Lukas Bongartz

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Education

PhD, Physics <div align="right">**TU Dresden**</div>
Aug 2021 – Apr 2025 (exp.) <div align="right">Germany</div>

- 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 <div align="right">**Stanford University**</div>
Apr 2023 – Oct 2023 <div align="right">US</div>

- 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: 3.8; with distinction) <div align="right">**FU Hagen**</div>
Oct 2021 – Jul 2024 <div align="right">Germany</div>

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

MS, (Physical) Chemistry (GPA: 3.9) <div align="right">**Heidelberg University**</div>
Oct 2018 – Jul 2021 <div align="right">Germany</div>

- 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) <div align="right">**Osaka University**</div>
Sep 2019 – Sep 2020 <div align="right">Japan</div>

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

BS, (Physical) Chemistry (GPA: 3.4) <div align="right">**Heidelberg University**</div>
Oct 2015 – Jul 2018 <div align="right">Germany</div>

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

Experience

Doctoral Researcher <div align="right">**TU Dresden**</div>
Aug 2021 – Present <div align="right">Germany</div>

- 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 <div align="right">**Heidelberg University**</div>
Nov 2018 – Sep 2019 <div align="right">Germany</div>

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

Research Assistant <div align="right">**EnBW Nuclear Energy**</div>
Aug – Sep 2017 <div align="right">Germany</div>

- 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