

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 (see 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**, December 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) on IEA Annex 58 and Annex 66**, August 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-

PhD. SUPERVISION: 42 completed PhD projects, 7 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 DKK230 mill. with partners from Denmark, a number of European countries and US.

PUBLICATIONS

More than 470 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. González, A.J. Conejo, H. Madsen, P. Pinson, M.Zugno, *Integrating Renewables in Electricity Markets, Operational Problems*, Springer, approx. 400 pp., 2013.

H. Madsen, E. Lindström, J.N. Nielsen, *Statistics for Finance*, Chapman and Hall, approx. 450 pp., 2014.

P. Pinson, H. Madsen, P. Bacher, *Renewable Energy Forecasting*, Wiley, approx. 300 pp., 2015

Other newer CITIES relevant 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, 2014.

Citations: >6000, *h-index:* >39

Selected journal papers (since 2012):

P. Pinson, H. Madsen: Adaptive modelling and forecasting of wind power fluctuations with Markov-switching autoregressive models. *Journal of Forecasting*, Vol. 31, pp. 281-313, 2012.

J.M. Morales, P. Pinson, H. Madsen: A transmission-cost-based model to estimate the amount of market-integrable wind resources, *IEEE Transactions on Power Systems*, Vol. 27, pp. 1060-1069, 2012.

P.-J. Trombe, P. Pinson, H. Madsen: A general probabilistic forecasting framework for offshore wind power fluctuations, *Energies*, Vol. 5, pp. 621-657, 2012.

P. Pinson, T. Jonsson, M. Zugno, J.M.M. González, H. Madsen; Statistical analysis of the impact of wind power on market quantities and power flows, *IEEE Power and Energy Society*, 2012.

R. Halvgaard, P. Bacher, B. Perers, E. Andersen, S. Furbo, J.B. Jørgensen, N.K. Poulsen, H. Madsen: Model predictive control for a smart solar tank based on weather and consumption forecasts, *Journal energy Procedia*, Vol. 30, pp. 270-278. 2012.

J.M.M. González, P. Pinson, H. Madsen, A transmission-cost-based model to estimate the amount of

market-integrable wind resources, *IEEE Transactions on Power Systems*, Vol. 27, pp. 1060-1069, 2012

M.H. Rosgaard, G. Giebel, T.S. Nielsen, A.N. Hahmann, P.E. Sørensen, H. Madsen: Integrated wind power planning tool, in *Geophysical Research Abstracts*, Vol. 14, p. EGU2012-13636, 2012.

A. Breinholt, M. Grum, H. Madsen, F.Ø. Thordarson, P.S. Mikkelsen, Informal uncertainty analysis of continuous flow simulation in a hybrid sewer system with infiltration inflow, *Journal Hydrology and Earth System Sciences*, Vol. 17, pp. 4159-4176, 2013.

P.-J. Trombe, P. Pinson, C.L. Vincent, T. Bøvith, N.A. Cutuluis, C. Draxl, G. Giebel, A.N. Hahmann, N.E. Jensen, B.P. Jensen, N.F. Le, H. Madsen, L.B. Pedersen, A. Sommer, *Journal Wind Energy*, 2013.

P. Pinson, H. Madsen, Forecasting the conditional dynamic elasticity of electricity consumers, *ERCIM News*, pp. 11-12, 2013.

O. Corradi, H. Ochsenfeld, H. Madsen, P. Pinson, Controlling electricity consumption by forecasting its response to varying prices, *IEEE Transactions on Power Systems*, Vol. 28, pp. 421-429, 2013.

A. Breinholt, J.K. Møller, H. Madsen, P.S. Mikkelsen: A formal statistical approach to representing uncertainty in rainfall-runoff modelling with focus on residual analysis and probabilistic output evaluation, *Journal of Hydrology*, Vol. 472, pp. 36-52, 2013.

G.F. Dorine, P. Pinson, H. Madsen, Chance-constrained optimization of demand response to price signals, *IEEE Transactions on Smart Grid*, Vol. 4, pp. 2072-2080, 2013.

P. Pinson, T. Jonsson, H.Aa. Nielsen, H. Madsen, T.S. Nielsen: Forecasting Electricity Spot Price Accounting for Wind Power Production, *IEEE Transac. on Sustainable Energy*, Vol. 4, pp. 210-218, 2013.

P. Pinson, G. Dorini, H. Madsen: Chance-constrained optimization of demand response to price signals, *IEEE Transactions on Smart Grids*, Vol., 2013.

M. Zugno, P. Pinson, H. Madsen, Impact of wind power generation on European cross-border power flows, *Journal IEEE Transactions on Power Systems*, Vol. 28, pp. 3566-3575, 2013.

