

Stefano Morra

Curriculum Vitae

Laboratoire d'Analyse, Géométrie Algèbre
Université de Paris 8, France

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Positions

- 2020-2025 **Membre Junior de l'Institut Universitaire de France**
- 2019.01- **Professeur d'Université**
Laboratoire d'Analyse, Géométrie et Applications
Université de Paris 8
- 2011.09- **Maître de Conférences**
2018.12 Université de Montpellier
- 2014.07- **Visiting researcher**
2015.06 University of Toronto
- 2012.01- **Fields-Ontario Post-Doctoral fellow**
2014.06 Fields Institute and University of Toronto
- 2008.09- **Doctorant-Moniteur**
2011.08 Université de Versailles St. Quentin

Career

- Décembre 2017 **Habilitation à Diriger de Recherches**, *Institut Montpelliérain Alexander Grothendieck*
After the reports of C. Breuil, M. Emerton, T. Gee;
Jury: I. Badulescu, C. Bonnafé, P. Boyer, C. Breuil, P. Colmez, F. Herzig, A. Mézard.
- December 2010 **Ph. D. defense**, *Laboratoire de Mathématiques de Versailles*
Supervisor : A. Mézard
- 2008.09 **Master 2 en Mathématiques**, *Université Paris-Sud, Orsay*, mention Très Bien
specialization: Algèbre, Analyse et Géométrie
- 2008.09 **Laurea specialistica in Matematica**, *Università degli Studi di Padova*, cum Laude
- 2006.11 **Laurea triennale in Matematica**, *Università degli Studi di Padova*, cum Laude
- 2004.06 **Diplomprüfung Violine**, *Kunstuniversität Graz*
Supervisor: Professor Y. Kless

Papers

Publications

- 1 *Explicit description of irreducible $GL_2(\mathbf{Q}_p)$ -representations over $\overline{\mathbf{F}}_p$* , **Journal of Algebra** 339, (2011), 252-303
- 2 *Invariant elements for p -modular representations of $GL_2(\mathbf{Q}_p)$* , **Transaction of the American Mathematical Society** 365, (2013), 6625-6667
- 3 *Multiplicity theorems modulo p for $GL_2(\mathbf{Q}_p)$* , **Mathematische Zeitschrift** 276, (2014), 421-456
- 4 *On some representations of the Iwahori subgroup*, **Journal of Number Theory** 132, (2012), 1074 - 1150

- 5 *Sur la fidélité de certaines représentations de $GL_2(F)$ sous une algèbre d'Iwasawa*, **Rendiconti del seminario matematico dell' Università di Padova** 131, (2014), 49-65, with B. Schraen, Y. Hu
- 6 *Structure interne des représentations modulo p de $SL_2(\mathbf{Q}_p)$* , **Manuscripta Mathematica** 143, (2014), 191-206, with R. Abdellatif
- 7 *Iwasawa modules and p -modular representations of GL_2* , **Israel Journal of Mathematics** Volume 219, Issue 1, (2017), 1–70
- 8 *Potentially crystalline deformation rings in the ordinary case*, **Annales de l'Institut Fourier**, 66 no. 5, (2016), 1923–1964, with B. Levin
- 9 *Sur les atomes automorphes de longueur 2 pour $GL_2(\mathbf{Q}_p)$* , **Documenta Mathematica** 22, (2017), 777–823
- 10 *On mod p local/global compatibility for GL_3 in the ordinary case*, **Compositio Mathematica** 153, (2017) ,2215–2286, with F. Herzig and D. Le
- 11 *Serre weights for ordinary 3-dimensional Galois representation*, **Journal of the London Mathematical Society** 96 no. 2, (2017), 394–424 , with C. Park
- 12 *Potentially crystalline deformation rings and Serre type conjectures (Shapes and Shadows)*, **Inventiones Mathematicae** 212 no. 1, (2018), 1–107, with B. Levin, D. Le, B. Le Hung
- 13 *On mod p local/global compatibility for GL_3 in the non-ordinary case*, **Proceedings of the London Mathematical Society** 117, (2018), 790–848, with D. Le and C. Park
- 14 *Serre weights and Breuil's Lattice conjecture in dimension three*, **Forum of Mathematics**, **PI** 8 (2020), e5, with B. Levin, D. Le, B. Le Hung
- 15 *Multiplicity one at full congruence level*, **Journal de l' Institut de Mathématiques de Jussieu** (2020), 1–22, with D. Le and B. Schraen
- 16 *Serre weight conjectures for p -adic unitary groups of rank 2*, **Algebra & Number Theory** (to appear), with K. Koziol

