Nikolai Nekrutenko

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Education

Cornell University | **Ithaca, NY** Aug 2021 - Dec 2024
Undergraduate pursuing a major in Physics with a concentration in Electrical Engineering - GPA of 3.44

- Relevant Coursework: Chemistry I & II, Calculus II & III, Differential Equations, Electronic Circuits, Intro to Computing, Linear Algebra, Physics I, II & III, Quantum I & II, Analytical Mechanics, Embedded Systems, Adv. Electro/Magnetostatics & Electrodynamics, Signals & Systems

Work Experience

Drone Development Member | **School of Mech. & Aero. Eng.** | **Ithaca, NY** Sep 2023 - Present
Integrating electrical and mechanical engineering through development of a quadcopter with a team under supervision from Dr. Brian Kirby to be used in mechanical and aerospace engineering course labs.

Gimbals R&D Intern | **Freefly Systems** | **Woodinville, WA** Jun 2023 - Present
Adaptability and collaboration to learn the motion control physics, electronics, and spatial rotation maths behind the Mōvi Pro as an intern on the gimbals subteam. Developing an upcoming software release.

Student Researcher | **Fatemi Lab** | **Ithaca, NY** Mar 2022 - Present
Researcher at the Fatemi Lab, a condensed matter physics and quantum devices lab. Work on a research project under supervision from the PI and grad students, attend and present at weekly lab meetings.

Teaching Assistant | **School of Applied & Engineering Physics** | **Ithaca, NY** Aug 2022 - Dec 2022
Lead office hours and a weekly lab section for an applied physics course about nanoscience/nanotechnology. Regularly grade assignments, give constructive feedback, and mentor students.

Relevant Projects

Mōvi Pan/Tilt Limits | **Freefly Systems** Jun 2023 - Present
Developing an embedded systems algorithm for smooth hard stops on Mōvi Pro gimbal pan and tilt axes based on IMU data, gimbal physics, and user input via Mōvi Wheels and Mōvi Controller. In beta testing.

Indirect Impurity Identification | **Fatemi Lab** Sep 2023 - Present
Designing a microwave microstrip-line resonator to measure surface impurities in substrates by detecting variation in resonance due to EM fields. Simulating EM fields in Sonnet Suite to parameterize the design.

QCoDeS-Interfacing | **Fatemi Lab** Jun 2022 - May 2023
Repo of installation shell scripts, drivers, and Jupyter notebooks to setup a Linux computer for interfacing with lab equipment over the GPIB interface with Python and QCoDeS, a data acquisition framework.

Rocket Sensor Payload | **Pennsylvania State University Outreach** Sep 2020 - Jun 2021
Developed a lightweight Raspberry Pi sensor and imaging payload. Simulated suborbital rocket trajectory in OpenRocket. Projected vs flight sensor data was analyzed for a PSU outreach with Dr. McEntaffer's lab.

NeoPixel FFT Audio Visualizer | **Personal** Jun 2022 - Jan 2023
Co-designed and wrote a program that visualizes the waveform and intensity of music for a custom-built individually-addressable RGB led matrix using FFTs in Python on a Raspberry Pi.

FPV Drones and Aircraft | **Personal** Oct 2019 - Present
Building and flying FPV drones and aircraft with custom-designed 3D printed components, and autonomous flight capabilities using open-source flight software such as Betaflight and iNav.

Extracurricular Activities

Member | **Cornell Amateur Radio Club** | **Ithaca, NY** Feb 2023 - Present
Help educate members about the physics behind how radio works, in addition to technical skills such as soldering. Involved with designing a sensor and camera payload to be launched on a weather balloon.

First Degree Black Belt | **A Mountain Wind Martial Arts** | **State College, PA** Feb 2013 - Present
Instruct, help lead class and aid students with the practical and philosophical applications of the martial art at a local Dojang. First Degree Black Belt in Tang Soo Do, a Korean martial art.

Skills & Licenses

- Fluent in Russian, French, English; FAA Part 107 Remote Pilot License, Technician FCC Radio License
- Electronics Skills: Microcontrollers, Embedded Systems, Analog/Digital Circuits, Signal Processing
- Prototyping Skills: CAD, Soldering, CNC, Laser Cutting, 3D Printing on SLA/FDM, Power Tools
- Languages and Tools: Python, C, C++, Java, Javascript, Unix, git, Jupyter Lab, Kiel µVision IDE
- Software: Sonnet, Fusion 360, Cura, Blender, KiCad, Photoshop, DaVinci Resolve, OpenRocket