Bri Aleman

baleman003@gmail.com | github.com/brialeman | linkedin.com/in/bri-aleman

Trained in gravitational-wave astronomy and numerical methods, I seek to bridge the gap between gravitational-wave observations and theory through simulating black holes and neutron stars. I aspire to contribute not only through groundbreaking research, but also by promoting an inclusive and diverse environment.

EDUCATION

California State University, Northridge Northridge, CA
Honors B.S. in Astrophysics, GPA 3.7 May 2026
Relevant Coursework: Classical Mechanics I & II, Electromagnetism I & II, Quantum Mechanics I & II, Thermodynamics and Statistical Mechanics I, Astrophysics (Celestial Mechanics, Stellar Structure and Evolution, Radiative Processes), Numerical Methods in Physics, Graduate Astrophysics Seminar, General Relativity

College of the Canyons Santa Clarita, CA
A.S. in Physics (Cum Laude) June 2023
A.S. In Mathematics (Cum Laude) June 2023

RESEARCH EXPERIENCE

NumRel - Pennsylvania State University State College, PA
Research Assistant May 2025 – Present

- Conducted research under David Radice on gravitational wave emission from phase-transition–induced collapse of neutron stars using AthenaK numerical relativity simulations on high-performance computing (HPC) clusters
- Analyzed simulation output through Python-based data processing, generating plots and animations to interpret collapse dynamics, gravitational waveforms, and EOS signatures
- Reported on HPC sustainability and investigated methods to lower power usage of simulations
- Presented research findings in reports and at national conferences, including AAS and APS
- Participated and supported in program as a Cal-Bridge scholar

LIGO - Caltech Pasadena, CA
Research Assistant June 2024 – Present

- Conducted research under Derek Davis on classification of transient noise in LIGO data using packages such as GWpy, gwdetchar, GravitySpy
- Developed and tested OmegaNeuron, combining existing machine learning models to automate transient noise identification
- Integrated machine learning models from GravitySpy to analyze noise across spectrograms, addressing issues in high-dimensional datasets and human bias
- Presented research at national conferences like AAS and APS, and to relevant audiences, including the LIGO detector characterization team and GravitySpy team.
- Paper in progress (about to submit to PRD)

Bri Aleman

FELLOWSHIPS AND MEMBERSHIPS

- **Cal-Bridge Undergraduate Research Fellow** **2024 - Present**
  - Participated in extensive professional development through the Cal-Bridge Program, including graduate school preparation, research skill building (Python, data analysis, scientific writing), mentorship, networking, and conference support. Engaged in multiple opportunities to present research and connect with faculty and peers across the CSU and UC systems.

- Society of Physics Students (SPS) Vice President, CSU Northridge 2024 - 2025
  - Coordinated outreach events for students and locals
  - Held informational sessions and workshops on available resources provided at CSUN

- APS Member 2024 - Present
- National Society of Hispanic Physicists (NSHP) Member 2024 - Present

TEACHING/WORK EXPERIENCE

California State University Northridge Northridge, CA
Peer Learning Facilitator August 2025 - Present

- Assisted course instructor with grading quizzes and exams for large class (55+ students)
- Collaborated with course instructor to track student progress, address learning gaps, and reinforce concepts through individualized support
- Held office hours and provided support for students in General Physics II

California State University Northridge Northridge, CA
Peer Learning Facilitator January 2025 - May 2025

- Guided physics students in writing Python code for scientific computing, including tasks such as interpolation, Pandas for data analysis, and visualization using matplotlib
- Taught practical skills in Unix/Linux command-line usage, remote computing, and accessing computing clusters for data-driven projects
- Collaborated with course instructor to track student progress, address learning gaps, and reinforce concepts through individualized support, code review, and office hours

