

# Mathilde Gerbelli-Gauthier

## Curriculum Vitae

Department of Mathematics  
Bahen Centre for Information Technology, University of Toronto  
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### Positions Held

- 2024-present **Assistant Professor**, *University of Toronto*, Toronto  
2020-2024 **Postdoctoral Fellow**, *Centre de Recherches Mathématiques and McGill University*, Montréal  
2021-2022 **Member**, *Institute for Advanced Study*, Princeton

### Education

- 2020 **Ph.D. in Mathematics**, *University of Chicago*, Advisor: Matthew Emerton  
Thesis: Growth of Cohomology of Arithmetic Groups and the Stable Trace Formula.  
2014 **B.Sc. in Mathematics**, *McGill University*, First Class Honours

### Publications

- 2023 **Limit multiplicity for unitary groups and the stable trace formula**  
*Algebra and Number Theory*. 17:12  
2016 **The order of nilpotence of Hecke operators mod 2: a new proof**  
*Research in Number Theory*, 2:7

#### Preprints

- 2024 **Root Number Equidistribution for Self-Dual Automorphic Representations on  $GL_N$ , with R. Dalal**  
Submitted. ArXiv: 2410.01976  
**A note on large sums of divisor-bounded multiplicative functions, with C. Frechette, A. Hamieh, and N. Tanabe**  
To appear in *Research Directions in Number Theory*. ArXiv: 2405.00658  
**Cohomology of Fuchsian groups and Fourier interpolation, with A. Venkatesh**  
Submitted. ArXiv: 2406.1951  
2023 **The Cohomological Sarnak-Xue Density Hypothesis for  $SO_5$ , with S. Evra and H. Gustafsson**  
Submitted. ArXiv: 2309.12413  
**Large sums of Fourier coefficients of cusp forms, with C. Frechette, A. Hamieh, and N. Tanabe**  
To appear in *Journal de Théorie des Nombres de Bordeaux*. ArXiv: 2308.06311  
**Mod  $\ell$  gamma factors and a converse theorem for finite general linear groups, with J. Bakeberg, H. Goodson, A. Iyengar, G. Moss, and R. Zhang**  
Submitted. ArXiv: 2307.07593  
2022 **Statistics of cohomological automorphic representations via the endoscopic classification, with R. Dalal**  
Submitted. ArXiv: 2212.12138

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## Awards

- 2020 **Postdoctoral Fellowship**, NSERC  
**Kowalsky Fellowship**, Department of Mathematics, University of Chicago
- 2018 **Lawrence and Josephine Graves Prize for Excellence in Undergraduate Teaching**,  
Department of Mathematics, University of Chicago
- 2016 **Postgraduate Scholarship - Doctoral**, NSERC  
**Alexander Graham Bell Canada Graduate Scholarship**, NSERC, *declined*  
**Doctoral Scholarship**, FRQNT, *declined*
- 2014 **Masters Scholarship**, FRQNT  
**McCormick Fellowship**, University of Chicago

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## Talks

- 2024 Québec-Maine Number Theory Conference, Université Laval.  
Canadian Number Theory Association XVI, Fields Institute.  
Women<sup>+</sup> and Mathematics Program: Postdoc Talks, Institute for Advanced Study.  
Bhaskaracharya celebrating Harish-Chandra, Bhaskaracharya Pratishthana and IISER Pune, *Online*.  
Ottawa-Carleton Number Theory Seminar, University of Ottawa.  
Beyond Voganish Seminar, University of Calgary, *Online*.  
AMS Spring Sectional: Special Session on Automorphic Forms and Trace Formulae, Howard University.  
QVNTS, McGill University.  
Number Theory Seminar, Rutgers University, *Online*.  
Colloquium, Boston College.  
Undergraduate Colloquium, Bowdoin College.  
Colloquium, University of Utah.  
Representation Theory/Number Theory Seminar, University of Utah.
- 2023 Colloquium, University of Toronto.  
Colloquium, Georgia Tech.  
Number Theory Seminar, Johns Hopkins University.  
Maine-Québec Number Theory Conference, University of Maine.  
Heilbronn Number Theory Seminar, University of Bristol.  
Clay Workshop: New Perspectives in the Analytic Theory of Automorphic Forms, Oxford.  
Conference on Automorphic forms, Endoscopy and Trace Formulas, CIRM.  
International Automorphic Forms Seminar, *Online*.  
Group, Lie, and Number Theory Seminar, University of Michigan.  
Number Theory Seminar, Northwestern University.  
Number Theory Seminar, University of Chicago.  
AMS Spring Sectional Meeting: Special Session on Arithmetic Statistics, University of Cincinnati.  
Number Theory Speaker Series, Ohio State University.  
Automorphic Forms and Arithmetic Seminar, Columbia University.  
Princeton-IAS Number Theory Seminar, Princeton University.

