

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

Thesis title: Geometric and Categorical Aspects of the Langlands Program in Mixed Characteristic.

This thesis synthesizes a combination of submitted works and ongoing research.

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, February 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 Spalinski.

Professional service

All roles listed below were conducted at Johns Hopkins University.

Graduate Mentorship

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

Undergraduate Mentorship

Spring 2024: Viggie 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.

Supervised 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)