

Joshua Lin

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EDUCATION

Princeton University, A.B. Mathematics

(Expected) Aug 2023 - May 2027

Minors in Computer Science, Statistics & Machine Learning

GPA: 3.8/4.0

- Relevant Coursework: Linear & Nonlinear Optimization[†], Machine Learning Theory[†], Functional Analysis[‡], Complex Analysis, Algorithmic Game Theory, Theory of Algorithms, Probability & Stochastic Systems.
- Awards & Activities: Princeton Physics Pyka Memorial Prize for “promise in independent research,” ACM Competition Chair, Tournaments Officer for Princeton Quantitative Traders, Tour Director for the Princeton Debate Panel.

[†] Denotes graduate coursework. [‡] Denotes upcoming fall coursework.

EXPERIENCE

Statistical Astrophysics Researcher

Oct 2024 - Present

Princeton Astrophysical Data Laboratory

Princeton, NJ

- Developed a message passing neural network (MPNN) in PyTorch Geometric to optimize class-level time allocations between spectrographic fibers and targets. Achieves 98.7% of theoretical upper bound for desired objective.
- Building a graph attention network (GAT) to efficiently solve high-dimensional, NP-hard combinatorial optimizations for exposure-level galaxy interactions by modeling the system with heterogeneous bipartite graphs.
- My work will guide the [Prime Focus Spectrograph](#)’s second-year exposures starting Fall 2025. [The PFS is an international consortium of over twenty-five universities/national laboratories to study [galaxy evolution](#).] Advised by Peter Melchior.

Directed Reading Program Participant

Jun 2024 - Aug 2024

Princeton Mathematics Department

Hybrid | Princeton, NJ

- Accelerated one-on-one study of topics in general relativity and cosmology, with the requisite semi-Riemannian geometry.
- Studied under Anthony Coniglio; program coordinated by Sergiu Klainerman.

Mathematics Teaching Assistant

Jun 2024 - Aug 2024

Jane Street Capital

New York, NY

- Taught topics in probability, combinatorics, and number theory at the Academy of Mathematics and Programming.
- Facilitated probability games, market-making simulations, and the Electronic Trading Challenge.

Computational Physics Researcher

Jan 2023 - May 2023

NASA Jet Propulsion Laboratory

Pasadena, CA

- Developed numerical methods to approximate the ages of lithospheric bands and identify regions of geologic co-/re-activation in Europa’s nondeformed and chaos terrains using NASA’s geographical information system (GIS) databases.
- Fundamentally characterized unmapped regions on Europa by applying modern physical models to *Galileo* data.
- Advised by Robert Pappalardo, Erin Leonard, and Michelle Selvans. Presented at NASA-JPL summer research conference to physicists on the *Europa Clipper* science team.

PROJECTS

Emergency Signaling System

Nov 2023

Top Prize, HackPrinceton

Princeton, NJ

- Developed “Moco” to discretely execute preset emergency calls, texts, and other customizable actions, triggered by customizable wrist gestures pre-calibrated with iOS app.
- Implemented gesture matching between live Apple Watch accelerometer/gyroscopic data and calibrations using iterative closest point for spatial transformations and dynamic time warping for temporal mappings.

SKILLS, INTERESTS, & AWARDS

Skills Languages: Python, C, C++, x86 Assembly. Libraries: CVXPY, PEPit, Tensorflow, Pandas, Scipy.

Interests Mathematical optimization; statistical learning theory; asymptotic statistics; high-dimensional probability.

Awards Top Prize at Jane Street Electronic Trading Challenge, Bill and Melinda Gates Scholarship, USAPhO Semifinalist with Honorable Mention, Wells Fargo Wealth Management Competition National Champion.