GEORGE CHEMMALA

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Education

Brown University Providence, RI

Sc.B. Computer Science, Sc.B. Mathematics (Major GPA: 4.0) *May 2026*

- Data Structures & Algorithms | Deep Learning | Machine Learning | Computer Vision | Robust Algorithms for ML | Formal Proof and Verification | Applied Cryptography | Computer Systems | Abstract Algebra | Number Theory

Projects/Research

Vote: Cryptographic Voting Protocol Implementation | *C++, CryptoPP* Spring 2025

- Built a secure, end-to-end verifiable voting system inspired by Helios, using homomorphic encryption and threshold decryption for distributed trust among 2+ arbiters
- Integrated zero-knowledge proofs and blinding to protect voter anonymity and ensure ballot integrity
- Extended the protocol to support multiple candidates and a restriction on the number of votes per user using a ZKP

WeensyOS: Virtual Memory Kernel Implementation | *C, C++, x86 Assembly* Spring 2025

- Engineered kernel code to manage user/kernel virtual memory and enforce correct access permissions
- Enhanced memory utilization by 3x, dynamically allocating virtual pages to non-contiguous physical memory
- Optimized fork and exit system calls for efficient process creation/exit with shared memory
- Incorporated process isolation by overlapping virtual address spaces, enabling full process virtual space utilization

Robust Estimation for the Erdős–Rényi Model | *Python, Matplotlib, NumPy, NetworkX* Fall 2024

- Developed and implemented robust algorithms to estimate the edge probability p in Erdős–Rényi graphs under adversarial edge perturbations for adversarial perturbation $\varepsilon < 1/2$
- Proved partial theoretical guarantees on runtime and estimation accuracy, outperforming existing methods
- Analyzed empirical evaluations on synthetic graph data (+10k nodes), demonstrating improvements in both computational efficiency and statistical robustness
- Applied software engineering best practices including modular design, visualization with Matplotlib, and reproducibility via clear documentation and code versioning

Spiderverse Style Transfer & Transfer Learning | *Python, Matplotlib, TensorFlow, CUDA* Spring 2024

- Designed and fine-tuned a multi-style transfer pipeline to apply distinct visual styles from different "Spiderverse" universes to input images using a pre-trained VGG16 model
- Pioneered VGG16's recognition of textures by developing a novel transfer learning method on the model
- Leveraged GPU acceleration with CUDA to optimize training time and inference performance on high-resolution image datasets by a factor of 10

Experience

President | *Math Circle* Spring 2023-Present

- Head a student-run outreach program teaching recreational math lessons (e.g., hexaflexagons, SET, combinatorial games) to local high school students (9th-11th grade)
- Coordinated semester-long programming, managed logistics, and oversaw administrative operations for sustained community engagement

Teaching Assistant | *Brown Department of Mathematics & Applied Mathematics* Spring 2024-Spring 2025

- Served as a teaching assistant: Statistical Inference I, Abstract Algebra, Applied Ordinary Differential Equations
- Spearheaded problem-solving sessions, held office hours, and graded advanced coursework (including proof-based reasoning) for classes with up to 350 students

Research Assistant | *Brown University's Directed Reading Program* Summer 2024

- Studied Classical Algebraic Geometry with a focus on its algorithmic and computational foundations, under the mentorship of a graduate student
- Explored polynomial system solving, Gröbner bases, and concepts in modern algebraic geometry

Computer Technician and Teaching Assistant | *Georgia's Governor's Honors Program (GHP)* Summer 2023

- Coordinated instructional support and mentored students on computational mathematics research projects for a cohort of 80 students across multiple classrooms (each with ∼30 students)
- Managed and developed classroom computing infrastructure, including machines configured for deep learning
- Assisted students with debugging Python code, troubleshooting hardware/software issues, and optimizing ML workflows

Skills & Interests

Languages: Python, C, C++, Java, Lean, Haskell, Julia, LaTeX, Mathematica, MATLAB
Developer Tools & Software: VS Code, Vim, PyCharm, IntelliJ, Google Colab, Jupyter, Git, Unix, Linux, Docker, Figma
Libraries: pandas, NumPy, scikit-learn, sympy, scipy, Matplotlib, NetworkX, TensorFlow, PyTorch, TorchVision, OpenCV, Sage
Interests: Education, Music, Board/Card Games, Photography, Manim