

Derek Qin

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EDUCATION

- **California Institute of Technology**, Pasadena, California *Sept 2020 - Present*
 - Bachelor of Science: Computer Science (Machine Learning & Robotics)
 - **Selected Coursework: Passed Placements:** Ma 1c (Multivariable Calculus), Ma 2 (Differential Equations), Ph 1a (Classical Mechanics); **CS:** CS 2 (Data Structures), CS 3 (Software Development), CS 21 (Decidability and Tractability), CS 38 (Algorithms); **Math:** Ma 6a (Discrete Math), Ma 1b (Linear Algebra, Analytical)

EXPERIENCE

- **Boston University Materials X-Ray Diffraction Lab** Boston, MA
Researcher *June 2019 - February 2020*
 - Selected for Research in Science & Engineering (RISE) Program
 - Analyzed self-organizing patterns on Si in ultra-high vacuum bombarded by Ar^+ using AFM imaging.
 - Developed computer vision analysis software using to speed up MOSS analysis and improve precision
 - *Mentors: Prof. Karl Ludwig, Peco Myint*
 - **Research Awards:** 1st Prize in Physics, DRSEF; TXSEF Finalist; ONR Special Award; AFRL Special Award
- **Caltech Tensor Lab** Pasadena, CA
Researcher *February 2021 - Present*
 - Research conducted under Caltech SURF
 - Designed and tested novel neural network architecture to improve performance of Fourier Neural Operator performance on PDEs with nonperiodic boundary conditions
 - *Mentors: Prof. Anima Anandkumar, Zongyi Li*

PROJECTS

- **Traffic Signal Control Simulation for Optimization of Vehicle Flow** Plano, Texas
Computer Science & Applied Mathematics *August 2017 - March 2018*
 - Developed a novel signal management algorithm using car volume statistics using Python and Google Maps API, tested on both non-actuated and semi-actuated intersections (18% decrease in wait times)
 - **Awards:** 1st Prize in Engineering Mechanics, DRSEF; TXSEF Finalist; 3rd Prize Terracon Consultants Excellence in Engineering; ONR Special Award; AFRL Special Award
- **Phantom Traffic Jam Alleviation Using Networked Autonomous Cars** Plano, Texas
Computer Science & Applied Mathematics *August 2018 - April 2019*
 - Created a novel microscopic traffic model and derived a first-order differential equation to model flow rate and jam dissipation for bilateral and vehicle unit control.
 - **Awards:** 1st Prize in Mathematics, DRSEF; TXSEF Finalist; Mu Alpha Theta Special Award

SELECTED AWARDS

- USA Physics Olympiad, Honorable Mention (National Top 200 Individuals) (2019)
- Harvard-MIT Mathematics Tournament, Team Round, 10th Place (2018)
- 5x American Invitational Mathematics Exam (AIME) Qualifier (2015, 2016, 2017, 2018, 2019)
- **Research Awards:** See Projects Section

SKILLS

- **Languages:** Fluent in English and Mandarin Chinese
- **Programming Languages:** C/C++, Java, Javascript, Python, HTML/CSS, \LaTeX , MATLAB
- **Tools:** PyTorch, Tensorflow, Keras, Scikit-learn, NumPy, Pandas