

# Riccardo Brasca

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## Contact Information

- Institut de Mathématiques de Jussieu-Paris Rive Gauche  
Université Paris Cité  
Bâtiment Sophie Germain  
75205 Paris Cedex 13  
France
- Office: 605
- Email: [riccardo.brasca@gmail.com](mailto:riccardo.brasca@gmail.com)
- Website: <https://webusers.imj-prg.fr/~riccardo.brasca/>
- Phone (+33) 01 57 27 93 02

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## Work Experience

**Maître de conférences (associate professor)** September 2013 - present  
Université Paris Cité  
Institut de Mathématiques de Jussieu-Paris Rive Gauche

**Post-Doc** October 2012 - August 2013  
École Normale Supérieure de Lyon

**Post-Doc** April 2012 - September 2012  
Max Planck Institute for Mathematics, Bonn

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## Publications and preprints

- *Fermat's Last Theorem for regular primes in Lean*. Joint work with [Alex Best](#), [Chris Birkbeck](#), and [Eric Rodriguez](#). *14th International Conference on Interactive Theorem Proving, no. 36, 2023*.
- The *Liquid Tensor Experiment*, 2023. Joint with the mathlib community.
- $p$ -adic powers of the Gauss–Manin connection for Siegel modular forms. Joint work with [Giovanni Rosso](#). In preparation.
- $p$ -adic families of modular forms for Hodge type Shimura varieties. Submitted for publication.
- Overconvergent Eichler–Shimura isomorphisms for certain unitary groups. Joint work with [Daniel Barrera Salazar](#). In preparation.
- Hida theory over some unitary Shimura varieties without ordinary locus. Joint work with [Giovanni Rosso](#). [arXiv:1711.05546](#). *Amer. J. Math.* 143 (2021), no. 3, 715–751.
- Eigenvarieties for non-cuspidal modular forms over certain PEL Shimura varieties. Joint work with [Giovanni Rosso](#). [arXiv:1605.05065](#). Submitted for publication.
- An Introduction to Perfectoid Spaces. Joint work with [Fabrizio Andreatta](#), [Olivier Brinon](#), [Bruno Chiarellotto](#), [Nicola Mazzari](#), [Simone Panozzo](#), and [Marco Seveso](#). *Panorama et Synthèses*, no. 54, 2019.

- Eigenvarieties for cuspforms over PEL type Shimura varieties with dense ordinary locus. *Canadian Journal of Mathematics* 68 (2016), no.6, 1227-1256. [doi.org/10.4153/CJM-2015-052-2](https://doi.org/10.4153/CJM-2015-052-2).
- Quaternionic modular forms of any weight. *Int. J. Number Theory* 10 (2014), no. 31, 31-53. [doi:10.1142/S1793042113500796](https://doi.org/10.1142/S1793042113500796).
- $p$ -adic modular forms of non-integral weight over Shimura curves. *Compos. Math.* 149 (2012), no. 1, 32-62. [doi:10.1112/S0010437X12000449](https://doi.org/10.1112/S0010437X12000449).

## Scientific activities

- Maintainer of [Mathlib](#)
- Organizer of the *Lean for the Curious Mathematician 2024* conference, CIRM March 2024
- Organizer of the *Atelier Lean* of the [seventh mini symposium of the Roman Number Theory Association](#), Università Roma Tre March 2023
- Member of the ANR project COLOSS 2020 - 2024
- Member of the ANR project PerCoLaTor 2015 - 2019
- Organizer of the seminar *Groupes Réductifs et Formes Automorphes*, Institute de Mathématiques de Jussieu-Paris Rive Gauche September 2014 - June 2016
- Organizer of the conference *Solstice 2014*, Université Paris 7 June 2014
- Referee for the *Canadian Journal of Mathematics*, *International Journal of Number Theory*, and *Algebra & Number Theory*
- Reviewer for MathSciNet
- Organizer of the workshop *Almost Xmas seminar*, Università degli Studi di Milano, Milan December 2011

## Seminars and Talks

- An introduction to proof assistants: a mini course about mathematical formalization  
Universidad de Santiago de Chile November 2022
- Maintenance of Lean's mathlib and the Liquid tensor experiment September 2022  
EuroProofNet Workshop on the development, maintenance, refactoring and search of large libraries of proofs  
Tbilisi State University - Tbilisi
- Fermat's Last Theorem for regular primes in Lean May 2022  
Conference *Lean in Lyon*  
Institut Camille Jordan - Lyon
- How to explain advanced mathematics to a computer December 2021  
Workshop *Luxembourg Number Theory Day 2021*  
University of Luxembourg
- $p$ -adic families of modular forms over Shimura varieties of Hodge type January 2020  
Workshop *Jornada de Teoría de Números y Representaciones*  
Universidad de Santiago de Chile
- $p$ -adic families of modular forms over Shimura varieties of Hodge type May 2019  
Conference  *$p$ -adic modular forms and  $p$ -adic L-functions*  
Fondazione Alessandro Volta, Como - Italy
- Hida theory over some Shimura varieties without ordinary locus April 2019  
*Fourth one-day workshop in Cardedeu:  $p$ -adic arithmetic geometry*  
Universitat de Barcelona - Spain
- Mini-course Katz  $p$ -adic modular forms September 2017  
*Summer School on Modular Forms*

