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CURRENT POSITION

Bernoulli Instructor and Marie Curie Fellow, 07/2019-present

École polytechnique fédérale de Lausanne, Institute of Mathematics.

The position of Bernoulli Instructor at EPFL is comparable to a fixed-term Lectureship or to an Assistant Professorship without tenure.

As a Marie Curie Fellow, hosted by the Chair of Algebraic Geometry, I carry out research on my project “Moduli and boundedness problems in Algebraic Geometry”.

EMPLOYMENT HISTORY

University Research Fellow, University of Cambridge, 09/2015-06/2019

Department of Pure Mathematics and Mathematical Statistics.

Visiting Scholar at SISSA during academic year 2016-17.

The University Research Fellowship is comparable to an independent postdoc position.

Fellow and College Lecturer in Pure Mathematics, 10/2015-06/2019

Churchill College, Cambridge.

Visiting Scholar at SISSA during academic year 2016-17.

Assegnista di ricerca (Post-Doc), SISSA, 10/2016-09/2017

Area of Mathematics. Group of Geometry and Mathematical Physics.

Supervisor: Prof. Jacopo Stoppa. Funded under ERC Starting Grant no. 307119.

I visited Professor Jacopo Stoppa at SISSA Trieste as part of a collaboration at the interface between birational algebraic geometry and complex geometry focused on the study of Kähler–Einstein metrics on algebraic varieties.

RESEARCH INTERESTS

Minimal Model Program and its applications.

Birational geometry of Calabi–Yau and Fano varieties with applications to physics.

Boundedness questions in algebraic geometry and their topological implications.

The topology of singularities in algebraic geometry and interactions with physics.

Holomorphic foliations and dynamics on projective varieties.

Toric geometry and toroidal compactifications.

Hyperbolicity questions in algebraic geometry.

EDUCATION

- Ph. D. in Mathematics.** 09/2010-06/2015
Massachusetts Institute of Technology, Department of Mathematics.
Thesis: “Log geometry and extremal contractions”.
Advisor: Prof. J. McKernan.
- Laurea Specialistica in Matematica** (equivalent of M.S. in Mathematics). 09/2008- 05/2010
Università degli Studi di Roma 3, Faculty of Sciences.
Thesis: “On the cohomology algebras of compact Kähler manifolds and the Kodaira problem”.
Advisor: Prof. L. Caporaso.
Graduated on 05/19/2010, with grade 110/110 cum laude.
- Laurea Triennale in Matematica** (equivalent of B.S. in Mathematics). 10/2005- 09/2008
Università degli Studi di Pavia, Faculty of Sciences.
Thesis: “Riemann’s singularity theorem”.
Advisor: Prof. M. D. T. Cornalba.
Graduated on 09/16/2008 with grade 110/110 cum laude.

AWARDS, FELLOWSHIPS, GRANTS

- Scheme 4 Grant**, Co-PI, London Mathematical Society, Ref.41916 (£1000). 10/2019
- Marie Skłodowska Curie Individual Fellowship**, PI, “Boundedness and Moduli problems in birational geometry”, Grant No.842071 (€191149,44) 07/2019-present
- EPSRC Postdoctoral Fellowship**, PI, “Moduli and boundedness problems in geometry”, EP/S024808/1, rejected in favor of the MSCA Fellowship. (£293505,40) 02/2019
- Scheme 8 Grant**, PI, London Mathematical Society, Ref.81613 (£4000). 06/2017
- Federigo Enriques Prize**, 2016, awarded by Unione Matematica Italiana and Fondazione Federigo Enriques (€2000). 03/2017
- AMS Graduate Student Travel Grant** (\$250). 03/2015
- Praecis Presidential Fellow**, Massachusetts Institute of Technology (\$40000). 09/2010- 05/2011
- INdAM scholarship** for students of the Laurea Specialistica program, awarded by the National Institute for High Mathematics “F. Severi” (€9000). 04/2009- 03/2011
- INdAM scholarship** for students of the Laurea Triennale program, awarded by the National Institute for High Mathematics “F. Severi” (€12000). 01/2006- 12/2008
- Scholarship** at Collegio Borromeo and University Institute for Higher Studies, Pavia, Italy. 10/2005- 10/2008

