

# Tianrui (Eric) Qi

+1(518)-961-3370 · tianrui.qi@gatech.edu

Linkedin: [tianrui-qi](#) · GitHub: [tianrui-qi](#)

## EDUCATION

---

### Bachelor of Science in Computer Science

Jan 2023 - May 2025

Georgia Institute of Technology, Atlanta, GA

Dean's Honor List all semesters, GPA: 3.92/4.00

- Minor in Physics.

### Bachelor of Science in Computer Science; Double Major in Mathematics

Sep 2020 - Dec 2022

Rensselaer Polytechnic Institute, Troy, NY

Dean's Honor List all semesters, GPA: 3.73/4.00

- Minor in Economics.

## EXPERIENCE

---

### Startup Founder

Aug 2024 - Present

Georgia Institute of Technology, Atlanta, GA

CREATE-X Idea to Prototype, Mentor: Dr. Xuanwen Hua

- Conceptualizing an AR platform that simulates interactions with 2D surfaces in a 3D space.
- Exploring Apple's AR platforms and ARKit and gathering user feedback to identify potential applications.
- Developing an iOS app that transforms a 3D space into 2D canvas for creation and projects back for viewing.

### Undergraduate Research Assistant

Apr 2023 - Present

Georgia Institute of Technology, Atlanta, GA

Jia Laboratory for Systems Biophotonics, PI: Dr. Shu Jia

- Engineered a scalable 3D U-Net pipeline based entirely on simulated data for volumetric localization in single-molecule super-resolution microscopy, resolving sub-cellular structure down to 20 nm.
- Developed a patch-based prediction pipeline that flexibly adapts to various input volume sizes and achieves a 100x speedup over conventional deterministic localization methods.
- Integrated the redundant cross-correlation algorithm for drift correction with the deep learning-based prediction pipeline.

### Co-op

Jan 2024 - Aug 2024

Regeneron Genetics Center, Tarrytown, NY

Therapeutic Area Genetics, Manager: Dr. Jing He

- Utilized BERT-based large language models (LLMs) and unsupervised feature selection to obtain a vector representation in a bio-meaningful space for each whole exome sequencing (WXS) sample.
- Demonstrated that the representations capture sample-wise differences by predicting immune system indicators of The Cancer Genome Atlas Program (TCGA) skin cancer samples.
- Scaled up the pipeline to handle 1,000 WXS samples with 100 billion DNA sequences by optimizing parallel computing for high-performance computing (HPC) and enhancing file system efficiency through hashing.

### Undergraduate Research Assistant

Nov 2021 - Dec 2022

Rensselaer Polytechnic Institute, Troy, NY

AI-based X-ray Imaging System Lab, PI: Dr. Ge Wang

- Derived backward propagation formulation for quadratic neural networks and compared forward and backward propagation between quadratic and conventional neural networks mathematically.
- Implemented forward propagation, backward propagation, and training process of quadratic and conventional neural networks explicitly using NumPy in Python.
- Demonstrated that single-layer quadratic neural networks rival conventional neural networks with hundreds of neurons in classifying simulated and real-world Gaussian mixture data.

## Undergraduate Teaching Assistant

Sep 2022 - Dec 2022

Rensselaer Polytechnic Institute, Troy, NY

Foundations of Computer Science, Instructor: Dr. David Goldschmidt

- Led weekly recitation sessions to help students understand course material.
- Assisted students' understanding of weekly lab exercises and graded assignments and exams.

## PUBLICATIONS

---

Keyi Han<sup>†</sup>, Xuanwen Hua<sup>†</sup>, **Tianrui Qi**<sup>†</sup>, Zijun Gao, Xiaopeng Wang, Shu Jia, "Volumetric Reconstruction and Localization Networks for 3D Single-molecule Localization Microscopy," *manuscript in preparation* (expected 2024).

**Tianrui Qi**, Ge Wang, "Superiority of quadratic over conventional neural networks for classification of gaussian mixture data," *Visual Computing for Industry, Biomedicine, and Art* (2022).

<sup>†</sup> denotes co-first authors

## PROJECTS

---

### Alternating Direction Method of Multipliers for Support Vector Machine Jan 2022 - May 2022

Rensselaer Polytechnic Institute, Troy, NY

Computational Optimization, Instructor: Dr. Yangyang Xu

- Formulated the primal and augmented dual optimization problems for support vector machine (SVM) objective and developed alternating direction method of multipliers (ADMM) solver.
- Implemented the ADMM solver in MATLAB and reported the primal and dual feasibility violations at each outer iteration for the testing datasets.

### Full Gate-Level Circuit in C for a Reduced MIPS ISA

Sep 2021 - Dec 2021

Rensselaer Polytechnic Institute, Troy, NY

Computer Organization, Instructor: Dr. Konstantin Kuzmin

- Designed a datapath for a reduced MIPS instruction set architectures (ISA) that support I-type instructions including `lw`, `sw`, `beq`, `addi`, R-type including `and`, `or`, `add`, `sub`, `sllt`, `jr`, and J-type including `j`, `jal`.
- Implemented the datapath through a full gate-level circuit in C, including components of the processor like memory, control, arithmetic logic unit (ALU), decoder, adder, multiplexor, etc.

## SKILLS

---

**Programming Languages:** Python (PyTorch, NumPy, pandas), MATLAB, Java, C, C++, R, Swift (ARKit), Bash, MIPS.

**Development Tools:** Git, Conda, VSCode, JetBrains (PyCharm, IntelliJ, CLion, Android Studio), RStudio, Xcode.

**Computing Platforms:** Linux (Ubuntu), AWS (EC2, S3), HPC (Slurm).

**Software:** LaTeX, ImageJ, Adobe Illustrator.

**Laboratory:** optics and laser alignment, fluorescence imaging, fluorescence labeling, cell culture maintenance.

**Communication:** English (Professional), Mandarin (Native).