- COGENT Seminar, *Online*.  
 Joint Mathematics Meeting: Automorphic Forms and Representation Theory, Boston.
- 2022 Modern Math Workshop, San Juan.  
 Québec-Maine Number Theory Conference, Université Laval.  
 Connecticut Summer School in Number Theory, University of Connecticut.  
 “What is...” Seminar, Institute for Advanced Study.  
 Philadelphia Area Number Theory Seminar, Bryn Mawr College.  
 Mathematics Colloquium, Dalhousie University. *Remote*
- 2021 Automorphic Forms and Number Theory Seminar, Purdue University. *Remote*  
 Members' Colloquium, Institute for Advanced Study.  
 Workshop on Cohomology of Arithmetic Groups: Duality, Stability, and Computations, Banff.  
 Boston University Number Theory Seminar. *Remote*  
 Séminaire représentations des groupes réductifs, Institut Mathématique de Marseille. *Remote*  
 CMS 75th+1 Anniversary Summer Meeting, Ottawa. *Remote*  
 Séminaire de géométrie arithmétique et motivique, Université Sorbonne-Paris-Nord. *Remote*  
 Arbeitsgemeinschaft: Derived Galois Deformation Rings and Cohomology of Arithmetic Groups, Oberwolfach. *Remote*.  
 Joint IAS/Princeton Number Theory Seminar, *Remote*.  
 (w/ Clara del Junco) CONSTRAIN Researcher Forum, University of Leeds. *Remote*.
- 2020 CMS Virtual Winter Meeting, University of Ottawa. *Remote*.  
 Number Theory Seminar, University of Oregon. *Remote*.  
 Québec-Vermont Number Theory Seminar, McGill University. *Remote*.  
 Members' Seminar, CRM Special Semester on Cohomology in Arithmetic. *Remote*  
 Number Theory Seminar, University of Wisconsin-Madison.  
 Representation Theory and Number Theory Seminar, University of Utah.  
 Group, Lie, and Number Theory Seminar, University of Michigan.
- 2019 Junior Number Theory Days, Johns Hopkins University.  
 Number Theory Seminar, MIT.  
 Number Theory Seminar, Johns Hopkins University.  
 AMS Fall Sectional Meeting: Special Session on Automorphic Forms and  $L$ -functions, University of Wisconsin-Madison.  
 Linfoot Seminar, University of Bristol.
- 2018 Women in Automorphic Forms, Technische Universität Darmstadt.

## Selected Workshops and Conferences

- 2024 **Women<sup>+</sup> and Mathematics: Symmetry and Arithmetic**, *Princeton*
- 2023 **Clay Workshop: New Perspectives in the Analytic Theory of Automorphic Forms**, *Oxford*  
**Conference on Automorphic forms, Endoscopy and Trace Formulas**, *Marseille*  
**Women in Numbers 6**, *Banff*  
**Joint Mathematics Meeting**, *Boston*
- 2022 **Modern Math Workshop and National Diversity in STEM Conference**, *San Juan*  
**Québec-Maine Number Theory Conference**, *Québec*  
**Connecticut Summer School in Number Theory**, *Storrs*

- Arizona Winter School: Automorphic Forms Beyond  $GL_2$** , *Tucson*
- 2021 **Cohomology of Arithmetic Groups: Duality, Stability, and Computations**, *Banff*  
**Rethinking Number Theory**, *Online*  
**CMS 75th+1 Anniversary Summer Meeting**, *Ottawa*, Remote  
**Arbeitsgemeinschaft: Derived Galois Deformation Rings and Cohomology of Arithmetic Groups**, *Oberwolfach*, Remote
- 2020 **CMS Winter Meeting**, *Ottawa*, Remote  
**CRM Workshop: Arithmetic Quotients of Symmetric Spaces and Their Cohomology**, *Montreal*
- 2019 **CMO Workshop: Modularity and Moduli Spaces**, *Oaxaca*  
**A Conversation on Professional Norms in Mathematics**, *Baltimore*  
**AMS Fall Sectional Meeting: Special session on Automorphic Forms and  $L$ -functions**, *Madison*
- 2018 **Sixth Abel Conference: A Mathematical Celebration of Robert P. Langlands**, *Minneapolis*  
**Women in Automorphic Forms**, *Darmstadt*  
**IAS Workshop: Representation Theory and Analysis on Locally Symmetric Spaces**, *Princeton*
- 2017 **IAS Workshop: Motives, Galois Representations and Cohomology Around the Langlands Program**, *Princeton*  
**MSRI Summer School: Automorphic Forms the Langlands Programme**, *Berkeley*  
**Arizona Winter School: Perfectoid Spaces**, *Tucson*  
**Barcelona Graduate School of Mathematics:  $p$ -adic Methods in Galois Representations and Modular Forms**, *Barcelona*

## Teaching

### Instructor of Record

#### University of Toronto

2024-2025 Algebra I, *Fall*, Introduction to Number Theory, *Spring*.