- Università di Padova - Italy
- Eigenvarieties for non-cuspidal Siegel modular forms September 2017  
*Summer School on Modular Forms*
- Università di Padova - Italy
- Eigenvarieties for non-cuspidal Siegel modular forms February 2017  
*Conference  $p$ -adic methods for Galois representations and modular forms*
- Universitat de Barcelona - Spain
- Hida theory over some Shimura varieties without ordinary locus May 2016  
*Number Theory Seminar*
- Cambridge University - UK
- Hida theory over some Shimura varieties without ordinary locus April 2016  
*Arithmetic and Algebraic Geometry Seminar*
- University of Amsterdam - The Netherlands
- Eigenvarieties for non-cuspidal Siegel modular forms March 2016  
*Québec-Vermont Number Theory Seminar*
- McGill University - Montreal, Canada
- Variété de Hecke pour formes de Siegel non cuspidales October 2015  
*Séminaire d'Arithmétique*
- Université de Lille - France
- Famiglie  $p$ -adiche di forme modulari non cuspidali September 2015  
*Conference of the UMI, the Italian Mathematical Society*
- University of Siena - Italy
- Almost mathematics September 2015  
*Summer school Perfectoid spaces*
- Organized by the University of Padova - Brixen, Italy
- Eigenvarieties for non-cuspidal Siegel modular forms June 2015  
*Conference Journées arithmétiques à Lyon*
- ENS-Lyon - France
- About the notion of  $p$ -adic family of modular forms April 2015  
*Seminar Number Theory and Algebraic Geometry*
- KU Leuven - Belgium
- Hida theory over some Shimura varieties without ordinary locus March 2015  
*Number Theory Seminar at Johns Hopkins University*
- Johns Hopkins University - Baltimore, USA
- Hida theory over some Shimura varieties without ordinary locus December 2014  
*Seminar Automorphic Forms and Arithmetic*
- Columbia University - New York City, USA
- Théorie de Hida pour certaines variétés de Shimura sans lieu ordinaire November 2014  
*Séminaire de théorie des nombres de l'IMJ-PRG*
- Institut de Mathématiques de Jussieu-Paris Rive Gauche - France
- Hida theory over Shimura varieties without ordinary locus October 2014  
*Conference  $p$ -adic methods in number theory*
- Università degli Studi di Milano - Italy
- Families of overconvergent modular forms over Shimura varieties without ordinary locus June 2014  
*Conference  $p$ -adic aspects of modular forms*
- IISER - Pune, India
- Familles des formes modulaires  $p$ -adiques et variétés de Hecke January 2014  
*Séminaire MathJeunes*

ENS Ulm - Paris, France

- Autour d'une construction géométrique des variétés de Hecke October 2013  
*Séminaire groupes réductifs et formes automorphes*

Institut de Mathématiques de Jussieu-Paris Rive Gauche - France

- About a geometric construction of eigenvarieties for Shimura variety of PEL type June 2013  
*Summer number theory in Milan*

Università degli Studi di Milano - Italy

- Variétés de Hecke pour certaines formes modulaires de type PEL January 2013  
*Séminaire de théorie des nombres de Caen*

Université de Caen Basse-Normandie - France

- Hecke varieties for Shimura varieties with ordinary locus January 2013  
Conference *Variétés de Shimura et formes modulaires  $p$ -adiques*

Université Paris 13 - France

- Strict  $\mathcal{O}$ -modules and  $p$ -adic modular forms December 2012  
*Oberseminar*

University of Zürich - Switzerland

- Strict  $\mathcal{O}$ -modules and  $p$ -adic modular forms November 2012  
*Séminaire de théorie des nombres*

Institut de Mathématiques de Bordeaux - France

- $p$ -adic modular forms of non-integral weight over Shimura curves May 2012  
*London number theory seminar*

Kings College - London, UK

- $p$ -adic modular forms of non-integral weight over Shimura curves May 2012  
*Oberseminar*

Max Planck Institute for Mathematics - Bonn, Germany

- $p$ -adic modular forms of non-integral weight May 2012  
Workshop *Algebraic Geometry and related topics*

Centro di Ricerca Matematica Ennio De Giorgi - Pisa, Italy

- Perfectoid fields and algebras December 2011  
*Almost Xmas Seminar*

Università degli Studi di Milano - Italy

- $p$ -adic modular forms of non-integral weight December 2011  
*Christmas Seminar*

Università degli Studi di Milano - Italy

- $p$ -adic modular forms of non-integral weight over Shimura curves June 2010  
*Seminario di teoria dei numeri*

Università degli Studi di Milano - Italy

## Education

### Ph.D. in Mathematics

March 2012

Università degli Studi di Milano

Thesis:  $p$ -adic families of modular forms over Shimura curves

Advisor: [Fabrizio Andreatta](#)

### M.Sc. in Mathematics

July 2008

Università degli Studi di Milano

Thesis: Galois cohomology via almost-étale extensions

Advisor: [Fabrizio Andreatta](#)

### **B.Sc. in Mathematics**

Università degli Studi di Milano

Spazi di Banach e proprietà di Radon-Nikodym

Advisor: [Clemente Zanco](#)

July 2006

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## *Teaching Experience*

### **Université Paris Cité**

- Teaching various courses as maître de conférences

September 2013 - present

### **Università degli Studi di Milano, Italy**

- Teaching assistant, Calculus III course
- Teaching assistant, Algebra II course

November 2008 - February 2009

March 2011 - July 2011