Brayden Goldstein-Gelb

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Education

Brown University Providence, RI
Sc. B Computer Science, Sc. B Mathematics 2021 - 2025

- GPA: 3.91/4.00, Magna Cum Laude
- Honors Thesis: Distributed Quantum Signal Processing. (External Advisor: Yuan Liu, NC Stat; Reader: Brenda Rubenstein, Brown, Department Advisor: James Tompkin, Brown

Research Interests

Quantum algorithms, complexity theory, quantum error correction

Research Experience

Research Fellow (Remote), North Carolina State University, Remote Jul '25 - Present

- Part-time continuation of thesis research after graduation, in collaboration with Prof. Yuan Liu and Yale Quantum Institute.
- Focused on distributed quantum algorithms.

SULI Program, Oak Ridge National Lab, Oak Ridge, TN May '23 - Jul. '23

- Developed methods for solving constrained optimization problems using the Quantum Approximate Optimization Algorithm (QAOA).
- Mathematically proved correctness and conducted simulations to demonstrate strong performance.

Undergraduate Researcher, Brown Visual Computing Lab, Providence, RI May '22 - May. '23

- **Decoupled Style Descriptors Project:** Built an interactive application for synthesizing handwriting via a recurrent neural network.
- **Augmented Reality Label Visualization Project:** Implemented and optimized algorithms for adapting augmented reality content in real-time to dynamic environments using high-performance Unity shaders.

Papers

Preprints

1. **Brayden Goldstein-Gelb**, Kun Liu, John Martyn, Yongshan Ding, Yuan Liu. Distributed Quantum Signal Processing. *In Preparation*.
2. **Brayden Goldstein-Gelb**, Phillip C. Lotshaw. Convergence guarantee for linearly-constrained combinatorial optimization with a quantum alternating operator ansatz. *Under review*, ACM TQC (submitted Dec 2024); preprint available at arXiv:2409.18829 (Sept 2024).

Posters

1. Ashley Kwon, Yuanbo Li, Eva Schiller, **Brayden Goldstein-Gelb**, James Tompkin. Environment Adaptive AR Label Visualization. Brown University Undergraduate Research Symposium, April 2023. Poster presentation.

Coursework

- **Computer Science:** An Algorithmist's Toolkit (grad.), Design and Analysis of Algorithms, Theory of Computation, Algorithmic Machine Learning, Cryptography, Systems, Formal Methods, Computer Vision
- **Mathematics:** Four semesters of Algebra (two undergrad, two grad), Real Analysis, Complex Analysis, Graph Theory, Number Theory, Calculus on Manifolds, Linear Algebra
- **Applied Mathematics:** Mathematical Quantum Mechanics, Information Theory, Optimization and Stochastic Calculus, Statistical Inference
- **Physics/Engineering:** Quantum Mechanics, Quantum Information, Dynamics and Vibrations, Mechanics

Professional Experience

Software Engineer (Incoming), NewGrid Inc., Somerville, MA — Aug '25 – Present
- Returning full-time after internship

Software Engineering Intern, NewGrid Inc., Somerville, MA — May '24 – Aug '24
- Built real-time grid outage monitoring and visualization tools using Vue.js and D3.
- Automated data ingestion pipelines to integrate outage data with internal tools.

Teaching Experience

Grader, Linear Algebra with Theory — Spring '25
- Graded problem sets for MATH 0540

Teaching Assistant, Theory of Computation — Fall '24
- Created problem sets and example solutions, assisted in grading, held weekly office hours

Online Tutor, Wyzant Inc. — May '21 – Aug '23
- Over 350 hours of tutoring experience, working with 50+ students ranging from middle schoolers to executives.
- Maintained a five-star rating, helping students build confidence and mastery in Python, Java, Calculus, and Algebra.

Projects

Hackathon Projects
MIT iQuHack, Brown Quantum Hackathon, Hack@Brown — Fall '24
- Won 2nd Place at Brown Quantum Hackathon
- Completed QuEra challenge at MIT's iQuHack quantum hackathon
- Created a space-themed game for Hack@Brown

Quantum Mechanics Proofs Library
Final Project, Formal Proof and Verification — Fall '22
- Created a library in the Lean Theorem Prover to model quantum particles, measurements, and multi-particle states.
- Demonstrated the library's capabilities by constructing a formal proof of the no-cloning theorem.

Re-Font Chrome Extension
JavaScript, Chrome APIs — Spring '22
- Published a Chrome extension that allows users to customize website appearance and improve accessibility, with over 9,300 total installs and 750 current active users.
- Continuously improved the user interface based on feedback, enhancing user experience and accessibility.

Additional personal and academic projects available on my website

Awards

- **Sigma Xi**, Scientific Research Honor Society — 2025
- **Audience Favorite Award**, Brown Undergraduate Research Symposium — 2023

Skills

Programming Languages: Python, C/C++, Java, HTML/CSS, JavaScript, Julia, Pyret

Technologies: Qiskit, Git, NumPy, Sklearn, Pandas, TensorFlow, PyTorch, Flask, PostgreSQL, Vue, D3, Node.js

Updated: July 2025