

Publications of Laurent Fargues

Laurent Fargues

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Born 19 June 1975 in Cagnes sur Mer (France)

Citizenship : French

Directeur de recherche at CNRS / Institut de Mathématiques de Jussieu

Studies

1998–2001 : PHD under the direction of Michael Harris at the Institut de Mathématiques de Jussieu (Paris 7), defended on December 2001.

November 2009 : "Habilitation à diriger des recherches" University Paris-Sud Orsay

Positions

October 2002 - October 2011 : Chargé de Recherche at CNRS / Laboratoire de mathématiques d'Orsay

Octobre 2011 - Février 2013 : Directeur de recherche at CNRS / IRMA Strasbourg

Since February 2013 : Directeur de Recherche at CNRS / Institut de mathématiques de Jussieu

Domain of Research

Automorphic Representations, Langlands conjectures, Shimura varieties, p -divisible groups and their moduli spaces, p -adic Hodge theory

Publications

- « Une suite spectrale de Hochschild-Serre pour l'uniformisation de Rapoport-Zink » note aux CRAS 334 (2002), no. 9, 739-742
- « Cohomologie des espaces de modules de groupes p -divisibles et correspondances de Langlands locales » in *Asterisque* 291 (2004) pages 1-200
- « Application de Hodge-Tate duale d'un groupe de Lubin-Tate, immeuble de Bruhat-Tits du groupe linéaire et filtrations de ramifications » : *Duke Math vol. 140, No 3* (2007)
- « L'isomorphisme entre les tours de Lubin-Tate et de Drinfeld et applications cohomologiques » in "L'isomorphisme entre les tours de Lubin-Tate et de Drinfeld" pages 1-325, Birkhauser, *Progress in Math*, vol. 262
- « Filtration de monodromie et cycles évanescents formels », *Inventiones Mathematicae* 177, 2009
- « La filtration de Harder-Narasimhan des schémas en groupes finis et plats » *Journal für die reine und angewandte Mathematik* 645 (2010)
- « La filtration canonique des points de torsion des groupes p -divisibles », *Annales scientifiques de l'ENS*, 2011, vol.44
- « Factorization of analytic functions in mixed characteristic », joint with J.-M. Fontaine, *Frontiers of mathematical sciences*, 307-315, Int. Press, Somerville, MA, 2011.
- « Vector bundles and p -adic Galois representations », joint with J.-M. Fontaine, *AMS/IP Studies in Advanced Mathematics Volume 51*, 2011
- "Groupes analytiques rigides p -divisibles", Accepted for publication in *Mathematische Annalen*
- "Vector bundles on curves and p -adic Hodge theory" joint with J.-M. Fontaine, in "Automorphic Forms and Galois Representations", London Mathematical Society Lecture Note Series, volume 415, Cambridge University Press, 2014
- "Quelques résultats et conjectures concernant la courbe" dans *Astérisque* 369, 2015 (proceedings of the conference in honor of Gérard Laumon)
- "From local class field to the curve and Vice Versa". proceedings of the AMS summer institute in Algebraic Geometry, Salt Lake City, July 2015
- " G -torseurs en théorie de Hodge p -adique", to appear in *Compositio Math.*

Preprints : cf. <http://www.math.jussieu.fr/~fargues>

Distinctions

- Cours Peccot at the College de France, Spring 2004
- "Petit d'Ormy, Carrière, Thébault" price of the french academy of sciences (2009)
- ERC Advanced grant "GeoLocLang" (starting 2017)
- Invitation at the international congress of mathematicians in Rio in 2018 (sections 3 and 4)
- "Tsinghua University Loo-Keng Hua Distinguished Lecture", Spring 2018

PHD students

- Miaofen Chen (PHD defended in May 2011, now professor at the East China Normal University, Shanghai)
- Xu Shen. Defend in December 2012, post-doc in Bonn then Regensburg. Now professor at the Morningside center Beijing in September 2015. PHD price of the Fondation Mathématique Jacques Hadamard.
- Arno Kret, joint with Laurent Clozel. Defended in September 2012. Postdoc at the IAS and MSRI. Now assistant professor in Amsterdam.
- Valentin Hernandez. Joint with Vincent Pilloni. Defended in June 2017. Post-doc in Barcelona with Victor Rotger..

- Arthur-César Le Bras. Joint with Michael Harris. Defended in June 2017. Post-doc in Bonn with Peter Scholze.
- Ildar Gaisin. Joint with Jean-François Dat. Defense in September 2017. Post-doc at Polytechnique with Benjamin Schraen and then with Naoki Imai in Kyoto.

