Chen-Wei (Milton) Lin

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Education

Ph.D. of Mathematics, Johns Hopkins University, 2019-Present
Expected Graduation: July 2025
Supervisor: David Gepner

Masters of Mathematics, University of Oxford, 2018-2019
Dissertation Topic: Index of Operators and KK-theory. Supervisor: Dr. Andre Henriques.
Fourth year examinations, ranked 4th in cohort
Best dissertation award

BA Mathematics, University of Oxford, 2015-2018
Supervisors: Prof. Glenys Luke, Prof. Tom Sanders.
Preliminary Examinations, ranked Top 10 of approx. 200 students.
Third Year Examinations, ranked Top 10 of approx. 150 students.

Awards and honors

Gibbs Dissertation Prize for Mathematics
Awarded by the Oxford Mathematical Institute.
Best Masters of Mathematics dissertation.

Alison Sheppard Prize for Mathematics
Awarded by St Hugh's College, Oxford.
Third year mathematician with highest first class in College.

St Hugh's College Scholarship Award
Awarded by St Hugh's College, Oxford, annually.
First Class Honors in each year.

Invited Talks

Technical University of Darmstadt, Feburary 7th, 2025.
University of Minnesota Student Number Theory Seminar, November 19th, 2024.
Johns Hopkins University, Topology seminar, September 12th, 2024.

Seminar Talks

2024
Topology *E-theory seminar*, JHU, on Gross-Hopkins period map.
Number theory learning seminar, JHU, motivic periods, two talks on Chen's Theorem.

2023
Topology Seminar, JHU, on *Dieudonné modules, following Lurie and Hopkins*.
Topics in representation theory seminar, JHU, on *Uniformization of G-bundles*.
Topological Quantum Field Theory learning seminar, JHU, on *Classical field theory and σ-models*.
Topics in representation theory seminar, JHU, on *Affine Grassmanian*.

Prismatic cohomology Seminar organizer, with Naruki Masuda and David Gepner.

2022
Heegner points study group, JHU, on *Selmer structures and duality.*
Derived deformation theory seminar, JHU, three talks on *Calegari-Geraghty method in modularity lifting.*
Jacquet Langlands Correspondence student seminar, JHU, four talks.

2021
eCHT Hermitian K-theory, on Poincaré categories.
Category theory seminar, on differential cohomology and cohesive topoi.
Derived deformation theory seminar, JHU, on formal moduli problems.
Seminar on Stack of Langlands Parameter, joint with U Chicago, on representation stacks.
Non-archimedean study group, on *Formal schemes and rigid generic fiber.*

2020
DaFra Seminar on Condensed mathematics, a talk on *Solid Abelian Groups.*
Étale homotopy study group, Kings College London, a talk on *Étale homotopy obstruction.*
Topological Hochschild Homology Seminar, UIC, two talks on *Construction of THH.*
Spectral Algebraic Geometry Seminar, UIC, two talks on *Spectrally Ringed ∞-Topoi.*
eCHT Kan Fall Seminar, two talks on chapter 1 of *A Survey of Elliptic Cohomology, J. Lurie.*
Number Theory Seminar, Uni. of Melbourne, two talks on *Contragredient representations.*
Oberseminar, Uni. of Regensburg, a talk on *The p-complete Frobenius.*

2019
Masters presentation, University of Oxford. On *The Atiyah Singer-Index Theorem.*
Reading Group, University of Oxford. On *Model Categories, Dwyer and Saplinski.*

Professional service

All roles listed below were conducted at Johns Hopkins University.

Graduate Mentorship
(2023-2025) Yashi Jain, serving as a secondary advisory. Primary advisor: David Savitt.

Undergraduate Mentorship
Spring 2024: Viggy Vanchinathan, mentored a DRP project on understanding addition with transformers.
Fall 2023: Spencer Huang, Dev Lalwani, mentored a DRP project on mechanistic interpretability.
Spring 2023: Orisis Zheng, mentored a DRP project on Zariski's lemma in Algebraic Geometry.
Fall 2022: Nick Lombardi: mentored a project on an introduction to the Langlands program.

Fall 2024
Graduate Algebra, Teaching Assistant
Introduction to Proofs, Teaching Assistant

Spring 2024
Directed Reading Program, Co-organizer.

Fall 2023
SOUL Course: Interpretability in AI, Lecturer
Honors Single Variable Calculus, Lecturer
Directed Reading Program, Organizer and Mentor.

Spring 2023
Calculus III, Head Teaching Assistant
Directed Reading Program, Co-organizer and Mentor.

Fall 2022
Calculus II, Teaching Assistant
Directed Reading Program, Co-organizer and Mentor

AI Projects

The following are some selected personal projects reflecting my interests in, 1. Social Impact and Ethical AI, 2. Multilingual Natural Language Processing, focusing on improving low-resource language performance, and 3. AI and Mathematics, exploring the role of language models in mathematical research, education, and the mathematical foundations of learning theory, such as singular learning theory.

Spoken MASSIVE: A Multilingual Spoken Language Understanding Dataset joint with Chutong Meng (Ph.D. student at George Mason University), this project presents the first multilingual spoken language understanding dataset. The dataset was synthesized from MASSIVE, and SLU models were trained and evaluated on this dataset.

Emotion Fine Tuning This is ongoing project, with Prof. Levine (Cornell University), explores the role of emotion in AI behavior. The first step is to quantify if emotional feedback can be as useful as RLHF in training data.

Superversed learning for steganography We train a transformer for minimum entropy coupling problem, which has been shown recently to apply to steganography.

Mitigating Social Biases in Language Models with Adversarial Debate This project is joint work with Cole Molloy and Lois Wang (Johns Hopkins University). We explore how in-context adversarial debates between language models can be structured to mitigate social biases in pretrained language models.

Some Thoughts on AI and Mathematical Research, in 2023 Written with Sina Hazratpour (Postdoc at Johns Hopkins University), this article surveys the state-of-the-art in machine learning for mathematical research, focusing on the impact of large language models and advances in the theorem-proving community, written in May 2023.

Skills

Programming Languages: Python, R, MATLAB
AI Frameworks: TensorFlow, PyTorch
Tools: Jupyter, Git, LaTeX
Languages: Mandarin (native), English (fluent), Ukrainian (elementary proficiency)