Curriculum vitae

Johan Dahlin

Characteristics, objectives and skills

I am passionate about finding hidden patterns and trends in data such as numbers, images and text. For the last six years, I have developed more efficient algorithms for machine learning and computational statistics. I now aim to make use of this expertise to help individuals, companies and the society. I believe that learning from data is essential in this quest by enabling improved data-driven decision making and forecasting.

My colleagues know me as a resourceful co-worker who delivers good solutions on time. I am always up for new challenges as they provide me with an opportunity to grow personally, expand my skill set and/or learn about new application areas. I am eager to share my extensive expertise, to learn from others and to collaborate to achieve great things together as a team.

Knowledge and experience

- Bayesian modelling and inference
- Programming in Python, R and C
- Machine learning
- Data analytics

Personal skills

- Collaboration and networking
- Teaching and communication
- Analytical thinking

Characteristics

- Ambitious and results-oriented
- Positive and dedicated
- Honest and flexible

Education

September, 2011 – May, 2016
Doctor of Philosophy in Electrical Engineering / Automatic Control
Linköping University — Linköping, Sweden.

Developed efficient computational methods for Bayesian statistical inference in 16 peer-reviewed publications for applications in engineering, economics and computer graphics. Two years of postgraduate coursework in statistics, probability theory, machine learning and automatic control. Thesis title: *Accelerating Monte Carlo methods for Bayesian inference in dynamical models*. Supervisors: Prof. Thomas B. Schön (Uppsala university, SE) and Dr. Fredrik Lindsten (Uppsala university, SE). Opponent: Dr. Richard Everitt (University of Reading, UK).

September, 2005 – July, 2011
Master of Science in Engineering Physics
Umeå University — Umeå, Sweden.

Four and a half years of coursework in mathematics, physics, statistics and risk management. My Master's thesis *Detecting community structures in imperfect networks* was based on work performed at the Swedish Defence Research Agency (FOI). Supervisors: Dr. Sang-Hoon Lee (Umeå University, SE) and Dr. Pontus Svenson (FOI, SE). The results from the thesis have been presented in two peer-reviewed conference publications.

September, 2009 – June, 2011
Bachelor of Science in Economics
Umeå University — Umeå, Sweden.

Three years of coursework in micro-/macroeconomics, econometrics, law, corporate strategy, marketing, group psychology and project management. Title of Bachelor thesis: *Simulated double auction-markets with production and storage*. Supervisor: Dr. Ulf Holmberg (Umeå University, SE).

Work experience (tailored selection)

August, 2017 – August, 2018
Research associate
University of Newcastle — Newcastle, Australia.

Developed new methodology for system identification and Bayesian computational inference. I also helped out in supervising two Master's thesis students and one PhD student. The work carried out during this year resulted in 3 accepted peer-reviewed conference papers and 3 submitted journal papers.

March, 2017 – July, 2017
Principal Research Engineer
Linköping University — Linköping, Sweden.

Developed algorithms for active learning in spatial statistical models known as log-Gaussian Cox processes. The work combined methods and models from spatial statistics with modern machine learning algorithms such as on Bayesian optimisation and reinforcement learning. The main motivating application for this work was to find survivors in disaster areas after e.g., floods and earthquakes.

September, 2016 – February, 2017
Research Scientist / Researcher
Sectra AB and Uppsala University — Linköping, Sweden.

Developed decision support systems for radiologists based on image and text data. The system made use of tools from deep learning, text mining and machine learning. This was an industrial PostDoc position in collaboration with the Machine learning group at Uppsala University.

September, 2014 – December, 2014
Visiting researcher
University of New South Wales (UNSW) Business School — Sydney, Australia.

Invited guest researcher at the department of Economics working on joint research projects concerning methodology for inference in big data projects with applications in health economics.

September, 2011 – August, 2016
Teaching assistent
Linköping University — Linköping, Sweden.

Taught undergraduate and postgraduate students in courses during in total one year on automatic control and signal processing. This included being responsible for supervising students in projects and theses work (around 10) as well as developing course material. Many students gave me special mentions in the course evaluations for being a good teacher and supervisor.

June, 2011 – August, 2011
Summer intern at the Division of Information Systems
Swedish Defence Research Agency (FOI) — Stockholm, Sweden.

Developed algorithms in R for fusing information from data mining methods with applications to network analysis. The work resulted in a peer-reviewed conference publication.

September, 2006 – December, 2010
Part-time employed student recruiter and educator
Faculty of Science and Technology, Umeå University — Umeå, Sweden.

Responsible for recruiting and training students that visits schools and fairs to recruit new students to the university. Partly responsible for arranging fairs, visits and other activities for recruiting new students.

July, 2008 – June, 2009
Head of Information Matters / Member of the Student Union Board
Umeå Student Union of Science and Technology Umeå, Sweden.

Full time employee with special responsibility for strategic communication, marketing and education for active union members. Responsible for a large oversight of governing documents and strategies.

August, 2008 – December, 2010
Project leader for Umestudent för en helg
Faculty of Science and Technology, Umeå University Umeå, Sweden.

