Lukas Franken

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Education

PhD, Engineering/Computer Science — **University of Edinburgh**
December 2024 (exp.)
- Geospatial machine learning: variance estimation, causal inference, dense features.
- Surrogate modelling, model predictive control and forecasting to evaluate the role of seasonal thermal storages in the energy transformation.
- Remote sensing: Object detection, transfer-learning.

MSc, Physics — **University of Cologne**
(Distinction) *March 2021*
- Thesis: Stability in quantum natural gradient descent (1.0/1.0, Prof David Gross)
- Courses in statistical, computational and solid state physics.

BSc, Geophysics — **University of Cologne**
- Thesis: Perturbation of solar wind by water vapor around dwarf planet Ceres (1.3/1.0, Prof Joachim Saur) *September 2017*
- Courses in foundational mathematics, physics and programming.

Experience

The Alan Turing Institute, London — **October 2022 - March 2023**
Enrichment Scheme Placement
- An opportunity for UK based machine learning PhD students to work in a shared environment to foster collaboration and exchange ideas.

PyPSA meets Africa Initiative — **Since Summer 2021**
Project Lead
- Code and Team lead in a project to infer the electric grid from satellite imagery using object detection and transfer-learning
- Developing tools to obtain coordinate-based energy demand estimations

Fraunhofer Institute IAIS, Sankt Augustin — **August 2019 - June 2021**
Researcher
- Research in machine learning (published at *ICLR* and *ESANN*).
- Public and science facing publications on quantum computing.
- Extensive coding along professionals, numerous talks, project organisation.

Selected Publications

Heating up decision boundaries: isocapacitory saturation, adversarial scenarios and generalization bounds. *Bogdan Georgiev, Lukas Franken, Mayukh Mukherjee*. International Conference on Learning Representations 2021.

Gradient-free quantum optimization on NISQ devices. *Lukas Franken, Bogdan Georgiev, Sascha Muecke, Moritz Wolter, Nico Piatkowski, Christian Bauckhage*. 2022 IEEE Congress on Evolutionary Computation

Predicting dam locations in West Bengal using Gaussian processes and lightweight data fusion. *Lukas Franken, John Fisher, Stephen James Lee*. Work in progress.

Scholarships and Awards

- **Full PhD Scholarship**. Funded by the EPSRC (∼100 000 £).
- **Enrichment Scheme Placement Award**. Six months research visit at the Alan Turing Institute (3 000 £).

Programming Skills

- **Languages**: Python, Julia, MATLAB.
- **Libraries**: sklearn, numpy, torch, scipy, pandas, geopandas, gdal, jax, detectron2, pypsa.
- **Tools**: git, vim, cuda, oop design, unix, testing, Lint.
- **Contributor**: atlite, a package to retrieve and transform weather data into renewable generation profiles.

Miscellaneous

- **Activities**: Physics Bonn-Cologne Graduate School Student Representative: Event and tutoring organisation.
- **Tutoring**: quantum information theory, partial differential equations.
- **Reviewer** at AISTATS 2022.
- **Cooking Enthusiast.** Favorites: italian cuisine, various curries, Kaiserschmarrn.