Lukas Bongartz

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Education

PhD, Physics — **TU Dresden**
Aug 2021 – Apr 2025 (exp.) — Germany

- Research on carbon-based transistors for neuromorphic computing
- Developed a thermodynamic transistor model (theory, simulation, experiment)
- Leveraged thermodynamics in a single-device noise filter (Schmitt trigger)
- *Currently*:
  - Building a tensor and Markov model in PyTorch to compute non-equilibrium and noise properties
  - Hardware-implementation in probabilistic computing (Bayesian inference)

PhD Scholar, Applied Physics & Materials Science — **Stanford University**
Apr 2023 – Oct 2023 — US

- Studying symmetry breaks in neuromorphic materials with a quantum mechanical transition model
- Coursework with Kwabena Boahen (Brains in Silicon)
- Raised research funding (> $30 000)
- *Private*:
  - Worked on an analog chip design for LLM inference (SkyWater)
  - Built noise model in PySpice

MS, Economics (GPA: 3.7) — **FU Hagen**
Oct 2021 – Jul 2024 — Germany

- Business studies alongside PhD
- Focus on quantitative finance (e.g., portfolio optimization)

MS, (Physical) Chemistry (GPA: 3.9) — **Heidelberg University**
Oct 2018 – Jul 2021 — Germany

- Extensive curriculum in condensed matter and semiconductor physics
- Major in quantum modeling and molecular dynamics
- Studies on machine learning

FrontierLab Program, Applied Physics (GPA: 4.0) — **Osaka University**
Sep 2019 – Sep 2020 — Japan

- Developed an ultra-high-density neural interface
- Raised research funding (> $15 000)

BS, (Physical) Chemistry (GPA: 3.4) — **Heidelberg University**
Oct 2015 – Jul 2018 — Germany

- Top 5% of the year
- Thesis on nanomaterials for transistor devices

Experience

Doctoral Researcher — **TU Dresden**
Aug 2021 – Present — Germany

- Instructor for undergraduate experimental physics
- Filed two patents in neuromorphic computing and bioelectronics
- Participant in start-up challenge SPRIN-D (Federal Agency for Disruptive Innovation Germany)

Teaching Assistant — **Heidelberg University**
Nov 2018 – Sep 2019 — Germany

- Instructor for multiple undergraduate courses
- Authored the manuscript for a graduate lecture on semiconductors and nanomaterials

Research Assistant — **EnBW Nuclear Energy**
Aug – Sep 2017 — Germany

- Research assistant in nuclear power plant (Philippsburg)
- Developed an analytical protocol and presented it to senior management

Awards

- Dec 2024 **Meiss Award**
  Paper Award in Applied Physics
- Apr 2023 **Research Scholarship**
  German Academic Exchange Service
- Mar 2023 **Research Scholarship**
  Graduate Academy Dresden
- Jan 2021 **Scholarship**
  e-fellows
- Jul 2020 **Best Presentation Award**
  Osaka University
- Aug 2019 **Graduate Scholarship**
  German Academic Exchange Service

Skills & Interests

Programming: Python, PyTorch, MATLAB, SPICE, CAD
Languages: English (fluent), German (native), Japanese (basic), French (basic)
Interests: Strength and endurance sports, artificial intelligence, information theory, complexity science