CHENGRU ZOU

400 Dowman Dr, Atlanta, GA 30322   •   +1 (404) 954-0423

eric.zou@emory.edu   •   GitHub: @EricZou007 •   Personal Web: @EZ

EDUCATION

BS in Applied Mathematics and Statistics   *Atlanta, GA   Aug 2022 – May 2026*
Emory University, Emory College of Art and Science

- Cumulative GPA: 3.96/4.0; Honor: Dean's List
- Sum Cum Laude highest honor graduation

SKILLS AND INTERESTS

Language: Mandarin (Native), English (Fluent), Japanese (Elementary)
Research Interests: Scientific Machine Learning, Inverse Problem, Numerical Optimization
Skills: Python, Pytorch, Jax, Matlab, R, SQL, Java, C, HTML
Visualization Skills: Paraview, Freefem, Quarto, Canva, Notion

PUBLICATIONS

- **Chengru Zou**, Yuanzhe Xi, Zichao Wendy Di.   *"Joint Reconstruction of X-ray Ptychography and X-ray Fluorescence"* (in submission).

- Erise He, Zhijiang Ye, **Chengru Zou**.   *"Quantitative Hybrid Structure Analysis of Equipment Wear under Dynamic Pressure based on Digital Intelligent Algorithm." Proceedings of the IEEE International Conference on Data Science and Intelligent Systems (ICDSIS)*, 2025, pp. 1–7. DOI: [link].

RESEARCH EXPERIENCE

Student Research Assistant   *Atlanta, GA   May 2025 – Present*
Argonne National Laboratory

- Developed a joint architecture for ptychography and fluorescence reconstruction that outperforms the original model using single modality on the benchmark dataset under guidance of Dr. Wendy Di.
- Achieved 50% improvement in mean square error compared to original separate reconstruction.
- Submitting paper to SIAM Journal on Imaging Science (in submission).

Student Research Assistant   *Atlanta, GA   July 2024 – Present*
MIT AI Watson Lab

- Developed an efficient training adapter method based on LORA (Low Rank Adaptation) using Multigrid and Kronecker product concepts under guidance of Dr. Jie Chen.
- Reduced trainable parameters in LORA adapter in $Roberta_{base}$ and GPT2 model from 400K to 100K while outperforming the benchmark metrics.

Direct Reading Program: Machine Learning   *Atlanta, GA   Jan 2024 – Aug 2024*
Deapartment of Mathematics, Emory University

- Engaged in reading *Probabilistic Machine Learning* by Kevin Murphy supervised by Professor Yuanzhe Xi.
- Learned the implementation of reinforcement learning algorithm through reading *Hands on Reinforcement Learning* by Mu Li.

PROJECTS

AI Chatbot Agent Development   *Atlanta, GA   June 2024 – Aug 2024*
Emory Center for AI Learning, Emory University

- Built a Vector RAG LLM agent for Emory student course selection using Neo4j graphical database and LangChain prompt engineering.
- Improved query accuracy for graphical data, benefiting hundreds of Emory students.
- Published the report and gave a presentation in the Emory QTM department symposium.

Atlanta Affordable Housing   *Atlanta, GA   Sep 2023 – Jan 2024*
City of Decatur: Affordable Housing Commission

- Collaborated with group leader and members to address housing complaints in partnership with the City of Decatur, GA.
- Utilized Geocoding and GIS to model racial and housing rate distributions in Decatur.
- Presented findings using Tableau, aiding over 100 local residents in making informed housing decisions.

AWARDS AND GRANTS

Mathematical Contest in Modeling (MCM), Meritorious Award   *May 2025*
Analyzed the age of stairs by using a mathematical model of erosion under the guidance of Professor Alessandro Veneziani. Ranked top 5% among over 20000 participate teams.

NSF Research Grant   *May 2025*
Awarded $6,000 for research grant from NSF

Emory Pathway Global Internship Grant   *May 2024*
Awarded $4,000 for outstanding summer internship performance

DataFest Competition, Finalist   *April 2024*
Analyzed real-life raw data from CourseKata Company; provided consulting advice that increased study efficiency for over 1,000 students.

Emory Phi Sigma, Member   *May 2023*
Recognition for outstanding academic achievement

IGEM Gold Medal   *May 2021*
Merit for excellent work in medical engineering and business advertisement

PROFESSIONAL SOCIETY MEMBERSHIP

Atlanta Precondition 2024   *Attendee*
Represented Emory Mathematics students at the academic conference

Atlanta Mathematics of Data Science Bootcamp   *Attendee*
Explored a new algorithm (Lipschitz-regualrized χ^2-GAN) by combining χ^2-GAN and WGAN.

Atlanta Science Festival – Exploration Exposition   *Volunteer*
Promoted mathematical knowledge to the public on behalf of the Emory Mathematics Department

ADDITIONAL

Activities: Emory China Care Club, ECSA
Hobbies: Chinese go, Badminton