# **ROBERTO SVALDI: Curriculum Vitae**

## École polytechnique fédérale de Lausanne

EPFL SB MATH MATH-GE MA B1 497 (Bâtiment MA) Station 8 CH-1015 Lausanne, Switzerland

#### Personal data

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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 carried out research on my project "Moduli and boundedness problems in Algebraic Geometry" from 01.07.2019 to 31.12.2021.

#### **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

Universitá 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 19.05.2010, with grade 110/110 cum laude.

Laurea Triennale in Matematica (equivalent of B.S. in Mathematics).

10.2005-09.2008

10.2017

Universitá degli Studi di Pavia, Faculty of Sciences.

Thesis: "Riemann's singularity theorem".

Visitor at BICMR, Beijing (Host: C. Xu).

Advisor: Prof. M. D. T. Cornalba.

Graduated on 16.09.2008 with grade 110/110 cum laude.

# AWARDS, FELLOWSHIPS, GRANTS, HABILITATIONS

Awards	
<b>Federigo Enriques Prize</b> , 2016, awarded by Unione Matematica Italiana and Fondazione Federigo Enriques (€2000).	03.2017
Grants	
<b>Funding Compositio</b> , Co-PI, Foundation Compositio, #550, (9500EUR) for the organization of the workshop in September 2022.	03.2022
<b>Grant</b> , Co-PI, Bernoulli Center for Fundamental Studies, (35000CHF) for the organization of the workshop in September 2022.	02.202
Scheme 4 Grant, Co-PI, London Mathematical Society, Ref.41916 (£1000), for the visit to King's College London in February 2020.	10.2019
Marie Skłodowska Curie Individual Fellowship, PI, "Boundedness and Moduli problems in birational geometry", Grant No.842071 (€191149,44)	07.2019-12.202
<b>EPSRC Postdoctoral Fellowship</b> , PI, "Moduli and boundedness problems in geometry", EP/S024808/1, rejected in favour of the MSCA Fellowship. (£293505,40)	02.2019
Scheme 8 Grant, PI, London Mathematical Society, Ref.81613 (£4000), for the organization of the PhD School of December 2017.	06.201
AMS Graduate Student Travel Grant (\$250).	03.201
Habilitations	
Abilitazione scientifica nazionale a professore associato	02.2022
Italian national habilitation to the ranking of associate professor	
Qualification aux fonctions de Maître de Conférences	01.201
French national habilitation to the ranking of Maître de Conférences	
Fellowships and Scholarships	
Praecis Presidential Fellowship, Massachusetts Institute of Technology (\$40000).	09.2010-05.201
INdAM scholarship for students of the Laurea Specialistica program,	04.2009-03.201
awarded by the National Institute for High Mathematics "F. Severi" (€9000).	
INdAM scholarship for students of the Laurea Triennale program,	01.2006 - 12.200
awarded by the National Institute for High Mathematics "F. Severi" (€12000).	
<b>Scholarship</b> at Collegio Borromeo and University Institute for Higher Studies, Pavia, Italy.	10.2005-10.200
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 University of Bohn (Host: L. Tasin). Visitor at Princeton University (Host: G. Di Cerbo).	03.201
visitor at Finiceton University (nost: G. Di Cerbo).	03.2018

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	09.2014-12.2014
Exchange Scholar Program.	
Visitor at Mathematics Department, UC San Diego.	10.2013-06.2014

### **PUBLICATIONS**

### Articles in peer-reviewed journals

- 10. (joint with C. Spicer), Local and global applications of the Minimal Model Program for co-rank one foliations on threefolds, in print at Journal of the European Mathematical Society, 57 pp., DOI: 10.4171/JEMS/1173.
- 9. (joint with L. Braun, J. Moraga, S. Filipazzi), The Jordan property for local fundamental groups, Geometry & Topology 26-1 (2022), 283–319. DOI: 10.2140/gt.2022.26.283.
- 8. (joint with G. Di Cerbo), Birational boundedness of low dimensional elliptic Calabi-Yau varieties with a section, Compos. Math. 157 (2021), no. 8, 1766–1806. DOI: 10.1112/S0010437X2100717X.
- 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
- 6. (joint with S. Filipazzi), Invariance of plurigenera and boundedness for generalized pairs, Mat. Contemp. 47 (2020), 114150, Proceedings of the ICM Satellite "Moduli spaces in Algebraic Geometry and Applications", Campinas, Brazil 2018, DOI: 10.21711/231766362020/rmc476
- 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.
- 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.
- 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.
- 2. (joint with M. Brown, J. McKernan, 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.
- 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.

