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

Selected Publications and Preprints

2024 **Sahel Iqbal**, Hany Abdulsamad, Sara Pérez-Vieites, Simo Särkkä, Adrien Corenflos, Simo Särkkä (2024). Recursive Nested Filtering for Efficient Amortized Bayesian Experimental Design. arXiv°.

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 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".