Sahel Mohammad Iqbal

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Education

PhD Student in Electrical Engineering   Dec 2022 - Dec 2026 (Expected)

Aalto University   Espoo, Finland

I am a second-year PhD student at Aalto University, working with Prof. Simo Särkkä. My primary research interests are Bayesian inference methods and their various applications to dynamical systems, and specific areas that I work on as part of my PhD include:

- Bayesian experimental design.
- Probabilistic numerical solvers for differential equations.
- Sequential Monte Carlo algorithms for inference in state-space models.

Integrated Master's in Physics   Aug 2017 - Jun 2022

National Institute of Science Education and Research   Bhubaneswar, India

Publications

2024   **Sahel Iqbal**, Adrien Corenflos, Simo Särkkä, Hany Abdulsamad (2024). Nesting Particle Filters for Experimental Design in Dynamical Systems. International Conference on Machine Learning.

       Sahel Iqbal, Hany Abdulsamad, Tripp Cator, Ulisses Braga-Neto, Simo Särkkä (2024). Parallel-in-Time Probabilistic Solutions for Time-Dependent Nonlinear Partial Differential Equations. *To appear in the* IEEE International Workshop on Machine Learning for Signal Processing.

2023   **Sahel Iqbal**, Subhankar Mishra (2023). Neural Networks at a Fraction with Pruned Quaternions. International Conference on Data Science & Management of Data.

Preprints

2023   Hany Abdulsamad, **Sahel Iqbal**, Adrien Corenflos, Simo Särkkä (2023). Risk-Sensitive Stochastic Optimal Control as Rao-Blackwellized Markovian Score Climbing. arXiv°.

Skills

Programming Languages – Python, Julia, Haskell.

Machine Learning Libraries – Proficient in JAX and the Julia ML stack (Flux, Zygote). Have used PyTorch and TensorFlow in the past.

Miscellaneous – LaTeX, Bash, React.

Invited Talks

- Jun 28, 2024. Talk titled "Nesting Particle Filters for Experimental Design in Dynamical Systems" at the ELLIS Workshop on Probabilistic Numerics and Physics-Informed Learning in Helsinki, Finland.
- Feb 16, 2024. Online talk titled "Policy Optimization with Markovian Score Climbing" at the Intelligent and Autonomous Systems (IAS) research group at TU Darmstadt, Germany.

Teaching and Advising

- Spring 2024. Teaching assistant for *ELEC-E8106, Bayesian Filtering and Smoothing* at Aalto University, spring semester 2024.
- Nov 2023 – Apr 2024. Advised a Master's thesis titled "Physics-Informed Machine Learning in Mineral Processing".