

Preston Wake

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Citizenship: US and Canadian

Academic Appointments

- Sept 2018 - **Member**, *Institute for Advanced Study*.
July 2019
- July 2016 - **NSF Postdoctoral Fellow**, *University of California, Los Angeles*.
Aug 2018
- July 2015 - **Assistant Adjunct Professor**, *University of California, Los Angeles*.
July 2018

Education

- 2009-2015 **PhD in Mathematics**, *University of Chicago*.
Thesis: *Eisenstein Hecke algebras and Iwasawa theory*, Advisor: Kazuya Kato
- 2005-2009 **BSc in Mathematics**, *McMaster University*.
Honours

Research Interests

Number theory. Particularly arithmetic geometry and Iwasawa theory.

Papers

9. *The Eisenstein ideal with squarefree level*.
With Carl Wang-Erickson.
Preprint (2018).
8. *The rank of Mazur's Eisenstein ideal*.
With Carl Wang-Erickson.
Preprint (2017).
7. *Deformation conditions for pseudorepresentations*.
With Carl Wang-Erickson.
Preprint (2017).
6. *Primitive elements in p -divisible groups*.
With Robert Kottwitz.
Res. Number Theory 3 (2017) 3:20.
5. *Ordinary pseudorepresentations and modular forms*.
With Carl Wang-Erickson.
Proc. Amer. Math. Soc. Ser. B 4 (2017), 53-71.
4. *Full level structures revisited: pairs of roots of unity*.
J. Number Theory 168 (2016), 81-100.
3. *Pseudo-modularity and Iwasawa theory*.
With Carl Wang-Erickson.
To appear in *American Journal of Mathematics*.
2. *Eisenstein Hecke algebras and conjectures in Iwasawa theory*.
Algebra Number Theory 9 (2015), no. 1, 53-75.

1. *Hecke algebras associated to Λ -adic modular forms.*
J. Reine Angew. Math. 700 (2015), 113-128.

Research Awards and Grants

- 2016-2018 NSF Postdoctoral Fellow.
- 2015-2016 AMS-Simons Travel Grant.
- 2012-2015 NSERC Postgraduate Scholarship, doctoral level.
- 2009-2011 McCormick Fellowship, University of Chicago.
- 2009-2010 NSERC Alexander Graham Bell Canada Graduate Scholarship, masters level.

Teaching Awards

- 2016 Honors Collegium course selected

Together with Olga Turanova, designed the course *Inquiry in numbers* for the UCLA Honors Collegium. The course proposal was selected in a University-wide competition for innovative teaching and learning.

- 2016 Sigma Pi Professor of Empowerment

Selected by UCLA Sigma Pi Fraternity for "outstanding efforts in the classroom". Nominated by a student in my Differential Equations class (Winter 2016).

Invited Conference Talks

- June 2018 Mathematics is a long conversation: a celebration of Barry Mazur – Cambridge, MA.
- June 2018 Connecticut Summer School in Number Theory – Storrs, CT.
- Dec 2017 Bay Area Algebraic Number Theory and Arithmetic Geometry Day – Berkeley, CA.
- Nov 2017 IAS Workshop on Motives, Galois Representations and Cohomology Around the Langlands Program – Princeton, NJ.
- Oct 2017 Southern California Number Theory Day – Irvine, CA.
- July 2017 Iwasawa 2017 – Tokyo, Japan.
- March 2017 AMS Special Session on Automorphic Forms and Number Theory – Bloomington, IN.
- Feb 2017 p -adic methods for Galois representations and modular forms – Barcelona, Spain.
- June 2016 New Directions in Iwasawa Theory – Banff, Canada.
- May 2013 p -adic L -functions and Modular Forms – Los Angeles, CA.

Invited Conference Participation

- March 2018 Project assistant for R. Sharifi at Arizona Winter School on Iwasawa theory – Tucson, AZ.
- July 2017 Poster presentation at the Automorphic Motives, Euler Systems and p -adic L -functions conference – Nisyros, Greece.
- July 2014 Invited participant at the Algebraische Zahlentheorie workshop – Oberwolfach, Germany.

Colloquia

- Jan 2018 University of Utah, Colloquium.
- Jan 2018 Michigan State University, Colloquium.
- Nov 2017 Purdue University, Colloquium.

Seminar Talks

- March 2018 UCLA, Number theory seminar.

