# Sage Li

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*My website has pictures of my research/projects!*

## EDUCATION

**Georgia Institute of Technology**　　　　　　　　　　　　　　　　　　　　　Atlanta, GA
*Master of Science in Computational Data Analytics*　　　　　*Aug. 2024 – May 2026 (Projected)*

**Georgia Institute of Technology**　　　　　　　　　　　　　　　　　　　　　Atlanta, GA
*Bachelor of Science in Physics*　　　　　　　　　　　　　　　　　*Aug. 2020 – May 2024*

## EXPERIENCE

**Computational Astrophysics Intern**　　　　　　　　　　　　　　　May 2025 – Current
*Astronomy and Astrophysics Analytics Group, Lawrence Livermore National Laboratory*　　　*Livermore, CA*
- Derived custom chi-squared loss functions in Python for high-precision asteroid orbit curve fitting.
- Optimized nonlinear orbital-element solvers to improve robustness and decrease convergence time.
- Derived and implemented a custom convolutional kernel to enhance source detection in crowded astronomical fields, significantly boosting sensitivity and suppressing background noise.
- Architected an end-to-end workflow spanning data collection, analysis, and compilation, enabling scalability and parallelism on LLNL supercomputers.

**Research Intern**　　　　　　　　　　　　　　　　　　　　　May 2022 – May 2023
*NASA Ames Research Center*　　　　　　　　　　　　　　　　　*Mountain View, CA*
- Managed HPC resources to simulate stellar fluid dynamics.
- Architected simulation setup pipelines in Python, reducing runtime over older versions by over 70%.
- Introduced new functionality to fluid simulations, allowing consideration of magnetic field effects.
- Utilized Numpy, Pandas, and SciPy to conduct and automate time-series analysis on 100+ TB of data.

## PROJECTS

**General Relativistic Ray Tracer** | *Python, NumPy, Numba (CUDA), Matplotlib, Numerical Methods*
- Developed a general relativistic simulation framework in python (numba), tracing photon trajectories in Schwarzschild spacetime by numerically solving null geodesic equations with a fourth order Runge–Kutta integrator.
- Optimized GPU grid/block configurations to achieve a 300+ times speedup over CPU-based code.

**Hit Error Analysis** | *Python, Pandas, Numpy, pymc (MCMC), tkinter*
- Conducted a Bayesian analysis on user hit error for online rhythm game "osu!".
- Utilized a hierarchical model to isolating high-impact parameters on game performance.
- Developed novel algorithms for object-hit association, improving runtime over similar programs by over 80%.
- Created a GUI-based dashboard application for seamless integration of data visualization and collection.

## PUBLICATIONS

**Li, S.**, Geringer-Sameth, A., Golovich, N. (2025). An automated probablistic asteroid prediscovery pipeline. *In Review.*

Kitiashvili, I., Wray, A., **Li, S.**, Granovsky, S., & Mullaney, K. (2023) ., Advances in 3D realistic modeling of solar-type stars to study stellar jitter and photospheric and subsurface dynamics [Abstract]. *American Astronomical Society Meeting Abstracts*, 55(2), 316.01.

## AWARDS

**Bloomberg BPuzzled Global Finals** – Selected to represent Georgia Tech after winning qualifiers and placed third in a problem solving and logic-based puzzle competition against global and domestic universities.

**LLNL PLS Poster Symposium Best In Show** – Selected as best Physics-related poster and presentation out of 130 contestants for my poster *Asteroids in Hiding: Determination of Asteroid Orbits with Prediscoveries.*

## TECHNICAL SKILLS

**Quantitative**: Mathematics, Statistics, Physics, Data Structures/Algorithms, Machine Learning
**Programming**: Python, R, SQL, Java, JavaScript, MATLAB
**Frameworks & Libraries**: HPC, CUDA, NumPy, Pandas, Scipy, Matplotlib, plotly, scikit-learn, PyTorch, Numba, OpenCV
**Tools & Platforms**: Linux, Bash, regex, Git/GitHub, Jupyter Notebook, Google Firebase, AWS, Docker, Kubernetes
**Languages**: English, Chinese (Mandarin), Japanese