Derek Qin

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Education

California Institute of Technology, Pasadena, California *Sept 2020 - June 2024 (Anticipated)*

- B.S. Major: Computer Science, Minor: Information and Data Sciences; **GPA:** 4.0
- **Selected Coursework: CS:** Data Structures, Software Development, Computing Systems, Algorithms, Machine Learning, Learning Systems, Computer Vision; **Math:** Discrete Math, Linear Algebra, Statistics

Skills

- **Programming Languages:** C, C++, Java, JavaScript, Python, SQL (intro), MATLAB, HTML/CSS, LaTeX
- **Tools:** PyTorch, TensorFlow, Keras, scikit-learn, Numpy, pandas, Git, FEniCS
- **Frameworks:** React (intro), Django

Experience

Caltech Tensor Lab Pasadena, CA

Machine Learning Researcher *Winter 2021 - Present*

- Improved Fourier Neural Operator performance on PDEs with nonperiodic boundary conditions by up to 15% by designing a Fourier Continuation-based neural network [presentation link]
- Generated PDE dataset with less than 0.0001% error for the Darcy flow problem using FEniCS, a finite elements solver for Python

Boston University Ludwig Lab Boston, MA

Researcher *Summer 2019 - Winter 2020*

- Developed computer vision analysis software using to speed up MOSS analysis and improve precision of surface stress measurements by up to 30%

Projects

Turtle Run [github] C, SDL

Software Development *February 2021 - June 2021*

- Created vector-based physics engine in C and 2D side scrolling game with full GUI rendered with SDL

Phantom Traffic Jam Alleviation Using Networked Autonomous Cars Python

Computer Science & Applied Mathematics *August 2018 - April 2019*

- Created a differential microscopic traffic model to model flow rate and jam dissipation for bilateral and vehicle unit control, implemented and rendered in Python
- Implemented vehicle control pattern that decreases jam duration by 12.2% and increases flow rate by 18%

Traffic Signal Control Simulation for Optimization of Vehicle Flow Python, Google Maps API

Computer Science & Applied Mathematics *August 2017 - March 2018*

- Developed signal management algorithm resulting in 18% average decrease in wait time, Monte Carlo simulation in Python

Leadership

Association for Young Scientists and Innovators [website] Plano, Texas

Vice President, Co-founder *May 2019 - September 2020*

- Co-founded and led organization to mentor students in scientific research with over 400 members
- Organized AYSI Summer Coding Institute, which taught over 300 middle and high school students essential skills in MIT App Inventor and Machine Learning

Selected Awards

- USA Physics Olympiad, Medalist (National Top 200 Individuals) (2019)
- Harvard-MIT Mathematics Tournament, Top 10 Team (2018)
- 5x American Invitational Mathematics Exam (AIME) Qualifier (2015, 2016, 2017, 2018, 2019)