

Nicolas Dirnegger

📍 Los Angeles, CA, USA ✉ nickeyd01@ucla.edu 📞 Nicolas Dirnegger in nicolas-dirnegger 📧 Nickeyd01

Education

University of California, Los Angeles
PhD in Electrical and Computer Engineering
MS in Quantum Science and Technology, Physics

Sep 2022 - Expected June 2027

ETH Zurich
BS in Electrical and Computer Engineering

Sept 2019 – Aug 2022

Academic Experience

NarangLab
Graduate Student Researcher, Prof. Prineha Narang

Los Angeles, CA

June 2023 – Present

- Investigated non-reciprocal superconducting quantum systems, focusing on control of qubit-qubit coupling, quantum batteries, superconducting qubit networks, and remote entanglement protocols using graph-based routing.
- Developed theoretical and computational models close to hardware for quantum sensing and computation, with a focus on cQED-based and hybrid quantum systems.

Mesoscopic Optics and Quantum Electronics Laboratory
Graduate Research Assistant, Prof. Chee-Wei Wong

Los Angeles, CA

Sep 2022 – June 2023


- Experimental measurements of on-chip integrated octave spanning frequency comb and soliton generation with dispersive waves. Device characterization and measurement of photonic ring resonators. Device design and experimental measurements of Q values, FSR and Cherenkov radiation. Post-processing of data in Matlab.
- Numerical simulations of dynamical decoupling sequences of superconducting qubits.

Institute of Electromagnetic Fields

Zurich, Switzerland

Undergraduate Research Assistant, Prof. Juerg Leuthold

Sep 2021 – Aug 2022

- 2D and 3D Device Design of efficient photonic and plasmonic grating couplers with FDTD and FME using COMSOL, Lumerical, work included in *ACS Photonics*, [Link to Publication](#) 

Professional Experience

IBM Research-Quantum
Quantum Hardware Engineer Intern

Yorktown Heights, NY

June 2024 – Sep 2024

- Computational analysis of remote entanglement methods for superconducting qubits with transducer and entanglement distillation. Theoretical analysis, experimental implementation and high performance simulations using IBM CCC cluster.

Air Force Research Laboratory
Quantum Co-Op Intern

Rome, NY

June 2023 – Sep 2023

- Device theory, design and simulation of low frequency superconducting ring resonator with Matlab, HFSS, Comsol and LTSpice. Design, composition and measurement of PCB resonator using surface mount and through hole components.
- Qubit characterization with single shot measurement. Measurement of qubit system under external laser drive to establish quasi-particle tunneling and resulting effects on T1, T2 and T2* time

ETH Zurich
Teaching Assistant

Zurich, Switzerland

Feb 2022 – June 2022

- Delivered tutorials and created hands-on lectures for an undergraduate course on electromagnetic fields and waves, increasing student understanding and engagement.

Publications

- [1] **N. Dirnegger** et al. "Monte Carlo model of distilled remote entanglement between superconducting qubits across optical channels." arXiv:2503.10842 (2025).
- [2] R. Negrin, **N. Dirnegger** et al., "Efficient Multiparty Entanglement Distribution with DODAG-X Protocol", *arXiv preprint, arXiv:2408.07118, in review at Physical Review Applied* (2024)

Skills & Projects

Coding Languages: Python, C++, Java, MATLAB, Mathematica

Languages: German, French, English, Spanish

Lab Experience:

- Design and simulation for microwave and optical devices in Comsol, Lumerical, LTSpice. Basics of GDS, HFSS & KLayout, Superconducting Qubit Measurement, Readout and Setup.
- Fiber and Free Space Optics, Laser Alignment, Frequency Comb Generation, LabView, RF Engineering, Simulink, PCB Design and Measurement, Soldering.

Software Experience:

- Lumerical, Comsol, LTSpice, Ansys, Qiskit, QuTip
- High Performance Computing.
- Typesetting LaTeX, HTML/CSS, and others.

Science Fair

Vienna, Austria

Winner 2018 Science and Technology Fair

May 2018

- Developed a thermal energy conversion headset, achieving local recognition in Austrian media [Read article: "Strom aus der Wärme von Kopfhörern"](#) [🔗](#)

Outreach

Quantum Computing Student Association - QCSA

Los Angeles, CA

Board Member

- Organization of events that include academic and industrial speakers, Hackathons, Workshops, and collaborations with other local Los Angeles universities, [LinkedIn](#) [🔗](#).

Aerospace Initiative ETHZ - ARIS

Zurich, Switzerland

Hardware Engineer

- Part of the liquid rocket engine team as a hardware engineer on sensors, circuit design, and electrical wiring.
- Responsible for sensor data acquisition and analysis of data as well as circuit layout of the electronic system. Assembly of sensor and actuators needed to control and regulate temperature, pressure levels, fuel levels and vibrations in rocket.

GVI - Volunteer

Pokhara, Nepal

Volunteer

- Volunteering abroad in Pokhara in Nepal to rebuild and renovate a local school. Social media fundraiser to support the local school system in the Pokhara region.