

# Emilio Peláez Cisneros

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## Education

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**Columbia University**  
Ph.D. in Physics

New York City, NY  
Incoming

**The University of Chicago**  
B.S. in Physics (Honors) and Mathematics, 3.9/4.0

Chicago, IL  
Expected June 2026

**Thesis:** Cross-Section of Pion Absorption in Liquid Argon in the LArIAT Experiment.

**Advisor:** Prof. Bonnie Fleming.

## Awards

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3. **Selove Summer Research Prize.** The University of Chicago, 2025.  
Awarded for outstanding research in Physics or Astronomy.
2. **Best Neutrino Talk.** New Perspectives at Fermilab, 2025.  
Awarded for best presentation in neutrino section.
1. **Jeff Metcalf Internship Award.** The University of Chicago, 2023 and 2024.  
Awarded funding for summer opportunities at Infleqtion and Fermilab.

## Research Experience

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**Neutrino Group at the University of Chicago**

November 2024–Present

- Perform cross-section measurement of pion absorption in liquid argon using data from the Liquid Argon in a Testbeam (LArIAT) experiment to decrease uncertainties in neutrino measurements.
- Commissioned data acquisition electronics and scintillating paddles for the Integrated Cryostat and Electronics Built for Experimental Research Goals (ICEBERG), a liquid argon time projection chamber used to test detector components and software to be used in the Deep Underground Neutrino Experiment (DUNE).

**Fermi National Accelerator Laboratory**

June 2024–October 2024

- Developed tools for double differential cross-section measurement of neutrino interactions with one muon and two protons in the final state in the Short Baseline Neutrino Detector (SBND) experiment.

**EPiQC at the University of Chicago**

September 2023–November 2024

- Researched the optimization of quantum gates for superconducting devices via optimal control techniques to reduce the effect of crosstalk between neighboring qubits at the design level.

## Professional Experience

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**Infleqtion**

*Software Engineer*

Chicago, IL

June 2023–March 2024

- Maintained the compatibility of Jaqalpaq, a quantum computing assembly language developed by Sandia National Laboratories, with modern Qiskit and Cirq versions.
- Collaborated in the development of Superstaq, a hardware-aware quantum circuit compiler, in preparation for its open-beta launch.

- Built an MVP of a quantum characterization, verification, and validation software tool, with protocols such as randomized measurement, direct fidelity estimation, and Pauli expectation value estimation.
- Automated the submission of application-level benchmarks across various quantum devices to measure and track advancements in hardware and Superstaq’s performance.

## Teaching Experience

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### UChicago Quantum Society

Chicago, IL

*Head of Education*

January 2023–September 2025

- Designed, planned, and executed annual quantum computing crash course to 50+ students spanning introductory topics across quantum hardware, software, and theory.

### University of Chicago Summer Session

Chicago, IL

*Teaching Assistant*

June 2025

- Mentored cohort of 51 high-school students in two-week career exploration program in Technology and Innovation.
- Designed add-on sessions at instructor’s discretion, led classroom discussion on a broad range of STEM topics, and guided students through a hackathon-style final project.

### University of Chicago Department of Mathematics

Chicago, IL

*Grader*

September 2024–June 2025

- Graded weekly homework assignments for 25+ students in an introductory calculus sequence and linear algebra course to ensure accurate assessment of student understanding and provide constructive feedback.

## Presentations

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### Contributed

#### 3. Pion Absorption Measurement in LArIAT

Gulf Coast Undergraduate Research Symposium at Rice University (October 2025); SBND Cross-Section Meeting (August 2025); Fermilab New Perspectives (June 2025).

#### 2. Two-Proton Interactions with the Short Baseline Neutrino Detector

SBND Cross-Section Meeting (October 2024).

#### 1. Average Circuit Eigenvalue Sampling on NISQ Devices

APS March Meeting (March 2024); Quantum Latino Conference (October 2023).

### Poster

#### 1. Pion Absorption Measurement in LArIAT

International Conference on Neutrino Physics and Astrophysics (Upcoming June 2026).

## Publications

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### Pre-Prints

2. **E. Pelaez**, V. Omole, P. Gokhale, R. Rines, K. N. Smith, M. A. Perlin, and A. Hashim. “Average circuit eigenvalue sampling on NISQ devices”. 2024. arXiv: 2403.12857 [quant-ph]. URL: <https://arxiv.org/abs/2403.12857>.

1. **E. Pelaez**, A. Das, P. S. Chani, and D. Sierra-Sosa. “Euler-Rodrigues Parameters: A Quantum Circuit to Calculate Rigid-Body Rotations”. 2022. arXiv: 2203.12943 [quant-ph]. URL: <https://arxiv.org/abs/2203.12943>.

### In Review

1. A. J. Goldschmidt, **E. Pelaez**, R. Sitler, K. Olsson, K. N. Smith, and G. Quiroz. “Quantum Noise Suppression at Scale with Crosstalk-Robust Gate Sets”. 2026. arXiv: 2603.15758 [quant-ph]. URL: <https://arxiv.org/abs/2603.15758>. Submitted to PRX Quantum.