

Christian A. Naesseth

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Academic Positions

Postdoctoral Research Scientist

Data Science Institute

Mentor: Prof. David Blei

Topic: Approximate Bayesian inference, causal inference and machine learning

Columbia University

2019 Aug–

Postdoctoral Researcher

Department of Computer and Information Science

Mentor: Dr. Fredrik Lindsten

Topic: Computational statistics, Monte Carlo methods, and variational methods

Linköping University

2019 Jan–Jul

Research Intern

Machine Intelligence & Perception

Host: Dr. Sebastian Nowozin

Topic: Projekt Tokyo - Visual agent technology to help people who are blind or low vision

Microsoft Research Ltd

2018 Apr–Jul

Fulbright Visiting Student Researcher

Data Science Institute

Host: Prof. David Blei

Topic: Variational and Monte Carlo methods

Columbia University

2016 Jul–2017 Jun

Visiting PhD Student

Department of Engineering Science

Host: Dr. Frank Wood

Topic: Probabilistic programming and computational statistics

University of Oxford

2015 Oct

Teaching Assistant

Department of Electrical Engineering, Department of Mathematics

Linköping University

2011 Aug–2018 Dec

Academic Degrees and Education

Ph.D., Electrical Engineering

Thesis: Machine learning using approximate inference: Variational and SMC methods

Advisors: Dr. Fredrik Lindsten, Prof. Thomas Schön

Linköping University

2019 Jan

M.Sc., Applied Physics and Electrical Engineering

Thesis: Vision and Radar Sensor Fusion for Advanced Driver Assistance Systems

Linköping University

2013 Jun

B.Sc., Mathematics

Thesis: Nowcasting using Microblog Data

Linköping University

2012 Aug

Exchange Program, Electrical Engineering

Beijing Institute of Technology

2010 Aug–2011 Jun

Chinese Language Studies

Shanghai Jiaotong University

2008 Aug–2010 Jan

Honors, Awards and Grants

Savage Award

International Society for Bayesian Analysis (ISBA)

2019

Awarded for Outstanding dissertation in Theory and Methods: Machine learning using approximate inference: Variational and sequential Monte Carlo methods.

Best Reviewer Award

Neural Information Processing Systems (NeurIPS)

2017

Best Paper Award

20th International Conference on Artificial Intelligence and Statistics (AISTATS)

2017

Awarded for the paper Reparameterization Gradients through Acceptance–Rejection Algorithms.

Fulbright Scholarship

Fulbright Commission

2016

Fulbright scholarship to study and do research in USA, awarded based on academic excellence and leadership potential.

Research Scholarships

Ericsson Research Foundation, Gållöstiftelsen, Bernt Järmarks stiftelse

2016

Research grants (3) to support research visit to Columbia University, USA. Awarded based on academic and research excellence.

Best Poster Award

Summer School on Deep Learning for Image Analysis

2014

Awarded for poster on *Sequential Monte Carlo for Graphical Models*.

Academic Scholarships

Adolf Lindgrens Stiftelse, Kamratshjälpfonden, Teknikföretagens, Anna Whitlocks Minnesfond

2008/2010

Scholarships (6) to study in Asia, selection process based on academic performance.

Publications

- A. K. Moretti, L. Zhang, C. A. Naesseth, H. Venner, D. Blei, and I. Pe'er. Variational combinatorial sequential Monte Carlo methods for Bayesian phylogenetic inference. In *Uncertainty in Artificial Intelligence (UAI)*, 2021. (accepted).
- C. A. Naesseth, F. Lindsten, and D. Blei. Markovian score climbing: Variational inference with $KL(p||q)$. In *Advances in Neural Information Processing Systems (NeurIPS) 33*, Vancouver, Canada, 2020.
- D. Biderman, C. A. Naesseth, L. Wu, T. Abe, A. C. Mosberger, L. J. Sibener, R. M. Costa, J. Murray, and J. Cunningham. Inverse articulated-body dynamics from video via variational sequential Monte Carlo. In *First workshop on differentiable computer vision, graphics, and physics in machine learning (NeurIPS)*, Vancouver, Canada, 2020.
- M. Lindfors, T. Chen, and C. A. Naesseth. Robust Gaussian process regression with G-confluent likelihood. In *21th IFAC World Congress*, Germany, 2020.
- C. A. Naesseth, F. Lindsten, and T. B. Schön. Elements of sequential Monte Carlo. *Foundations and Trends® in Machine Learning*, 12(3):307–392, November 2019a. Now Publishers, Inc.
- C. A. Naesseth, F. Lindsten, and T. B. Schön. High-dimensional filtering using nested sequential Monte Carlo. *IEEE Transactions on Signal Processing*, 67(16):4177–4188, August 2019b.
- C. A. Naesseth. *Machine learning using approximate inference: Variational and sequential Monte Carlo methods*. PhD thesis, Linköping University, 2018. **(Savage Award for outstanding dissertation in Theory and Methods)**.
- D. Lawson, G. Tucker, C. A. Naesseth, C. J. Maddison, R. P. Adams, and Y. W. Teh. Twisted variational sequential Monte Carlo. In *Third workshop on Bayesian Deep Learning (NeurIPS)*, Montreal, Canada, 2018.
- C. A. Naesseth, S. W. Linderman, R. Ranganath, and D. M. Blei. Variational sequential Monte Carlo. In *Proceedings of the 21st International Conference on Artificial Intelligence and Statistics (AISTATS)*, Lanzarote, Spain, Apr 2018.
- C. A. Naesseth, F. J. R. Ruiz, S. W. Linderman, and D. M. Blei. Reparameterization gradients through acceptance–rejection algorithms. In *Proceedings of the 20th International Conference on Artificial Intelligence and Statistics (AISTATS)*, Fort Lauderdale, USA, Apr 2017. **(Best Paper Award)**.
- F. Lindsten, A. M. Johansen, C. A. Naesseth, B. Kirkpatrick, T. B. Schön, J. Aston, and A. Bouchard-Côté. Divide-and-conquer with sequential Monte Carlo. *Journal of Computational and Graphical Statistics*, 2016.

