

CHRISTIAN ANDERSSON NÆSSETH

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EMPLOYMENT

Assistant Professor Amsterdam Machine Learning Lab	University of Amsterdam 2022 Jan – Present
Postdoctoral Research Scientist Data Science Institute Advisor: David M. Blei	Columbia University 2019 Aug – 2021 Dec
Postdoctoral Researcher Department of Computer and Information Science Advisor: Fredrik Lindsten	Linköping University 2019 Jan – 2019 Jul
Research Intern Machine Intelligence & Perception Supervisor: Sebastian Nowozin	Microsoft Research Ltd 2018 Apr – 2018 Jul
Fulbright Visiting Student Researcher Data Science Institute Advisor: David M. Blei	Columbia University 2016 Jun – 2017 Jul
Teaching Assistant Department of Electrical Engineering	Linköping University 2011 Aug – 2018 Dec

EDUCATION

Ph.D. Electrical Engineering with Specialization in Automatic Control Linköping University Dissertation: <i>Machine learning using approximate inference: Variational and SMC methods</i> Advisors: Thomas B. Schön, Fredrik Lindsten	2019
M.Sc. Applied Physics and Electrical Engineering Linköping University Thesis: <i>Vision and Radar Sensor Fusion for Advanced Driver Assistance Systems</i>	2013
B.Sc. Mathematics Linköping University Thesis: <i>Nowcasting using Microblog Data</i>	2012

HONORS AND AWARDS

Savage Award International Society for Bayesian Analysis (ISBA) Outstanding dissertation in Theory and Methods: <i>Machine learning using approximate inference: Variational and sequential Monte Carlo methods</i>	2019
Best Reviewer Award Neural Information Processing Systems (NeurIPS)	2017
Best Paper Award International Conference on Artificial Intelligence and Statistics (AISTATS) <i>Reparameterization Gradients through Acceptance-Rejection Algorithms</i>	2017

Fulbright Scholarship Fulbright Commission	2016
Research Scholarships Ericsson Research Foundation, Gålostiftelsen, Bernt Järmarks stiftelse	2016
Best Poster Award Summer School on Deep Learning for Image Analysis <i>Sequential Monte Carlo for Graphical Models</i>	2014

RESEARCH FUNDING

CO-INVESTIGATOR

UvA-Bosch Delta Lab Gift funding for 10 PhD students and 1 postdoc from the Bosch Group. Role: Lab manager, postdoc advisor, PhD co-supervisor. PIs: Theo Gevers, Jan-Willem van de Meent.	2021-2026
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ACADEMIC SUPERVISION

PHD CANDIDATES

Rajeev Verma (with Eric Nalisnick) University of Amsterdam	2023 –
Alexander Timans (with Eric Nalisnick) University of Amsterdam	2022 –
Grigory Bartosh University of Amsterdam	2022 –
Heiko Zimmermann (with Jan-Willem van de Meent) University of Amsterdam	2020 –

MASTER STUDENTS

UNIVERSITY OF AMSTERDAM: Jonathan Hombroek (2024), Doris Wezenberg (2024).

LINKÖPING UNIVERSITY: Elina Fantenberg (2018), Martin Lindfors (2014), Olle Noren (2014), Alfred Dahlin (2014).

VISITING STUDENTS

UNIVERSITY OF AMSTERDAM: Raghuram D R (2024), François Cornet (2024).

PUBLICATIONS

- F. Eijkelboom*, G. Bartosh*, C. A. Naesseth, M. Welling, and J-W. van de Meent. Variational flow matching for graph generation. *arXiv:2406.04843*, 2024. * equal contribution.
- H. Yang, A. K. Moretti, S. Macaluso, P. Chlenski, C. A. Naesseth, and I. Pe’er. Variational pseudo marginal methods for jet reconstruction in particle physics. *arXiv:2406.03242*, 2024.
- M. Jazbec, A. Timans, T. H. Veljković, K. Sakmann, D. Zhang, C. A. Naesseth, and E. Nalisnick. Fast yet safe: Early-exiting with risk control. *arXiv:2405.20915*, 2024.
- G. Bartosh, D. Vetrov, and C. A. Naesseth. Neural flow diffusion models: Learnable forward process for improved diffusion modelling. *arXiv:2404.12940*, 2024a.
- H. Zimmermann, C. A. Naesseth, and J-W. van de Meent. VISA: Variational inference with sequential sample-average approximations. *arXiv:2403.09429*, 2024.

