Qilin Ye

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EDUCATION

Duke University *August 2024 - May 2026 [expected]*
† M.S. in Computer Science **Durham, NC**

University of Southern California *August 2020 - May 2024*
† B.S. in Mathematics, *summa cum laude* & with highest honors, 4.00/4.00 **Los Angeles, CA**
† B.S. in Computer Science, *summa cum laude*, 3.94/4.00
† M.S. in Applied Mathematics, 3.93/4.00
  Thesis: *A "Pointless" Theory of Probability*, advised by Professor Andrew Bacon
† *Minor in musical studies, advised by Dr. Lucinda Carver*

RELEVANT SKILLS & COURSEWORK

Languages: Python (advanced), Java, C, C++, HTML/CSS, JavaScript, SQL; (*for computing*) MATLAB, R
Developer Tools: VS Code, Eclipse, Android Studio, Google Cloud Platform, AWS, MySQL, Xcode
Frameworks & Others: PyTorch, Tensorflow, CUDA; Linux, Unix, Git, Shell, React.js, Expo, Firebase, Figma; LaTeX, Vim
Coursework: Software Development, Operating Systems, Computer Systems, Internetworking
  †(CS, PhD level) Approximation Algorithms, Statistical Learning Theory, Deep Learning, NLP, Machine Learning
  †(Math, PhD level) {Real, Complex, Functional, Numerical} Analysis, Modern Algebra, Measure Theory

EXPERIENCE

Duke University **Durham, NC**
  Teaching Assistant, CPS-330, Algorithm Theory *Fall 2024*

University of Southern California **Los Angeles, CA**
  ALLeGRo Lab, Undergraduate Researcher *Spring 2024 - Present*
  † Performed a series of experiments to probe Transformer models' learning process on graph problems.
  † Discovered a "message-passing" algorithm used by Transformers to predict graph connectivity on query nodes.
  † Devised a metric for task-importance of each attention head, where the "top 10% heads" does >85% of the work.

  Author of Lecture Notes & Teaching Assistant
  † Authored **official** LaTeX lecture notes for **Real Analysis** and **Algorithms** in the following TA-ships.
  † *Teaching Assistant*, CSCI-270, Algorithm Theory *Spring 2024*
  † *Teaching Assistant*, MATH-425a, Real Analysis *Spring 2022*
  † *Supplemental Instructor* (undergraduate TA) for MATH-226 [Calculus III] and MATH-225 [Linear Algebra].

  Undergraduate Researcher in Functional Analysis (Mathematics) *Fall 2021 - Fall 2022*
  † Conducted in-depth research and literature review in key areas of Functional Analysis under faculty supervision.
  † Provided an alternate proof to the Banach-Steinhaus Theorem, significantly shortening the 1929 original proof.
  † Co-organized and participated in weekly seminar sessions with the USC PDE reading group.

PROJECTS

AthletesTogether: Fitness Tracking iOS App | *JavaScript, React, Expo, Xcode* *Fall 2023*
  † Built an iOS app with Xcode for 50+ users to log, track, and customize workout goals. User base still growing.
  † Orchestrated backend integration, improving real-time user updates by 25% in responsiveness.
  † Refined data structures, reducing database access and page loading time to under 10ms.

PlanMyDay: Itinerary Planning Android App | *Java, Android Studio, Google Cloud Platform* *Fall 2023*
  † Co-led a team of 3 to build an itinerary app with 100+ downloads, optimizing schedules for tourists exploring LA.
  † Created a Firebase protocol with linear complexity, reducing data storage/retrieval time by 20% even in small scale.
  † Implemented a trip-optimizing algorithm with the Google Maps API, enhancing user planning efficiency by 25%.

DormUtils: Living Utilities Web Application | *Java, HTML/CSS, SQL, Approximation Algorithms* *Fall 2022*
  † Led a 6-person team to create a web app for 100+ dorm mates to track shared living expenses and tasks.
  † Developed HTML/CSS front-end, ensuring seamless communication with backend for 20% faster task management.
  † Designed a 2-approximate algorithm for task allocation, efficiently approaching an otherwise NP-hard problem.

AWARDS AND HONORS

Phi Beta Kappa 2022
Renaissance Scholar 2023
  · Awarded to USC undergraduates pursuing widely separate fields of studies