#### McGill University

2023-2024 Linear Algebra and Geometry, *Winter*.

2022-2023 Linear Algebra and Geometry, *Fall*.

#### University of Chicago

2019-2020 Calculus III, *Fall*.

2018-2019 Mathematical Methods for the Social Sciences, *Fall*.

2017-2018 Mathematical Methods for the Social Sciences, *Fall and Summer*.

2016-2017 Calculus III, *Fall*, Mathematical Methods for the Social Sciences, *Spring*.

### Teaching Assistant

#### Arizona Winter School

2022 Automorphic Forms and the Theta Correspondance, Study Group Leader. *Arizona Winter School on Automorphic Forms Beyond  $GL_2$* .

#### University of Chicago

2018-2019 Mathematics Study Abroad at the University of Chicago Center in Paris: Arithmetic in Function Fields, Introduction to  $p$ -groups, Random Walks and The Heat Equation, *Spring*.

2015-2016 Calculus I-II-III, Inquiry-Based Learning, *Fall, Winter, and Spring*.

### Workshops Attended

- 2023 Equity Discussion Group, *Department of Mathematics and Statistics, McGill University*.
- 2022 Pedagogy Discussion Group, *Department of Mathematics and Statistics, McGill University*.
- 2019 Fundamentals of Teaching Mathematics, *Chicago Center for Teaching*.
- 2018 Inclusive Teaching in STEM, *Race and Pedagogy working group at the University of Chicago*.

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## Service and Outreach

### Refereeing

I have served as a referee for Transactions of the American Mathematical Society, GAFA, and Essential Number Theory.

### Volumes Edited

- 2021 **A Conversation on Professional Norms in Mathematics**, *American Mathematical Society*, ISBN: 978-1-4704-6780-7

**Burnout: a zine about academia, travel, and climate change**, *self-published*, [knowledge.uchicago.edu/record/2773](https://knowledge.uchicago.edu/record/2773)

### Conferences and Seminars Organized

- 2023 **Scientific Session: Automorphic representations and p-adic aspects of the Langlands program**, *CMS Winter Meeting*, Co-organizer.  
**AMS Special Session: Women in Automorphic Forms**, *Joint Mathematics Meeting*, Co-organizer.
- 2022 **Mathematical Conversations**, *Institute for Advanced Study*, Co-organizer
- 2020 **CRM Women's Seminar**, *Centre de Recherche Mathématiques*, Co-organizer
- 2016-2017 **Student Number Theory Seminar**, *University of Chicago*, Organizer  
Fall-Winter 2016:  $p$ -adic geometry, Summer 2017: the Local Langlands correspondence for  $GL_2$

### Other

- 2023 **EDI assesment**, *Banff International Research Station*, Evaluator  
Assess the merits of workshop proposals on the basis of Equity, Diversity, and Inclusion.
- 2022 **Lunch in the Time of Covid**, Panelist  
Discussion on the role and responsibility of academics in climate change.
- 2022-2023 **Part B Exam**, *McGill University*, Secondary Examiner  
Topics: Growth in the torsion of cohomology of arithmetic groups, Hilbert modular forms.
- 2021-2022 **Women's Lunches**, *Institute for Advanced Study*, Co-organizer  
Organized a monthly lunch meeting for female members at the Institute's School of Mathematics.
- 2019-2020 **Arts + Science Collaboration Grant**, *University of Chicago*, Fellow  
Recipient of a \$3000 grant for an interdisciplinary arts and science project with two students at the School of the Art Institute of Chicago. Title: *Numerical Alternatives*
- 2018-2020 **Lunchtime Ado with Female Speakers**, *University of Chicago*, Co-organizer  
Organized and moderated a series of biquarterly lunchtime conversations with women speaking in the department's research seminars. Recipient of an \$800 grant in 2019-2020.
- 2017-2020 **Directed Reading Program**, *University of Chicago*, Co-organizer  
Managed a program pairing undergraduate and graduate students for quarter-long reading projects.
- 2018-2019 **Graduate Students United**, *University of Chicago*, Steward  
Union representative for graduate workers in the mathematics department.

- 2018 **Department of Mathematics Climate Survey**, *University of Chicago*  
Co-development of a climate survey to assess the experiences of graduate students.
- 2016-2018 **Directed Reading Program**, *University of Chicago*, Mentor  
Projects: Class field theory, Pythagorean triples, Fermat's theorem on the sum of two squares, Algebraic Varieties, Fourier Series, Arithmetic of Elliptic Curves.
- 2013-2014 **Program in Mathematics for Young Scientists**, *Boston University*, Counselor  
Mentorship of high-school students in a 6-week number theory summer camp.