

# Riccardo Brasca

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## Contact Information

- Institut de Mathématiques de Jussieu-Paris Rive Gauche  
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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*, 2022. Work in progress. Joint with the mathlib community.
- The *Liquid Tensor Experiment*, 2022. 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-](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](#) 2022 - present
- 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

Conference *p-adic aspects of modular forms*

June 2014

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  $O$ -modules and  $p$ -adic modular forms December 2012  
*Oberseminar*  
 University of Zürich - Switzerland
- Strict  $O$ -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**

July 2006

Università degli Studi di Milano

Spazi di Banach e proprietà di Radon-Nikodym

Advisor: [Clemente Zanco](#)

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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