Christian A. Naesseth

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Academic Positions

Assistant Professor — **University of Amsterdam**
Amsterdam Machine Learning Lab — *2022 Jan–*
Research Interests: Approximate statistical inference, causality and artificial intelligence as well as their application to the sciences

Postdoctoral Research Scientist — **Columbia University**
Data Science Institute — *2019 Aug–2021 Dec*
Mentor: Prof. David Blei
Topic: Approximate Bayesian inference, causal inference and machine learning

Postdoctoral Researcher — **Linköping University**
Department of Computer and Information Science — *2019 Jan–Jul*
Mentor: Dr. Fredrik Lindsten
Topic: Computational statistics, Monte Carlo methods, and variational methods

Research Intern — **Microsoft Research Ltd**
Machine Intelligence & Perception — *2018 Apr–Jul*
Host: Dr. Sebastian Nowozin
Topic: Projekt Tokyo - Visual agent technology to help people who are blind or low vision

Fulbright Visiting Student Researcher — **Columbia University**
Data Science Institute — *2016 Jul–2017 Jun*
Host: Prof. David Blei
Topic: Variational and Monte Carlo methods

Visiting PhD Student — **University of Oxford**
Department of Engineering Science — *2015 Oct*
Host: Dr. Frank Wood
Topic: Probabilistic programming and computational statistics

Teaching Assistant — **Linköping University**
Department of Electrical Engineering, Department of Mathematics — *2011 Aug–2018 Dec*

Academic Degrees and Education

Ph.D., Electrical Engineering — **Linköping University**
Thesis: Machine learning using approximate inference: Variational and SMC methods — *2019 Jan*
Advisors: Dr. Fredrik Lindsten, Prof. Thomas Schön

M.Sc., Applied Physics and Electrical Engineering — **Linköping University**
Thesis: Vision and Radar Sensor Fusion for Advanced Driver Assistance Systems — *2013 Jun*

B.Sc., Mathematics — **Linköping University**
Thesis: Nowcasting using Microblog Data — *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, Gålöstiftelsen, 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, Kamratshjälpsfonden, Teknikföretagens, Anna Whitlocks Minnesfond *2008/2010*
Scholarships (6) to study in Asia, selection process based on academic performance.

Publications

T. Pandeva, T. Bakker, C. A. Naesseth, and P. Forré. E-valuating classifier two-sample tests. *arXiv:2210.13027*, 2022.

H. Zimmermann, F. Lindsten, JW van de Meent, and C. A. Naesseth. A variational perspective on generative flow networks. *arXiv:2210.07992*, 2022.

L. Zhang, D. Blei, and C. A. Naesseth. Transport score climbing: Variational inference using forward kl and adaptive neural transport. *arXiv:2202.01841*, 2022.

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.

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

Monte Carlo and Variational Methods: Bridging the Gap — **ESSEC Paris**
Workshop on Monte Carlo and Approximate Dynamic Programming Methods — *2022 Aug*

Variational Bayes Goes to Monte Carlo — **University of Amsterdam**
Amsterdam Machine Learning lab (seminar) — *2021 May*

Machine learning using approximate inference — **Joint Statistical Meeting**
Savage Award session (contributed talk) — *2020 Aug*

Machine learning using approximate inference — **Bocconi University**
Junior Bayes Beyond the Borders (webinar) — *2020 Jul*

Variational and Monte Carlo methods – Bridging the Gap — **KTH**
Center for Industrial and Applied Mathematics (seminar) — *2019 Feb*

Variational and Monte Carlo methods – Bridging the Gap — **Chalmers**
Department of Mathematical Sciences (seminar) — *2019 Jan*

Variational inference — **Uppsala University**
Department of Information Technology (tutorial) — *2018 Feb*

Approximate Bayesian inference: Variational and MC methods — **Linköping University**
Department of Computer Science (seminar) — *2017 Nov*

Monte Carlo methods and proper weighting — **The University of Oxford**
Department of Engineering Science (tutorial) — *2015 Oct*

Nested Sequential Monte Carlo Methods — **ENSAE Paris**
SMC Workshop — *2015 Aug*

Sequential Monte Carlo for Probabilistic Graphical Models — **University of NSW**
School of Mathematics and Statistics (seminar) — *2014 Oct*

Sequential Monte Carlo for Probabilistic Graphical Models — **University of Newcastle**
School of Electrical Engineering and Computer Science (seminar) — *2014 Oct*

Professional Service

Workflow Chair, International Conference on Artificial Intelligence and Statistics
2022 — *AISTATS*

Area Chair, International Conference on Artificial Intelligence and Statistics
2021 — *AISTATS*

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 machine learning, automatic control, mathematical modeling, simulation, mathematics and signal processing. Completed a first course (6 ECTS) on learning and knowledge in higher education.

Introduction to Machine Learning
Lecturer — *2022*
B.Sc. level, 1 occasion

Foundations of Graphical Models
Guest lecturer — *2019*
Ph.D. level, 1 occasion

Sensor Fusion
Recitation instructor, teaching and lab assistant — *2015–2016*
M.Sc. level, 2 occasions

Digital Signal Processing
Lab assistant — *2014*
M.Sc. level, 1 occasion

Industrial Control Systems
Recitation instructor, teaching and lab assistant — *2014*
M.Sc. level, 1 occasion

Control Project Laboratory
Project supervisor — *2014–2018*
M.Sc. level, 4 occasions

Modeling and Simulation
Recitation instructor, teaching and lab assistant — *2013–2015*
M.Sc. level, 3 occasions

Engineering Project
Project supervisor *2013*
B.Sc. level, 1 occasion

Automatic Control
Recitation instructor, teaching and lab assistant *2012–2014*
B.Sc. level, 5 occasions

Foundation Course in Mathematics
Recitation instructor and teaching assistant *2011*
B.Sc. level, 1 occasion

Languages

Swedish: Native Proficiency

English: Full Professional Working Proficiency

Chinese: Limited Working Proficiency