SPIROS MANOLAS

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EDUCATION

Stony Brook University Jun. 2023 - May 2027
B.S. in Applied Mathematics & Statistics; Mathematics GPA: 3.93
Minor in Mechanical Engineering

Coursework: Numerical Methods for PDEs (Graduate); Intro to Scientific Programming in C++ (Graduate); Numerical Analysis; Intro to Fluid Mechanics; Applied Real Analysis; Computational Geometry; Intro to Quantum Computing & Applications (Graduate); Applied Complex Analysis

RESEARCH EXPERIENCE

Stony Brook University, Department of Applied Math & Statistics Mar. 2025 - Present
Undergraduate Researcher | Dr. Charalampos Markakis

· Develop mesh-less Lagrangian particle method for relativistic compressible fluid dynamics

Stony Brook University, Department of Mechanical Engineering Sep. 2024 - Present
Undergraduate Researcher | Dr. Shikui Chen - Computational Modeling, Analysis, Design and Optimization Lab

· Develop a novel non-linear topology optimization algorithm using a prescribed force displacement curve to design bi-stable devices that allow for more control over device behavior, with applications for brain aneurysm devices.
· Implement work in a MATLAB-based non-linear topology optimization code.
· Research supported by New York NASA Space Grant Research Award.

Los Alamos National Laboratory, X-Computational Physics Division Jun. - Aug. 2025
Student Summer Researcher | Dr. Mikhail Shashkov & Dr. Nathanial Vaughn-Kukura

· Developed one-dimensional multi-velocity capabilities for arbitrary Lagrangian Eulerian multi-material hydrocodes using a contact-force procedure, enabling normal contact mechanics, an essential capability for various Multiphysics Simulations.
· Derived contact force formula and designed test cases to demonstrate our contact-force procedure's capabilities.
· Implemented work in a Python-based one-dimensional Arbitrary Lagrangian Eulerian (ALE) hydrocode.

Stony Brook University, Department of Applied Math & Statistics Jan. - Dec. 2024
Undergraduate Researcher | Dr. Hyun-kyung Lim

· Investigated quantum error mitigation for the Quantum Approximate Optimization Algorithm (QAOA), seeking to demonstrate quantum computational advantages in combinatorial optimization problems using NISQ devices.
· Explored the usage of linear programming, openMP, and MPI for applications in optimization problems in quantitative finance, specifically for those relating to FARIMA-FIGARCH models.

Emory University, Department of Mathematics Jun. - Jul. 2024
Undergraduate REU Researcher | Dr. Nicole Yang

· Researched the usage of a Conditional Continuous Normalizing Flow (CCNF) generative model to solve ill-posed inverse problems in medical imaging.
· Tested various, and determined the optimal, condition input to use for the model architecture.
· Developed code to test model against a baseline solution.

· Implemented work in a Python code using High-Performance Computing (HPC) resources.

AWARDS & HONORS

Nominated for Barry Goldwater Scholarship *(Final application still under review)* 2026

Student Travel Grant to 2026 Joint Mathematics Meeting 2026

New York NASA Space Grant Research Award (× 2) 2025 & 2026

Academic Achievement Award, Stony Brook University (× 2) 2025 & 2026

Princeton Prospective Ph.D. Preview (P3) Scholar 2025

Out 4 Undergrad Engineering Travel Grant & Alumnus 2025

Computational Physics Summer Workshop Fellowship, Los Alamos National Laboratory 2025

Student Travel Award to SIAM CSE25 Conference 2025

Tau Beta Pi Engineering Honor Society 2024

Simons STEM Scholar Full Scholarship, Stony Brook University 2023

PREPRINTS

Delgado, C, **Manolas, S**, Vaughn-Kukura, N, and Shashkov, M. One-Dimensional Multi-Velocity Capabilities for Arbitrary Lagrangian-Eulerian Normal Contact Mechanics. (2025)
https://doi.org/10.2172/2998230

POSTER AND ORAL PRESENTATIONS

Joint Mathematics Meeting 2026
One-Dimensional Multi-Velocity Capabilities for Arbitrary Lagrangian-Eulerian Normal Contact Mechanics; Paper presented at AMS Contributed Session on Mathematical Physics.

Los Alamos National Laboratory Student Symposiums 2025
One-Dimensional Multi-Velocity Capabilities for Arbitrary Lagrangian-Eulerian Normal Contact Mechanics

Celebration of Undergraduate Research & Creativity, Stony Brook University 2025
Designing Bistable Brain Aneurysm Implants Via an Integrated Non-Linear Topology Optimization and Conformal Geometry Approach.

SIAM Computational Science & Engineering (CSE) Conference 2025
Optimal Experiment Design and Image Reconstruction using Generative Methods.

MIT Undergraduate Research Technology Conference 2025
Optimal Experiment Design and Image Reconstruction using Generative Methods.

