Kangsheng Qi

Website | LinkedIn | Github | Scholar | Email | +1(713) 501-9426 | Austin, Texas

Education

- **B.S.** in Mathematics, The University of Texas at Austin, 2025
- **B.S.** in Computer Science, The University of Texas at Austin, 2025 (GPA: 3.96)
  Thesis in Preparation: *Protein Function Prediction Through Ensemble Graph Neural Networks*
  Advisor: Dr. Can Cenik (Primary Advisor), Dr. William H. Press (Second Reader)

Research Experience

Undergraduate Research Assistant, Dr. Can Cenik's Lab January 2024 - Present
The University of Texas at Austin, Austin, United States

- Investigate translational control across species to understand its impact on protein function
- Examine how different biological networks influence protein function prediction through multi-view ensemble graph neural network
- Develop multiprocessing pipeline to analyze the periodicity of ribosome profiling data in human and mouse

Moncrief Summer Research Intern, The Oden Institute June - August 2024
The University of Texas at Austin, Austin, United States

- Explored the application of deep learning (DL) to model cardiac function in preterm infants, aiming to derive physiological insights and to improve early clinical intervention strategies
- Designed an evaluation system grounded in clinical application to assess DL models' performance in forecasting heart rate signals
- Conducted ablation studies to identify DL's limitations and challenges in predicting preterm infants' health

Undergraduate Research Assistant, Livestrong Cancer Institutes November 2023 - January 2024
The University of Texas at Austin, Austin, United States

- Investigated the potential of large language models in predicting DNA functional activity
- Contributed to the curation of a comprehensive antibody/antigen mutation dataset
- Analyzed the efficiency of Gibbs sampling motif-finding algorithms through parallelization

Publications

- [In Preparation] **Kangsheng Qi**, Joshua Chang. (2024). *Towards a Deep Learning Integrated Digital Twin System of Preterm Cardiac Function.* Status: Completed and to be submitted to IEEE EMBC 2025
- **Kangsheng Qi**, Joshua Chang. (2024). *Deep Learning Approaches for Time Series Forecasting of NICU Heart Rate Data.* Abstract and poster in Proceedings of the TACCSTER Symposium. DOI: 10.26153/tsw/55885
- Yue Liu, Ian Hoskins, Michael Geng, Qiuxia Zhao, Jonathan Chacko, **Kangsheng Qi**, et al. (2024). *Translation efficiency covariation across cell types is a conserved organizing principle of mammalian transcriptomes.* Preprint on bioRxiv. DOI: 10.1101/2024.08.11.607360. Status: Under review at Nature Biotechnology
- Himanshu Reddy, **Kangsheng Qi**, Michael Zeosky, S. Stephen Yi. (2023). *Understanding the Parallelizability of Gibbs Sampling for DNA Motif Finding.* Status: Under Review at Computational and Structural Biology

Conferences

- "Deep Learning Approaches for Time Series Forecasting of NICU Heart Rate Data", Lightning talk and poster presentation at the *TACCSTER Symposium*, Austin, USA, 2024

Awards and Honors

- UT Austin Undergraduate Research Fellowship Award - $1,000 Research Funding
- UT Austin 2024 College of Natural Science College Scholar

Professional Experience

Student Associate, The Oden Institute September 2023 - Present
The University of Texas at Austin, Austin, United States

- Conduct interviews with distinguished faculties on advanced interdisciplinary research projects
- Publish articles that highlight significant student and faculty achievements, as well as key events and profiles
- Design the institution's annual report to accurately present research outcomes and achievements

Software Development Intern, Potevio Science & Technology Co Ltd May - June 2023
Guangzhou, China

- Collaborated with senior developers on current company projects
- Demonstrated strong adaptability by quickly mastering and applying new tools to meet project-specific requirements

Teaching Experience

Course Assistant (Probability I), Department of Mathematics September - December 2023
The University of Texas at Austin, Austin, United States

- Collaborated with the instructor on grading criteria and provided constructive feedback to students
- Managed unforeseen challenges, including student medical emergencies and miscommunications, to ensure smooth flow of the course

Projects

Convolution Long Short-Term Memory Networks (CNN-LSTM) Project Repo

- Developed a hybrid CNN-LSTM model that integrates convolutional and recurrent neural networks for time series forecasting
- Extended from the DARTS library to enhance model flexibility and leverage built-in functionality

Periodicity Pipeline Project Repo

- Designed a system to quantify the triplet periodicity pattern in ribosome profiling data
- Implemented multi-processing to enhance efficiency and scalability for large datasets

High Performance Matrix Matrix Multiplication

- Utilized blocking, five loops, and assembly microkernel to implement a matrix matrix multiplication algorithm optimized for near-peak performance on the Haswell microarchitecture
- Ensured algorithmic correctness and high performance across matrices of varying sizes, shapes, and storage patterns

Skills

- Proficient in Python, Java, R, MATLAB, SQL, and C/C++ programming languages
- Skilled in Biology Sequence Analysis, Protein Function Prediction, Biological Modeling, Time Series Analysis, Medical Informatics, Machine Learning, and Graph Neural Networks
- Fluent in English and native in Mandarin