

Gerald (Jace) Curran III

Education

Doctor of Philosophy in Physics

May 2022 – Expected Graduation Fall 2025

Lehigh University

Thesis: “The Entangled Triplet Pair State in Rubrene”

Advisor: Ivan Biaggio

Master of Science in Physics

September 2020 - May 2022

Lehigh University

Bachelor of Science in Physics (w/ Math minor)

January 2018 - May 2020

Kutztown University

4.0 Cumulative GPA

Publications

Persistence of Spin Coherence in a Crystalline Environment

Published 2024

Physical Review Letters 133 - <https://doi.org/10.1103/PhysRevLett.133.056901>

Selected as an Editor’s Suggestion

Transport-Induced Decoherence of the Entangled Triplet Exciton Pair

Submitted 2025

Currently in pre-publication/peer review

Research Experience

Graduate Research Assistant

Summer 2020 - Present

Lehigh University

- Published theory (transport-induced dephasing) to explain apparent lack of quantum beats in the zero field and off-axis high field limits in crystalline rubrene
- Devised scheme to use experimentally determined quantum beat frequencies as a probe of zero field parameters (D and E) in acene materials
- Developed Monte Carlo Hamiltonian-swapping simulation in MATLAB, to successfully predict observables of fluorescence in acene materials, including quantum beats, TID-driven decoherence, and ‘boost’/ ‘quench’ effects.

Undergraduate Research Assistant

Spring 2019 – Summer 2020

Kutztown University

- Programmed MATLAB simulation to explore the quantum hall effect in simplified conductor models under various topologies
- Mapped variations in the expected eigenenergy graph (the “Hofstadter Butterfly”) to changes in topology, inter-ring coupling, ring radius and perturbations
- Presented summer research poster at DAMOP 2019

Published Software

BeatBoostAnalyzer2024.m – Companion analysis software for PicoHarp .dat time-correlated photo counting files. Can analyze and fit quantum beats, with or without TID decay effects, and can automatically report ‘boost’ and phase parameters for a given data set with minimal user input.

SpinSim2025.m – Full numerical solution of the triplet pair Hamiltonian given both zero field splitting and electronic Zeeman effect (with small dipole-dipole effect considered). Inputs are unit cell geometry, ZFS parameters, and external field; outputs eigenvalues, singlet projection amplitudes, predicted ‘boost’ effect, and even predicted frequency and relative amplitude of quantum beats.

Conference Presentations

APS March Meeting 2025
Transport-Induced Dephasing (TID) in a Crystalline Environment

Represented the Biaggio Group at 2025 Department of Energy PI Meeting

Teaching Experience

Teaching Assistant	September 2020 – May 2021
Lehigh University	January 2024 - January 2025

- Lead two sections of ~26 students each in bi-weekly recitation lectures for introductory physics
- Recorded walkthrough videos for each homework, available after the submission period
- Received perfect 5/5 student evaluations, with 38% and 45% of students responding

Work Experience

Database Administrator & Front-End Developer	March 2017 – May 2020
International Institute for Learning	

- Constructed library of courses and course materials for international teaching organization (more than 500 courses with appendices, handouts, and other materials)
- Rescued at-risk, 1,200 question practice exam project with knowledge of python and xml

Project Manager / TARP Lead for E.PA	Jan 2014 – Jan 2017
AT&T	

- Promoted to market TARP lead, and saved AT&T \$600,000 through tower review program
- Developed and managed dozens of automated trackers & reports, using VBA for automation

Technical Skills

Programming:	MATLAB, Python, C++, C#, Java, AS3, VBA
Productivity Tools:	Excel, Word, PowerPoint, Miro, Trello, Slack