Project manager and initiator of a recruitment project involving 100 students, university employees and 125 visiting secondary school students. The project was a great success resulting in good PR for the university and improved recruitment. The project continued for two more years.

October, 2008 – December, 2008
Teaching assistant
Department of Physics, Umeå University Umeå, Sweden

Supervised introductory labs for new students in physics.

February, 2006 – June, 2008
Worker and team leader
Nationernas Hus (NH) Umeå, Sweden.

Team leader with responsibility for managing and educating volunteer workers at a student pub.

Commission of trust (tailored selection)

October, 2016 – June, 2017
Webmaster / Member of the Board
Toastmasters International, Linköping Club Linköping, Sweden.

Partly responsible for the club homepage and social media accounts with the aim to recruit new members. I also helped out with arranging activities for the members of the club.

September, 2013 – June, 2014
Head of organising committee
Linköping University Linköping, Sweden.

Head of the sub-committee with the task to organise the *PhD day* during Reglermöte 2014 (the Swedish national conference in automatic control) with 90 participants.

July, 2008 – June, 2009
Member of the Faculty Board
Faculty of Science and Technology, Umeå University Umeå, Sweden.

Member of the highest decision-making body in the faculty. Member in a workgroup for creating new long-term strategies to improve the education at the faculty.

September, 2007 – June, 2008
Member of the Student Union Council
Umeå Student Union of Science and Technology (NTK) Umeå, Sweden.

Member of the highest decision-making body in the union. Member in a workgroup to evaluate the future organisation of the union's restaurants and pubs.

January, 2006 – June, 2008
Vice President of the Nation Board
The Nation of South Sweden Umeå, Sweden.

Responsible for the recruitment of new members and for activities arranged by the student society.

Linguistic and computer skills

Communication	Swedish (native) and English (fluent, CEFR level: C2 in CAE test). Competent communication (CC) award from Toastmasters International.
Programming	Everyday: Python (NumPy, SciPy, Cython), R, Git and WordPress. Often: C, MATLAB and Tensorflow with Keras. Sometimes: C++, React/Redux and MongoDB/SQL.
Computers	General big interest in computers and overall excellent skills with most operating systems and standard software. Good knowledge in LaTeX.

Miscellaneous

I have engaged in a large number of smaller commissions of trust in various student associations and other voluntary associations. As part of this, I have attended a number of smaller courses on leadership, effective presentations and marketing.

My personal interests include: physical exercise (triathlon in IK NocOut.se, gym and yoga), outdoor activities (hiking and canoeing), socialising with friends, entrepreneurship, photography, playing the guitar and self-development. My life goals include to explore the world, to improve myself a bit every day and at the same time help others live better lives.

References, certificates and letters of recommendation

Available upon request.

Publications

This section lists my peer-reviewed journal and conference contributions. Technical reports, working papers and theses are not listed and can be found at `http://papers.johandahlin.com/` together with pre-prints and code.

Journal contributions (peer-reviewed)

[J3] **J. Dahlin** and T. B. Schön, *Getting started with particle Metropolis-Hastings for inference in nonlinear dynamical models*. arXiv:1511.01707, June 2017. (Accepted for Journal of Statistical Software)

[J2] P. E. Valenzuela, **J. Dahlin**, C. R. Rojas and T. B. Schön, On robust input design for nonlinear dynamical models. Automatica 77:268-278, Elseiver, 2017.

[J1] **J. Dahlin**, F. Lindsten and T. B. Schön, Particle Metropolis-Hastings using gradient and Hessian information. Statistics and Computing 25(1):81-92, Springer, 2015.

Conference contributions (peer-reviewed)

[C18] M. Balenzuela, **J. Dahlin**, N. Bartlett, A. Wills, C. Renton and B. Ninness, *Accurate Gaussian mixture model smoothing using a two-filter approach*. Proceedings of the 57th IEEE Conference on Decision and Control, Miami Beach, FL, USA, December 2018.

[C17] **J. Dahlin**, A. Wills and B. Ninness, *Constructing Metropolis-Hastings proposals using damped BFGS updates*. Proceedings of the 18th IFAC Symposium on System Identification (SYSID), Stockholm, Sweden, July 2018.

[C16] **J. Dahlin**, A. Wills and B. Ninness, *Sparse Bayesian ARX models with flexible noise distributions*. Proceedings of the 18th IFAC Symposium on System Identification (SYSID), Stockholm, Sweden, July 2018.

[C15] P. E. Valenzuela, **J. Dahlin**. C. R. Rojas and T. B. Schön, *Particle-based Gaussian process optimization for input design in nonlinear dynamical models*. Proceedings of the 55th Conference of Decision and Control (CDC), Las Vegas, USA, December 2016.

[C14] A. Svensson, **J. Dahlin** and T. B. Schön, *Marginalizing Gaussian Process Hyperparameters using Sequential Monte Carlo*. Proceedings of the 6th IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), Cancun, Mexico, December 2015.