Post-docs :

- 2016-2017 : Alexander Ivanov and Daniel Kirch (DFG post-docs)
- 2017-2018 : Timo Rochartz (DFG post-doc)

Talks in international conferences

- « Workshop on reductions of Shimura varieties and related spaces : geometry and representation theory », Toronto, Fields Institut, November 2001
- conférence « Representation of reductive p-adic groups » Banff, PIMS (Canada) February 2002
- Regensburg, May 2002 (conference of the European Network "arithmetic algebraic geometry")
- Conference « Groupes Réductifs » at CIRM Luminy, October 2002
- Conference « Number theory and arithmetic geometry » in Hiroshima November 2002
- « Workshop on Shimura varieties and related topics » at the Fields Institut, March 2003
- Workshop « Algebraische Zahlen theorie » in Oberwolfach, June 2003
- Conference in honor of John Coates, Morningside center, Beijing, August 2005
- International conference on arithmetic geometry and automorphic forms, university of Nankai (Tianjin, China), August 2005
- Conference « Of ramification and vanishing cycles », Tokyo, September 2007
- Workshop « Non-archimedean period domains », Max Planck institut, September 2007
- Workshop « Motivic Integration and its Interactions with Model Theory and Non-Archimedean Geometry », Edinburgh, May 2008
- Conference for the 50 years of the IHES, May 2008
- Workshop « Arithmetic Algebraic Geometry », Mathematisches Forschungsinstitut Oberwolfach, August 2008
- Workshop « The stable trace formula, automorphic forms, and Galois representations », Banff August 2008
- « Conference on Arithmetic Algebraic Geometry on the occasion of Michael Rapoport's 60th birthday », Bonn October 2008
- Séminaire de théorie des nombres Paris-Londres, June 2009
- Journées arithmétiques de Caen, June 2009
- « Conference on Arithmetic Algebraic Geometry on the occasion of Thomas Zink's 60th birthday », Bielefeld, June 2009
- Conference « Formes modulaires, Théorie de Hodge p-adique et Applications », Roscoff July 2009
- « Conférence en l'honneur de Jean-Marc Fontaine », Paris March 2010
- « Workshop on Arithmetic Geometry and Related Topics », Taiwan, July 2010
- « Witt vectors, foliations, and absolute de Rham cohomology », Nagoya November 2010.
- « Automorphic Forms and Galois Representations », Durham July 2011
- « Workshop on Cohomology of Shimura varieties : arithmetic aspects and the construction of Galois representations », Fields Institut, March 2012
- « Workshop on the p-adic Langlands program : recent developments and applications », Fields Institut, April 2012
- "Conférence en l'honneur de Gérard Laumon", IHES-university Paris-Sud, June 2012
- Journées Arithmétiques 2013 (Grenoble), July 2013
- "Conference on Arithmetic Geometry", Banach Center (Varsovie), July 2013
- "Conference on Arithmetic Algebraic Geometry", Paderborn, October 2013
- "Hot Topics : Perfectoid spaces and their applications" MSRI February 2014

- "Automorphic forms, Shimura varieties, Galois representations and L-functions", MSRI December 2014
- 2015 Summer Research Institute on Algebraic Geometry University of Utah, Salt Lake City
- "p-adic Hodge theory and Iwasawa theory" September 2015, Bielefeld
- "Motives and Automorphic forms" September 2015, Oxford
- Septembre 2016 : Conference "Geometric representation theory" Oxford Clay Institut
- Novembre 2016 : "The Second Sino-French Conference in Arithmetic Geometry" Sanya (Chine)
- May 2017 : Simons Symposium "p-adic Hodge theory" in Schloss-Elmau (Krün Allemagne) Octobre 2017 : "Arithmétique, Géométrie et Représentations" franco-indian conference in Jussieu, Paris
- July 2018 : "Correspondance de Langlands p-adique, variétés de Shimura et perfectoides" CIRM Luminy
- July 2018 : "Automorphic Forms, Galois Representations and L-functions" satellite conference of the ICM in Rio
- August 2018 : ICM talk in sections 3 and 4 in Rio

Organization of conferences

- July 2007 : Organizer with B.C.Ngo et D.Prasad of the conference and summer school « Summer School and Conference on Automorphic Forms and Shimura Varieties » at the ICTP in Trieste
- Organizer with Ulrich Görtz, Eva Viehmann and Torsten Wedhorn of the workshop « Reductions of Shimura Varieties » in Oberwolfach (July 2012)
- Organization of the conference « Arithmétique des variétés de Shimura et des formes automorphes et Applications » at the CIRM Luminy in July 2014
- Organization with Ulrich Görtz, Eva Viehmann and Torsten Wedhorn of the conference "Reductions of Shimura Varieties" in Oberwolfach in August 2015
- Organization with Dennis Gaitsgory, Peter Scholze and Kari Vilonen of the Arbeitsgemeinschaft "The geometric Langlands conjecture" from April 4 to 8 in Oberwolfach.
- "Recent developments in integral p-adic cohomology theories" à Bonn en February 2016
- Arbeitsgemeinschaft "The geometric Langlands conjecture" Oberwolfach, April 2016.
- Programme "Groupes algébriques et géométrisation du programme de Langlands" du labex Milyon (co-financed by my ERC "GeoLocLang"). April-June 2018