Preprints

- 17 *Local models for Galois representations and applications*, (2020, 144 pages) with B. Levin, D. Le, B. Le Hung
- 18 *Gelfand–Kirillov dimension and mod p cohomology for GL_2* , (2020, 101 pages) with C. Breuil, F. Herzig, Y. Hu, B. Schraen
- 19 *Conjectures and results on modular representations of $GL_n(K)$ for a p -adic field K* , (2021, 189 pages) with C. Breuil, F. Herzig, Y. Hu, B. Schraen
- 20 *Moduli of Fontaine–Laffaille modules and mod- p local-global compatibility*, (2021, 189 pages) with D. Le, B. Le Hung, C. Park, Z. Qian
- 21 *Serre weights for three dimensional wildly ramified Galois representations*, (2022, 50 pages) avec B. Levin, D. Le, B. Le Hung

Advanced courses

- April 2021 **Towards a mod p Langlands correspondence**, *Universitaet Duisburg–Essen*, (3 hours course)
for the international spring school “towards a mod p Langlands correspondence”

- March–Mai 2021 **Local models for potentially crystalline Galois representations**, *Ulsan National Institute of Science and Technology*, (16 hours course)
- December 2020 **Completed cohomology of Shimura curves**, *Tata Institute*, (Mumbai), (4 hours course)
for the international conference “Recent developments around p -adic modular forms”
- July 2020 **Patching and the p -adic local Langlands correspondence**, *Ulsan National Institute of Science and Technology*, (10 hours course)
- June 2019 **Patching and the p -adic local Langlands correspondence**, *Università degli studi di Padova*, (7.5 hours course)
for the international summer school “Padova school on Serre conjectures and the p -adic Langlands program ”
- Feb. 2015 **Recent developments in the p -adic Langlands correspondence**, *Università degli studi di Padova*, (4.5 hours course)
- Jan. 2015 **Global patching and the Breuil–Mézard conjecture for $GL_2(\mathbb{Q}_p)$** , *KIAS*, (Seoul), (5 hours course)
- Dec. 2013 **On the p -modular Langlands program for GL_2** , *Tata Institute*, (Mumbai), (6 hours course)
for the international conference “Conference on the Local Langlands Conjectures and Galois Representations”

Prizes, grants, outreach

Junior Member of the Institut Universitaire de France (Appointed 2020–2025)

Appel Aide à la Recherche (research fund from the Université Paris 8-LAGA), **Member of the ANR “CLap CLap”**, **Prime de recherche et d’encadrement doctoral** (2018–2022 et 2014–2018), **Délegation CNRS** (6 months), **Prix de Thèse** de la Fondation de Mathématiques Jaques Hadamard

Research in Pairs (Mathematisches Institut Oberwolfach, with B. Levin, D. Le, B. Le Hung), **AIM SquaRE** (with B. Schraen, C. Breuil, S-W. Shin), **Research in Pairs** (Banff, with K. Koziol), **Research in Pairs** (Centro de Giorgi, Pisa, with B. Levin, D. Le, B. Le Hung), **Binôme de Recherche** (Luminy, with B. Levin, D. Le, B. Le Hung), **Research in Paris** (Institut Henri Poincaré, with B. Levin, D. Le, B. Le Hung)

INdAM periodo intensivo (25.000 EUR), **Compositio Foundation** (4995 EUR), **Berkeley-France Fund** (12.000 \$, Principal Investigator in France, avec S-W Shin, C. Breuil, B. Schraen), **FACCTS funding** (12.000 \$ avec B. Levin, B. Le Hung Chicago, B. Schraen, L. Fargues)