[C13] T. B. Schön, F. Lindsten, **J. Dahlin**, J. Wågberg, C. A. Naesseth, A. Svensson and L. Dai, *Sequential Monte Carlo Methods for System Identification*. Proceedings of the 17th IFAC Symposium on System Identification (SYSID), Beijing, China, October 2015.

[C12] M. Kok, **J. Dahlin**, T. B. Schön and A. Wills, *Newton-based maximum likelihood estimation in nonlinear state space models*. Proceedings of the 17th IFAC Symposium on System Identification (SYSID), Beijing, China, October 2015.

[C11] **J. Dahlin**, F. Lindsten and T. B. Schön, *Quasi-Newton particle Metropolis-Hastings*. Proceedings of the 17th IFAC Symposium on System Identification (SYSID), Beijing, China, October 2015.

[C10] J. Kronander, **J. Dahlin**, D. Jönsson, M. Kok, T. B. Schön and J. Unger. *Real-time Video Based Lighting Using GPU Raytracing*. Proceedings of the 2014 European Signal Processing Conference (EUSIPCO), Lisbon, Portugal, September 2014.

[C9] J. Kronander, T. B. Schön and **J. Dahlin**. *Backward sequential Monte Carlo for marginal smoothing*. Proceedings of the 2014 IEEE Statistical Signal Processing Workshop, Gold Coast, Australia, July 2014.

[C8] D. Hultqvist, J. Roll, F. Svensson, **J. Dahlin** and T. B. Schön. *Detection and positioning of overtaking vehicles using 1D optical flow*. Proceedings of the IEEE Intelligent Vehicles (IV) Symposium, Dearborn, MI, USA, June 2014.

[C7] **J. Dahlin**, F. Lindsten and T. B. Schön, *Second-order particle MCMC for Bayesian parameter inference*. Proceedings of the 19th World Congress of the International Federation of Automatic Control (IFAC), Cape Town, South Africa, August 2014.

[C6] **J. Dahlin** and F. Lindsten, *Particle filter-based Gaussian process optimisation for parameter inference*. Proceedings of the 19th World Congress of the International Federation of Automatic Control (IFAC), Cape Town, South Africa, August 2014.

[C5] P. E. Valenzuela, **J. Dahlin**. C. R. Rojas and T. B. Schön, *A graph/particle-based method for experiment design in nonlinear systems*. Proceedings of the 19th World Congress of the International Federation of Automatic Control (IFAC), Cape Town, South Africa, August 2014.

[C4] **J. Dahlin**, F. Lindsten and T. B. Schön, *Particle Metropolis Hastings using Langevin Dynamics*. Proceedings of the 38th International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Vancouver, Canada, May 2013.

[C3] **J. Dahlin**, F. Johansson, L. Kaati, C. Mårtensson and P. Svenson, *Combining Entity Matching Techniques for Detecting Extremist Behavior on Discussion Boards*. Proceedings of International Symposium on Foundation of Open Source Intelligence and Security Informatics 2012, Istanbul, Turkey, August 2012.

[C2] **J. Dahlin**, F. Lindsten, T. B. Schön and A. Wills, *Hierarchical Bayesian approaches for robust inference in ARX models*. Proceedings of the 16th IFAC Symposium on System Identification (SYSID), Brussels, Belgium, July 2012.

[C1] **J. Dahlin** and P. Svenson, *A Method for Community Detection in Uncertain Networks*. Proceedings of 2011 European Intelligence and Security Informatics Conference, Athens, Greece, August 2011.

Invited talks

This section summarises my invited talks at workshops, seminar series, etc. Presentations at conferences and internal seminars can be found at `http://talks.johandahlin.com/`.

[P8] *Machine learning - a software perspective*. Mechatronics seminar series at the University of Newcastle, Newcastle, Australia, August 2018.

[P7] *Machine learning for medical applications*. Guest lecturer in Statistical Machine Learning, Uppsala University, Sweden, March 2017.

[P6] *Particle Metropolis-Hastings for inference in non-linear state-space models*. Statistics seminar series at Örebro University School of Business, Örebro, Sweden, February 2017.

[P5] *Particle Metropolis-Hastings for inference in non-linear state-space models*. European Research Network in System Identification (ERNSI) Workshop, Cison de Valmarino, Italy, September 2016.

[P4] *Tutorial: Particle Metropolis-Hastings for Bayesian non-linear system identification*. Swedish National conference in Automatic Control (Reglermöte), Göteborg, Sweden, June 2016.

[P3] *Gaussian process optimization for approximate Bayesian inference*. IDA Machine learning seminar series at Linköping University, Linköping, Sweden, April 2015.

[P2] *Speeding up the particle Metropolis-Hastings algorithm for Bayesian parameter inference*. University of Newcastle, Newcastle, Australia, November 2014.

[P1] *Detecting community structures in uncertain social networks*. Nordita Workshop – Applications of Network Theory: From Mechanisms to Large-Scale Structure, Stockholm, Sweden, March 2011.

Research grants

This section lists the research grants that I have applied for and been awarded.

[G1] *Machine learning-based decision support system for radiology* (127,459 SEK), Vinnova (Sweden's innovation agency), September 2016.