

PHILIP SHENK

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RESEARCH EXPERIENCE

LevyLab – Dr. Jeremy Levy, University of Pittsburgh (levylab.org)

Undergraduate Researcher (Jan. 2018 – Present)

- Studied Single-Electron Transistors at $\text{LaAlO}_3/\text{SrTiO}_3$ interface
 - Fabricated nanoscale devices using conductive-AFM lithography¹
 - Characterized device behavior with respect to experimental parameters (magnetic field, temperature, and gate voltages) in magnetic cryostat using automated data acquisition software and equipment
 - Analyzed experimental data with custom LabView software, revealing interactions between electronic states
 - Presented findings at APS March Meeting 2019, 2020
- Managed Agilent 5500 Atomic Force Microscope (AFM)
 - Built software to automate AFM data acquisition
 - Configured hardware to automate conductive-AFM lithography¹
 - Trained graduate students to use AFM for their research projects
- Contributed to lab software packages
 - Designed more efficient and flexible data analysis software
 - Utilized PostgreSQL database and cloud storage to increase data redundancy and streamline storage and retrieval of experimental data
 - Assisted senior lab members in modularizing automated data acquisition packages with object-oriented programming techniques

Nanoscale Quantum Physics Course – Dr. Sergey Frolov, Univ. of Pittsburgh

Undergraduate Researcher (Fall Semester 2019)

- Studied fabrication of semiconductor nanowire devices
 - Designed pattern to make electrical contact to semiconductor nanowires using electron beam lithography
 - Refined methods for transferring nanowires onto silicon substrate
 - Obtained cleanroom certification for the Nanoscale Fabrication & Characterization Facility (NFCF) at the University of Pittsburgh
 - Trained on spin coating, development hoods, electron microscope, maskless aligner, surface profiler, sputtering, plasma asher

PRESENTATIONS

- *Effects of writing parameters on electron transport in sketched single-electron transistors*, Session M62.00005, APS March Meeting 2020
- *Single-electron charging effects in sketched $\text{LaAlO}_3/\text{SrTiO}_3$ single-electron transistors*, Session V11.011, APS March Meeting 2019

LEADERSHIP

Secretary, Society of Physics Students of the University of Pittsburgh (2019 – Present)

EDUCATION

Bachelor of Science

Majors: Physics & Computer Science

University of Pittsburgh, August 2021

3.93 GPA

Highlighted coursework:

- Quantum Mechanics 1 & 2
- Quantum Physics at the Nanoscale
- Analog and Digital Electronics
- Computational methods in Physics
- Algorithm Implementation
- Data Structures
- Data Science

KEY SKILLS

- Experimental techniques
 - Atomic Force Microscopy
 - Magnet Cryostat operation
 - Cryogen transfer
 - Wire bonding
 - Soldering
 - Low-noise 2- and 4-terminal electrical measurements
 - I-V curve measurements
 - Lock-in amplifier measurements
- Software
 - Python (numpy, scipy, pandas, matplotlib), LabVIEW, Java, C
 - Linux, Windows
 - KLayout, Blender, MS Office

AWARDS

- (2020) Halliday Award for Excellence in Undergraduate Research
- (2020) PIRE:HYBRID GIANT International Internship Program (cancelled due to COVID-19)
- (2019) Peter F.M. Koehler Academic Achievement Award
- (2019, 2020) NASA PA Space Grant Consortium Award
- (2018) Pittsburgh Quantum Institute Outstanding Poster Award

Citizenship: U.S.A.

1. C. Cen, S. Thiel, J. Mannhart, and J. Levy, "Oxide Nanoelectronics on Demand," *Science* **323**, 1026 (2009).
<http://dx.doi.org/10.1126/science.1168294>