S. Schmidt, D. Boiroux, A.K. Duun-Henriksen, L. Frøssing, O. Skyggebjerg, J.B. Jørgensen, N.K. Poulsen, H. Madsen, S. Madsbad, K. Nørgaard, Model-based closed-loop glucose control in Type 1 diabetes; The DiaCon experience, *Journal of Diabetes Science and Technology*, vol. 7, pp. 1255-1264, 2013.

P. Bacher, H. Madsen, H.Aa. Nielsen, B. Perers: Short-term heat load forecasting for single family houses, *Energy and Buildings*, Vol. 65, pp. 101-112, 2013.

T. Jónsson, P. Pinson, H. Aa. Nielsen, H. Madsen, T. Nielsen, Forecasting electricity spot prices accounting for wind power predictions, *Journal IEEE Transactions on Sustainable Energy*, Vol. 5, pp. 210-218, 2013.

M. Zugno, J.M. Morales Gonzales, P. Pinson, H. Madsen: A bilevel model for the electricity retailers' participation in a demand response market, *Energy Economics*, Vol 36, pp. 182-197, 2013.

P. Bacher, H. Madsen, B. Perers, H.Aa. Nielsen: A non-parametric method for correction of global radiation observations, *Solar Energy*, Vol. 88, pp. 13-22, 2013.

R. Löwe, H. Madsen, P.S. Mikkelsen, Stokastiske prognoser for afløb og realtidsstyring, *EVA; Erfaringsudveksling i vandmiljøteknikken*, Vol. 26, pp. 17-18, 2013.

M. Zugno, M. Gonzáles, P. Pinson, H. Madsen: Pool strategy of a price-maker wind power producer, *IEEE Transactions on Power Systems*, Vol. 28, p 3440-3450, 2013.

R. Löwe, P.S. Mikkelsen, H. Madsen, Stochastic rainfall-runoff forecasting; parameter estimation, multi-step prediction, and evaluation of overflow risk, *Journal Stochastic Environmental Research and Risk Assessment*, ISSN 1436-3240, published online, Springer, 2013.

A.K. Duun-Henriksen, S. Schmidt, R. Røge, J. Bech, K. Nørgaard, J.B. Jørgensen, H. Madsen, Model identification using stochastic differential equation grey-box models in diabetes, *Journal of Diabetes Science and Technology*, Vol. 7, pp. 431-440, 2013

P.D. Andersen, C. Rode, H. Madsen: An arctic low-energy house as experimental setup for studies of heat dynamics of buildings, *Journal Frontiers of Architectural Research*, Vol. 2, pp. 488-499, 2013.

R. Löwe, P.S. Mikkelsen, M.R. Rasmussen, H. Madsen: State-space adjustment of radar rainfall and skill score evaluation of stochastic volume forecasts in urban drainage systems, *Water Science and Technology*, Vol. 68, pp. 584-590, 2013.

J. Tastu, P. Pinson, P.-J. Trombe, H. Madsen: Probabilistic forecasts of wind power generation accounting for geographical dispers information, *IEEE Transactions on Smart Grid*, Vol. 5, pp. 480-489, 2014.

P. Meibom, K. Hilger, H. Madsen, D. Vinther: Energy comes together in Denmark: The key to a future fossil-free Danish power system, *IEEE Power and Energy Magazin*, Vol. 11, pp. 46-55, 2014.

R. Löwe, P.S. Mikkelsen, H. Madsen: Stochastic rainfall-runoff forecasting; parameter estimation, multi-step prediction, and evaluation of overflow risk, *Journ. Stochastic Environmental Research and Risk Assessment*, Vol. 28., pp. 505-516, 2014.

P.H. Delff Andersen, A. Iversen, H. Madsen, C. Rode: Dynamic Modeling of presence of occupants using inhomogeneous Markov chains, *Energy and Buildings*, Vol. 69, pp. 213-223, 2014.

P.-J. Trombe, P. Pinson, H. Madsen: Automatic classification of offshore wind regimes with weather radar observations, *Journ. Topics in Applied Earth Observations and Remote Sensing*, Vol. 7, pp. 116-125, 2014.

R. Löwe, S. Thorndal, P.S. Mikkelsen, M.R. Rasmussen, H. Madsen, Probabilistic online runoff forecasting for urban catchments using inputs from rain gauges as well as statistically and dynamically adjusted weather radar, *Journal of Hydrology*, Vol. 512, pp. 397-407, 2014.

J.E.B. Iversen, J.M. Morales Gonzáles, H. Madsen, Optimal charging of an electric vehicle using a Markov decision process, *Applied Energy*, Vol. 123, pp. 1-12, 2014.