VISITING POSITIONS

- Visitor at King’s College London (Host: C. Spicer). 02/2020
- Visitor at University of Bonn (Host: L. Tasin). 10/2018
- Visitor at Princeton University (Host: G. Di Cerbo). 03/2018
- Visitor at BICMR, Beijing (Host: C. Xu). 10/2017
- Visitor at SISSA, Trieste (Host: J. Stoppa). 10/2016- 09/2017
- Visitor at IMPA, Rio de Janeiro (Host: J. V. Pereira). 03/2016- 04/2016
- Visitor at Mathematics Department, UC San Diego. 02/2015- 06/2015

Visitor at Mathematics Department, Princeton University under the
Exchange Scholar Program.
Visitor at Mathematics Department, UC San Diego.
Long term visitor at Università di Trento

09/2014- 12/2014
10/2013- 06/2014
06/2012-present

PUBLICATIONS

Articles

1. (joint with G. Codogni, A. Fanelli, L. Tasin), Fano varieties in Mori fibre spaces, *Int. Math. Res. Not.*, Volume 2016, Issue 7: 2026–2067, DOI:10.1093/imrn/rnv173.
2. (joint with M. Brown, J. M^cKernan, H. R. Zong), A geometric characterization of toric varieties, *Duke Math. J.*, Volume 167, Number 5 (2018), 923–968, DOI:10.1215/00127094-2017-0047.
3. (joint with A. Fanelli, G. Codogni, and L. Tasin), A note on the fibres of Mori fibre spaces, *Eur. J. Math.* 4 (2018), no. 3, 859–878, DOI:10.1007/s40879-018-0219-z.
4. (joint with J. V. Pereira), Effective algebraic integration in bounded genus, *Algebraic Geometry* 6 (4) (2019) 454–485, DOI:10.14231/AG-2019-021.
5. Hyperbolicity for log canonical pairs and the Cone Theorem, *Sel. Math. New Ser.* (2019), no.5, paper 67, 23 pp., DOI: 10.1007/s00029-019-0512-9.
6. (joint with S. Filipazzi), Invariance of plurigenera and boundedness for generalized pairs, *Mat. Contemp.* 47 (2020), 114–150, Proceedings of the ICM Satellite “Moduli spaces in Algebraic Geometry and Applications”, Campinas, Brazil 2018, DOI: 10.21711/231766362020/rmc476
7. (joint with W. Chen, G. Di Cerbo, J. Han, and C. Jiang), Birational boundedness of rationally connected Calabi-Yau threefolds, *Adv. Math.*, 378 (2021), 107541, 32 pp., DOI: 10.1016/j.aim.2020.107541
8. (joint with G. Di Cerbo), Birational boundedness of low dimensional elliptic Calabi-Yau varieties with a section, accepted for publication at *Compositio Mathematica*, 40 pp., arXiv:1608.02997.
9. (joint with L. Braun, J. Moraga, S. Filipazzi), The Jordan property for local fundamental groups, accepted for publication at *Geometry & Topology*, 36 pp., arXiv:2006.01253.
10. (joint with C. Spicer), Local and global applications of the Minimal Model Program for co-rank one foliations on threefolds, accepted for publication at *Journal of the European Mathematical Society*, 65 pp., arXiv:1908.05037.

Submitted papers

11. (joint with H. Liu), Rational curves and strictly nef divisors on Calabi–Yau threefolds, 18 pp., arXiv:2010.12233.
12. (joint with S. Filipazzi), On the connectedness principle and dual complexes for generalized pairs, 48 pp., arXiv:2010.08018.
13. (joint with C. Birkar, G. Di Cerbo), Boundedness of elliptic Calabi–Yau varieties with a rational section, 44 pp., arXiv:2010.09769

Surveys

14. On the structure of local and global singularities: Shokurov’s Conjecture, Proceedings for the Kinoshita algebraic geometry symposium 2017, 12 pages, available electronically on the Kyoto University Research Information Repository.

15. Recent progress on the birational geometry of foliations on threefolds, Overwolfach Report 19 (2020), DOI: 10.4171/OWR/2020/19
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Work in progress

16. (joint with C. Spicer) Effective generation for foliated surfaces: results and applications (expected May 2021)
17. (joint with J. Moraga) A characterization of toric singularities. (expected May 2021)
18. (joint with S. Filipazzi, C. Hacon) On the finiteness of models of elliptic Calabi–Yau fibrations and boundedness thereof (expected June 2021)

INVITED TALKS

Invited lectures series

- A geometric characterization of toric varieties, BAGS, Université de Lorraine. 03/2018
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Invited conference talks

