RICCARDO BRASCA

- Last Name: Brasca
- First Name: Riccardo
- Date of Birth: 26/10/1984
- Nationality: Italian and French
- Email: riccardo.brasca@gmail.com
- Work Address: Institut de Mathématiques de Jussieu-Paris Rive Gauche. Bâtiment Sophie Germain. Université Paris Cité. 5 rue Thomas Mann 75205 Paris 13.

Publications.

- A complete formalization of Fermat's Last Theorem for regular primes in Lean. Joint work with Alex Best, Chris Birkbeck, Eric Rodriguez, Ruben van de Velde and Andrew Yang. Annals of Formalized Mathematics, Volume 1, 2025, hal-04718128.
- Categorical foundations of formalized condensed mathematics. Joint work with Dagur Asgeirsson, Nikolas Kuhn, Filippo Nuccio and Adam Topaz. arXiv:2407.12840. The Journal of Symbolic Logic. Published online 2024:1-28.
- 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.
- p-adic families of modular forms over Shimura varieties of Hodge type. Submitted for publication, 2023. arXiv:2009.07150.
- Hida theory over some unitary Shimura varieties without ordinary locus. With Giovanni Rosso. arXiv:1711.05546. American Journal of Mathematics, Volume 143, Number 3, 2021.
- Eigenvarieties for non-cuspidal modular forms over certain PEL Shimura varieties. With Adel Betina and Giovanni Rosso. arXiv:1605.05065. Submitted for publication (major revision on 2025).
- An Introduction to Perfectoid Spaces. With Fabrizio Andreatta, Olivier Brinon, Bruno Chiarellotto, Nicola Mazzari, Simone Panozzo, and Marco Seveso. Panoramas et Synthèses.
- 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.
- Quaternionic modular forms of any weight. Int. J. Number Theory 10 (2014), no. 31, 31-53. doi: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.

Source code of work in formalized mathematics.

- The Liquid Tensor Experiment: a complete formalization in `Lean` of a fundamental result by Clausen and Scholze concerning condensed mathematics.
- The FLT regular project: a complete formalization in `Lean` of Fermat's Last Theorem for regular primes.
- `mathlib`: the official mathematical library of `Lean`, of which I am one of the maintainers.

Professional Experience.

- 2013 - Present: Maître de conférences (tenured associate professor), Université Paris Cité.
- 2025 - 2026: Part-time Delegation (2nd semester) at Imperial College London.
- 2020 - 2021: Part-time Delegation (1st semester) at CRM Montréal (virtual attendance because of the pandemic).
- 2012 - 2013: Postdoctoral researcher, École Normale Supérieure de Lyon.
- 2012: Postdoctoral researcher, Max-Planck-Institut für Mathematik (Bonn, Germany).

Fellowships and Awards.

- I am one the two scientific coordinators of the ANR project FALSE (*Formalizing Arithmetic in the Lean Software Environment*) (2025-2029), 252K €.
- I am one of the two coordinators for the APRAPRAM project (program Émergence en recherche of Université Paris Cité, 2023-2025), 35K €.
- I was the local coordinator for France of the MATH AmSud project *Arithmetic Geometry: Shimura varieties, Automorphic Forms and Elliptic curves* (2022-2023), 15K €.
- I hold the *RIPEC C3* for research (2022-2025 and 2025-2028).
- I was member of ANR projects PerCoLaTor (2013-2018) and COLOSS (2019-2024).

Date: December 17, 2025.

Education.

- 2009-2012: Ph.D. in Mathematics, Università degli Studi di Milano, Italy
  Thesis: *p-adic modular forms of non-integral weight over Shimura curves*.
  Advisors: Fabrizio Andreatta.
- 2008: Master Degree in Mathematics, Università degli Studi di Milano, Italy.

Organisation of scientific meeting.

- Organizer of the *Lean for The Curious Mathematician 2026* conference, SNS Cortona (Italy), 2026.
- Organizer of the *Lean Together 2025* conference, online.
- Organizer of the *Arithmetic and p-adic geometry in Chile*, University of Santiago, Chile, 2024.
- Organizer of the *Lean for the Curious Mathematician 2024* conference at CIRM Luminy.
- Organizer of the *Atelier Lean* of the seventh mini symposium of the Roman Number Theory Association, Università Rome 3 (2023).
- Organizer of the *seminar Groupes Réductifs et Formes Automorphes*, Institute de Mathématiques de Jussieu-Paris Rive Gauche (2014-2016).
- Organizer of the *Solstice* conference, Institut de Mathématiques de Jussieu-Paris Rive Gauche (2014).
- Organizer of the workshop *Almost Xmas seminar*, Università degli Studi di Milano (2011).

Scientific responsibilities.

- Maintainer of `mathlib` (2021 - present).
- Member of the *Commission Scientifique* of the Institut de Mathématiques de Jussieu-Paris Rive Gauche (2014 - 2017).

