

# Ray Tsai

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## EDUCATION

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### University of Oxford

*M.Sc. in Mathematical Science*

Oxford, United Kingdom

*Sep 2025 – Jun 2026*

### University of California San Diego

*B.Sc. in Mathematics-Computer Science, Honors with High Distinction*

La Jolla, CA

*Sep 2021 – Jun 2025*

- **Honors Thesis:** *Double Turán Problems*, advised by Prof. Jacques Verstraete
- **Selected coursework:** Extremal Combinatorics and Graph Theory (Honors), Algebraic Combinatorics (Graduate), Discrete Geometry (Graduate), Statistical Learning (Graduate), Complex Analysis (Graduate)

## RESEARCH EXPERIENCE

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### UC San Diego, Department of Mathematics

*Undergraduate Research Assistant*

La Jolla, CA

*Mar 2023 – Present*

- Studied open problems in extremal graph theory under the guidance of Prof. Jacques Verstraete.

### UC San Diego, Department of CSE

*Undergraduate Research Assistant*

La Jolla, CA

*Apr 2024 – Present*

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

## WORK EXPERIENCE

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### 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

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### 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.

## AWARDS

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**Physical Sciences Dean's Undergraduate Award for Excellence**

*UC San Diego, 2025*