- T. Rainforth*, C. A. Naesseth*, F. Lindsten, B. Paige, J-W. van de Meent, A. Doucet, and F. Wood. Interacting particle Markov chain Monte Carlo. In *Proceedings of the 33rd International Conference on Machine Learning (ICML)*, New York, USA, Jun 2016. * equal contribution.
- C. A. Naesseth, F. Lindsten, and T. B. Schön. Towards automated sequential Monte Carlo methods for probabilistic graphical models. In *NIPS Workshop on Black Box Learning and Inference*, Montreal, Canada, 2015a.
- T. B. Schön, F. Lindsten, J. Dahlin, J. Wågberg, C. A. Naesseth, A. Svensson, and L. Dai. Sequential Monte Carlo Methods for System Identification. In *Proceedings of the 17th IFAC Symposium on System Identification (SYSID)*, Beijing, China, 2015.
- C. A. Naesseth, F. Lindsten, and T. B. Schön. Nested Sequential Monte Carlo Methods. In *Proceedings of the 32nd International Conference on Machine Learning (ICML)*, Lille, France, Jul 2015b.
- C. A. Naesseth, F. Lindsten, and T. B. Schön. Sequential Monte Carlo for Graphical Models. In *Advances in Neural Information Processing Systems (NIPS)* 27, pages 1862–1870. Montreal, Canada, 2014a.
- C. A. Naesseth, F. Lindsten, and T. B. Schön. Capacity estimation of two-dimensional channels using sequential Monte Carlo. In *Proceedings of the 2014 IEEE Information Theory Workshop (ITW)*, pages 431–435, Hobart, Australia, Nov 2014b.

Invited Talks

Variational Bayes Goes to Monte Carlo <i>Amsterdam Machine Learning lab (seminar)</i>	University of Amsterdam 2021 May
Machine learning using approximate inference <i>Savage Award session (contributed talk)</i>	Joint Statistical Meeting 2020 Aug
Machine learning using approximate inference <i>Junior Bayes Beyond the Borders (webinar)</i>	Bocconi University 2020 Jul
Variational and Monte Carlo methods – Bridging the Gap <i>Center for Industrial and Applied Mathematics (seminar)</i>	KTH 2019 Feb
Variational and Monte Carlo methods – Bridging the Gap <i>Department of Mathematical Sciences (seminar)</i>	Chalmers 2019 Jan
Variational inference <i>Department of Information Technology (tutorial)</i>	Uppsala University 2018 Feb
Approximate Bayesian inference: Variational and MC methods <i>Department of Computer Science (seminar)</i>	Linköping University 2017 Nov
Monte Carlo methods and proper weighting <i>Department of Engineering Science (tutorial)</i>	The University of Oxford 2015 Oct
Nested Sequential Monte Carlo Methods <i>(contributed talk)</i>	SMC Workshop 2015 Aug
Sequential Monte Carlo for Probabilistic Graphical Models <i>School of Mathematics and Statistics (seminar)</i>	University of NSW 2014 Oct
Sequential Monte Carlo for Probabilistic Graphical Models <i>School of Electrical Engineering and Computer Science (seminar)</i>	University of Newcastle 2014 Oct

Professional Service

Reviewer, Journal of Machine Learning Research 2020	JMLR
Reviewer, Neural Information Processing Systems 2017, 2018, 2019, 2020	NeurIPS

Reviewer, International Conference on Machine Learning 2017, 2018	ICML
Reviewer, International Conference on Learning Representations 2017	ICLR
Reviewer, International Conference on Artificial Intelligence and Statistics 2017, 2018	AISTATS

Teaching Experience

Experience as a lecturer, recitation instructor, teaching and lab assistant in basic and advanced courses on automatic control, mathematical modeling, simulation, mathematics and signal processing. Completed a first course (6 ECTS) on learning and knowledge in higher education.

Foundations of Graphical Models

<i>Guest lecturer</i>	2019
Ph.D. level, 1 occasion	

Sensor Fusion

<i>Recitation instructor, teaching and lab assistant</i>	2015–2016
M.Sc. level, 2 occasions	

Digital Signal Processing

<i>Lab assistant</i>	2014
M.Sc. level, 1 occasion	

Industrial Control Systems

<i>Recitation instructor, teaching and lab assistant</i>	2014
M.Sc. level, 1 occasion	

Control Project Laboratory

<i>Project supervisor</i>	2014–2018
M.Sc. level, 4 occasions	

Modeling and Simulation

<i>Recitation instructor, teaching and lab assistant</i>	2013–2015
M.Sc. level, 3 occasions	

Engineering Project

<i>Project supervisor</i>	2013
B.Sc. level, 1 occasion	

Automatic Control

<i>Recitation instructor, teaching and lab assistant</i>	2012–2014
B.Sc. level, 5 occasions	

Foundation Course in Mathematics

<i>Recitation instructor and teaching assistant</i>	2011
B.Sc. level, 1 occasion	

Languages

Swedish: Native Proficiency

English: Full Professional Working Proficiency

Chinese: Limited Working Proficiency