Samuel LeRose

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Education

University of Kentucky (UKY) Lexington, KY

B.S. in Physics, Minor in Mathematics *Aug. 2021 – May 2025*

- Cumulative GPA: 3.88/4.00
- Patterson Scholarship – Full Tuition Coverage (National Merit Finalist).
- Relevant Coursework: Classical Mechanics, Electromagnetic Fields, Quantum Mechanics, Thermodynamics, Computational Methods

Research Experience

NSF IRES Summer Research Intern (NOPTREX) May 2024 – July 2024

Nagoya University *Nagoya, Japan*

- Developed and implemented a novel apparatus to measure the electric dipole moment of polarized gases using Helmholtz coils and high-voltage electric fields in collaboration with American and Japanese undergraduates and graduates.
- Successfully measured Helium-3 EDM via Fourier analysis and curve fitting of its free induction decay, validating new methods that can be refined in future experiments.
- Designed and constructed a modular operational-amplifier circuit based on the expected Larmor precession frequency of target gases.
- Explored methods of data collection and analysis using FPGA devices.
- Principle lab notebook recorder and editor of our collaborative research paper.
- Supported by the NSF under Grant No. 2246335.

Undergraduate Research Assistant / UKY REU Aug. 2022 – Aug. 2024

University of Kentucky *Lexington, KY*

- Developed digital signal processing programs designed to filter noisy exponentially decaying signals on open-source FPGAs.
- Tested proof-of-concept designs that filtered and measured artificial signals to within expectations.
- Created a *GitHub* repository of automated scripts and detailed instructions allowing end users to modify and implement the programs.
- Identifying methods to improve program efficiency and reduce complexity.

Other Experience

Private Physics Tutor Aug. 2022 – Dec. 2024

Independent *Lexington, KY*

- Tutor college students in introductory physics courses based on algebraic and calculus methods, balancing multiple students through one-on-one sessions.
- Explain concepts at an individualized level to guide students to a better understanding of course material, breaking down complex topics for different learning styles to fill in gaps.
- On average, tutees improved their grades by a letter grade and understood abstract and mathematical concepts to a greater depth.

University Service

Society of Physics Students (SPS) President Jan. 2023 – Dec. 2023

- Organized the monthly "Cosmic Lunch," a one-hour lunch-and-learn event featuring presentations by professors and graduate students on their current research or general physics topics.
- Enriched and spread a welcoming environment to foster peer-to-peer support in academics, scholarship and internship applications, research, and personal projects.
- Created a small collection of *LaTeX* templates and examples to provide learning assistance.

University Membership

Lunsford Scholars Program Aug. 2021 – May 2025

- College of Arts & Sciences scholarship program that provides high-impact learning experiences for students interested in good citizenship and public service.
- Supplies funding to members to pursue education abroad, internships, and/or undergraduate research.

Awards & Honors

2024 **Distinguished SPS Chapter** for the 2023 – 2024 academic year for our dedication and commitment to the SPS mission and vision, *UKY*.

2024 **Physics Department Undergraduate Student of the Year** for excellent coursework, independent research, and summer research awards, *UKY*.

2023 **Summer Undergraduate Research Award** to participate in summer-long faculty-sponsored undergraduate research, *UKY*.

Publications

S. S. LeRose and C. B. Crawford, "Design and implementation of digital logic filtration on open-source field-programmable gate arrays", Aperture: University of Kentucky Journal of Undergraduate Research **1**, 63–72 (2024).

Conference Presentations

S. S. LeRose and C. B. Crawford. (**2024**). *Design and Implementation of Digital Logic Filtration on Open-Source Field-Programmable Gate Arrays.* [Virtual Poster Presentation]. APS March Meeting 2024.

S. S. LeRose and C. B. Crawford. (**2024**). *Design and Implementation of Digital Logic Filtration on Open-Source Field-Programmable Gate Arrays.* [Poster Presentation]. 22nd Annual Posters-at-the-Capitol, Frankfort, KY.

S. S. LeRose and C. B. Crawford. (**2024**). *Design and Implementation of Digital Logic Filtration on Open-Source Field-Programmable Gate Arrays.* [Poster Presentation]. 18th Annual Showcase of Undergraduate Scholars, Lexington, KY.

References

Dr. Christopher Crawford, Physics Professor, REU and IRES Director (Research Mentor)
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Dr. Max Brown, Instructional Designer and Physics Professor (SPS Mentor)
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Dr. Masaaki Kitaguchi, Associate Physics Professor (Research Mentor)
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Technical Skills

Computer Languages: Python, Verilog, LaTeX
Developer Tools: Spyder, Vivado, GitHub, GitLab, WSL (Ubuntu)
Languages: Intermediate Japanese