

# Jae Hyung (John) Sim

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## Education

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*Ph.D. Mathematics [Candidate]*

Boston University

Advisor: Glenn Stevens

Started September 2019

Boston, MA

*B.A. Mathematics with Honors; Minor in Computer Science*

University of Chicago

Completed 2019

Chicago, IL

*High School Diploma*

Milton Academy

Graduated 2015

Milton, MA

## Academics Graduate

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### *Papers*

Explicit Cocycle of the Dedekind-Rademacher Cohomology Class and the Darmon-Dasgupta Measures

- Preprint uploaded to the Arxiv on July 1, 2023

### *Seminars*

Graduate Research Seminar organized by Darmon at McGill - Aut 2023

- Invited speaker on the Dedekind-Rademacher cocycle.

Fermat's Last Theorem Seminar - Aut 2023

- Talk given on Taylor-Wiles Patching.

Learning Seminar on  $p$ -adic Geometry - Spr 2023

- Talk given on Foundations of Adic Spaces.

Boston University Number Theory Expository Seminar (BUNTES)

- Organizer in Spr 2024 on  $p$ -adic Hodge Theory and  $p$ -divisible Groups.
- Organizer in Spr 2022 on Class Field Theory.
- Organizer in Aut 2020 on Complex Multiplication.
- Talks Given:
  - Introduction to  $p$ -adic Hodge Theory - Spr 2024
  - Semistable and Crystalline Period Rings - Aut 2023
  - Representability of a deformation functor via a Hida Family - Aut 2023
  - Galois Representations - Aut 2023
  - Tate Algebras - Spr 2023
  - Stark's Conjectures - Spr 2022
  - Explicit and Cohomological Hilbert Symbol - Spr 2022
  - Introduction to Class Field Theory - Spr 2022
  - Complex Multiplication for Shimura Varieties - Aut 2021
  - Introduction to Quaternion Algebras and Shimura Curves - Aut 2021
  - Lefschetz Fixed Point Formula in Étale Cohomology - Spr 2021
  - $H^1$  and Torsors - Spr 2021
  - Étale Maps - Spr 2021
  - Coates-Wiles Complex Multiplication and BSD - Aut 2020
  - Intro and Overview of Complex Multiplication - Aut 2020
  - Raynaud's Generic Fiber - Spr 2020
  - Ramification of Curves - Spr 2020
  - Kolyvagin's Work - Aut 2019
  - Modular Curves Background I - Aut 2019

## Conferences Attended

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Main-Quebec Number Theory Conference	University of Maine
• 2023 Talk given: “Dedekind-Rademacher Cocycle and Explicit Class Field Theory.”	
AMS New England Graduate Student Conference	Brown University
• 2024 Talk given: “Euler Systems and Adelic Distributions.”	
• 2023 Talk given: “The Missing Theory of RM Elliptic Curves.”	
Spring School on Non-archimedean geometry and eigenvarieties (Mar 2023)	Heidelberg
Arizona Winter School	University of Arizona
• 2024 - Abelian Varieties	
• 2022 - Automorphic Forms Beyond GL <sub>2</sub>	
Tenth Annual Upstate Number Theory Conference (Oct 2021)	Union College
Elliptic Curves and the Special Values of L-functions (Aug 2021)	ICTS (virtual)
paraDIGMS (Apr 2021)	AMS (virtual)

## Teaching

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Instructor of Record at Boston University – (†) indicates use of ungrading assessment system.

- MA 341 Elementary Number Theory - Sum1 2023 (†)
- MA 242 Linear Algebra - Sum1 2022 (†)
- MA 113 Elementary Statistics - Sum1 2021
- MA 225 Multivariate Calculus - Sum1 2020

Teaching Fellow at Boston University

- MA 581 Probability - Spr 2023
- MA 541 Abstract Algebra - Aut 2021
- MA 442 Linear Algebra - Spr 2021
- MA 225 Multivariate Calculus - Spr 2024, Sum 2020, Aut 2019
- MA 123 Calculus I - Aut 2023, Aut 2022, Spr 2022
- MA 122 Calculus for Social Sciences - Spr 2020
- MA 121 Calculus - Aut 2020

Course Organizer

- Assisted in creating an asynchronous online course (MA 113) for BU - Sum 2021

PROMYS

- Assistant to David Fried for Returning Student and Returning Teacher Labs - 2023
- Assistant to David Fried for Returning Student Labs - 2022
- Teacher's Teacher ( $T^2$ ) for PROMYS for Teachers - 2020

BU Center for Teaching and Learning Alternative Grading Project [Link]

- Project to create a webpage for instructors interested in alternative grading - Summer 2022

## Non-academic

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*GirlsGetMath@BU*

Boston University

Boston, MA

- Five-day mathematics program for high schoolers regardless of gender.
- Teaching Fellow - Aug 2023, Aug 2022

*Directed Reading Program*

Boston University

September 2019 - Current

Boston, MA

- Steering Committee Member - Spr 2020 - Current.
- Mentor:
  - Aut 2023 - Algebraic Number Theory.
  - Aut 2022 - Algebraic Number Theory.
  - Aut 2021 - Riemann Surfaces and Complex Analysis.
  - Spr 2021 - Group Theory.
  - Aut 2020 - Machine Learning and CNN.
  - Spr 2020 - Elliptic Curve Cryptography.
  - Aut 2019 - Algebraic Number Theory.

*Graduate Student Organization Representative*  
Boston University  
• Representative for Math and Stats Department

September 2021 - Current  
Boston, MA

*Maroon Tutor Match*  
University of Chicago

January 2016 - June 2019  
Chicago, IL

- Educational program providing affordable one-to-one tutoring for K-12 students in the Hyde Park neighborhood of Chicago
- Weekly tutoring three students in high school mathematics
- Tutoring undergraduates as a department tutor within University

## **Undergraduate Experience**

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*Number Theory Reading Course*  
University of Chicago

April 2018 - June 2019  
Chicago, IL

- Reading course with Matthew Emerton on local and global class field theory
- Reading course with Matthew Emerton on elliptic curves and CM fields

*REU in Mathematics*  
University of Chicago

June - August 2018  
Chicago, IL

- Talk: "Introduction to  $p$ -adic Numbers and Their Use in Algebraic Number Theory" - 2018
- Authored: "The  $p$ -adic numbers and a proof of the Kronecker-Weber theorem" [link] - 2018
- Authored: "The Fundamental Group and CW Complexes" - 2016

*Department Reader*  
University of Chicago

September 2017 - June 2019  
Chicago, IL

- Graded MATH 19620 in Fall 2017, Winter 2018 and MATH 20410 in Winter 2019

## **Miscellaneous Skills**

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- Proficient with Sage, C++, HTML, and  $\text{\LaTeX}$
- Event planning and coordination
- Fluent in Korean
- Breakdancing