- Boundedness of elliptic fibrations, 04/2021
Projective and birational higher dimensional geometry, online conference, Università di Trieste
- Recent progress on the birational geometry of foliations on threefolds, 07/2020
Algebraic Geometry: Moduli Spaces, Birational Geometry and Derived Aspects, MFO Oberwolfach.
- Minimal Model Program for foliations on threefolds and applications, 05/2020
Geometry and Dynamics of Foliations, online conference, CIRM.
- Birational boundedness of elliptic Calabi-Yau varieties, 02/2020
Workshop on the geometry of elliptic fibrations & COW Seminar, University of Warwick.
- A geometric characterization of toric morphisms, 12/2019
From Trento to Geometry and back, Università di Trento.
- Birational boundedness of elliptic Calabi-Yau varieties, 07/2019
Moduli and stability conditions, Leibniz Universität Hannover.
- Birational boundedness of elliptic Calabi-Yau varieties, 04/2019
Western Algebraic Geometry Symposium, UC Berkeley.
- Towards birational boundedness of elliptic Calabi-Yau varieties, short communication 07/2018
Moduli spaces in Algebraic Geometry and applications, ICM Satellite Conference, Campinas.
- On the birational boundedness of the bases of elliptically fibered Calabi-Yau manifolds in low dimension, Geometry and Physics of F-theory, BIRS. 01/2018
- On the geometry of Calabi-Yau varieties in low dimension, 01/2018
Korean-Italian Meeting on Algebraic Geometry 2018, KIAS, Seoul.
- Global vs. Local structure of singularities, 10/2017
Kinosaki Algebraic Geometry Conference, Japan.
- Log birational boundedness of Calabi-Yau pairs, 01/2017
Workshop on Fano varieties and Calabi-Yau varieties, Kobe University.
- Log birational boundedness of Calabi-Yau pairs, 09/2016
Birational Geometry and Characteristic $p > 0$, CIRM, Marseille.

A geometric characterization of toric varieties, Giornate di Geometria Algebrica ed Argomenti Correlati XXIII, Università di Catania.	05/2016
Adjoint dimension of foliations, Cambridge–Tokyo Workshop, I, University of Cambridge.	11/2015
Hyperbolicity for log pairs, Postgraduate Conference in Complex Geometry, University of Cambridge.	09/2015
Hyperbolicity for log pairs, Distribution of Rational and Holomorphic Curves in Algebraic Varieties, Birs.	03/2015
A geometric characterization of toric varieties, The Geometry of Algebraic Varieties, AMS Sectional Meeting, Michigan State.	03/2015
A geometric characterization of toric varieties, Geometria e Rappresentazioni nella Capitale, II, Università degli Studi Roma 3.	12/2014

Invited seminar talks

Algebraic Geometry seminar (online), University of Kansas.	04/2021
Algebraic Geometry Seminar (online), Université de Bordeaux.	04/2021
Dutch online Algebraic Geometry seminar (online), University of Amsterdam.	03/2021
Algebraic Geometry Seminar (online), University of Utah.	02/2021
Algebraic Geometry Seminar (online), UC San Diego.	01/2021
Iskovskikh Seminar (online), Steklov Mathematical Institute, Moscow.	11/2020
Algebraic Geometry Seminar (online), OSU, Columbus.	11/2020
Algebraic Geometry Seminar (online), MPI, Bonn.	05/2020
Algebraic Geometry Seminar, University of Princeton.	03/2020
KCL/UCL Geometry seminar, UCL, London.	02/2020
Seminario di Geometria Algebrica, Università di Torino.	03/2019
Edinburgh Geometry Seminar, University of Edinburgh.	03/2019
Séminaire d'homotopie en géométrie algébrique, Université de Toulouse.	01/2019
Oberseminar Algebraische Geometrie, Universität des Saarlandes, Saarbrücken.	11/2018
Algebraic Geometry Seminar, MPI, Bonn.	10/2018
Groups, Arithmetic & Algebraic Geometry Seminar, EPFL, Lausanne.	09/2018
Seminario di Geometria Algebrica, Università di Trento.	05/2018
Geometry and Mathematical Physics seminar, Loughborough University.	05/2018
Warwick Algebraic Geometry Seminar, University of Warwick.	05/2018
Algebraic Geometry Seminar, UCSD.	04/2018
Algebraic Geometry Seminar, University of Utah.	04/2018
Algebraic Geometry Seminar, Princeton.	03/2018
Math-Physics Joint Seminar, UPenn.	03/2018
Mathematics–String Theory Seminar, IPMU.	10/2017
Algebraic Geometry Seminar, University of Tokyo.	10/2017
Log birational boundedness of Calabi-Yau pairs, BICMR, Beijing.	10/2017

