Sean E. Li

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Education

Bowdoin College — **Brunswick, ME**
B.A. Physics; Minor: Mathematics — May 2023

Relevant Courses: Methods of Theoretical Physics (3000), Astrophysics (2510), Nuclear and Particle Physics (2260), Methods of Computational Physics (3020), General Relativity (3500), Quantum Mechanics (3140), Fields, Particles, and Symmetries (3200), Electromagnetism (3130), Methods of Experimental Physics (3010), and Honors Project (4050, 4051).
Honors Project: Properties of Slicing Conditions for Charged Black Holes.

Hamilton-Wenham Regional High School — **Hamilton, MA**
Valedictorian of the Class of 2019 — June 2019

Relevant Courses: AP Physics C: Mechanics and AP Physics C: Electricity and Magnetism.

Research Experience

Bowdoin College Department of Physics and Astronomy — **Brunswick, ME**
Summer Research, PI: Thomas W. Baumgarte — June–August 2022

Analyzed the properties of a set of gauge choices, known as Bona-Massó slices, for Reissner-Nordström spacetimes.
Used Mathematica to assist with analytical calculations and Python for numerical integration and plotting.

Honors Project, Mentor: Thomas W. Baumgarte — September 2022–present

Investigated late-time oscillations of the central lapse observed for a gauge-shock-avoiding slicing condition.
Used a radial perturbation approach to recover harmonic oscillation of the location of the black-hole puncture.
Preparing a thesis for the Department of Physics and Astronomy.

Publications

S. E. Li, T. W. Baumgarte, K. A. Dennison, and H. P. de Oliveira, Dynamical perturbations of black-hole punctures: Effects of slicing conditions, Phys. Rev. D **107**, 064003 (2023).

S. E. Li, T. W. Baumgarte, K. A. Dennison, and H. P. de Oliveira, Bona-Massó slices of Reissner-Nordström spacetimes, Phys. Rev. D **106**, 104049 (2022).

Presentations and Posters

S. E. Li, T. W. Baumgarte, K. A. Dennison, and H. P. de Oliveira, Dynamical perturbations of black-hole punctures: Effects of slicing conditions, APS April Meeting, Hilton Minneapolis, Minneapolis, MS, April 2023.

S. E. Li, T. W. Baumgarte, K. A. Dennison, and H. P. de Oliveira, Bona-Massó slices of Reissner-Nordström spacetimes, President's Summer Research Symposium, Bowdoin College, Brunswick, ME, October 2022.

Awards and Fellowships

Bowdoin College — **Brunswick, ME**
Student Faculty Research Grant Fellowship — May 2022
Sarah and James Bowdoin Scholar Book Award — October 2020
Bowdoin Faculty Scholarship — April 2019

Hamilton-Wenham Regional High School — **Hamilton, MA**
National AP Scholar — July 2019
Science Achievement Award — May 2019
Mathematics Achievement Award — May 2019

National Endowment for the Humanities — **Washington, D.C.**
National Endowment for the Humanities Scholar — June 2018

Teaching and Mentoring

Baldwin Center for Learning and Teaching — Bowdoin College **Brunswick, ME**
Learning Assistant for Introductory Physics II September 2022–present

Hosting weekly one-hour practice-problem and review sessions for nine students.
Focusing on developing critical thinking and general problem-solving skills.

Learning Assistant for Introductory Physics II February–May 2022

Tutored an individual student in weekly one-hour meetings.

McKeen Center for the Common Good — Bowdoin College **Brunswick, ME**
Brunswick High School Mentoring October 2019–present

Mentoring a student at Brunswick High School in weekly one-hour after-school meetings.

Professional Experience

Bowdoin College Department of Physics and Astronomy **Brunswick, ME**
Grader for Statistical Physics January 2023–present
Grader for Introductory Physics II September 2022–present

Grading problem sets and writing feedback on student solutions.
Emphasizing conceptual understanding and approach above numerical results.

Physics Communication Assistant September 2022–present

Writing articles for the physics department website, including interviews of students.
Using a content mangement system (CMS) to design, update, and publish webpages.

Faculty Search Student Interviewer November–December 2021

One of three physics students who interviewed three final candidates for a tenure-track astrophysics professorship.
Completed a workshop on implicit bias and diversity, equity, and inclusion in the hiring process.
Collaborated to prepare an interview script and criteria for evaluation and conducted one-hour interviews.

Programming Experience

Riverside Research Institute **Lexington, MA**
Systems Engineering Intern June–August 2021

Developed a software framework for accessing a custom computational electromagnetics simulation tool and an interactive visualization of simulated radar cross section in 4π steradian space using Python and shell scripting.

Software Engineering Intern June–August 2020

Created a graphic user interface and backend logic for data entry and nonlinear curve fitting with Kotlin, to be integrated with a program for radar systems maintenance and analysis.

Software Engineering Intern June–August 2019

Worked on automated metadata extraction from technical documents using heuristic image processing algorithms and convolutional neural networks with Python `OpenCV` and `tensorflow`.

Outreach and Leadership

Bowdoin College Society of Physics Students (SPS) **Brunswick, ME**
Member and Liaison for the Physics Department Coordinator January 2021–present

Organizing and helping execute physics department events. Facilitating weekly one-hour SPS meetings.

Hamilton-Wenham Regional High School Robotics Team **Hamilton, MA**
Co-Founder and Co-Captain September 2018–June 2019

Helped establish and lead the school's FRC (First Robotics Competition) team.
Wrote grant applications and led the team's electrical engineering division.

Massachusetts Mathematics League Team Captain September 2017–June 2019

Facilitated weekly one-hour practices and attended monthly competitions.

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