

# Christopher Lazda

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## Research Interests

Arithmetic geometry and number theory,  $p$ -adic cohomology, homotopy theory, crystalline fundamental groups, degenerations of varieties, arithmetic of K3 surfaces, characteristic  $p$  geometry.

## Employment

- Sep 2017 – Present **Post-Doctoral Researcher**, *KdVI Universiteit van Amsterdam*, Netherlands.
- Nov 2015 – Aug 2017 **Marie Curie INdAM Fellow**, *Università Degli Studi di Padova*, Italy.
- Oct 2014 – Oct 2015 **HIMR Research Fellow**, *Imperial College London*, UK.
- Apr – Oct 2014 **EPSRC Doctoral Prize Fellow**, *Imperial College London*, UK.

## Education

- Oct 2010 – Mar 2014 **Ph.D.**, *Imperial College London*, UK.  
Thesis title: *Rational homotopy theory in arithmetic geometry, applications to rational points*.  
Advisor: Dr. A. Pál.
- Oct 2009 – Jun 2010 **C.A.S.M./M.Math.**, *University of Cambridge*, UK, Distinction.  
Thesis title: *2-Descent on the Jacobians of Hyperelliptic Curves*.  
Advisor: Dr. T. Fisher.
- Oct 2006 – Jun 2009 **B.A.**, *University of Cambridge*, UK, 1st Class (Hons).

## Grants

- 2017 **LMS**, Funding for workshop “Interactions between Arithmetic and Homotopy Theory”, £2,500.
- 2016 **HIMR**, Funding for workshop “Interactions between Arithmetic and Homotopy Theory”, £5,000.
- 2015 **BIRS**, Funding for Banff workshop “ $p$ -adic cohomology and arithmetic applications”.
- 2015 **INdAM**, Marie Curie INdAM Fellowship (PI), €101,700.
- 2014 **EPSRC**, Funding for workshop “Recent trends in  $p$ -adic cohomology” (Imperial College Platform Grant), £10,000.
- 2014 **EPSRC**, Doctoral Prize Fellowship (PI), £21,064.

## Journal Articles

- C. Lazda, *Fundamental groups and good reduction criteria for curves over positive characteristic local fields*, to appear in *J. Théor. Nombres Bordeaux*.
- B. Chiarellotto and C. Lazda, *Around  $\ell$ -independence*, *Compos. Math.*, (2018) **154** (1):223–248.
- B. Chiarellotto and C. Lazda, *Combinatorial degenerations of surfaces and Calabi–Yau threefolds*, *Algebra & Number Theory*, (2016) **10** (10):2235–2266.
- C. Lazda, *Incarnations of Berthelot’s conjecture*, *J. Number Theory* (2016) **166**:137–157.
- C. Lazda, *Relative fundamental groups and rational points*, *Rend. Sem. Mat. Univ. Padova* (2015) **134**:1–45.
- C. Lazda, *Rigid rational homotopy types*, *Proc. London Math. Soc.* (2014) **109** (2):523–551.

## Monographs

- C. Lazda and A. Pál, *Rigid cohomology over Laurent series fields*, Springer (2016), vol. 21 of ‘Algebra and Applications’, pp x+267.

## Preprints

- B. Chiarellotto, C. Lazda and C. Liedtke, *A Néron–Ogg–Shafarevich criterion for K3 Surfaces*.  
<http://arxiv.org/abs/1701.02945> (51 pages)
- C. Lazda, *A note on effective descent for overconvergent isocrystals*.  
<http://arxiv.org/abs/1706.05300> (10 pages)
- C. Lazda and A. Pál, *A homotopy exact sequence for overconvergent isocrystals*.  
<http://arxiv.org/abs/1704.07574> (31 pages)
- C. Lazda and A. Pál, *Cycle classes in overconvergent rigid cohomology and a semistable Lefschetz  $(1, 1)$  theorem*.  
<http://arxiv.org/abs/1701.05017> (19 pages)