#### **Pre-prints**

- 11. (joint with H. Liu), Rational curves and strictly nef divisors on Calabi–Yau threefolds, submitted, 18 pp., arXiv:2010.12233.
- 12. (joint with S. Filipazzi), On the connectedness principle and dual complexes for generalized pairs, submitted, 48 pp., arXiv:2010.08018.
- 13. (joint with C. Birkar, G. Di Cerbo), Boundedness of elliptic Calabi–Yau varieties with a rational section, submitted, 44 pp., arXiv:2010.09769.
- 14. (joint with C. Spicer) Effective generation for foliated surfaces: results and applications, submitted, 32 pp., arXiv:2104.11540.
- 15. (joint with J. Moraga), A characterization of toric singularities, 57 pp., arXiv:2108.01717.
- 16. (joint with S. Filipazzi, C. Hacon), Boundedness of elliptically fibered Calabi–Yau threefolds, submitted, 49pp, arXiv:2112.01352.

# Surveys

- 17. On the structure of local and global singularities: Shokurov's Conjecture, Proceedings for the Kinosaki algebraic geometry symposium 2017, 12 pages, available electronically on the Kyoto University Research Information Repository.
- 18. Recent progress on the birational geometry of foliations on threefolds, Oberwolfach Reports 17 (2020), no. 2/3, 1002-1006 DOI: 10.4171/OWR/2020/19

# **INVITED TALKS**

Invited lectures series	
Boundedness for foliated surfaces, Final conference of the ANR Project Foliage, Quimper, France.	03.2022
A geometric characterization of toric varieties, BAGS, Université de Loraine.	03.2018
Colloquia	
The geometry of projective varieties, online talk, SISSA, Trieste.	04.2021
Invited conference talks	
A characterization of toricness, 2021 Workshop on Algebraic Geometry: Generalised Pairs and Applications, online conference, Chinese Academy of Sciences & Tsinghua University.	08.2021
Boundedness of elliptic fibrations, Projective and birational higher dimensional geometry, online conference, Universitá di Trie	04.2021 ste
Recent progress on the birational geometry of foliations on threefolds, Algebraic Geometry: Moduli Spaces, Birational Geometry and Derived Aspects, MFO Oberw	07.2020 olfach.
Minimal Model Program for foliations on threefolds and applications, Geometry and Dynamics of Foliations, online conference, CIRM.	05.2020
Birational boundedness of elliptic Calabi-Yau varieties, Workshop on the geometry of elliptic fibrations & COW Seminar, University of Warwick.	02.2020
A geometric characterization of toric morphisms, From Trento to Geometry and back, Universitá di Trento.	12.2019
Birational boundedness of elliptic Calabi-Yau varieties, Moduli and stability conditions, Leibniz Universitát Hannover.	07.2019
Birational boundedness of elliptic Calabi-Yau varieties, Western Algebraic Geometry Symposium, UC Berkeley.	04.2019
Towards birational boundedness of elliptic Calabi-Yau varieties, short communication Moduli spaces in Algebraic Geometry and applications, ICM Satellite Conference, Campinas	07.2018
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, Korean-Italian Meeting on Algebraic Geometry 2018, KIAS, Seoul.	01.2018
Global vs. Local structure of singularities, Kinosaki Algebraic Geometry Conference, Japan.	10.2017
Log birational boundedness of Calabi-Yau pairs, Workshop on Fano varieties and Calabi-Yau varieties, Kobe University.	01.2017
Log birational boundedness of Calabi-Yau pairs, Birational Geometry and Characteristic $p>0$ , CIRM, Marseille.	09.2016
A geometric characterization of toric varieties, Giornate di Geometria Algebrica ed Argomenti Correlati XXIII, Universitá di Catania.	05.2016

