

Ray Tsai

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EDUCATION

University of California San Diego

B.Sc. in Mathematics-Computer Science (Math GPA: 4.0/4.0)

La Jolla, CA

Sep 2021 – Jun 2025

- **Honors Thesis:** *Double Turán Problems*, advised by Prof. Jacques Verstraete
- **Selected coursework:** Abstract Algebra, Real Analysis, Extremal Combinatorics and Graph Theory, Graduate Algebraic Combinatorics, Graduate Statistical Learning, Graduate Complex Analysis, Design and Analysis of Algorithms, Theory of Computation

RESEARCH EXPERIENCE

UC San Diego, Department of Mathematics

Undergraduate Research Assistant

La Jolla, CA

Mar 2023 – Present

- Conducting research on open problems in extremal graph theory under the guidance of Prof. Jacques Verstraete.
- Working on the paper *Double Turán Problems*, which serves as the foundation for my honors thesis.

UC San Diego, Department of CSE

Undergraduate Research Assistant

La Jolla, CA

Apr 2024 – Present

- Studying the connections between algorithmic fairness, complexity theory, and learning theory under Prof. Russell Impagliazzo.

WORK EXPERIENCE

Software Engineer

MSI

New Taipei City, Taiwan

Jul 2023 – Aug 2023, Full-time

- Collaborated with a 5-member team to develop a Windows-based application for local AI image generation and model training.
- Pioneered a custom model using Stable Diffusion, effectively generating images of MSI laptops.
- Architected and implemented an installation process for multiple optimizers, boosting image generation speeds by 80%.

Co-founder & Lead Software Engineer

Kook

San Diego, CA

Dec 2021 – Dec 2022, Start-up

- Led a 5-member team in the creation of an automated surfboard rental station, incubated by UCSD Basement Blackstone LaunchPad and ECE Makerspace.
- Operated as a full-stack engineer, independently learning app development to architect the company's application, facilitating access to the surfboard station, and documenting the rental history.
- Innovated the station's unlock system by leveraging NFC technology, significantly enhancing the user experience.

TEACHING EXPERIENCE

Instructional Assistant

UC San Diego, Department of CSE

La Jolla, CA

Jan 2025 – Mar 2025, Part-time

- Held office hours and graded homework assignments, midterms, and final exams for the Design & Analysis of Algorithms course.

Private Tutoring

Self-employed

San Diego, CA

Aug 2024 – Dec 2024, Part-time

- Designed individualized 10th-grade geometry lessons that address student's needs.

ADDITIONAL EXPERIENCE

William Lowell Putnam Mathematical Competition Scored 20 out of 120 possible points on the most prestigious undergraduate level math competition.

Combinatorics Seminar Participated in weekly seminar on various topics on modern combinatorics research held by the UCSD Math Department

UCSD Theory Group Attended seminars and weekly meetings on theoretical computer science.

AWARDS

Physical Sciences Dean's Undergraduate Award for Excellence

UC San Diego

SKILLS

LaTeX, TypeScript(React Native, Next.js), Python(Pytorch, SageMath, Flask, Selenium), C/C++, Java, Git