

# Ruey-An Shiu

Email: b10201034@ntu.edu.tw

<https://shiurueyan.github.io/academic-site/>

## EDUCATION

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### National Taiwan University, Taipei, Taiwan

Sep. 2021 – (Expected) Jun. 2026

*B.S. in Mathematics, B.A. in Economics (Honor), Minor in Computer Science*

**GPA:** 4.09/4.30

- **Advisor:** [Prof. Chun-Hsiung Hsia](#)
- **Thesis:** On the Synchronization of ReLU Version of Dense Networks

### University of California San Diego, California, USA

Fall 2024

*University of California Education Abroad Program*

**GPA:** 4.00/4.00 (Provost Honors)

### 2025 SLMath Summer Graduate School, California, USA

Jun 9<sup>th</sup>. 2025 - Jun 20<sup>th</sup>. 2025

*Statistical Optimal Transport (SLMath)*

## RESEARCH EXPERIENCE

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### 2023 Undergraduate Summer Research Program, NCTS

Summer 2023

- **Advisors:** [Prof. Gi-Ren Liu](#), [Prof. Yuan-Chung Sheu](#)
- Leveraged Stein's method to reinforce the classical central limit theorem and its extensions, broadening the framework to cover non-Gaussian approximations.

### Part-Time Research Assistance, Financial Engineering Research Lab, NTUST Aug. 2023 – Now

- **Advisor:** [Prof. Daniel Wei-Chung Miao](#)
- Topic: Variants of the Jump Diffusion Model.

### 2023 NCTS Undergraduate Research Program, NCTS

Oct. 2023 – Jun. 2024

- **Advisor:** [Prof. Chun-Hsiung Hsia](#)
- Derived sufficient conditions for synchronization equilibria in the ReLU-modified Kuramoto model on dense networks.

### Part-Time Research Assistance, Institute of Sociology, Academia Sinica Mar. 2024 – Aug. 2024

### Part-Time Research Assistance, College of Health, Lehigh University

Aug. 2024 – Now

- **Advisor:** [Prof. Hsuan-Wei "Wayne" Lee](#)
- Topics: Complex systems, Computational Sociology, Game Theory, Mathematical Epidemiology.

### 2024 Undergraduate Research Project Scholarship, NSTC

Jul. 2024 – Feb. 2025

- **Advisor:** [Prof. Daniel Wei-Chung Miao](#)
- Enhance the Double Exponential Jump Diffusion Model with time-heterogeneous parameters to capture evolving jump characteristics and risk dynamics across different time periods.

### Member of the Multi-agent Intelligence and Decision Systems Lab, UCSD

Fall 2024

- **Advisor:** [Prof. Parinaz Naghizadeh](#)
- Formulated a multiplex opinion-dynamics model with alternating layers, proving timing-driven consensus emergence or breakdown and providing spectral conditions and convergence-rate bounds.

### 2025 Student Summer Research Fellowship Program, University of Chicago

Summer 2025

- **Advisor:** [Prof. Haifeng Xu](#)
- Developed a generalized principal-agent framework grounded in approximate best-response dynamics, systematically capturing strategic interactions under information asymmetry.

### Part-Time Research Assistance, Department of Economics, NTU

Sep. 2025 – Now

- **Advisor:** [Prof. Hung-Jen Wang](#)
- Extended the stochastic frontier model by incorporating flexible distributional assumptions and model averaging techniques, providing more robust efficiency estimation in empirical applications.

## CONFERENCE

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- **Ruey-An Shiu** and Parinaz Naghizadeh. "Opinion Dynamics in Multi-Layer Social Networks: Consensus and Convergence in Coordination Games." *Annual Allerton Conference on Communication, Control, and Computing*, accepted (2025).
- Daniel Wei-Chung Miao, Xenos Chang-Shuo Lin, **Ruey-An Shiu**. "Exact Analytical Option Pricing Formula Under a Jump-Diffusion Model with Hawkes Intensity." *Under review in the APORS (Association of Asia-Pacific Operational Research Societies) Youth Forum*, (2025).

## PUBLICATION

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- **Ruey-An Shiu** and Hsuan-Wei Lee. "Shaping network structures in evolutionary games for stronger cooperation." *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, accepted (2025).
- **Ruey-An Shiu** and Chun-Hsiung Hsia. "On the Synchronization of ReLU Version of Dense Networks." *Under review in the Chaos, Solitons & Fractals*, (2025).

## AWARDS

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|--|------------------------|
| • NSTC College Student Research Creativity Award                                     | 2025                   |
| • National Taiwan University Bachelor's Thesis Award                                 | 2025                   |
| • Shih Kung-Sing Outstanding Thesis Award  | 2025                   |
| • National Taiwan University System Beyond Borders Scholarship                       | 2025                   |
| • Taiwan Mathematical Society Outstanding Students Prize                             | 2024                   |
| • Chow Hung-Ching Scholarship  | 2024                   |
| • Academic Achievement Award (Top 5%)  | Spring 2024, Fall 2023 |
| • Finance and Mathematics Joint Scholarship  | 2023                   |
| • National Taiwan University Voyage of Aspirations Scholarship for Exchange Students | 2023                   |
| • Asian Pacific Mathematics Olympiad (APMO) Bronze Award                             | 2019                   |

## TEACHING EXPERIENCE

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| • <b>Teaching Assistant</b> , Stochastic Processes (FIN7050)                             | Fall 2025, Fall 2024, Fall 2023 |
| • <b>Teaching Assistant</b> , Introduction to Ordinary Differential Equations (MATH2217) | Fall 2023                       |
| • <b>Teaching Assistant</b> , Introduction to Partial Differential Equations (MATH2218)  | Spring 2024                     |

## COMPUTATIONAL SKILLS / OTHER

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- **Programming Languages:** R, Python, C++, MATLAB, Julia
- **Languages:** Mandarin (native), English (fluent)