

ZSOLT PATAKFALVI

CURRICULUM VITAE



AREA OF INTEREST:

Algebraic Geometry (with connections to Complex Geometry, Arithmetic Geometry and to Commutative Algebra).

EMPLOYMENT:

- 2016- **École polytechnique fédérale de Lausanne (EPFL)**, Department of Mathematics
head of the Chair of Algebraic Geometry
ASSISTANT PROFESSOR (TENURE TRACK)
- 2014-2016 **Princeton University**, Department of Mathematics
ASSISTANT PROFESSOR (TENURE TRACK)
- 2011-2014 **Princeton University**, Department of Mathematics
INSTRUCTOR (POST-DOC)

SHORT TERM POSITIONS:

- 04/2019-05/2019 MSRI Research Membership
- 11/2018 Research Professor, Shanghai Center for Mathematical Sciences at Fudan University

EDUCATION:

- 2006-2011 **University of Washington**, Seattle
PHD IN MATHEMATICS
advisor: Sándor Kovács
- 2001-2006 **Eötvös Loránd University**, Budapest, Hungary
MASTERS IN MATHEMATICS
summa cum laude
- 1999-2004 **Technical University of Budapest**, Budapest, Hungary
MASTERS IN COMPUTER SCIENCE

GRANTS AND FELLOWSHIPS:

	Name/Agency	Number	Amount	Link
2021-2024	SWISS NATIONAL SCIENCE FOUNDATION (FNS/SNF) - project	#200020B/192035	CHF 626 554	
2020-2025	EUROPEAN RESEARCH COUNCIL (ERC) - starting grant	#804334	€ 1 201 370	https://cordis.europa.eu/project/rcn/225097/factsheet/en
2017-2020	SWISS NATIONAL SCIENCE FOUNDATION (FNS/SNF) - project - EXCELLENCE GRANT	#200021/169639	CHF 656 328	http://p3.snf.ch/project-169639

2015-2018	NATIONAL SCIENCE FOUNDATION (NSF, USA) - research grant, transferred to another PI after 1 year, because of leaving the US	DMS-1502236	\$162 000	http://www.nsf.gov/awardsearch/showAward?AWD_ID=1502236
2012-2015	AMERICAN MATHEMATICAL SOCIETY (AMS, USA) - Simons Travel Grant		\$4000	http://www.ams.org/programs/travel-grants/AMS-SimonsTG
2006-2011	FELLOWSHIPS AND AWARDS DURING PHD: Tseng Fellowship (teaching reduction), McFarlan Fellowship (teaching reduction), Academic Excellence Award (best prelim results), Microsoft Scholar Award (\$20000 over 4 years)			

SELECTED PUBLICATIONS:

- [1] *Positivity of the CM line bundle for families of K-stable klt Fano varieties*, with Giulio Codogni, INVENTIONES MATHEMATICAE, vol. 223(3), 811–894 (2020)
- [2] *Birational characterization of abelian varieties and ordinary abelian varieties in characteristic $p > 0$* , with Christopher Hacon and Lei Zhang, DUKE MATHEMATICAL JOURNAL, vol. 168, no. 9, 1723–1736 (2019)
- [3] *Projectivity of the moduli space of stable log-varieties and subadditivity of log-Kodaira dimension*, with Sándor Kovács, JOURNAL OF THE AMERICAN MATHEMATICAL SOCIETY, vol 30, 959–1021 (2017)
- [4] *Semi-positivity in positive characteristics*, ANNALES SCIENTIFIQUES DE L'ÉCOLE NORMALE SUPÉRIEURE, vol. 47, no. 5, 991–1025 (2014)

FURTHER PUBLISHED AND ACCEPTED PUBLICATIONS (CHRONOLOGICALLY):