Ph. D. students

- 2018–2022 **Kegang Liu**, *Compatibilité locale-globale dans le programme de Langlands mod p* ,
Co-supervisor: P. Boyer
Funding: Bourse de l'ED de l'Institut Galilée,
Defended on February 11th, 2022 with jury: P. Boyer, C. Johannson, D. Le, A. Mézard,
S. Morra, B. Stroth,
reports from C. Johannson et B. Stroth.
preprints:
K. Liu: “Local–global compatibility of mod p Langlands program for certain Shimura varieties”
(2021) <https://arxiv.org/abs/2106.10674>
K. Liu, Z. Qian: “A note on mod- p local-global compatibility via Scholze’s functor” (2021)
<https://arxiv.org/abs/2111.11137>
- 2019–2023 **Amir Mostaed**, *Quelques problèmes sur les périodes et périodes exponentielles*,
Co-supervisor: Y. André
Funding: Bourse de l'ED de Paris 8
preprint:
A. Mostaed “On the invariant cycle theorem for families of Nori motives” (2021, submitted)
- 2021–2024 **Mohamed Moakher**, *Groupes de Selmer, Pseudodéformations locales et fonctionnalités de Langlands p -adiques*,
Funding: bourse de l'ENS Lyon
- 2021–2024 **Dat Pham**, *Geometry of the Emerton–Gee stack of p -adic Langlands parameters*,
co-supervisor: B. Le Hung
Funding: programme CoFund de la FSMP

Jury member for the Ph. D. thesis of

- Sept. 2021 **Hanneke Wiersema**, (*Supervisor: F. Diamond, King’s College London*)
June 2021 **Yichian Cai**, (*Supervisor J. Tilouine, LAGA*)
October 2020 **Yu Min**, (*Supervisor M. Morrow, Jussieu*)
July 2020 **Vincent de Daruvar**, (*Supervisor : B. Schraen, Polytechnique*)
July 2019 **Zicheng Qian**, (*Supervisor : C. Breuil, Orsay*)

Organization of scientific events

- Fall 2022 **École Parisienne d’Arithmétique et Géométrie**
coordinator for thea network of Ph. D. students in algebraic geometry and number theory in
the Paris region
- Summer 2021 **Algebraic local models and Galois representations**, (*organizer of a 2 month
cours given by B. Le Hung, invited on the excellence chair of the Fondation de Sciences
Mathématiques de Paris*)
(about 15 participants)
- January 2021 **The geometry of the stack of Fontaine-Laffaille modules**, (*mini-cours given by
Z. Qian at the LAGA*)
(about 10 participants)
- September 2019– **The Paris–London Number theory Seminar**, (*co-organiser with : A. Caraiani,
F. Diamond, V. Dokchitser, D. Fiorilli, M. Hindry, M. Morrow, Y. Petridis, S. Zerbes*)
(about 35 participants each event)
- September 2019– **Journées Arithmétiques du LAGA**, (*twice a year at the LAGA*)
(about 20 participants each event)

- Fall 2019 **Groupe de travail sur Caraiani–Scholze**, (*with the IMJ, Institut de Mathématiques d’Orsay*)
(about 20 participants)
- Summer 2019 **Padova School on Serre weight conjectures and the p -adic Langlands program**, (*budget: 81550 EUR, >60 participants fully accommodated for 3 weeks*)
- 2012–2017 **organizer of the weekly seminars**, (*“Number and Representation theory” at UoToronto, “Séminaire de théorie des Nombres” at Université de Montpellier*)

Further Academic Responsibilities

Ecole Polytechnique, Lozère, Jury Committee for “Monge” Assistant Professor positions, Spring 2019,2020,2021

Université de Paris 8, Université de Montpellier, Jury committee for MCF positions, Spring 2018,2020

Referee for, *IMRN, MRN, Annales de l’ENS, Israel J. of Math., Bulletin et Mémoires de la SMF, Rendiconti del Seminario dell’Università di Padova, Mathematische Zeitschrift, Documenta Mathematica, Proceedings of the LMS, Annals of Mathematical studies*

