# Li **Jingyi**

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**Languages**

- Englsh C1
- Russian C1
- German C1
- Chinese Native

**Areas of Specialization**

- Simulation Methods
- Nanofabrication
- Hardware Developing
- Software Developing

**Hobbies**

- Ice-skating
- Skiing
- Swimming
- Bouldering
- running
- cross-country cycling

**Technical Qualification**

- Finite Element Method
- Density Functional Theory
- Python
- Kotlin
- TypeScript
- Pennylane
- VHDL
- C++/C++ for embedded system
- MATLAB/Simulink
- Cleanroom nanofabrication
- Semiconductor Technologies

## Resumé

## Work Experience

2025 Jan.– 2025. Dec

**Test Platform Hardware Developer**
Advantest · Böblingen, Germany

- **Portable Stimulus Standard (PSS) & System Verification:** Used C++ for test cases generation through Cadence Perspec System Verifier to have C++ test cases implemented using PSS models generated for pre- and post-silicon emulation and validation.
- **SiConic ATE :** Leveraged the SiConic ecosystem to streamline the workflow for automated test execution (ATE) and Python-based scripting, utilizing **SiConic Link** as the hardware foundation for high-bandwidth HSIO (USB/PCIe) and functional interfaces (JTAG/SPI/I2C) DUT stimulation.
- **Test Optimization & Coverage:** Optimized Cost-of-Test (CoT) and Test Time through **SmartLoop memory emulation** and multi-site concurrency. Conducted coverage-driven validation closure by mapping PSS functional coverage to hardware defect models, ensuring comprehensive sign-off of next-generation SoC designs.
- **High-Speed FPGA-Based Test Developing:** Manually developed customized ATE test methods utilizing FPGA-based architecture to enable autonomous pattern synthesis and real-time comparison. Leveraged FPGAs as reconfigurable "on-the-fly" pattern generators to overcome memory limitations of legacy ATE digital modules, specifically targeting multi-GHz data rates and complex serial link validation.
  - **Skills involved:** RTL Design, Semiconductor Technlogies, JTAG/SPI/I2C,SoC,IoT, VHDL, C++, Python, PCI-express, IC Design.

2024 Okt.–2025 Apr.

**Embedded Engineer**
ATF Cooling GmbH · Stuttgart, Germany

- **Server set-up and management:** Set up server and encrypted access that allow distant access to the company's server.
- **Maintenance**: Setup routine check on backup and safety of company's server.
- **Micro-controller:** reverse engineering and programming: Performed reverse engineering using Ghidra on the already existing loaded-using-boot-loader .s19 file back into C-like languages structure, implemented optimized PID algorithm and then compiled it into hex file and loaded it again into the machine.
  - **Skills involved:** C++, C, Git CI/CD, Embedded System, RTL Design, Ghidra, Assembly, Linux, Bash

2022 Dec.–2023 Jun.

**Nanoopitcs/Levitodynamics/Xilinx FPGA**
Center of Applied Quantum Technology · Stuttgart, Germany

- **Simulation and Verification of Phase-Lock Feedback Cooling scheme onto Red Pitaya (Xilinx Zynq 7010 Series)**: developed, programmed, tested, simulated the logic of Kalman Filter and Linear Quadratic Regulator based on the equations for feedback controlling of isotropic dielectric nanoparticles. The simulation logic and test-benches were first done and tested on MATLAB Simulink and then after successful theoretical results, translated and transferred into VHDL on Xilinx Vivado, tested, validated and synthesised into bitstream and loaded onto FPGA.
- **Heterodyne Detection and Optical feedback cooling:** Used heterodyne detection for phase - difference signal detection for the state estimation $(\vec{p}, \vec{r})$ for the dielectric nanoparticle. Utilized micro-resonator and Whispering Gallary-Modes (WGMs) to enhance the light-matter interaction and achieve feedback optical cooling.
  - **Skills involved:** VHDL, Xilinx Vivado, Python, Nanooptics, Laser Physics, RTL Design, MATLAB Simulink, Linux, Bash