- [5] *Ordinary varieties with trivial canonical bundle are not uniruled*, to appear in MATHEMATISCHE ANNALEN, with Maciej Zdanowicz, <https://arxiv.org/abs/2006.04692>
- [6] *Singularities of general fibers and the LMMP*, with Joe Waldron, to appear in the AMERICAN JOURNAL OF MATHEMATICS, <http://arxiv.org/abs/1708.04268>
- [7] *On subadditivity of Kodaira dimension in positive characteristic over a general type base*, JOURNAL OF ALGEBRAIC GEOMETRY, vol. 17, 21–53 (2018)
- [8] *F-singularities in families*, with Karl Schwede and Wenliang Zhang, ALGEBRAIC GEOMETRY, vol 5, no 3, 264–327 (2018)
- [9] *Ampleness of the CM line bundle on the moduli space of canonically polarized varieties*, with Chenyang Xu, ALGEBRAIC GEOMETRY, vol 4, no 1, 29–39 (2017)
- [10] *Generic vanishing in characteristic $p > 0$ and the characterization of ordinary abelian varieties*, with Christopher D. Hacon, AMERICAN JOURNAL OF MATHEMATICS, vol. 138, no. 4, 963–998 (2016)
- [11] *Fibered stable varieties*, TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY, vol 368, no 3, 1837–1869 (2016)
- [12] *On Rational Connectedness of Globally F-Regular Threefolds*, with Yoshinori Gongyo, Zhiyuan Li, Karl Schwede, Hiromu Tanaka and Hong R. Zong, ADVANCES IN MATHEMATICS, vol. 280., 47–78 (2015)
- [13] *Semi-negativity of Hodge bundles associated to Du Bois families*, JOURNAL OF PURE AND APPLIED ALGEBRA, vol 219, 5387–5393 (2015)

- [14] *Depth of F -singularities and base change of relative canonical sheaves*, with Karl Schwede, JOURNAL OF THE INSTITUTE OF MATHEMATICS OF JUSSIEU, vol 13, no. 1, 43–63 (2014)
- [15] *Arakelov-Parshin rigidity of towers of curve fibrations*, MATHEMATISCHE ZEITSCHRIFT, vol. 278, no 3, 859–892 (2014)
- [16] *Moduli of products of stable varieties*, with Bhargav Bhatt, Wei Ho and Christian Schnell, COMPOSITIO MATHEMATICA, vol. 149, no. 12, 2036–2070 (2013)
- [17] *Base change behavior of the relative canonical sheaf related to higher dimensional moduli*, ALGEBRA & NUMBER THEORY 7-2, 353–378 (2013)
- [18] *Viehweg’s hyperbolicity conjecture is true over compact bases*, ADVANCES IN MATHEMATICS, vol. 229., 1640–1642 (2012)
- [19] *The incidence class and the hierarchy of orbits*, with László Fehér, CENTRAL EUROPEAN JOURNAL OF MATHEMATICS (now: European Journal of Mathematics), vol 7., no. 3, 429–441 (2009)
- [20] *Line-graphs of cubic graphs are normal*, DISCRETE MATHEMATICS, vol. 308., no. 12., 2351–2365 (2008)

PREPRINTS AND SUBMITTED PAPERS:

- [21] *Globally $+$ -regular varieties and the minimal model program for threefolds in mixed characteristic* with Bhargav Bhatt, Linquan Ma, Karl Schwede, Kevin Tucker, Joe Waldron and Jakub Witaszek, <https://arxiv.org/abs/2012.15801>
- [22] *Generic vanishing in characteristic $p > 0$ and the geometry of theta divisors*, with Christopher D. Hacon, <https://arxiv.org/abs/2009.12041>
- [23] *Pseudo-effectivity of the relative canonical divisor and uniruledness in positive characteristic*, <https://arxiv.org/abs/2009.07158>
- [24] *On the Beauville–Bogomolov decomposition in characteristic $p \geq 0$* , with Maciej Zdanowicz, <https://arxiv.org/abs/1912.12742>
- [25] *On the projectivity of the moduli space of stable surfaces in characteristic $p > 5$* , <http://arxiv.org/abs/1710.03818>

LECTURE NOTES AND SURVEYS:

