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:** 4.0/4.0
- **Selected Coursework: CS:** Data Structures, Software Development, Computing Systems, Algorithms, Relational Databases, Data Mining, Learning Systems, Computer Vision; **Math:** Discrete Math, Linear Algebra, Statistics

Skills

- **Programming Languages:** Python, C, C++, Java, JavaScript, MATLAB, LaTeX
- **Tools:** Git, Docker, AWS, FEniCS
- **Development:** HTML/CSS, SQL, React, Django
- **Machine Learning:** PyTorch, TensorFlow, Keras, scikit-learn, Numpy, pandas, Jupyter Notebooks

Experience

Caltech Tensor Lab Pasadena, CA

Machine Learning Research Intern *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, deployed using AWS
- 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 X-Ray Diffraction Lab Boston, MA

Research Software Engineer Intern *Summer 2019 - Winter 2020*

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

Projects

Facebook Data Analyzer Python, Pandas, Django, Heroku

- Web application built on Python/Django for statistical analysis, sentiment analysis, and NLP processing of personal Facebook data.

Turtle Run Game C, SDL

- 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

- Designed and implemented autonomous vehicle control system that decreases phantom traffic jam duration by 12.2% and increases vehicle flow rate by 18%

Smart Traffic Signal Controller Python, Google Maps API

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

Leadership

Association for Young Scientists and Innovators Plano, Texas

Vice President, Co-founder, Advisory Board *May 2019 - Present*

- Co-founded and led a 501(c)(3) nonprofit 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)
- 5x American Invitational Mathematics Exam (AIME) Qualifier
- 8x American Mathematics Competition (AMC 10/12) Distinguished Honor Roll