Research visits

- 2019 **UNIST (Ulsan), Northwestern University, University of California, Berkeley, Università degli Studi di Padova, University of Arizona**, invited by *C. Park, B-V Le Hung, S-W Shin, B. Chiarellotto, B. Levin* respectively
- 2018 **Korean Institute for Advanced Studies, Ecole Normale Supérieure (Lyon)**, invited by *C. Park*, special trimester on the géométrisation of the Langlands program of *Fargues–Scholze*
- 2017 **University of Arizona, École Polytechnique, CIRM, University of Bar-Ilan, University of Chicago**, invited by *B. Levin, B. Schraen*, *recherche en biôme, M. Schein, B-V Le Hung* respectively
- 2016 **Morningside center for Mathematics, University of Chicago, IHP, École Polytechnique**, invited by *Y. Hu, B. Levin*, *research in Paris, B. Schraen* respectively
- 2015 **École Polytechnique, University of Chicago, IHES, Max Planck Institute, Università di Padova**, invited by *B. Schraen, B-V. Le Hung, B. Schraen, Max Planck, B. Chiarellotto* respectively
- 2014 **University of Chicago, IHES, TATA Institute**, invited by *B. Levin, B. Schraen, E. Gathe* respectively

Selected talks

In international conferences

- June 2021 “Fontaine–Laffaille modules and mod p local–global compatibility”, **Université de Montpellier**, for the *Journées du GDR Théorie de Lie Algébrique et Géométrie*
- April 2021 “Towards a mod p Langlands correspondence”, **Universitaet Duisburg–Essen**, for the international spring school “towards a mod p Langlands correspondence”
- December 2020 “Completed cohomology of Shimura curves”, **Tata Institute (Mumbai)**, *Minicourse* for the international conference “Recent developments around p -adic modular forms”

- July 2019 “Local models for potentially crystalline deformation rings and the Breuil–Mézard conjecture”, **Università degli studi di Genova**, Recent advances in the arithmetic of Galois representations
- July 2018 “An algebraic local model for mod p Galois representations”, **CIRM-Luminy**, for the Conference *p-adic Langlands, Shimura varieties and Perfectoids*
- May 2018 “An algebraic local model for mod p Galois representations”, **University College London** for the 24th *London-Paris Number theory seminar*
- June 2017 “Generalized Serre conjectures, local-global compatibility, and the p -adic local Langlands program”, **Bar-Ilan University**, 5-th Israeli *Algebra and Number Theory Day*
- February 2017 “Propriétés de multiplicité un à niveau de congruence principal pour les courbes de Shimura”, **Université d’Amiens**, *Colloque tournant en théorie de Lie algébrique et géométrique*
- August 2016 “On the mod p local Langlands program for Hilbert modular forms”, **Banach Center-Będlewo**, for the conference *Galois representations and automorphic forms*
- June 2016 “Serre weights and Breuil’s Lattice conjecture in dimension three”, **Université de Caen**, *Journées Arithmétiques de Caen*
- January 2014 “On the ordinary representations in the p -modular Langlands program”, **Tata Institute, Mumbai**, *International Conference on the p-adic Langlands correspondence*
- [In weekly seminars](#)
- 2021 **Muenster, RAMPAGe (online), Paris 13, Brazilia (online), Tokyo (online)**
- 2020 **Jussieu, Marseille, Grenoble, Versailles**
- 2019 **Paris 13, University of Illinois at Urbana Champaign, Orsay**
- 2018 **Jussieu, Strasbourg, Versailles, Lyon, Seoul**
- 2017 **ENS Lyon, Bordeaux, Amsterdam**
- 2016 **Grenoble, Paris 13, Montpellier, Rennes**
- 2015 **Duisburg-Essen, Max Plank Institut, Strasbourg**
- 2014 **Jussieu, Versailles Saint-Quentin, Northwestern, Chicago, Rochester, Buffalo**
- 2013 **Ottawa, King’s College London, Padova**
- 2012 **Columbia, Toronto, Muenster**
- 2011 **ENS Lyon, Rennes, Bordeaux, Jussieu, Besançon, Strasbourg**