

Simon Pepin Lehalleur

Curriculum Vitae

PERSONAL INFORMATION

Nationality: French

Date of birth : 9th of January 1986

Personal situation: Married, two children

Professional adress:

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RESEARCH

Research interests (Algebraic and arithmetic geometry, homotopy theory):

- Motivic homotopy theory, relative motives, Grothendieck operations formalism
- Relative 1-motives, abelian schemes, Picard schemes, Néron models and related objects
- Motives of moduli spaces of bundles
- Exponential motives and exponential periods
- Motivic vanishing cycles and rigid-analytic motivic homotopy theory
- \mathbb{A}^1 -enumerative geometry and Grothendieck-Witt Euler characteristics

Research positions

Postdoc (research group of Prof. Ben Moonen, Radboud University Nijmegen)	01/2020-
Principal Investigator SPP 1786 (Wissenschaftlicher Mitarbeiter) (research group of Prof. Hélène Esnault, Freie Universität Berlin)	04/2019- 12/2019
Postdoc (Wissenschaftlicher Mitarbeiter) (research group of Prof. Hélène Esnault, Freie Universität Berlin)	04/2018- 04/2019
Einstein fellowship postdoctoral position (research group of Prof. Hélène Esnault, Freie Universität Berlin)	04/2016- 04/2018
Ph.D. with Prof. Joseph Ayoub (Universität Zürich), defended 6th of November 2015 2011-11/2015 Title: “An abelian category of relative 1-motives”	09/
2 years as a Ph.D. student in Paris 13 under the supervision of Prof. Jörg Wildeshaus	09/2009-09/2011

Publications

Subgroups of maximal rank of reductive groups, in “Autour des schémas en groupes”, *Panoramas et Synthèses* 47, 2015

On the relative motive of a commutative group scheme (with G. Ancona and A. Huber), *Algebraic geometry*, vol. 3 issue 2, 2016

Triangulated categories of relative 1-motives, *Advances in Mathematics*, vol. 347, 2019

Constructible 1-motives and exactness of realisation functors, *Documenta Mathematica* 24, 1721-1737, 2019

On the Voevodsky motive of the moduli stack of vector bundles on a curve (with V. Hoskins), *The Quarterly Journal of Mathematics*, <https://doi.org/10.1093/qmathj/haaa023>

A formula for the Voevodsky motive of the moduli stack of vector bundles on a curve (with V. Hoskins), accepted for publication in *Geometry and Topology*.

On the Voevodsky motive of the moduli space of Higgs bundles on a curve (with V. Hoskins), *Selecta Mathematica* volume 27, Article number: 11 (2021)

Motives of moduli spaces of rank 3 vector bundles and Higgs bundles on a curve (with V. Hoskins and L. Fu), accepted in Electronic Research Archive.

Preprints

Euler characteristics of homogeneous and weighted-homogeneous hypersurfaces (with M. Levine and V. Srinivas), arXiv preprint 2101.00482

Motives of moduli spaces of bundles on curves via variation of stability and flips (with V. Hoskins and L. Fu), arXiv preprint 2011.14872

In preparation

Exponential motives I: exponentiation of coefficient systems (with M. Gallauer and J. Fresán)

Exponential motives II: motivic Fourier transform (with M. Gallauer and J. Fresán)

Motivic mirror symmetry for Higgs bundles (with V. Hoskins)

Invited research visits

Tokyo Institute of Technology, Tokyo 09/2018

Mittag-Leffler Institute, Stockholm 01/2017

Tata Institute, Mumbai 10/2016

Lecture series/minicourses

Triangulated categories of motivic sheaves, University of Freiburg 02/2020

Motives of moduli of bundles on curves, Indian Institute of Technology Madras 11/2021

Conference talks

Motivic mirror symmetry for Higgs bundles, Motives and Hodge theory, Mittag-Leffler Institute, Stockholm 10/2020

A motivic non-abelian Hodge theorem, Higgs bundles and relative topics, online 05/2020

On the motive of the moduli space of Higgs bundles, SPP Jahrestagung, Essen 10/2019

A formula for the motive of the moduli stack of vector bundles, GLEN, Manchester 03/2019

Foliated cohomology at the generic point, Motives, Foliations and the Conservativity conjecture, Berlin 09/2018

<i>E-localisation, Motives, Foliations and the Conservativity conjecture</i> , Berlin	09/2018
<i>E-localisation, Conservativity conjecture workshop</i> , Harumura	09/2018
<i>The Voevodsky motive of the moduli stack of vector bundles</i> , NoGAGS Berlin	11/2017
<i>Reductive group schemes, Workshop on equivariant and motivic homotopy</i> , Osnabrück	10/2017
<i>The motivic t-structure for relative 1-motives</i> , Annual Meeting of the SPP 1786	03/2017
<i>The motivic t-structure for relative 1-motives, Generalizations of \mathbb{A}^1-Homotopy Invariance in Algebraic Geometry and Homotopy Theory</i> , Usedom	04/2016
<i>An introduction to motivic homotopy theory</i> , Motivic Homotopy theory day, FU Berlin	03/2016
<i>The Borel-De Siebenthal theorem</i> , SGA3 summer school, Luminy	09/2011

