

Lukas Franken

✉ lukas.franken@ed.ac.uk • 📄 lukasfrankenq.github.io • 🌐 LukasFrankenQ

Education

PhD, Engineering

University of Edinburgh

December 2024 (exp.)

- Surrogate modelling, model predictive control and forecasting to evaluate the role of seasonal thermal storages in the energy transformation.
- Object detection and transfer-learning.
- Bayesian inference in sparse data settings.

MSc, Physics

University of Cologne

(Distinction)

March 2021

- Thesis: Stability in quantum natural gradient descent (1.0/1.0, Prof David Gross)
- Courses in theoretical solid state, statistical and computational physics.

BSc, Geophysics

University of Cologne

(Upper 2nd class)

September 2017

- Thesis: Perturbation of solar wind by water vapor around dwarf planet Ceres (1.3/1.0, Prof Joachim Saur)
- Courses in foundational mathematics, physics and programming.

Experience

Project Lead

PyPSA meets Africa Initiative

Since Summer 2021

- Code and Team lead in a project to infer the electric grid from satellite imagery using object detection and transfer-learning

Research Internship

Technische Universität Berlin, Berlin

April 2021 - June 2021

- Provided support in statistics and programming for a project investigating urban planning to reduce of CO₂ emissions (submitted to *Nature Sustainability*).

Researcher

Fraunhofer Institute IAIS, Sankt Augustin

August 2019 - June 2021

- Research in machine learning (published at *ESANN* and *ICLR*).
- 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.

On the impact of stable ranks in deep nets. *Bogdan Georgiev, Lukas Franken, Mayukh Mukherjee, Georgios Arvanitidis*. Preprint available on request.

How to choose the regularization parameter in the quantum natural gradient method. *Lukas Franken, David Wierichs, David Gross*. work in progress (available on request).

Skills

- **Programming:** Python, Julia, MATLAB.
- **Libraries:** pandas, sklearn, numpy, torch, jax, detectron2, pypsa.
- **Tools:** git, vim, cuda, oop design, unix, VS code, Inkscape, MS office, \LaTeX .
- **Languages:** Native: German; Professional: English; Basic: French.

Miscellaneous

- **Activities:** BCGS Student Representative: Event and tutoring organisation.
- **Tutoring:** quantum information theory, partial differential equations.
- **Scholarships:** Full PhD scholarship funded by the EPSRC ($\sim 100\,000$ £).
- **Reviewer** at AISTATS 2022.
- **Cooking Enthusiast.** Favorites: italian cuisine, various curries, Kaiserschmarrn.