# LUKE WEAVER

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## EDUCATION

**Doctor of Philosophy in Physics** *GPA: IP*
Stanford University, School of Humanities and Sciences, Stanford, CA
Expected Graduation: May 2030

**Bachelor of Science in Physics, with Highest Honors** *GPA: 4.0*
Lehigh University, College of Arts and Sciences, Bethlehem, PA

**Awards and Honors**

Lehigh University Honors Convocation *Spring 2024, Spring 2025*
*Maintaining a 4.0 GPA for three years*

Goldwater Scholarship Nominee *Fall 2023*
*Selected as one of Lehigh University's Goldwater candidates*

Iacocca International Internship Program *Fall 2022*
*Highly selective fully funded international internship program*

**Relevant Coursework *(2021-2025)***
Nonlinear Optics, Plasma Physics, Quantum Mechanics II (Graduate Level), General Relativity, Selected Topics in Gravity and Quantum Field Theory, Quantum Field Theory, Introduction to String Theory

## PUBLICATIONS & PAPERS

**[1] Transport-Induced Decoherence of the Entangled Triplet Exciton Pair (Link)** *July 2025 – arXiv*
III, G. C., **Weaver, L. J.**, Rex, Z., & Biaggio, I. (2025). Transport-Induced Decoherence of the Entangled Triplet Exciton Pair. *arXiv [Quant-Ph]*. Retrieved from http://arxiv.org/abs/2507.23770

**[2] Slosh Measuring Sensor System for Liquid Carrying Robots (Link)** *November 2024 - IEEE Sensor Letters*
***L. J. Weaver**, S. M. B. P. Samarakoon, M. A. V. J. Muthugala, M. R. Elara and Z. S. Saldi, "Slosh Measuring Sensor System for Liquid Carrying Robots," in IEEE Sensors Letters, doi: 10.1109/LSENS.2024.3473688.*

**[3] Characterization and Simulation of the H6 Secondary Beamline for Beam Spot Reduction (Link)** *October 2024 - CERN Document Server (CDS)*
***Weaver, L.** (2024). Characterization and Simulation of the H6 Secondary Beamline for Beam Spot Reduction. CERN Document Server.*

**[4] Persistence of Spin Coherence in a Crystalline Environment (Link)** *July 2024 – Physical Review Letters*
*Curran, G., Rex, Z., Xallan Wilson, C., **Weaver, L. J.**, & Biaggio, I. (2024). Persistence of Spin Coherence in a Crystalline Environment. Phys. Rev. Lett., 133, 056901. doi:10.1103/PhysRevLett.133.056901*

## RESEARCH EXPERIENCE

**Lehigh University, Bethlehem PA,** Undergraduate Research Assistant *December 2022 – August 2025*

- Worked with femtosecond laser to induce fluorescence and detect its dynamics by time-correlated single photon counting
- Used MatLab and Python to analyze data on photon arrival times and extract fluctuations connected to quantum interference
- Worked on theoretical analysis of entangled spin states in pairs of triplet excitons generated by singlet fission
- Co-Author of paper published in Physical Review Letters, highlighted as an Editor's Suggestion [4]
- Co-Author of preprint [1]

**European Organization for Nuclear Research (CERN), Switzerland,** Research Intern *June – August 2024*

- Worked in Beams Department (BE-EA-LE) to develop proposal for extension of the H6 Secondary Beamline to further focus particle beam
- Created solutions using Methodical Accelerator Design (MAD-X) framework and modeled entire beamline using Beam Delivery Simulation (BDSIM), utilizing Monte Carlo techniques to simulate the beamline, obtaining estimates for performance
- Designed and performed experiment varying quadrupole (focusing magnet) strengths to confirm simulated results and determine emittance of the beam
- Wrote report accessible in the CERN Document Server [3]

**Singapore University of Technology and Design, Singapore,** Research Assistant *June – August 2023*

- Designed and soldered sensor array to measure surface displacement of water mounted on a robot
- Wrote hardware level code to implement communication between devices including Serial, Bluetooth, and $I^2C$ protocols
- Made programs to utilize Delaunay Triangulation and Cubic spline interpolation (in Python and MatLab) to construct a three-dimensional map of the water over time
- First author of paper published in IEEE Sensor Letters [2]

**Fruitful, LLC, New York,** Independent LLM Researcher *January – February 2023*

- Performed a large-scale literature review pertaining to the efficacy and viability of developing an LLM for use in a domain specific area
- Determined useful metrics to facilitate comparison of the current LLMs
- Compiled both a document and presentation including all relevant information and presented findings to organization

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## TEACHING EXPERIENCE

**Lehigh University,** Apprentice Teacher for Advanced Physics Lab (PHY 220 & PHY 221) *August 2024 – December 2024*

- Wrote lectures and presented to students on the topics of circuit analysis, phasor and Laplace transformations, Lock-In Amplifiers, Python programming, and firmware/software development
- Assisted students with completing lab work and troubleshooting efforts
- Graded and provided feedback on lab papers

**Lehigh University,** Peer Tutor *August 2023 – May 2025*
(MATH 075, MATH 076, ECE 033, ECE 081, PHY 21)

- Facilitate group tutoring sessions with 10+ students
- Outline problem solving frameworks and present short lectures on the class material
- Reinforced core concepts in small group sessions

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## PROFESSIONAL EXPERIENCE

**Passr Technologies, LLC,** Co-Founder *December 2021 – Present*

- Implement front-end and back-end features
- Manage product and project trajectory
- Consider and direct UI/UX interactions and enhancements

**Quantum Dynamix, LLC, Lancaster PA,** Freelance Software Engineer. *February 2022 – May 2022*

- Identified and generated solutions to remove bugs and improve stability
- Managed two websites and one web application–implementing new views and improving search algorithms
- Established professional relationships with clients to communicate expectations and project scope

**Benefix, LLC, Lancaster PA,** Associate Software Engineer *June 2019 – July 2021*

- Implemented front-end and back-end features and maintained software across the codebase
- Led large scale API integrations integral to the operations team, responsible for syncing 1,000+ clients between different databases
- Spearheaded a major redesign of the client workflow and facilitated design reviews for new features

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## SKILLS

- **Programming Languages/Frameworks –** Java, C++, JavaScript, Ruby, MatLab, Julia, Python, HTML/CSS/SCSS, SQL/PostgreSQL, Root, Beam Delivery Simulation (BDSIM)/GEANT4, MAD-X
- **Laboratory Skills –** Optics, Laser Usage, Cryostat Operation, Crystal Growth via Physical Vapor Deposition, Interferometry, Monochromator Operation, Crystal Microscopy
- **Hardware Development –** Arduino, Raspberry Pi, PCB/PCBA Development