Teaching

- Cours Peccot at Collège de France Spring 2004
- Introductory course on Lubin-Tate spaces at "Summer school on arithmetic geometry and automorphic forms" Tsinghua (Beijing), August 2005
- « Motifs et formes automorphes : le cas abélien » at the "école d'été franco-asiatique de géométrie algébrique et théorie des nombres" in 2006 at the IHES
- Course on Lubin-Tate spaces and formal groups at the « Hong Kong university of science and technology », April and May 2007
- Course on Shimura varieties at the « Summer School and Conference on Automorphic Forms and Shimura Varieties » ICTP Trieste July 2007
- Talks on PEL type Shimura varieties and their integral models at the summer school "The stable trace formula, automorphic forms, and Galois representations", Banff August 2008
- Course at the summer school "Advanced school and workshop on p-adic analysis and applications", Trieste (ICTP) September 2009

- "Professeur chargé de cours d'exercice incomplet" at the Ecole Polytechnique since September 2009 (72h of teaching a year; PDE, Lebesgue integration, Galois theory)
- Master course « Filtrations des schémas en groupes finis et plats » for the "trimestre Galoisien" at the IHP, Spring 2010
- November 2011 : 12h course at Bonn (Hausdorff institut) "Curves and vector bundles in p -adic Hodge theory"
- Spring 2014 : Master course "Théorie de Hodge p -adique, le point de vue de la courbe" at the university Paris 6 (24h course).
- March 2015 : Course " p -adic Hodge theory, vector bundles and their modifications" at the "Spring school on p -adic arithmetic" in Essen
- October/November 2015 : 8 lectures of 2h at Drinfeld's "Geometric Langlands seminar" in Chicago about "Geometrization of the local Langlands correspondence".
- August 2016 : 5h course on my work at the summer school "The Langlands correspondence in arithmetic and geometry" KIAS. Seoul.
- Octobre 2016 : 8h course at the Morningside center of mathematics (Beijing) on my conjecture about the geometrization of the local Langlands correspondence.
- Programme "Groupes algébriques et géométrisation du programme de Langlands" du labex Milyon (co-financed by my ERC "GeoLocLang"). April-June 2018

Invitations

- October-November 2004 : Harvard University (invited by Richard Taylor)
- April-May 2007 : « Hong Kong university of science and technology » (invited by Jian Shu Li)
- September-December 2008 : Institute for Advanced Study, Princeton (Von Neumann Fellowship)
- November 2011 : Bonn University (invited by Michael Rapoport)
- March-April 2012 : Fields Institut "Thematic program on Galois representations"
- September-December 2014. Invited professor at the MSRI for the program "New Geometric Methods in Number Theory and Automorphic Forms"
- October/November 2015 : Invited professor at Chicago University by Bao Chau Ngo.
- December 2015 : Caltech, invited by Elena Mantovan.

Administrative activities :

- Member of the hiring comity (assistant professor) in the math department in Orsay (2004-2006)
- Member of the hiring comity (assistant professor) in Bordeaux (section 25) 2006-2008
- Member of the hiring comity (assistant professor) in Paris 6 (section 25) 2007-2008
- Member of a hiring comity (assistant professor) at the University Lyon I, Spring 2009
- Member of a hiring comity (assistant professor) at the University Paris 6, Spring 2009
- Member of a hiring comity (assistant professor) at the University Paris 7, Spring 2010
- Member of a hiring comity (assistant professor) at the University of Poitiers, Spring 2010
- Member of a hiring comity (assistant professor) at the University of Strasbourg, Spring 2011
- Member of a hiring comity (assistant professor) at the University of Strasbourg, Spring 2012
- Member of a hiring comity (full professor) at the University of Rennes, Spring 2012
- 2014 : Member of a panel for the DFG (Deutsche Forschungsgemeinschaft).

Editorial activities

- Member of the editorial board of the "Journal de l'Institut de Mathématiques de Jussieu".

Grants

- Coordinator de "ACI jeunes chercheurs" (joint grant for juniors in France) « Réalisations géométriques des correspondances de Langlands »(finished in September 2007)
- Member of the ANR project (joint grant) « Méthodes géométriques et p-adiques en théorie des formes automorphes »(finished)
- Scientific coordinator in Orsay of the ANR (joint grant) « ArShiFo » Arithmétique des variétés de Shimura et Formes Automorphes. Finished in December 2014.
- Member of the ANR (joint grant) "PerCoLaTor" beginning in 2015.
- PI ERC Advanced Grant "GeoLocLang", starting on October 1 2017 (1.4 Millions euros).