

Ola Rønning

oroe@itu.dk | ronning@pm.me | ronning.io

Postdoctoral Researcher — Data Science & Probabilistic Machine Learning
IT University of Copenhagen, Denmark

RESEARCH PROFILE

I work on Bayesian inference, mostly for robots that need to know where they are. Right now that means real-time filtering, underwater tracking and SLAM, and checking whether the uncertainty a filter reports can be trusted. Often it can't (see our odometry paper, A.1).

APPOINTMENTS

- **IT University of Copenhagen** Jun 2025 - Jun 2027
Postdoctoral Researcher Copenhagen, Denmark
 - Bayesian inference methods for mobile-robot navigation and pose estimation.
- **University of Copenhagen** Apr 2023 - Apr 2025
Postdoctoral Researcher Copenhagen, Denmark
 - Bayesian inference for high-dimensional problems; published at top ML venues.
 - Co-supervised M.Sc. projects and theses.
- **Cobiro** Jun 2018 - Dec 2019
Lead AI Engineer Copenhagen, Denmark
 - Led a six-engineer ML team; designed and maintained a production ML system over heterogeneous data sources.
 - Contributed to investor pitches, grant seeking, and reporting.
- **Cobiro** Apr 2018 - Jun 2018
AI Engineer Copenhagen, Denmark
 - Keyword extraction from websites and e-commerce products; fine-grained business-category algorithm; annotation platform.

EDUCATION

- **University of Copenhagen** 2023
Ph.D., Computer Science Copenhagen, Denmark
- **University of Copenhagen** 2018
M.Sc., Computer Science Copenhagen, Denmark
- **University of Copenhagen** 2015
B.Sc., Computer Science Copenhagen, Denmark

GRANTS & FELLOWSHIPS

- **Danish Data Science Academy (DDSA) — Postdoc Fellowship** 2025 - 2027
Stein Mixture Filtering: Advancing Bayesian Data Science Towards Real-Time Inference Fellow
 - Collaborators: [A. Wąsowski](#) [M. Rico](#).
- **Villum Foundation — Villum Experiment** 2026 - 2028
Pose Estimation Beyond Deep Learning Technical Lead & Co-Author
 - PI: [A. Wąsowski](#). Hired postdoc: [U. Saqib](#).

PUBLICATIONS

Peer-reviewed

- [P.7] O. Rønning, E. Nalisnick, C. Ley, P. Smyth, T. Hamelryck (2025). **ELBOing Stein: Variational Bayes with Stein Mixture Inference**. In *International Conference on Learning Representations (ICLR)*.
- [P.6] J. Eklöf, U. Snis, T. Hamelryck, A. Grima, O. Rønning (2024). **AI Implementation and Capability Development in Manufacturing: An Action Research Case**. In *Hawaii International Conference on System Sciences (HICSS)*.
- [P.5] R. Schenck, O. Rønning, T. Henriksen, C. E. Oancea (2022). **AD for an Array Language with Nested Parallelism**. In *Int. Conf. for High Performance Computing, Networking, Storage and Analysis (SC)*.
- [P.4] L. S. Moreta, O. Rønning, A. S. Al-Sibahi, J. Hein, D. Theobald, T. Hamelryck (2022). **Ancestral Protein Sequence Reconstruction using a Tree-Structured Ornstein-Uhlenbeck Variational Autoencoder**. In *International Conference on Learning Representations (ICLR)*.

- [P.3] O. Rønning, C. Ley, K. V. Mardia, T. Hamelryck (2021). **Time-Efficient Bayesian Inference for a (Skewed) Von Mises Distribution on the Torus in a Deep Probabilistic Programming Language**. In *IEEE Int. Conf. on Multisensor Fusion and Integration (MFI)*.
- [P.2] O. Rønning, D. Hardt, A. Søgaard (2018). **Linguistic Representations in Multi-Task Neural Networks for Ellipsis Resolution**. In *EMNLP Workshop BlackboxNLP*.
- [P.1] O. Rønning, D. Hardt, A. Søgaard (2018). **Sluice Resolution without Hand-Crafted Features over Brittle Syntax Trees**. In *Conf. of the North American Chapter of the ACL (NAACL-HLT)*.

Preprints

- [A.2] U. Saqib, O. Rønning, A. Wąsowski (2026). **Wave-Robust Passive AUV Localization Using FP-MUSIC**. *arXiv:2609.27712*.
- [A.1] O. Rønning, U. Saqib, A. Wąsowski (2026). **You Should Be Properly Scoring Your Odometry**. *arXiv:2609.25900*.

In preparation

- [S.3] S. D. Upadhyay (KTH), S. Aldhaferi (UCL), O. Rønning (ITU). **Bayesian Bathymetry Factors from Sidescan Sonar for AUV SLAM**.
- [S.2] O. Rønning (ITU), A. Wąsowski (ITU). **AMFoM: A Bures–Wasserstein–Fisher–Rao Adaptive Mixture Filter for Non-Gaussian State Estimation in Sonar SLAM**.
- [S.1] O. Rønning (ITU). **Convergence of Bures–Wasserstein–Fisher–Rao Mixture Flows for Variational Filtering**.