DIY Girls San Fernando, CA
Instructional Aide September 2023 - July 2025

- Developed project-focused astronomy-based curriculum consisting of middle school appropriate lectures and hands-on activities
- Utilized Python and Pandas to preprocess and organize client data for integration into Salesforce
- Supported middle school girls and gender-expansive youth in hands-on STEM projects, including soldering, circuitry, power tool usage, 3D printing, and collaborative design

- Assisted with day-to-day office operations, including inventory tracking, materials organization, and project preparation

College of the Canyons Santa Clarita, CA
Instructional Aide January 2023 – January 2025

- Tutored college level students in subjects such as General AND Lower Division Physics (Mechanics/Electromagnetism/Modern Physics), Mathematics (Algebra to Differential Equations), and General Chemistry
- Supported and guided diverse student populations, adapting explanations to meet varying academic backgrounds and learning styles
- Collaborated with faculty and staff to create an inclusive and academically supportive environment for students across STEM disciplines

SCV In Home Tutoring/Various Tutoring Positions Santa Clarita, CA
Tutor May 2021 – August 2023

- Tutored for K-12 math and science students, both in home and with the Mathnasium Learning Center
- Assigned assessments and developed appropriate learning plans based on students' individual needs
- Discussed student progress with parents/guardians/staff and made necessary updates to curriculum accordingly

PUBLICATIONS

Aleman, B and Davis, D. *OmegaNeuron: Applying GravitySpy Similarity Methods to the Search for LIGO Glitch Witnesses*, in process to be submitted to Phys. Review D. Paper draft available.

Aleman, B and Radice, D. *Phase-Transition-Induced Collapse of Neutron Stars*, in preparation.

COMPUTATIONAL SKILLS

Python (Advanced):
GWpy, gwdetchar, gwosc, GravitySpy, MatPlotLib, Numpy, Pandas, Sci Kit Learn
C++ (Intermediate):
AthenaK, GDB for debugging, CMake, building and compiling scientific codes
General:
High-performance computing (HPC), job submission and debugging in HTCondor and Slurm, Git/Github, Bash scripting, Unix/Linux, Jupyter, Conda and environment management, interpolation methods, numerical methods, time-series analysis, high-dimensional datasets, data preprocessing, post-processing, plotting and scientific visualizations and animations

Bri Aleman

PRESENTATIONS

- **"Phase-Transition-Induced Collapse of Neutron Stars"**
  - AAS Meeting, *Phoenix, AZ* — Jan 2026
  - Cal-Bridge Symposium @ UCI, *Irvine, CA* — Oct 2025
  - CSUN Colloquium, *Northridge, CA* — Sep 2025
  - Penn State REU Symposium, *State College, PA* — Aug 2025
- **"Automating LIGO Glitch Witness Identification with OmegaNeuron"**
  - LIGO DetChar Meeting, *Virtual* — Jan 2026
  - APS Global Summit, *Anaheim, CA* — Mar 2025
  - AAS Meeting, *National Harbor, MD* — Jan 2025
  - Cal-Bridge Symposium @ UCI, *Irvine, CA* — Sep 2024
  - Caltech LIGO SURF Symposium, *Pasadena, CA* — Aug 2024
  - LIGO DetChar. Meeting, *Virtual* — Aug 2024

LECTURES/WORKSHOPS

- "Black Hole - Neutron Star Mergers" — Nov 2025
  Lecture @ CSU Northridge, CA
- "Applying to Research Experiences for Undergraduates (REUs)" — Nov 2025
  Workshop @ CSU Northridge, CA
- "Neutron Stars 101 - What We Know" — Nov 2025
  Lecture @ CSU Northridge, CA
- "Origin and Evolution of Multiple Star Systems" — Sep 2025
  Lecture @ CSU Northridge, CA
- "Cal-Bridge Scholarship Information Session" — Mar 2025
  Workshop @ CSU Northridge, CA

AWARDS

- College of Science and Mathematics Edison STEM Scholarship — 2025
- Victor M. Blanco Fellowship — 2024

- Remo & Ami Belli Percussion Scholarship 2023
- Southern California Edison STEM Scholarship 2023