- [26] *Positive characteristic algebraic geometry*, with Karl Schwede and Kevin Tucker, PROCEEDINGS OF SYMPOSIA IN PURE MATHEMATICS, vol 95, 33–80 (2017)
- [27] *Frobenius techniques in birational geometry*, PROCEEDINGS OF SYMPOSIA IN PURE MATHEMATICS, vol 97, part 1, 489–518 (2018)

COMMITTEES AND ADMINISTRATIVE POSITIONS

At EPFL:

2021	Representing the Mathematics Department in the Library Committee
2020	Committee about the Analysis curriculum
2020-2021	Tenure-track assistant professor hiring committee
2018-2019	
2018	Instructor hiring committee

- 2017- Teaching committee of the Mathematics Section & contact person for the Algebra & Geometry track
- 2017-2018 Masters admission committee
- 2016- Masters posters jury
- 2016- head of the Chair of Algebraic Geometry

■ AT PRINCETON UNIVERSITY:

- 2014-2016 Director of Graduate Studies (including being two times on the graduate admission committee)

■ SPONSORED MARIE CURIE FELLOWS

- 2019-2021 Roberto Svaldi, title: Boundedness and Moduli problems in birational geometry, ID: 842071, <https://cordis.europa.eu/project/id/842071>

■ POST-DOCS (AT THE CHAIR OF ALGEBRAIC GEOMETRY AT EPFL)

- 2021- Stefano Filipazzi
- 2021- Calum Spicer
- 2021- Fabio Bernasconi
- 2021- Ejiri Sho (partially on an Overseas Research Fellowships by the Japan Society for the Promotion of Science)
- 2020- Chuyu Zhou
- 2018- Javier A. Carvajal-Rojas
- 2017-2020 Marta Pieropan - [now: *tenure-track assistant professor at Utrecht University*]
- 2017-2020 Maciej Zdanowicz - [now: *post-doc at University of Amsterdam*]
- 2017-2018 Giulio Codogni - [now: *tenure-track assistant professor (ricercatore B) at Rome II*]
- 2016-2017 Aurel Mihai Fulger - [now: *tenure-track assistant professor at University of Connecticut*]
- 2016-2017 Joseph Allen Waldron - [now: *tenure-track assistant professor at Michigan State University*]

■ PHD STUDENTS

- 2021- Jefferson Baudin
- 2021- Linus Rösler
- 2018- Quentin Posva
- 2017-2021 Emelie Arvidsson
- 2017-2021 Ursina Schweizer

■ ORGANIZATION OF SCIENTIFIC MEETINGS:

- 2021 The annual meeting of the Swiss Mathematical Society and the associated Birational Geometry conference (with Jérémy Blanc), cancelled/postponed because of COVID.
- 2020- Host and organizer of Zoom Algebraic Geometry (ZAG) seminar.

- 2017, 2020 AIM SQuaRE: Arithmetic, Algebra and Geometry of singularities measured by finite covers
- 2018 Geneva-EPFL study workshop on motivic integration (with András Szenes).
- 2017- Basel-Dijon-EPFL (formerly Basel-EPFL) Meeting in Birational Geometry (with Jérémy Blanc, Ronan Terpereau and Ardien Dubouloz; meets once a semester and rotates between the three institutions)
- 2016 Tokyo-Princeton algebraic geometry conference (with Yujiro Kawamata, János Kollár and Yoshinori Gongyo), Princeton
- 2014 the school “Positive characteristic algebraic geometry workshop” (with Karl Schwede and Kevin Tucker) at University of Illinois at Chicago
special session “Algebraic Geometry” at the Joint Mathematical Meetings (with Christopher Hacon), Baltimore, Maryland
- 2013 special session “The geometry of algebraic varieties” at the AMS Sectional meeting (with Karl Schwede), Temple University, Philadelphia
- 2011- Algebraic geometry seminar organization at Princeton, and then at EPFL

■ INVITED CONFERENCE TALKS:

