Samuel Vasquez

(916) 960-8680 | samuel.vasquez@stonybrook.edu | sam-vasquez.github.io | sam-vasquez | samcv234

Education

Stony Brook University Aug. 2024 - Present

Additional Education (Non-Matriculated) *Stony Brook, NY*

Coursework: Statistical Mechanics, Quantum Information Science, Science Communication.

Anticipated Coursework: Advanced Statistical Mechanics, Computational Chemistry, Quantum Programming.

Carnegie Mellon University Aug. 2018 - May 2023

Bachelor of Science in Physics *Pittsburgh, PA*

Relevant Coursework: Principles of Imperative Computation (Data Structures), Computational Physics (Numerical Methods), Advanced Computational Physics (Parallel and High-Performance Computing), Modern Physics Laboratory (Laboratory Physics)

Experience

Undergraduate Research Assistant May 2021 - May 2022

Carnegie Mellon University *Pittsburgh, PA*

Advisor: Diana Parno

Modified a data analysis framework for a modelled simulation of a high energy neutrino physics experiment to better characterize radioactive products from beam spills and their contribution to neutrino flux.

- Adapted a simulation built with the Geant4 toolkit for C++ to process ionizing radiation events from the passage of neutrinos through matter.
- Rewrote data structures to extend functionality of the simulation output code to support new simulated processes.
- Analyzed resulting output data using the ROOT data analysis framework and generated visualizations through a command line interface.
- Interpreted and presented the impact of simulated radioactive processes on neutrino generation.

Undergraduate Research Assistant Aug. 2022 - June 2023

Carnegie Mellon University *Pittsburgh, PA*

Advisor: Riccardo Penco

Investigated the action of the classical double copy on pure gauge fields and corresponding spacetimes.

- Applied principles of covariant classical field theory to
  - demonstrate failure of the Kerr-Schild prescription to determine a non-trivial single copy field corresponding to an O(N) monopole configuration,
  - determine a general form of a class of solutions to vacuum Maxwell's equations that are compatible with interpretation as a single copy field,

  using a tensor analysis package for Mathematica.

Undergraduate Tutor Aug. 2022 - Dec. 2022

Carnegie Mellon University *Pittsburgh, PA*

- Led a group tutoring session to provide academic support to physics students for upper division core subjects such as classical mechanics, quantum theory, and statistical physics.
- Assisted 10-20 students twice a week with problem-solving strategies for homework assignments and exam preparation.

Undergraduate Teaching Assistant Aug. 2021 - Dec. 2021

Carnegie Mellon University *Pittsburgh, PA*

Course: Introductory Classical Mechanics

- Collaborated with teaching staff to deliver recitation-style lectures to a class of 30 first-year students.
- Taught and clarified concepts on homework assignments and worksheets.
- Provided feedback and resolved questions about students' work on their activities.

Honors & Awards

2021 **Pennsylvania Space Grant Consortium Fellowship,** to support summer research.

Presentation

APS Fall Meeting of the Division of Nuclear Physics Oct. 12 2021

Conference Experience for Undergraduates *Boston, MA (Remote)*

- Poster Title: Neutrino Flux from Beta-Decaying Isotopes at the SNS

Skills

Programming Languages	Python (Scipy, Pandas, Matplotlib), C, HTML
High Performance Computing	MPI, OpenMP, OpenACC
Scientific Software	Mathematica, LaTeX, Geant4, ROOT
Mathematics	Linear Algebra, Numerical Analysis and Optimization
Unix-like Systems	Basic familiarity with configuration and scripting for personal use.