## Activities Organised

- Spring 2018 **Intercity Geometry Seminar: Mirror symmetry and moduli spaces of Higgs bundles**, Netherlands.  
Joint with D. Holmes and A. Smeets.
- Oct 2017 **Workshop:  $p$ -adic cohomology and arithmetic applications**, *Banff International Research Station*, Canada.  
Joint with A. Pál, K. Kedlaya and T. Abe.
- Feb 2017 **Workshop: Interactions between Arithmetic and Homotopy Theory**, *Imperial College London*, UK.  
Joint with A. Pál, and T. Schlank.
- Spring 2016 **Study group: Moduli of  $p$ -divisible groups**, *Università Degli Studi di Padova*, Italy.  
Joint with B. Chiarellotto and M. Longo.
- Mar 2015 **Workshop: Recent trends in  $p$ -adic cohomology**, *Imperial College London*, UK.  
Joint with A. Pál.

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## Conference Talks

- Apr 2018 **Arithmetic and Geometry**, *Technische Universität München*, Germany.  
Title: *A homotopy exact sequence for overconvergent isocrystals.*
- Mar 2017  **$p$ -adic Analytic Geometry and Differential Equations**, *CIRM*, France.  
Title: *A semistable Lefschetz (1, 1) theorem in equicharacteristic.*
- Sep 2015 **Interactions between Arithmetic and Homotopy Theory**, *Imperial College London*, UK.  
Title: *Rational homotopy types and mixedness.*
- Jul 2015  **$p$ -adic Manifolds and Applications**, *Universität Wuppertal*, Germany.  
Title:  *$p$ -adic cohomology: classical and over Laurent series fields.*
- Jun 2015 **Function Fields, Zeta Functions and Drinfel'd Modular Forms**, *Imperial College London*, UK.  
Title: *Rigid cohomology over Laurent series fields.*
- Jun 2013 **TCC Graduate Event Day in Number Theory**, *University of Bristol*, UK.  
Title: *Rigid rational homotopy types.*

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## Invited Seminars

- May 2018 **Université de Bordeaux**, France.
- Dec 2017 **Technische Universität München**, *Algebra Seminar*, Germany.
- Nov 2017 **Vrije Universiteit Amsterdam**, *Intercity Number Theory Seminar*, Netherlands.
- Oct 2017 **Université Grenoble Alpes**, *Fourier Institute*, France.
- Sep 2017 **Universiteit van Amsterdam**, *KdVI*, Netherlands.
- June 2017 **Université Pierre et Marie Curie**, *IMJ-PRG Number Theory Seminar*, France.
- May 2017 **Adam Mickiewicz University**, *Poznań*, Poland.
- Mar 2017 **Università Degli Studi di Padova**, *Seminario Dottorato*, Italy.
- Dec 2016 **Université de Strasbourg**, *IRMA*, France.
- Nov 2016 **Université de Rennes I**, France.
- Apr 2016 **Università Degli Studi di Milano**, Italy.
- Jun 2015 **Università Degli Studi di Padova**, Italy.
- Dec 2014 **Max Planck Institute for Mathematics**, *Bonn*, Germany.
- Nov 2014 **University of Cambridge**, *Number Theory Seminar*, UK.
- Jul 2014 **Università Degli Studi di Padova**, Italy.
- Jun 2014 **University of Oxford**, *Number Theory Seminar*, UK.
- Jun 2014 **University College London**, *London Number Theory Seminar*, UK.