- 2021 Algebraic Geometry Angers
Dutch Online Algebraic Geometry Seminar
- 2020 K-stability, Originally: Simons conference center, Stony Brook; Eventually: over Zoom
Zoom Algebraic Geometry (ZAG) seminar, the online worldwide seminar of algebraic geometry
K-stability and related topics, American Institute of Mathematics, San Jose (US)
- 2019 Geometry in Pairs, Rome
Joint seminar in algebraic geometry of the Universities of Basel, Freiburg, Nancy, Saarbrücken and Strasbourg, Strasbourg
Derived Categories and Geometry in Positive Characteristic, Warsaw
Belgian-Dutch Algebraic Geometry Day, Amsterdam
Recent Progress in Moduli Theory, MSRI, Berkeley
Higher dimensional complex geometry, Saarbrücken
- 2018 Workshop on Birational geometry, Shanghai
Workshop on algebraic surfaces, Hannover
- 2017 Algebraic Geometry: Birational Classification, Derived Categories, and Moduli Spaces, Oberwolfach
Moduli of K-stable varieties, Rome
Workshop on Positivity ICMS, Edinburgh
- 2016 Differential forms in algebraic geometry, Freiburg
Higher dimensional algebraic geometry and characteristic p , Luminy
Higher-Dimensional Algebraic Geometry, Salt Lake City

- 2015 Higher Dimensional Algebraic Geometry, Taipei
 Basel - Freiburg - Nancy - Strasbourg joint Seminar in Algebraic and Complex Geometry ,
 Strasbourg
 Oberwolfach workshop: Algebraic Geometry, Oberwolfach
- 2014 FRG Special Month in Ann Arbor, Ann Arbor
 AGNES - Algebraic Geometry Northeastern Series, Stony Brook
 Homological and Characteristic p Methods in Commutative Algebra, special session at JMM,
 Baltimore, Maryland
 Algebraic Geometry, special session at JMM, Baltimore.
- 2013 Birational Geometry and Singularities in Positive Characteristic, Tokyo.
 Workshop on Algebraic Geometry, Taipei.
 Workshop on Deformation and Moduli in Complex Geometry, Seoul.
- 2012 AMS sectional meeting, special session on Geometry of Algebraic Varieties, Akron.
- 2010 Bellingham Algebraic Geometry Seminar, Bellingham.
 Birational Geometry and Moduli Spaces (MRC conference), Snowbird.
 School on Birational Geometry and Moduli Spaces, Salt Lake City.
 Winter School on Algebraic Geometry, Seoul.
- 2005 4th Japanese - Hungarian Symposium on Discrete Mathematics and Its Applications, Bu-
 dapest.

■ INVITED SEMINAR TALKS (IN ALPHABETICAL ORDER):

- 2009, 2010, 2015 Albert-Ludwigs-Universität Freiburg
 2011 Brown University
 2011, 2012, 2020 Columbia University,
 2017 Humboldt-Universität zu Berlin
 2017 Imperial College London
 2015 Institute for Advanced Studies
 2018 IST Austria (Institute of Science and Technology Austria)
 2017 Johannes Gutenberg Universität Mainz
 2011, 2013 Johns Hopkins University
 2011, 2014 MIT and Harvard
 2009 MSRI, Graduate Student Seminar
 2012, 2013 Pennsylvania State University
 2011 Princeton University
 2010, 2015 Rényi Institute
 2010 Rice University

2013	Rutgers
2011	Stanford University
2012	Stony Brook University
2015	Technische Universität München
2016	Universität Basel
2016	Universität Bonn
2018	Universität Des Saarlandes
2019	Université de Lorraine, Nancy
2013	University of Michigan
2015	University of South Carolina
2013, 2015	University of Utah
2010, 2013	University of Washington

■ INVITED COLLOQUIUM TALKS (IN CHRONOLOGICAL ORDER):

2018	Fields medal day, organized by the Swiss Mathematical Society, talk about Caucher Birkar's work
2017	University of Geneva
2015	UCLA, University of California at Los Angeles
2015	Universität Bern (job talk)
2015	Rutgers, Newark
2015	École polytechnique fédérale de Lausanne (job talk)
2013	Rutgers (job talk)
2013	University of Georgia (job talk)
2013	Purdue University (job talk)

■ LECTURING AT WINTER/SUMMER SCHOOLS:

