: >11200, *h-index:* >50, *i10-index:* > 220

Selected journal papers (since 2015):

- J. Tastu, P. Pinson, H. Madsen, Space-time trajectories of wind power generation; Parameterized precision matrices under a Gaussian copula approach, in Modeling and Stochastic Learning for Forecasting in High Dimensions, 2015.
- L.E. Sokoler, L. Standardi, K. Edlund, N.K. Poulsen, H. Madsen, J.B. Jørgensen, A Dantzig-Wolfe decomposition algorithm for linear economic model predictive control of dynamically decoupled subsystems, *Journal of Process Control*, Vol. 24, pp. 1225-1236, 2015.
- J.E.B. Iversen, J.M. Morales Gonzales, J.K. Møller, H. Madsen, Short-term probabilistic forecasting of wind speed using stochastic differential equations, *International Journal of Forecasting*, issn=0169-2070, 2015.
- A. Thavlov, H. Madsen, A nonlinear stochastic model for an office building with air infiltration, *Journal of Sustainable Energy Planning and Management*, Vol. 7, pp. 59-70, 2015.
- E. Lindstrom, H. Madsen, N. Vicke, Consumption management in the Nord Pool region; A stability analysis, *Journal of Applied Energy*, Vol. 146, pp. 239-246, 2015.
- P. Nystrup, H. Madsen, E. Lindstrom, Stylised facts of financial time series and hidden Markov models in continuous time, *Quantitative Finance*, issn=1469-7688, 2015.
- E.B. Iversen, J.K. Møller, J.M. Morales, H. Madsen, Inhomogeneous Markov Models for describing driving patterns, accepted, *IEEE Transactions on Smart Grid*, 2015.
- J.S. Gallego, J.M.M. Gonzales, H. Madsen, Determining reserve requirements in DK1 area of Nord Pool using a probabilistic approach, accepted, *Energy*, 2015.
- M. Nielsen, J.M.M. Gonzales, M. Zugno, T.A. Østergaard, H. Madsen, Economic valuation of heat pumps and electric boilers in the Danish energy system, accepted, *Applied Energy*, 2015.
- N. O'Connell, M. O'Malley, P. Pinson, H. Madsen, Economic dispatch of demand response balancing through asymmetric block offers, accepted, *IEEE Transactions on Power Systems*, 2015.
- D. Del Giudice, R. Lowe, H. Madsen, P.S. Mikkelsen, Comparison of two stochastic techniques for reliable urban runoff prediction by modeling systematic errors, *Water Resources Research*, issn=0043-1397, 2015.
- S. Schmidt, D. Boiroux, A. Ranjan, J.B. Jørgensen, H. Madsen, K. Nørgaard; An artificial pancreas for automated blood glucose control in patients with Type 1 diabetes, *Journal Therapeutic Delivery*, Vol. 6, pp. 211-221, 2015.
- P. Nystrup, B.W. Hansen, H. Madsen, E. Lindstrom; Regime-based versus static asset allocation: Letting the data speak, *Journal of Portfolio Management*, Vol. 42, pp. 103-109, 2015.
- M.G. Nielsen, M.G. Juan Miguel, M. Zugno, T.E. Pedersen, H. Madsen; Economic valuation of heat pumps and electric boilers in the Danish energy systems, *Applied Energy*, Vol. 167, pp. 189-200, 2016.
- L.B. Rasmussen, P. Bacher, H. Madsen, H. Aa. Nielsen, C. Heerup, T. Green; Load forecasting of supermarket refrigeration, *Applied Energy*, Vol. 163, pp. 32-40, 2016.
- J.K. Møller, M. Zugno, H. Madsen, Probabilistic Forecasts of wind power generation by stochastic differential equation models', *Journal of Forecasting*, Vol. 35, pp. 189-205, 2016.
- F. Cheng, F. Xiao, H. Madsen, D. Wang; Temporal knowledge discovery in big BAS data for building energy management, *Energy and Buildings*, Vol. 109, pp. 75-89, 2016.
- R. Lowe, L. Vezzano, P.S. Mikkelsen, M. Grum, H. Madsen; Probabilistic runoff volume forecasting in risk-based optimization for RTC of urban drainage systems, *Journal Environmental Modelling and Software*, Vol. 80, pp. 143-158, 2016.
- R. Juhl, J.K. Møller, J.B. Jørgensen, H. Madsen; Modelling and Prediction using Stochastic Differential Equations, In H. Kirchsteinger, J.B. Jørgensen, E. Renard, L. Del Ree; Prediction Models for Blood Glucose Concentration; Design, Use and Evaluation, Springer, pp. 183-209, 2016.
- R.F. Halvgaard, L. Vanderberghe, N.K. Poulsen, J.B. Jørgensen; Distributed Model Predictive Control for Smart Energy Systems, *IEEE Transactions on Smart Grid*, Vol. 7, pp. 1675-1682, 2016.
- J. Saez-Gallego, J.M. Morales Gonzales, M. Zugno, H. Madsen; A Data-driven Bidding Model for a Cluster of Price-responsive Consumers of Electricity, *IEEE Transactions on Power Systems*, 2016.
- J.E.B. Iversen, J.M. Morales Gonzales, M. Zugno, T.E. Pedersen, H. Madsen; Short-term Probabilistic Forecasting of Wind Speed Using Stochastic Differential Equations, *Int. Journal of Forecasting*, Vol. 10, 2016.
- D. Boiroux, A.K. Duun-Henriksen, S. Schmidt, K. Nørgaard, N.K. Poulsen, H. Madsen, J.B. Jørgensen; Adaptive Control in an Artificial Pancreas for People with Type 1 Diabetes, *Control Engineering Practice*, Vol. 10, 2016.
- R. Lowe, H. Madsen, P. McSharry; Objective Classification of Rainfall in Northern Europe for Online Operation of Urban Water Systems Based on Clustering Techniques, *Water*, Vol. 8, 2016.
- P. Bacher, P. A. De Saint-Aubain, L.E. Christiansen, H. Madsen; Non-parametric method for separating domestic hot water spikes and space heating, Accepted for *Energy and Buildings*, 2016.