Bradley J. McGhee

678-599-7136 | bjmcghee@gatech.edu | linkedin.com/in/bjmcghee | github.com/nptnl | nptnl.github.io

Education

Georgia Institute of Technology May 2027
B.S. Mathematics, Minors in Quantum Technology and in Economics *Atlanta, GA*

Coursework: Algorithms, Probability Theory, Applied Combinatorics, Abstract Algebra, Quantum Mechanics, Graph Theory, Quantum Information, Number Theory, Game Theory, Real Analysis, Advanced Linear Algebra
GPA: 3.76

Experience

Quantum Compiler Research Assistant August 2024 – Present
Georgia Institute of Technology, Center for Research into Novel Computing Hierarchies *Atlanta, GA*

- Worked with the quantum signal processing (QSP) and quantum singular value transform (QSVT) frameworks.
- Created new syntax for QSP, enabling the creation of important algorithms in a high-level language.
- Developed a compiler for the new syntax with Python and Qiskit, bringing these algorithms to researchers.
- Presented a poster on generating QSP circuits from arbitrary functions at the 2025 CRNCH Summit.

Elementary Particle Physics Research Intern June 2023 – December 2023
Kennesaw State University, Theoretical Particle Physics Group *Kennesaw, GA*

- Made quantitative predictions for a hadron collider experiment using a model of an undiscovered Z' particle.
- Accounted for electromagnetic, strong, weak, and combined-electroweak contributions in the Fenyman calculus.
- Developed a tool for physicists to compute reaction cross-sections for Z' production using C++ and LHAPDF.
- Composed and presented a 40-page manuscript detailing my process and phenomenological results.

Projects

Deep Learning Network | *C* github.com/nptnl/babys-first

- Created a deep learning model from scratch with no libraries to classify images.
- Implemented backpropagation, nonlinearization, and mini-batch gradient descent to train the model.
- Used quantization to run the network using small (8-bit) datatypes for training speedups.

Math Functions Library | *Rust* github.com/nptnl/basemath

- Created a math functions library in Rust with zero dependencies.
- Used generic types to allow several datatypes in the same math functions.
- Implemented exponentiation, trigonometric functions, and arbitrary polynomials of generic-typed coefficients.
- Reached 6,000+ total downloads Rust's package distributor.

General Fractal Generator | *Rust* github.com/nptnl/generic-fractals

- Created input and parameter space fractal generators for recursive functions on complex numbers.
- Used multi-threading in Rust for parallel image generation, with a 5x speedup.
- Created a custom image format to easily write and store plots 2x smaller than similar formats.
- Generated plots based on arbitrary functions, producing both well-known and novel sights.

Honors & Awards

- President's Undergraduate Research Award (x2), a competitive Georgia Tech salary award for lab research.
- Eagle Scout Rank Award
- National Merit Scholarship Finalist

Skills & Interests

Languages and Tools: Python, C, C++, Rust, Qiskit, HTML, CSS, Git, ZSH
Technical Skills: quantum computing, algorithms analysis, data analysis, deep learning, combinatorics
Hobbies: Swimming, reading, jazz, pickleball, lifting, Brazilian jiu-jitsu