Hyperbolicity for log pairs,	09.
Postgraduate Conference in Complex Geometry, University of Cambridge.	09.
Hyperbolicity for log pairs, Distribution of Rational and Holomorphic Curves in Algebraic Varieties, Birs.	03.
A geometric characterization of toric varieties, The Geometry of Algebraic Varieties, AMS Sectional Meeting, Michigan State.	03.2
A geometric characterization of toric varieties, Geometria e Rappresentazioni nella Capitale, II, Universitá degli Studi Roma 3.	
Invited seminar talks	
Explicit Birational Geometry Seminar, Fudan University	02.
Algebraic Geometry Seminar, Columbia University.	01.
Oberseminar: Algebra, Zahlentheorie und algebraische Geometrie, online talk, Albert-Ludwigs-Universität Freiburg.	07.5
Algebraic Geometry seminar, online talk, University of Kansas.	04.
Algebraic Geometry Seminar, online talk, Université de Bordeaux.	04.
Dutch online Algebraic Geometry seminar, online talk, Universiteit van Amsterdam.	03.
Algebraic Geometry Seminar, online talk, University of Utah.	02.
Algebraic Geometry Seminar, online talk, UC San Diego.	01.
Iskovskikh Seminar (online), Steklov Mathematical Institute, Moscow.	11.
Algebraic Geometry Seminar, online talk, Ohio State University.	11.5
Algebraic Geometry Seminar, online talk, Max Planck Institute, Bonn.	05.
Algebraic Geometry Seminar, University of Princeton.	03.3
KCL/UCL Geometry seminar, University College London.	02.
Seminario di Geometria Algebrica, Universitá di Torino.	03.5
Edinburgh Geometry Seminar, University of Edinburgh.	03.5
Séminaire d'homotopie en géométrie algébrique, Université de Toulouse.	01.5
Oberseminar Algebraische Geometrie, Universität des Saarlandes.	11.5
Algebraic Geometry Seminar, Max Planck Institute, Bonn.	10.5
Groups, Arithmetic & Algebraic Geometry Seminar, EPF Lausanne.	09.5
Seminario di Geometria Algebrica, Universitá di Trento.	05.
Geometry and Mathematical Physics seminar, Loughborough University.	05.
Warwick Algebraic Geometry Seminar, University of Warwick.	05.5
Algebraic Geometry Seminar, UC San Diego.	04.5
Algebraic Geometry Seminar, University of Utah.	04.5
Algebraic Geometry Seminar, Princeton.	03.5
Math-Physics Joint Seminar, UPenn.	03.5
Mathematics-String Theory Seminar, IPMU, Tokyo.	10.5
Algebraic Geometry Seminar, University of Tokyo.	10.5
Log birational boundedness of Calabi-Yau pairs, BICMR, Beijing.	10.5
Algebraic Geometry Seminar, University of Oslo.	04.2

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, UC San Diego.	11.2016
Seminario de Álgebra, IMPA, Rio de Janeiro.	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, Universitá 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, Universitá degli Studi Roma 3.	12.2014
Algebraic Geometry Seminar, UC San Diego.	05.2014
TEACHING	
TEACHING  Teaching as an Instructor at EPFL Complex Manifolds, Mathematics Master's course, EPFL.	Spring 2022
Teaching as an Instructor at EPFL Complex Manifolds, Mathematics Master's course, EPFL. Analysis I, 1st year Bachelor course, EPFL.	Fall 2021
Teaching as an Instructor at EPFL Complex Manifolds, Mathematics Master's course, EPFL. Analysis I, 1st year Bachelor course, EPFL. Analysis I, 1st year Bachelor course, EPFL.	Fall 2021 Fall 2020
Teaching as an Instructor at EPFL Complex Manifolds, Mathematics Master's course, EPFL. Analysis I, 1st year Bachelor course, EPFL. Analysis I, 1st year Bachelor course, EPFL. Rings and modules, 3rd year Mathematics Bachelor course, EPFL.	Fall 2021 Fall 2020 Fall 2019
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# Teaching as a graduate student at MIT