SPECIAL PROJECTS

Markov-Chain Model for Disease Spread in C++ 2025

· Developed and implemented a Markov-Chain approach to model the evolution of a population during a disease outbreak in C++

· Documented code with doxygen-style comments & utilized version control with GitHub
https://github.com/spirosManolas/AMS562_FinalProject.git

Predator-Prey Modeling 2024

- Implemented the Classical Runge-Kutta Method to perform numerical simulations of various predator-prey relationships in Python.
- Utilized version control with GitHub.
  https://github.com/spirosManolas/AMS325-PredatorPreyModel.git

WORKSHOPS AND TRAINING

Computational Research Methods For Plasma Physics & Sciences Virtual Seminar 2026

- Will participate in workshop series focusing on focuses on developing Python-based skills including simulation methods, Monte Carlo methods, differential equation solvers, and data-driven methods like machine learning, with a focus on applications for plasma physics.

Los Alamos National Laboratory Computational Physics Summer Workshop 2025

- Participated in a 10-week long computational physics-focused lecture series, covering topics such as hydrodynamics, finite-element methods, and computational plasma physics.
- Completed a mentored computational physics research project in collaboration with a partner.

Turkana Basin Institue Research Abroad Experience 2025

- Collaborated with a diverse team of scientists during a 3-week immersive research experience in Kenya.
- Developed a deeper understanding of the scientific process, sustainability efforts, and the importance of interdisciplinary research in addressing global challenges.
- Conducted fieldwork and data collection in Nairobi, Naivasha, and Turkana on projects addressing climate change, paleontology, and sustainability.

PROFESSIONAL & TEACHING EXPERIENCE

Stony Brook University, Department of Applied Math & Statistics Jan. 2026 - Present
Teaching Assistant - Computing & Proramming Fundamentals in AMS, AMS 325

- Hold weekly office hours to help students better understand concepts and strengthen their skills in using Python and Mathematica for applications in scientific computing, data structures, and algorithms. Grade Student work.

Stony Brook University, Simons STEM Scholars Program Aug. 2025- Dec. 2025
Teaching Assistant - Research and Discovery in STEM, SSP380

- Assisted with lesson planning and grading of student work.
- Taught and created assignment for lecture on abstract writing.
- Assisted students with understanding of course material and assignments.

West Palm Test Prep May. 2024 - Present
Ace Tutor

- Tutor students for a variety of college, college-level, and high school subjects.
- Plan lessons and effectively coordinate with other tutors.
- 200+ hours of tutoring.

Stony Brook University, Department of Applied Math & Statistics Jan. - May 2025
Teaching Assistant - Applied Calculus III, AMS 261

- Held weekly office hours to help students better understand concepts and strengthen their skills in multivariate calculus.

LEADERSHIP AND VOLUNTEERING

Stony Brook University, College of Engineering & Applied Sciences Aug. 2025 - Present
Peer Mentor

· Guide three first-year area-of-interest mentees through acclimating to university life by assisting them in their academic, professional, and social growth through weekly mentoring meetings.

Stony Brook University, Simons STEM Scholars Program Aug. 2025 - Present
Peer Mentor

· Guide three first-year mentees through acclimating to university life, procuring research opportunities, and expanding their network through bi-weekly mentoring meetings.

Spectra Mar. 2025 - Present
Profession Committee Member

Stony Brook University, Simons STEM Scholars Program Oct. 2024 - Present
Cohort Representative to the Programmatic Student Government

· Represent the academic and personal needs of 29 fellow scholars as a liaison and advocate to program staff.
· Responsible for planning events, advocating students' needs to program staff, informing students of duties.
· Work with team of co-representatives to effectively achieve goals.

Stony Brook University Student Chapter of SIAM May. 2024 - Present
President (Previously Treasurer & Social Media Chair)

· Lead the student chapter in organizing events and setting long-term goals.
· Effectively organize E-Board meetings and delegate tasks.
· Facilitate the creation of community among Applied Mathematics students at my university.
· Event highlights: Research workshop, Professor Talk, and starting my university's first Applied Math Research Day.

Stony Brook University Student Chapter of AIAA Mar. 2024 - Present
Public Relations Chair

· Create posters and advertisements for AIAA events.
· Help plan a variety of AIAA events focused on professional development and community building.
· Effectively collaborate with fellow E-board members to meet goals.

Sustainable Horizons Institute Apr. 2025 - Nov. 2025
Volunteer

· Assisted in the creation and holding of CULTIVATE Conversations and the Computational Research Leadership Council Seminar Series, a series of webinars for aspiring early-career researchers with interests in the Computational Sciences.

TECHNICAL SKILLS

Computer Languages	C++, MATLAB, Python, Java
Tools	OpenMP, Git/GitHub, Doxygen-Style Documentation, LaTeX