Administrative responsibilities.

- Member of the *commission des bureaux* of the Institut de Mathématiques de Jussieu-Paris Rive gauche (2023 - present).

Teaching responsibilities.

- I am one of the coordinators of the double major program in mathematics and computer science of Université Paris Cité (2018 - present).

Outreach.

- I've been interviewed about my formalization work in various French journals, such as Le Monde, as well as on French and Italian radio programs (La Science, CQFD and Radio 3 Scienza).
- I've spoken twice at the event Mathématiques en mouvement organized by the Fondation Sciences Mathématiques de Paris.
- I actively participate every year to the *fête de la science*, an event held in France to promote mathematics to the general public.

Reviewing activities.

- I have served as a referee for many international mathematical journals including: Annals of Formalized Mathematics, Canadian Journal of Mathematics, International Journal of Number Theory, and Algebra & Number Theory etc.
- I have acted as a reviewer for several scientific funding applications, such as ANR projects.
- I've been reviewer for mathscinet and zbMATH.

Selected talks.

- "Number Theory in `mathlib`". Conference *ItaLean 2025 Bridging Formal Mathematics and AI*. University of Bologna, 2025.
- Various talk about the use of `mathlib`. Conference *Lean for Mathematician 2025*. Simons foundation, New York City, 2025.
- "Progrès récents dans la formalisation de la théorie des nombres". Conference *Formalisation des mathématiques et types dépendants*. Collège de France, Paris, 2025.
- "Finding theorems in Lean and Mathlib" and "Fermat's Last Theorem for regular primes in `Lean`". Conference *Lean for the curious mathematician*. ICTS, Bengaluru, India, 2025.
- "Teaching Lean to first-year undergraduates". Conference *ALearning Mathematics with Lean*. Virtual event, organized by the University of Southampton and the University of Edinburgh, 2025.
- "Advanced tactics in formalizing mathematics". Conference *AI for Mathematics. Workshop on Lean, Automated Reasoning and Beyond*. Beijing International Center for Mathematical Research, 2024.
- Cours "An introduction to the `Lean` proof assistant for mathematicians". National University of Singapore, 2024.
- "Geometry in `mathlib`". Workshop *Interplay between algebra, combinatorics and proof formalization*. Centre de Recerca Matemàtica, Barcelone, 2024.
- Atelier `Lean`. Workshop *The seventh mini symposium of the Roman Number Theory Association*. University Rome 3, 2023.

- Cours "An introduction to proof assistants: a mini course about mathematical formalization". University of Santiago, Chile, 2022.
- "Maintenance of `mathlib` and the Liquid tensor experiment". Conference *EuroProofNet Workshop on the development, maintenance, refactoring and search of large libraries of proofs.* Tbilisi State University, 2022.
- "Fermat's Last Theorem for regular primes in `Lean` ". Conference *Lean in Lyon.* Institut Camille Jordan, Lyon, 2022.
- "How to explain advanced mathematics to a computer". *Luxembourg Number Theory Day 2021.* University of Luxembourg, 2021.
- "p-adic families of modular forms over Shimura varieties of Hodge type". *Jornada de teoría de números y representaciones.* University of Santiago, Chile, 2020.
- "'p-adic families of modular forms over Shimura varieties of Hodge type". Conference *p-adic modular forms and p-adic L-functions.* Fondazione Alessandro Volta (University of Milan), 2019.
- "Hida theory over some Shimura varieties without ordinary locus". Conference *Fourth one-day workshop in Cardedeu: p-adic arithmetic geometry.* University of Barcelona, 2019.
- "Eigenvarieties for non-cuspidal Siegel modular forms". Final conference of the summer school *Modular forms.* University of Padova, 2017.
- "Eigenvarieties for non-cuspidal Siegel modular forms". Conference *p-adic methods for Galois representations and modular forms.* University of Barcelone, 2017.
- "Eigenvarieties for non-cuspidal Siegel modular forms". Conference of the Italian Mathematical Union. University of Siena, 2015.
- Cours "Almost Mathematics". Summer school *Perfectoid spaces.* University of Padova, 2015.
- "Eigenvarieties for non-cuspidal Siegel modular forms". Conference *Journées Arithmétiques à Lyon.* University of Lyon, 2015.
- "Hida theory over Shimura varieties without ordinary locus". Conference *p-adic methods in number theory.* University of Milan, 2014.
- "Families of overconvergent modular forms over Shimura varieties without ordinary locus". Conference *p-adic aspects of modular forms.* International Centre for Theoretical Sciences, Tata Institute of Fundamental Research, 2014.
- "About a geometric construction of eigenvarieties for Shimura variety of PEL type". Conference *Summer Number Theory in Milan.* University of Milan, 2013.
- "Hecke varieties for Shimura varieties with ordinary locus". Conference *Variétés de Shimura et Formes modulaires p-adiques.* University Paris XIII, 2013.