Touching us a graduate state in all I	
<ul> <li>18.095, Mathematics Lecture Series, Organizer and Recitation Leader.</li> <li>18.085, Computational Science and Engineering, Course Instructor.</li> <li>18.095, Mathematics Lecture Series, Organizer and Recitation Leader.</li> <li>18.02, Multivariable Calculus, Teaching Assistant.</li> <li>18.085, Mathematical Methods for Engineering, Grading Assistant and responsible for Office Hours.</li> <li>18.112, Complex Analysis, Grading Assistant and responsible for Office Hours.</li> </ul>	IAP 2015 Summer 2013 IAP 2013 Fall 2012 Spring 2012 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,	Fall 2008
University of Pavia.	
STUDENT SUPERVISION	
Thesis supervision Linus Rösler, MA Thesis, "The geometry of elliptic fibrations", EPFL.	02,2021-09.2021
Anaëlle Pfister, BA project (equivalent to a bachelor's thesis),	02.2021-09.2021
"An introduction to toric geometry", EPFL.	02.2021-00.2021
Luca Nyckess, BA project (equivalent to a bachelor's thesis),	02.2020-06.2020
"An introduction to complex manifolds and Hodge Theory", EPFL.	02.2020 00.2020
<b>Simen Moe</b> , Part III essay (equivalent to a master's thesis),	12.2018-05.2019
"An introduction to the Minimal Model Program", University of Cambridge.	
Study projects supervision	
Alberto Smailovic Funcasta, BA semester study project,	02.2022 - 06.2022
"Introduction to algebraic structures: from groups to modules", EPFL.	
Linus Rösler, MA project (one semester project),	09.2020-12.2020
"Elliptic surfaces in Algebraic Geometry", EPFL.	00 0000 10 0000
Maxime Matthey, MA project (one semester project),	09.2020-12.2020
"Advanced topics in Commutative Algebra: Completions", EPFL.	00 9010 09 9010
<b>Gheehyun Nahm</b> , 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	IAP 2015
learning Hodge Theory, MIT.	IAI 2010
Minseon Shin, Direct Reading Program, Supervisor for an undergraduate student	IAP 2013
learning Scheme Theory, MIT.	
ORGANIZATION OF CONFERENCES, SEMINARS AND WORKSH	OPS
Conferences and workshops	
Foliation in Algebraic and Birational Geometry, 5 days workshop (team of 4),	09.2022
Bernoulli Center for Fundamental Studies, Lausanne, Switzerland.	
Basel-Dijon-EPFL Workshop, two-day workshop, (team of 2), Lausanne, Switzerland.	05.2022
Basel-Dijon-EPFL Workshop, two-day workshop, (team of 5), Basel, Switzerland.	11.2021
Basel-Dijon-EPFL Workshop, two-day workshop, (team of 4), Lausanne, Switzerland.	11.2019
Cambridge-Tokyo Algebraic Geometry Workshop, III, two-day workshop,	12.2018
(team of 4), Cambridge, UK.	
New advances in Fano manifolds, five-day school for Ph.D. students, (team of 4),	12.2017
Cambridge, UK.  Pritich Algebraic Cometry, three day conference (level ergenizer). Combridge UK.	00 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.

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

04.2019

I gave a lecture on modern geometry and organized an exercise session for high school students.

Open days, Churchill College, Cambridge

07.2018

I gave a lecture on symmetries and geometry and organized an exercise session for high school students.

Orientation for high-school students, Liceo Classico "G. Prati", Trento

04.2012

I spoke to high school students about what are the challenges of becoming a maths student starting from a background in humanities.

#### **ACADEMIC SERVICES**

Referee for academic journals:

Since 2015

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'Insitute Fourier, Journal of Differential Geometry, Proceedings of the LMS,

Advances in geometry, Forum Math Pi, Journal of the LMS, Electronic Research Archive.

Referee for conference proceedings (by conference title):

Since 2013

Groups of Automorphisms in Birational and Affine Geometry; Moduli of K-stable Varieties;

Birational geometry, Kähler-Einstein metrics and degenerations.

Referee for grants and fellowships applications submitted to

Since 09.2019

the Engineering and Physical Sciences Research Council, UK (3 grants reviewed).

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

Postdoc Selection Committee for the Chair of Algebraic Geometry, EPFL.

02.2021 and 02.2022

Doctoral students Selection Committee for the Chair of Algebraic Geometry, EPFL.

02.2022

# **LANGUAGES**

Italian: mother tongue.
English: professional proficiency.
French: intermediate level.
German: beginner level.

Last update: March 10th, 2022

#### REFERENCES

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Prof. Zsolt Patakfalvi Research and teaching reference École polytechnique fédérale de Lausanne EPFL SB MATH CAG MA C3 635 (Bâtiment MA), Station 8 CH-1015 Lausanne, Switzerland +41 21 693 55 20 http://cag.epfl.ch/ zsolt.patakfalvi@epfl.ch