Christian A. Naesseth

Mudd Building, Data Science Institute, Columbia University
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Academic Positions

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

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

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 — **SMC Workshop**
(contributed talk) — *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

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
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

References

David Blei
Columbia University, USA
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Fredrik Lindsten
Linköping University, Sweden
fredrik.lindsten@liu.se

Scott Linderman
Stanford University, USA
scott.linderman@stanford.edu

Further references available upon request.