2021 Sep–2022 Sep

**Quantum Hardware Simulation**
Facility for Rare Isotope Beams, MSU · East Lansing, USA

- Used snapshot method for reduced basis method for parametrized Hamiltonian systems
- Validated the feasibility of this method with other scientists when applying to different non-linear systems (for example, dilute Bose-Einstein Condensates) for reducing systems to effective two-level system.
- Applied the Variational Quantum Eigensolver(VQE) and Finite Element method then automatically append the two-level system hamiltonian as tokens for setting up the quantum circuit on Pennylane and IBM Qiskit for reduced basis quantum computing.
- Verified the error and noise mitigation method on the Quantum hardware with Zero-noise Extrapolation Method (ZNE).
- Details can be found at *Variational Quantum Eigensolver (VQE) to determine ground states in dilute Bose-Einstein Condensates:Quantum Computing Applications in Nuclear Physics*.
  - **Skills involved:** Python, Finite Element Method, Condensed Matter Physics, Modal Order Reduction, Linux, Bash

## Research Experience

2022 Dec–2023 Aug.

**Research Assistant, Microfabrication**
Max Planck Institute for Solid State Research / Uni Stuttgart · Stuttgart, Germany
Niobium-nitrate/Gallium arsenide Josephson junction nanofabrication using electron beam lithography and clean room lithography.Superconducting electrodes were made for spin transport and polarization quantum interference measurement.

2022 Dec–2023 Aug.

**Quantum Simulation / Deep Learning**
Institute for Computer Physics · Stuttgart, Germany
Performed GGA-DFT band structure calculations using PyGeometry and compared with message-passing neural network (MPNN) predictions. Implemented graph neural networks (GNNs) that efficiently model long-range interactions via message-passing for molecular energy band simulation, achieving significant speed improvements over traditional DFT while maintaining high consistency with reference results. Developed CUDA/OpenCL-optimized C++ graph algorithms leveraging GPU-accelerated HPC architectures for GNN training and prediction.

2022 Sep–2023 Apr

**Research Assistance / Quantum transport measurement**
1.Physikalisches Institute · Stuttgart, Germany
Performed Quantum Hall Effect Measurement and Giant Magnetoresistance measurement with the the experimental setup based on the previous Doktorate students on Weyl semimetals of its band structure and topological properties. Performed band structure calculations using DFT method based on Quantum Espresso scripts.

2021 Sep –2022 Sep

**Research Assistant, Experimental Physics**
Michigan State University · East Lansing, USA
Performed nanofabrication of multi-layer Josephson tunneling junction with photolithography and E-beam lithography. Measured the spin transport at the ferromagnetic superconductor interface with the superconducting quantum interferometry measurements (nanoSQUID). The spin-polarization, spin orbit coupling behavior were analyzed from the Fraunhofern pattern ($I_c/I_0$ vs external sweeping field $\vec{B}$) and magnetic hysteresis, and asymmetrical $0-\pi$ shift.

## Education

2022-2024 **Physics**
M.Sc. · University of Stuttgart
Stuttgart,Germany

2017-2022 **Physics**
B.Sc. · Michigan State University
East Lansing, Michigan

2015-2017 **Physics**
B.Sc. · Moscow Institute of Physics and Technology, Dolgoprudnyy
Moscow, Russian Federation

## Works

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|---|---|
| 2022 | Variational Quantum Eigensolver (VQE) to determine ground states in dilute Bose-Einstein Condensates:*Quantum Computing Applications in Nuclear Physics*. |
| 2022 | Antiferromagnetic Josephson Junction and the formation of spin-triplet current :*Antiferromagnetic Josephson Junction*. |
| 2025 | PINN for physical prediction *PINN-for-physical-prediction* |
| 2025 | 2D Finite Element Method Poisson Solver *2D-poisson-solver* |