INVITED TALKS & DISSEMINATION

- **D3A.v4 — AI for Robots and Embodied Agents** Talk — *Probabilistic Guarantees in a Physical World: What Can We Promise?* 2026
- **SDU Robotics** Invited talk — *You Should Be Properly Scoring Your Odometry* 2026
- **RPL Summer School (KTH)** Poster — *How Honest Is Your Covariance?* 2026
- **Robotics Software Engineering (RSE)** Invited talk — *Real-Time Bayesian Filtering for Pose Estimation with Stein Mixtures* 2025
- **ELLIS UnConference (EurIPS)** Poster — *Stein Mixture Inference*; DDSA poster pitch 2025
- **D3A** Poster — *How Normal Is Your Process? Ask Stein*. 2025
- **University of Oxford** Invited talk — *ELBOing Stein: Variational Bayes with Stein Mixture Inference* 2025
- **Active Inference Institute** Invited talk — *ELBOing Stein: Variational Bayes with Stein Mixture Inference* 2025
- **Computational and Methodological Statistics Conf.** Invited talk — *Directional (protein) models as computer programs* 2023
- **NordicAI Meet** Poster — *Bayesian Automatic Differentiation* 2023
- **University of Luxembourg** Invited talk — *General and Integrated Stein Variational Inference with EinStein* 2022
- **Int. Conf. on Probabilistic Programming** Poster — *EinStein Variational Inference; Variational Energy-Conserving Subsampling* 2020, 2021
- **Broad Institute of MIT & Harvard** Invited talk — *EinStein Variational Inference* 2020

COMPETITIONS & CHALLENGES

- **Intrinsic — AI for Industry Challenge** Team: D. Cáceres Domínguez (KU), F. O. Zdyb (KU), Y. Yang (Örebro), P. Forte (Örebro) 2026

TEACHING & SUPERVISION

- **Probabilistic Programming (M.Sc.)**, ITU Guest lecture — *Introduction to Variational Inference* 2026
- **Probabilistic Programming Workshop**, U. Luxembourg *From Frequentist to Bayesian via Probabilistic Programming; Deep Probabilistic Programming* 2026
- **Co-supervisor · M.Sc. Research Project**, ITU Underwater Acoustic Localization 2026
- **B.Sc. Thesis Co-supervisor**, U. Copenhagen Global Encoding Variational Auto-Encoder 2026
- **Co-advisor · M.Sc. Thesis**, U. Copenhagen Efficient Bayesian Neural Networks with Spectral Weight Priors 2025
- **Teaching Assistant · Probabilistic Machine Learning (M.Sc., 45 students)**, UCPH 2021-2023
- **Master TA · Machine Learning A (M.Sc., 350 students)**, UCPH 2021-2023
- **Primary Advisor · M.Sc. Thesis**, UCPH Generalising Stein Variational Gradient Descent through Rényi's α -divergence 2022
- **Advisor · M.Sc. Projects**, UCPH Applications of Probabilistic ML to Protein Generation; Rényi's α -divergence and SVGD 2022-2023
- **Teaching Assistant · Machine Learning (M.Sc., 300 students)**, UCPH 2020

- **Invited Lecturer · Advanced Statistics (M.Sc., 30 students), U. Luxembourg** 2020-2021
- **Lecturer & Instructor · Introduction to Data Science, Novo Nordisk Professional workshop, ran 4 times · 35 attendees** 2020
- Pedagogical training**
- **Project and Thesis Supervision Course, ITU Supervisor roles, phases, and legislation in project and thesis supervision** Apr 2026
- **Exam Seminar, ITU Constructive alignment, exam forms, grading, and oral examination** Nov 2025

ACADEMIC SERVICE

Reviewing

- **NeurIPS** 4 papers + 1 emergency review 2026
- **ICLR** 3 papers + 1 emergency review 2026
- **ICLR Workshop — AI with Recursive Self-Improvement** 1 paper 2026
- **DDSA** Grant-proposal reviewer; mock interviews 2026

Organizing

- **D3A.v4 — Modern Statistics and Machine Learning** Session organizer, with H. B. H. Zhu (UCPH, lead), D. Sulem (USI), J. Yang (UCPH) 2026
- **D3A.v4 — AI for Robots and Agents: Perspectives, Applications & Open Problems** Session organizer, with I. Iturrate (SDU, lead), A. Mompo Alepuz, T. N. Le (DTU), C. Shen (SDU), W. P. Empleo 2026

Committees & Outreach

- **Censorkorpset i Datalogi** National examiner corps; 4 M.Sc. theses for SDU, Jun 2026 2026-2030
- **Internal Examiner · ITU & UCPH** ITU research projects (Differential Privacy & Fairness for Generative Modeling; Auditable EU Emission Report Generation); M.Sc. Projects in Bioinformatics at UCPH 2021 - 2025
- **DDSA — Data Science Paths: From PhD to Postdoc** Panel talk at EurIPS 2025

OPEN SOURCE

- **Pyro / NumPyro** Deep probabilistic programming languages on PyTorch (Pyro) and JAX (NumPyro); contributed Stein variational inference (EinStein / Stein Mixture Inference) to NumPyro. Contributor
- **ADBench** Benchmark suite comparing automatic-differentiation tools across frameworks; contributed optimized Python implementations of the benchmark tasks. Contributor
- **SMFEval** Proper-scoring diagnostics for SLAM/odometry filters: tests whether a filter's reported covariance is calibrated to its actual errors, not just its pose accuracy. Main developer