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## Research Visits

- Apr 2018 **Max Planck Institute for Mathematics**, *Bonn*, Germany.  
Host: Dr. P. Achinger
- Dec 2017 **Technische Universität München**, Germany.  
Host: Prof. C. Liedtke
- Mar 2017 **Institut Mittag-Leffler**, Sweden.  
Research Program: *Algebraic-Geometric and Homotopical Methods*

- Nov 2016 **Université de Rennes I**, France.  
Host: Prof. B. Le Stum
- May 2016 **Imperial College London**, UK.  
Host: Dr. A. Pál
- Jun 2015 **Università Degli Studi di Padova**, Italy.  
Host: Prof. B. Chiarellotto
- Dec 2014 **Max Planck Institute for Mathematics**, Bonn, Germany.  
Host: Dr. A. Pál
- Jul 2014 **Università Degli Studi di Padova**, Italy.  
Host: Prof. B. Chiarellotto

## Teaching Experience

- July 2018 **Homotopy theory and Arithmetic Geometry**, *Imperial College London*, UK.  
Level: Research student.  
Assistant for the lecture course “Cohomological methods in intersection theory” as part of a LMS-CMI summer school on homotopy theory.
- Spring 2018 **Vector Calculus**, *Amsterdam University College*, Netherlands.  
Class size: 15, Level: 2nd year undergraduate.  
Bachelor’s course for liberal arts students. Classes involving lecturing and problem solving. Setting and grading final exams.
- Mar – Jun 2016, 2017 **Algebraic Geometry**, *Università Degli Studi di Padova*, Italy.  
Class size: 25, Level: Masters.  
Introductory course in algebraic geometry given with B. Chiarellotto for masters students on the ALGANT program in Padova. Lectures and online discussion groups.
- Feb 2016 **Moduli of  $p$ -divisible groups**, *Università Degli Studi di Padova*, Italy.  
Class size:  $\sim 20$ , Level: Ph.D. upwards.  
Study group talks on  $p$ -divisible groups.
- Jun 2015 **Fundamental groups in algebraic geometry**, *Università Degli Studi di Padova*, Italy.  
Class size: 25, Level: Masters.  
4 lecture mini-course on fundamental groups in algebraic geometry for masters students on the ALGANT program in Padova.
- Oct – Dec 2014 **The Weil conjectures and Betti numbers of moduli spaces**, *London School of Geometry and Number Theory*, UK.  
Class size: 15, Level: 1st year Ph.D.  
10 lecture course on the Weil conjectures and Monsky–Washnitzer cohomology for first year Ph.D. students in London.
- Oct – Dec 2013 **Tutor in Foundations of Analysis**, *Imperial College London*, UK.  
Class size: 10, Level: 1st year undergraduate.  
Tutorials for first year undergraduates involving going through course material and problem sheets in small groups of students, as well as marking course homework.
- Oct 2011 – Dec 2013 **Graduate Teaching Assistant**, *Imperial College London*, UK.  
Class size:  $\sim 50$ , Level: 1st – 3rd year undergraduate.  
Courses: Foundations of Analysis, Real Analysis, Complex Analysis, Algebra I & II, Linear Algebra.  
Going through course material and problem sheets one on one with students.

Oct 2010 – **London Number Theory Seminar**, *Imperial College, University College, King's College London*, UK.  
Oct 2015  
Class size:  $\sim 30$ , Level: Ph.D. upwards.  
Regular talks given as part of study groups for number theorists in London on a wide range of research level topics.

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## Students Supervised

Oct 2017 – **Christopher Spelt**, *University of Amsterdam*, Netherlands.  
Masters thesis on  $p$ -divisible groups and  $\ell$ -independence for commutative algebraic group schemes.  
Jan 2018 – **Leon Inglese**, *University of Amsterdam*, Netherlands.  
Bachelors thesis on  $p$ -adic numbers and the local global principle.

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## Service

### Refereeing.

Algebra & Number Theory, Commentarii Mathematici Helvetici, Documenta Mathematica, International Mathematics Research Notices, Journal of Number Theory, Revista Matemática Complutense, Transactions of the American Mathematical Society.

### Reviewing.

MathSciNet.

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## Languages

English	Native	
French	Basic	<i>IB Standard Level</i>
Italian	Basic	<i>CEFR Level B1</i>
Dutch	Beginner	<i>CEFR Level A2</i>

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## References

Available on request.