Algebraic Geometry Seminar, University of Oslo.	04/2017
Seminario di Geometria Algebrica, SISSA.	03/2017
Algebraic Geometry Seminar, University of Cambridge	03/2017
Algebraic Geometry Seminar, University of Tokyo.	01/2017
Groups, Arithmetic & Algebraic Geometry Seminar, EPFL.	11/2016
Algebraic Geometry Seminar, UCSD.	11/2016
Seminario de Álgebra, IMPA.	03/2016
Algebraic Geometry Seminar, Princeton University.	03/2016
Algebraic Geometry Seminar, Columbia University.	03/2016
Geometry and Mathematical Physics seminar, Loughborough University.	02/2016
EDGE Seminar, University of Edinburgh.	01/2016
Geometry and Topology Seminar, Imperial College.	11/2015
Algebraic Geometry Seminar, University of Cambridge.	11/2015
Seminario di Geometria Algebrica, Università degli Studi di Pavia.	10/2015
CIRGET Seminar, UQAM, Montreal.	03/2015
Algebraic Geometry Seminar, Johns Hopkins University.	02/2015
Algebraic Geometry Seminar, UT Austin.	02/2015
Seminario di Geometria Algebrica, Università degli Studi di Roma 3.	12/2014
Algebraic Geometry Seminar , UCSD.	05/2014

Contributed talks

Hyperbolicity for log pairs, AMS Summer Institute in Algebraic Geometry, Salt Lake City.	07/2015
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TEACHING

Teaching as an Instructor at EPFL

Analysis I, 1st year Bachelor course, EPFL.	Fall 2020
Rings and modules, 3rd year Mathematics Bachelor course, EPFL.	Fall 2019
Complex Manifolds, 1st year Mathematics Master's course, EPFL.	Fall 2019

Teaching as a Research Fellow at University of Cambridge

Positivity in Algebraic Geometry, Part III course, University of Cambridge.	Lent (Spring) 2018
Linear Series, Part III course, University of Cambridge.	Lent (Spring) 2017
Introduction to birational geometry, Minicourse in 6 lectures, part of the Ph.D. course "Topics in algebro-geometric stability", SISSA, Trieste.	12/2016-1/2017

Teaching as a College Lecturer at Churchill College

Groups, Rings and Modules. Supervisor for 10 students (25 hours).	Lent (Spring) 2019
Geometry 1B. Supervisor for 7 students (16 hours).	Lent (Spring) 2019
Groups 1A. Supervisor for 12 students (30 hours).	Michaelmas (Fall) 2018
Group, Rings and Modules. Supervisor for 9 students (26 hours).	Lent (Spring) 2018
Geometry 1B. Supervisor for 7 students (16 hours).	Lent (Spring) 2018
Linear Algebra 1B. Supervisor for 13 students (35 hours).	Michaelmas (Fall) 2017
Group, Rings and Modules. Supervisor for 8 students (16 hours).	Lent (Spring) 2017

Geometry 1B. Supervisor for 9 students (15 hours).	Lent (Spring) 2017
Group, Rings and Modules. Supervisor for 9 students (25 hours).	Lent (Spring) 2016
Geometry 1B. Supervisor for 10 students (16 hours).	Lent (Spring) 2016
Analysis 1B. Supervisor for 12 students (28 hours).	Michaelmas (Fall) 2015
Topology and Metric Spaces. Supervisor for 8 students (12 hours).	Michaelmas (Fall) 2015

Teaching as a graduate student at MIT

18.095, Mathematics Lecture Series, Organizer and Recitation Leader.	IAP 2015
18.085, Computational Science and Engineering, Course Instructor.	Summer 2013
18.095, Mathematics Lecture Series, Organizer and Recitation Leader.	IAP 2013
18.02, Multivariable Calculus, Teaching Assistant.	Fall 2012
18.085, Mathematical Methods for Engineering, Grading Assistant and responsible for Office Hours.	Spring 2012
18.112, Complex Analysis, Grading Assistant and responsible for Office Hours.	Fall 2011
18.755, Lie Groups, Grading Assistant and responsible for Office Hours.	Fall 2011

Teaching as an undergraduate student in Italy

Complex Analysis, Teaching Assistant, University of Rome 3.	Spring 2010
Calculus 1, Teaching Assistant, University of Rome 3.	Fall 2009
General topology, Teaching Assistant, University of Rome 3.	Spring 2009
General Mathematics for Biological Sciences, Teaching Assistant, University of Pavia.	Fall 2008

