Rin Liu
CV

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Relevant Roles & Experience

Academic Teaching & Research

Sep. 2024 – Pres (Contract)

University of Strathclyde, CIS
Graduate Teaching Assistant

- Assisted in the delivery of undergraduate and postgraduate courses in computer science and mathematics.
- Conducted tutorial sessions and provided support to students in their coursework and research projects.
- Ran labs and tutorials for:
  - *CS882 Security Protocols and Threat Models*

Jun. 2025 – Oct. 2025 (Grant-Funded)

University of Warwick
Undergraduate Researcher

- Awarded a small grant (URSS) to undertake an independent project.
- Developed introductory learning resources on type theory suitable for late-stage undergraduate students.

Jun. 2025 – Sep. 2025 (Freelance)

MEI
PSM Academic Mentor

- Trained students in advanced mathematical problem-solving skills.
- Provided tailored academic guidance and mentoring to students.

Sep. 2024 – Jul. 2025 (Contract)

University of Warwick, WMI
Graduate Teaching Assistant

- Led small-group tutorials for core undergraduate maths modules.
- Created targeted exercises and worksheets to reinforce lecture content.

Mar. 2024 – Apr. 2025 (Student-Led)

Warwick Maths Society
Academic Support

- Organised and ran weekly mathematics support sessions.
- Delivered large-group lectures for over 300 undergraduate students.
- Developed and taught an introductory course on PGF/TikZ.

Public Engagement & Outreach

Jun. 2025 – Jul. 2025 (Full-time, fixed-term)

Good Future Foundation; NatMatSci
Assistant Teacher and Houseparent

- Facilitated interactive lessons for students from diverse backgrounds.
- Assisted in organising and leading educational trips and activities.

Jul. 2024 – Jun. 2025 (Freelance)

National Mathematics and Science College
STEM Communication Facilitator

- Taught research, writing, and presentation skills to advanced students.
- Guided students through advanced mathematical concepts beyond the standard curriculum.

Education

2025 – Pres.	**Doctor of Philosophy** Mathematically Structured Programming Group *University of Strathclyde*
2021 – 2025	**MMath (Hons)** First Class Warwick Mathematics Institute *University of Warwick*
2019 – 2021	**A-Level** A* Further Mathematics
2019 – 2021	**A-Level** A* Computer Science
2021	**Advanced Extension Award** Merit
2017 – 2019	**A-Level** A* Mathematics
2016	**Advanced FSMQ** A

Computer Skills

Beginner	Haskell, OCaml, Java, Prolog Agda, Stenotype
Intermediate	C, Lean 4, Git
Proficient	LaTeX, PGF/TikZ, Python

Other Skills

Language	English (Native) Cantonese (Spoken) Japanese (Beginner)
Music	Violin (Grade 8) Voice Piano

Invited Talks

2025	Warwick-Imperial Mathematics Conference *Structural Set Theory in Foundations* Selected for *Outstanding Talk Award*
2024	Warwick Maths Society Colloquium *Topoi and Categorical Logic*
2024	Undergraduate Seminar Series, WMI *Introduction to Category Theory*

Sep. 2023 – Sep. 2025 (Freelance)

University of Warwick
Mathematics Teaching and Outreach

· Mentored younger students in mathematics and problem-solving skills.
· Coordinated and facilitated STEM outreach events and festivals.

Aug. 2023 – Sep. 2025 (Volunteer)

Stand-up Maths Ltd
Branch Organiser

· Organised the Coventry branch of the MathsJam event.
· Managed contacts and mailing lists, promoting regional STEM events and maths outreach initiatives.

Technical Consultancy & Editorial Work

Jul. 2024 – Dec. 2024 (Freelance)

Outlier
Mathematics Specialist for AI Development

· Authored detailed solutions for advanced mathematics problems.
· Evaluated and refined AI-produced solutions for accuracy and clarity.

Mar. 2024 – Dec. 2024 (Student-Led)

Warwick Maths Society
Publications Officer

· Independently developed, built, and maintained the WMS website.
· Managed communications within and around the society.

Sep. 2021 – Jul. 2025 (Freelance)

Various
Proofreader, Editor, Writer

· Edited and graphic-designed the Warwick *Poincaré Magazine*.
· Proofread various textbooks, arXiv preprints, Poincaré articles, etc.

Selected Works & Projects

Notes on Mathematics

A collection of notes compiled into a reference book, written in LaTeX, with diagrams written using the Ti*k*Z library. (In progress.)

The Yoneda Lemma

A short paper expositing the basics of category theory, culminating in a proof of the celebrated Yoneda Lemma (§5, pp.13-15).

Structural Foundations in Topoi

An analysis of various styles of mathematical foundations, beginning with a discussion of classical material set theories and structuralism, before introducing Lawvere's *Elementary Theory of the Category of Sets*.

102 Combinatorial Problems in Lean 4

A collection of proofs of various olympiad training problems from the book *102 Combinatorial Problems* in the formal proof assistant *Lean 4*, co-authored as part of a three-person team.

Corne Keymap

An ergonomic 40% keyboard firmware for AVR/ARM MCUs, optimised for writing LaTeX and C code, with mouse and stenotype protocol emulation.

References

Dr. Siri Chongchitnan

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Director of Undergraduate Studies
Employer — Mathematics Institute
University of Warwick

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Dr. Helena Verrill

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& Outreach Coordinator
Employer — Mathematics Institute
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