- G. Bartosh, D. Vetrov, and C. A. Naesseth. Neural diffusion models. In *Proceedings of the 41st International Conference on Machine Learning (ICML)*, Vienna, Austria, Jul 2024b.
- T. Pandeva, T. Bakker, C. A. Naesseth, and P. Forré. E-evaluating classifier two-sample tests. *Transactions on Machine Learning Research*, 2024.
- L. Wu, B. L. Trippe, C. A. Naesseth, D. M. Blei, and J. P. Cunningham. Practical and asymptotically exact conditional sampling in diffusion models. In *Advances in Neural Information Processing Systems (NeurIPS) 36*, 2023.
- L. Zhang, D. Blei, and C. A. Naesseth. Transport score climbing: Variational inference using forward KL and adaptive neural transport. *Transactions on Machine Learning Research*, 2023.
- H. Zimmermann, F. Lindsten, J-W. van de Meent, and C. A. Naesseth. A variational perspective on generative flow networks. *Transactions on Machine Learning Research*, 2023.
- 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

Generative Models and Approximate Bayesian Inference	2024
Special Invited Session: Bayesian computational methods	COMPSTAT
There And Back Again: A Diffusion's Tale	2024
Industry-on-Campus Lab (seminar)	Bosch Center for AI and University of Tübingen
Twisted Diffusion Sampling for Accurate Conditional Generation	2023
Plenary talk	ELLIS unConference
Monte Carlo and Variational Methods: Bridging the Gap	2022
Special Invited Session: Grand challenges and advances in Bayesian computation	CMStatistics
Monte Carlo and Variational Methods: Bridging the Gap	2022
Workshop on Monte Carlo and Approximate Dynamic Programming Methods	ESSEC Paris
Variational Bayes Goes to Monte Carlo	2021
Amsterdam Machine Learning lab (seminar)	University of Amsterdam
Machine learning using approximate inference	2020
Savage Award session (contributed talk)	Joint Statistical Meeting
Machine learning using approximate inference	2020
Junior Bayes Beyond the Borders (webinar)	Bocconi University
Variational and Monte Carlo methods	2019
Center for Industrial and Applied Mathematics (seminar)	KTH
Variational and Monte Carlo methods	2019
Department of Mathematical Sciences (seminar)	Chalmers
Variational inference	2018
Department of Information Technology (tutorial)	Uppsala University
Approximate Bayesian inference: Variational and MC methods	2017
Department of Computer Science (seminar)	Linköping University
Monte Carlo methods and proper weighting	2015
Department of Engineering Science (tutorial)	The University of Oxford
Nested Sequential Monte Carlo Methods	2015
SMC Workshop	ENSAE Paris
Sequential Monte Carlo for Probabilistic Graphical Models	2014
School of Mathematics and Statistics (seminar)	University of NSW
Sequential Monte Carlo for Probabilistic Graphical Models	2014
School of Electrical Engineering and Computer Science (seminar)	University of Newcastle

TEACHING

Reinforcement Learning (Graduate)	2024
Lecturer	University of Amsterdam
Introduction to Machine Learning (Undergraduate)	2022 – 2024
Lecturer	University of Amsterdam
Foundations of Graphical Models (Graduate)	2019
Guest lecturer	Columbia University
Sensor Fusion (Graduate)	2015 – 2016
Recitation instructor, teaching and lab assistant	Linköping University
Digital Signal Processing (Graduate)	2014
Lab assistant	Linköping University
Industrial Control Systems (Graduate)	2014
Recitation instructor, teaching and lab assistant	Linköping University
Control Project Laboratory (Graduate)	2014 – 2018
Project supervisor	Linköping University
Modeling and Simulation (Graduate)	2013 – 2015
Recitation instructor, teaching and lab assistant	Linköping University
Engineering Project (Undergraduate)	2013
Project supervisor	Linköping University
Automatic Control (Undergraduate)	2012 – 2014
Recitation instructor, teaching and lab assistant	Linköping University
Foundation Course in Mathematics (Undergraduate)	2011
Recitation instructor and teaching assistant	Linköping University

PROFESSIONAL SERVICE

ORGANISATION

Symposium on Advances in Approximate Bayesian Inference	2023 – 2024
Co-organizer, Program Chair	AABI
International Conference on Artificial Intelligence and Statistics	2023
Workflow Chair	AISTATS

SENIOR PROGRAM COMMITTEE

Conference on Uncertainty in Artificial Intelligence	2024
Area Chair	UAI
International Conference on Artificial Intelligence and Statistics	2024
Senior Area Chair	AISTATS
International Conference on Artificial Intelligence and Statistics	2022
Area Chair	AISTATS

REVIEWING

Journal of Machine Learning Research (JMLR)	2020 – 2021
Neural Information Processing Systems (NeurIPS)	2017 – 2020
International Conference on Machine Learning (ICML)	2017 – 2018
International Conference on Learning Representations (ICLR)	2017
International Conference on Artificial Intelligence and Statistics (AISTATS)	2017 – 2018

DOCTORAL COMMITTEES

Gabriel Bénédict

2024

A Machine Learning Personalization Flow

University of Amsterdam

Salem Lahlou

2023

Advances in uncertainty modelling: from epistemic uncertainty estimation to generalized generative flow networks

Université de Montréal, MILA

PROFESSIONAL DEVELOPMENT

University Teaching Qualification (BKO)

2024

University of Amsterdam

Leadership Course for Tenure Trackers

2022

Center for Academic Leadership

University of Amsterdam

Learning and Knowledge

2016

Advanced course in higher education pedagogy

Linköping University