STUDENT SUPERVISION

Thesis supervision

Anaëlle Pfister , BA project (equivalent to a bachelor's thesis), "An introduction to toric geometry", EPFL.	02/2021-06/2021
Linus Rösler , MA Thesis, "The geometry of elliptic fibrations", EPFL.	01/2021-06/2021
Luca Nyckess , BA project (equivalent to a bachelor's thesis), "An introduction to complex manifolds and Hodge Theory", EPFL.	02/2020-06/2020
Simen Moe , Part III essay (equivalent to a master's thesis), "An introduction to the Minimal Model Program", University of Cambridge.	12/2018-05/2019

Study projects supervision

Linus Rösler , MA project (one semester project) "Elliptic surfaces in Algebraic Geometry", EPFL.	09/2020-12/2020
Maxime Matthey , MA project (one semester project), "Advanced topics in Commutative Algebra: Completions", EPFL.	09/2020-12/2020
Gheehyun Nahm , Study project for an undergraduate student on advanced topics in Algebraic Geometry, University of Cambridge.	08/2018-03/2019
Leon Zhang , Direct Reading Program, Supervisor for an undergraduate student learning Hodge Theory, MIT.	IAP 2015
Minseon Shin , Direct Reading Program, Supervisor for an undergraduate student learning Scheme Theory, MIT.	IAP 2013

CONFERENCES, SEMINARS AND WORKSHOPS ORGANIZATION

Conferences and workshops

Birational Geometry conference and 2021 meeting of the Swiss Mathematical Society, four-day conference, (team of 4), Lausanne, Switzerland.	05/2021
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Basel-Dijon-EPFL Workshop, two-day workshop, (team of 2), Lausanne, Switzerland.	11/2019
Cambridge-Tokyo Algebraic Geometry Workshop, III, two-day workshop, (team of 4), Cambridge, UK.	12/2018
New advances in Fano manifolds, five-day school for Ph.D. students, (team of 4), Cambridge, UK.	12/2017
British Algebraic Geometry, three-day conference, (local organizer), Cambridge, UK,	09/2017
Cambridge-Tokyo Algebraic Geometry Workshop, II, two-day workshop, (team of 4), Cambridge, UK.	03/2017
MIT-RTG Mirror Symmetry Workshop, five-day workshop, (team of 6), Big Bear Lake, CA.	05/2013

Seminars

Organizer for the Groups, Arithmetic & Algebraic Geometry Seminar, EPFL.	07/2019-present.
Organizer for the Algebraic Geometry Seminar, University of Cambridge.	10/2017-06/2019.

OUTREACH ACTIVITIES

HE+ Masterclass, Churchill College, Cambridge <i>I gave a lecture on modern geometry and organized an exercise session for high school students.</i>	04/2019
Open days, Churchill College, Cambridge <i>I gave a lecture on symmetries and geometry and organized an exercise session for high school students.</i>	07/2018
Orientation for high-school students, Liceo Classico "G. Prati", Trento <i>I spoke to high school students about what are the challenges of becoming a maths student starting from a background in humanities.</i>	04/2012

ACADEMIC SERVICES

Referee for academic journals: Mathematics Research Letter, Michigan Journal of Mathematics, International Mathematics Research Notices (3x), Mathematische Annalen, Annali della Scuola Normale Superiore di Pisa, Journal of Algebraic Geometry, Inventiones Mathematicae, International Journal of Mathematics, Manuscripta Mathematica, Advances in Mathematics (2x), Transactions of the AMS, Annales de l'Institut Fourier, Journal of Differential Geometry, Proceedings of the LMS.	Since 2015
Referee for conference proceedings (by conference title): Groups of Automorphisms in Birational and Affine Geometry, Moduli of K-stable Varieties.	Since 2013
Reviewer for Zentralblatt and Mathscinet.	Since 2014
Master Thesis committee for Peter Simko, EPFL.	07/2017
Mentor for postgraduate students, Churchill College.	10/2017-06/2019

Mentor for the students of the Institute of Mathematics, EPFL.

11/2020-present

Admission Selection Interviews, Churchill College, Cambridge.

12/2018

LANGUAGES

Italian: mother tongue.

English: professional proficiency.

French: intermediate level.

German: beginner level.

Last update: April 9th, 2021

REFERENCES

Prof. James M^cKernan
Ph.D. thesis advisor
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