Seminar talks

<i>Motivic mirror symmetry for Higgs bundles</i> , Topology seminar, Wuppertal	01/2022
<i>Quadratic enumerative geometry and the Deligne-Milnor formula</i> , Quadratic forms, linear algebraic groups and beyond	10/2020
<i>Exponential periods and Exponential motives</i> , GADEPs, IMPA (Rio)	05/2020
<i>Motives of moduli spaces of bundles on curves</i> , Jussieu (Paris)	10/2020
<i>Motives of moduli spaces of bundles on curves</i> , Purdue	10/2020
<i>Constructible 1-motives</i> , Amsterdam	02/2020
<i>A formula for the Voevodsky motive of the moduli stack of vector bundles</i> , Berlin	10/2018
<i>A formula for the Voevodsky motive of the moduli stack of vector bundles over a curve</i> , Tokyo Institute of Technology	09/2018
<i>Triangulated categories of relative 1-motives</i> , University of Illinois Urbana Champaign	03/2018
<i>The Voevodsky motive of the moduli stack of vector bundles</i> , University of Illinois Chicago	03/2018
<i>Constructible 1-motives</i> , KTH Stockholm	02/2018
<i>On the motive of the stack of vector bundles on a curve</i> , Oxford University	02/2018
<i>The Voevodsky motive of the moduli stack of vector bundles</i> , FU Berlin	02/2017
<i>The motivic t-structure for relative 1-motives</i> , Rennes	11/2016
<i>Relative 1-motives</i> , Tata Institute Mumbai	10/2016
<i>Triangulated categories of 1-motivic sheaves</i> , Singapore	08/2016
<i>The motivic t-structure for relative 1-motives</i> , Regensburg	01/2016
<i>The motivic t-structure for relative 1-motives</i> , Freiburg (Oberseminar)	10/2015
<i>Deligne 1-motives in the triangulated categories of mixed motives</i> , Paris Réga	12/2012

Machine Learning talks

<i>Markov Chain Monte Carlo, a space odyssey</i> , Seminar at the company Lateral (NLP, Machine Learning), Berlin	10/2015
<i>Introduction to Topological Data Analysis</i> , Zürich Data Analysis and Machine Learning meetup	09/2014

RESEARCH GRANTS

Van Gogh scholarship (travel grant for Dutch-French collaboration), 2240 EUR	2021
SPP 1786, Project “Exponential motivic homotopy theory, foliations and applications”, Principal investigator, 213 600 EUR	2018-2020
Forschungskredit: Candoc, Principal investigator, University of Zürich, 55200 CHF	2013-2014

TEACHING

Teaching activities

Radboud Universiteit/University of Amsterdam (2020-)

Masters course “Commutative Algebra”	WS21
Graduate course “Categories and Infinity-categories”	WS20

Freie Universität Berlin (2016-2019)

Student seminar “Categories and infinity-categories”	WS18
Teaching assistant for “Local Class Field Theory”	WS18
Student seminar “Differential Galois Theory”	SS18
Teaching assistant for “Complex Analysis”	SS18
Graduate course “Models of curves and abelian varieties”	SS17

University of Zürich (2011-2015): teaching assistant

Linear Algebra I-II (Bachelor course, in German)	WS14-SS15
Programming in Python (Bachelor course)	WS13
Differential forms in topology (Masters course)	SS13
Algebraic Geometry (Masters course)	WS12
Probability and statistics for science students (Bachelor course, in German)	SS12
Linear Algebra and Geometry for teaching students (Bachelor course, in German)	WS 11

Université Paris XIII: (2009-2011): teaching assistant

Mathematics for Computer science (Bachelor course for computer science students, in French)	SS11
Linear Algebra (Bachelor course, in French)	WS10

Student supervision

- Bachelor thesis: *Representations of compact groups and the Peter-Weyl theorem*, R. Gisolf (UvA), 2020
- Master thesis: *Relative Galois theory of ∞ -topoi and the relative Étale homotopy type*, L. Martini (FU Berlin), 2019
- Master thesis: *Galois representations attached to modular forms of weight 2*, D. Loutchko (FU Berlin), 2019
- Master thesis: *Model categories and unstable \mathbb{A}^1 -homotopy category*, V. Tabakov (FU Berlin), 2019
- Bachelor thesis: *The Étale fundamental group and the regular inverse Galois problem*, L. Martini (FU Berlin), 2018

EDUCATION

Master in mathematics with distinction in University Paris 7 Denis Diderot	09/2008
“Agrégation de Mathématiques”	09/2007
Bachelor in mathematics with distinction, université Paris 11 Orsay	09/2006
Passed the competitive examination to enter the Ecole Normale Supérieure	09/2005

ORGANISATION AND SERVICE

Conference organisation

Co-organisation of Arbeitsgemeinschaft “Motives, Foliations and the Conservativity Conjecture” (Humboldt University)	24/09/18-28/09/18
Co-organisation of summer school “Motives for periods” (FU Berlin)	28/08/2017-1/09/2017

Research seminar organisation

Organised seminar on “Hilbert schemes of points on surfaces” (Radboud/University of Amsterdam)	
Spring 2020	
Supervised seminar on “Motivic Galois groups and periods” (FU Berlin)	2016
Co-organised the Graduate Colloquium of the Graduate School of Mathematics of Zürich	2013-2014

PhD defense committees

Peter Badea (Radboud, Nijmegen)	09.12.2020
Eva Martinez (FU Berlin)	29.06.2018
Irem Portakal (FU Berlin)	27.04.2018
Matej Filip (FU Berlin)	09.03.2018

Committees

Advisory board of the Mathematics department, Radboud University	2020-
Hiring committees for several postdocs in the research group of Prof. Esnault	2016-2019

Referee work

Refereed for Advances in Mathematics, Annales scientifiques de l'ENS, Tohoku mathematical journal, Mémoires de la Société Mathématique de France., Kodai Mathematical Journal, Journal of Pure and Applied Algebra, Bulletin of the London Mathematical Society

Zentralblatt and Mathreviews

Reviewed 8 papers for Zentralblatt and Mathreviews.

LANGUAGES

French : native
English : written, spoken (fluent)
Spanish : written, spoken (B2)

German : written, spoken (B2)