- Dec 2017 University of Utah, Number theory seminar.
- Oct 2017 McGill University, Québec-Vermont number theory seminar.
- Oct 2017 University of Toronto, Representation theory and number theory seminar.
- Oct 2017 Emory University, Algebra seminar.
- March 2017 UIUC, Number theory seminar.
- March 2017 University of Chicago, Number theory seminar.
- Sept 2016 UCLA, Number theory seminar.
- April 2016 University of Chicago, Number theory seminar.
- April 2016 UC San Diego, Number theory seminar.
- March 2016 University of Maryland, Lie Group and Representation Theory Seminar
- March 2016 University of Arizona, Algebra and number theory seminar.
- Feb 2016 Stanford, Number theory seminar.
- Jan 2016 Caltech, Number theory seminar.
- Oct 2015 UC Santa Cruz, Number theory seminar.
- June 2015 UCLA, Number theory seminar.
- Feb 2015 Northwestern University, Number theory seminar.
- Feb 2015 Harvard University, Number theory seminar.
- Nov 2014 Boston University, Number theory seminar.
- Apr 2014 University of California Irvine, Number theory seminar.
- Jan 2014 University of Chicago, Number theory seminar.
- June 2013 Université Paris 11, Séminaire d'Arithmétique et de Géométrie Algébrique.
- June 2013 Université Paris 6 and Paris 7, Séminaire Groupes Réductifs et Formes Automorphes.
- Oct 2012 Midwest Number Theory – UIUC.
- May 2012 University of Chicago, Number theory seminar.

Conferences Attended

- Oct 2016 Southern California Number Theory Day, UC Irvine
- May 2015 Southern California Number Theory Day, UCSD
- Mar 2015 p -adic methods in the theory of classical automorphic forms, CRM
- Dec 2014 Automorphic forms, Shimura varieties, Galois representations and L -functions, MSRI
- June 2014 p -adic Variation in Number Theory, Boston University
- Feb 2014 Hot Topics: Perfectoid Spaces, MSRI
- May 2013 p -adic L -functions and Modular Forms, UCLA
- June 2012 Hida birthday conference, UCLA
- May 2012 Towards a Local Proof of Local Langlands, UIC
- Oct 2011 Workshop on Iwasawa Theory, University of Arizona

Seminars Organized

- Winter 2018 UCLA Number theory working seminar – work of Harris-Ventatesh
- Spring 2017 UCLA Algebra seminar – Beilinson's proof of p -adic comparison
- 2015-2017 UCLA Number theory seminar.
- 2015-2016 UCLA participating number theory seminar – Derived deformation theory.
- 2010-2011 UChicago Graduate student seminar on algebraic geometry.
- 2010-2011 UChicago Graduate student pizza seminar.

Refereeing

- Mathematische Annalen
- Algebra and Number Theory
- International Mathematics Research Notices
- Mathematical Research Letters
- Research in Number Theory
- Journal of the London Mathematical Society

Teaching Experience

2015-present **Lecturer, UCLA.**

Instructor for six 10-week-long courses. Designed the *Inquiry in numbers* course, including selecting all material and determining evaluation methods. Upper division classes have 20-40 students, and lower division courses have 150-200 students. Duties include giving preparing and delivering all lectures, assigning homework, writing and grading exams, and assigning final grades.

- Inquiry in numbers (honors collegium), Spring 2018.
- Linear algebra (upper division), Autumn 2015.
- Calculus II (lower division), Winter 2016.
- Differential Equations (lower division), Winter 2016.
- Linear algebra (upper division), Spring 2016.
- Advanced linear algebra (upper division), Spring 2016.

2011-2015 **Lecturer, University of Chicago.**

Instructor for eight 10-week-long courses, with each class having 20-30 students. Duties include giving preparing and delivering all lectures, assigning homework, writing and grading exams, and assigning final grades.

- Elementary Functions and Calculus I, Autumn 2011.
- Elementary Functions and Calculus II, Winter 2012.
- Calculus II, Autumn 2012, 2013, 2014.
- Calculus III, Winter 2013, 2014, 2015.

2010-2011 **College Fellow, University of Chicago.**

Duties include grading, holding problem sessions, writing some exam questions, and giving several lectures.

- Honors Algebra I. Autumn 2010. Mentor: John Alperin.
- Honors Algebra II. Winter 2011. Mentor: John Alperin.
- Honors Algebra III. Spring 2011. Mentor: David Constantine.

2010-2015 **Mentor, University of Chicago.**

Duties include advising undergraduate students in advanced reading courses and introductions to research, and assisting students in preparing oral and written research reports.

- Directed reading program (DRP). Winter 2011, Spring 2011 and Winter 2012, Winter 2013.
- Research experience for undergraduates (REU). Summer 2010 and Summer 2011.

References

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Gang Liu (teaching reference)

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