2014	the school "POSITIVE CHARACTERISTIC ALGEBRAIC GEOMETRY WORKSHOP" at University of Illinois at Chicago
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■ OTHER PROFESSIONAL ACTIVITIES:

2011- REFEREED AND GAVE QUICK OPINIONS for several journals including:

Advances in Geometry	Advances in Mathematics	Algebra & Number Theory
Algebraic Geometry	Annales de l'Institut Fourier	Annals of Mathematics
Annali della Scuola Normale Superiore di Pisa	Commentarii Mathematici Helvetici	Communications in Algebra
Compositio Mathematica	Crelle's Journal für die reine und angewandte Mathematik	Duke Mathematical Journal

European Journal of Mathematics	International Journal of Mathematics	International Mathematics Research Notices
Inventiones Mathematicae	Journal of Algebraic Geometry	Journal of Pure and Applied Algebra
Journal of the Institute of Mathematics of Jussieu	Journal of the European Mathematical Society	Manuscripta Mathematica
L'Enseignement Mathématique	Mathematical Research Letters	Mathematische Zeitschrift
Nagoya Mathematical Journal	Proceedings of the American Mathematical Society	Osaka Journal of Mathematics

TEACHING EXPERIENCE:

PHD TEACHING EXPERIENCE AT EPFL:

- 2020 Étale cohomology (material: Milne's notes)
- 2019 Positive characteristic algebraic geometry II (material: work in progress book)
- 2018 Positive characteristic algebraic geometry (material: work in progress book)
Sheaf cohomology (Hartshorne's book Chp III)
- 2017 Scheme Theory (Hartshorne's book Chp II)

BACHELORS AND MASTERS TEACHING EXPERIENCE AT EPFL:

- 2020-2021 Modern algebraic geometry (schemes theory, Msc)
- 2020-2021 Structures algébriques (English translation: algebraic structures, 1st year math BSC)
- 2021-2022 Anneaux et corps (English translation: rings and fields, 2nd year math BSC)
- 2017-2019 3 times Analysis I
- 2017-2019 3 times Algebraic Geometry (MsC)
- 2016- bachelors projects (6th semester BSC), masters projects (1st semester of MsC), master theses (3th semester of MsC), multiple per semester on average
- 2016, Rings and modules (3rd year math BsC)
- 2020-2021

TEACHING EXPERIENCE AT PRINCETON UNIVERSITY:

- 2013-2015 1 times: Algebra II (Math 346); 1 PhD course (Positive Characteristic Algebraic Geometry); 1 Junior seminar (Commutative algebra and algebraic geometry in positive characteristic); 1 times advising a junior project.
- 2013-2014 5 reading courses on different topics in Algebraic Geometry.
- 2012-2014 5 courses of Linear Algebra (Math 202), including 2 times being the coursehead, the person who directs all the parallel Linear Algebra courses.
- 2011-2013 4 courses of Multivariable Calculus (Math 201).

TEACHING EXPERIENCE AT UNIVERSITY OF WASHINGTON AS A GRADUATE STUDENT:

- 2009-2011 4 quarters of graduate course grading: Manifolds (twice), Algebra (twice)

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- 2008-2011 4 quarters of teaching Differential Equations (Math 307)
- 2006-2008 4 quarters of TAing Calculus courses: Calculus with Analytic Geometry I (Math 124), Calculus with Analytic Geometry II (Math 125, twice), Calculus with Analytic Geometry III (Math 126).
- 2007 2 quarters of mentoring in the Math Study Center at University of Washington (2007 Summer, Fall).

TEACHING EXPERIENCE IN HUNGARY AS AN UNDERGRADUATE STUDENT:

- 2001-2005 5 semesters TA in Graph Theory, Technical University of Budapest, following semesters: 2001-2002/1, 2001-2002/2, 2002-2003/2, 2003-2004/2, 2004-2005/2.
- 2002-2005 2 semesters TA in Linear Algebra, Technical University of Budapest, following semesters: 2002-2003/1, 2004-2005/1.
- 2004-2005 1 semester TA in Analysis, Eötvös Loránd University, Budapest, following semester: 2004-2005/1.