

Andrea Petracci

CONTACT INFORMATION	Università di Bologna Dipartimento di Matematica Piazza di Porta San Donato 5 40126 Bologna Italy	andrea.petracci@alumni.sns.it (<i>permanent</i>) a.petracci@unibo.it https://www.unibo.it/sitoweb/a.petracci/en https://www.dm.unibo.it/~andrea.petracci3/
PERSONAL INFORMATION	I am an Italian citizen.	
EMPLOYMENT	Università di Bologna • Tenure-track assistant professor (RTD-B) • Assistant professor (RTD-A)	Bologna, Italy October 2022 – present October 2021 – October 2022
	Freie Universität Berlin Wissenschaftlicher Mitarbeiter in the research group of Klaus Altmann	Berlin, Germany October 2018 – September 2021
	University of Nottingham Research Associate in the research group of Alexander Kasprzyk	Nottingham, UK October 2017 – September 2018
	Imperial College London Research Assistant in the research group of Tom Coates	London, UK April 2017 – September 2017
EDUCATION	Imperial College London Doctor of Philosophy in Mathematics – Thesis title: On Mirror Symmetry for Fano varieties and for singularities – Advisor: Alessio Corti – Examiners: Alessandro Chiodo, Richard Thomas	London, UK October 2013 – September 2017
	Scuola Normale Superiore Diploma in Mathematics – Assessment: 70/70	Pisa, Italy October 2010 – May 2013
	University of Pisa Master of Science in Mathematics – Thesis title: The hyperelliptic locus in the moduli stack of curves of given genus – Advisor: Angelo Vistoli – Assessment: 110/110 cum laude	Pisa, Italy October 2010 – March 2013
	University of Pisa Bachelor degree in Mathematics – Thesis title: Il teorema della sezione iperpiana di Lefschetz – Advisor: Rita Pardini – Assessment: 110/110 cum laude	Pisa, Italy October 2007 – July 2010
HABILITATIONS	Italian habilitation for full professor (I fascia) of Geometry and Algebra (S.C. 01/A2),	

valid from the 24th of October 2023 to the 24th of October 2034

Italian habilitation for associate professor (II fascia) of Geometry and Algebra (S.C. 01/A2), valid from the 25th of January 2023 to the 25th of January 2033

HONORS, GRANTS
AND AWARDS

Won the ‘Federigo Enriques’ prize from Unione Matematica Italiana, September 2019

Awarded a grant from Heilbronn Institute for Mathematical Research to organise a workshop about cluster algebras (£7,500), April 2018

Won the Doris Chen PhD Award in the academic year 2016-2017 from the Department of Mathematics of Imperial College London

Awarded the ‘Roth Studentship’ of the Department of Mathematics of Imperial College London, October 2013

Won a full scholarship at Scuola Normale Superiore di Pisa after selective examination, September 2010

RESEARCH
INTERESTS

Algebraic geometry.

More specifically: Fano varieties and their moduli, toric geometry, deformation theory, Gromov–Witten theory and the Gross–Siebert program.

PUBLISHED
PAPERS

S. Felten, A. Petracci, S. Robins, *Deformations of log Calabi–Yau pairs can be obstructed*, Math. Res. Lett. 30 (2023), no. 5, 1357-1374

A. Grassi, G. Gugiatti, W. Lutz, A. Petracci, *Reflexive polygons and rational elliptic surfaces*, Rend. Circ. Mat. Palermo (2) 72 (2023), no. 6, 3185-3221.

A. Petracci, *On deformation spaces of toric singularities and on singularities of K -moduli of Fano varieties*, Transactions of the American Mathematical Society 375 (2022), no. 8, 5617-5643.

A. Petracci, *A 1-dimensional component of K -moduli of del Pezzo surfaces*, In: I. Cheltsov, X. Chen, L. Katzarkov, J. Park (eds), *Birational Geometry, Kähler–Einstein Metrics and Degenerations (BGKEMD 2019)*, Springer Proceedings in Mathematics & Statistics, vol. 409, pp. 709-723, Springer.

Y. Liu, A. Petracci, *On K -stability of some del Pezzo surfaces of Fano index 2*, Bull. London Math. Soc. 54 (2022), no. 2, 517-525.

S. Felten, A. Petracci, *The logarithmic Bogomolov–Tian–Todorov theorem*, Bull. London Math. Soc. 54 (2022), no. 3, 1051-1066.

A.-S. Kaloghiros, A. Petracci, *On toric geometry and K -stability of Fano varieties*, Transactions of the American Mathematical Society, Series B (2021), Volume 8, 548-577.

A. Corti, M. Filip, A. Petracci, *Mirror Symmetry and smoothing Gorenstein toric*

affine 3-folds, In: Facets of Algebraic Geometry: A Collection in Honor of William Fulton's 80th Birthday (2022), London Mathematical Society Lecture Note Series, pp. 132-163, Cambridge University Press.

A. Petracci, *On deformations of toric Fano varieties*, In: A.M. Kasprzyk, B. Nill (eds), Interactions with Lattice Polytopes, Springer Proceedings in Mathematics & Statistics, vol. 386, pp. 287-314, Springer.

A. Petracci, *An example of Mirror Symmetry for Fano threefolds*, Birational Geometry and Moduli Spaces (2020), Springer, pp. 173-188.

A. Petracci, *Some examples of non-smoothable Gorenstein Fano toric threefolds*, Mathematische Zeitschrift (2020), no. 295, 751-760.

A. Petracci, *Homogeneous deformations of toric pairs*, Manuscripta Mathematica (2021), no. 166, 37-72.

A. Oneto, A. Petracci, *On the quantum periods of del Pezzo surfaces with $\frac{1}{3}(1, 1)$ singularities*, Adv. Geom. 18 (2018), no. 3, 303-336.

M. Akhtar, T. Coates, A. Corti, L. Heuberger, A. Kasprzyk, A. Oneto, A. Petracci, T. Prince, K. Tveiten, *Mirror Symmetry and the Classification of Orbifold del Pezzo Surfaces*, Proc. Amer. Math. Soc. 144 (2016), no. 2, 513-527.

ACCEPTED
PAPERS

L. Heuberger, A. Petracci, *On K -moduli of Fano threefolds with degree 28 and Picard rank 4*, preprint arXiv:2303.12562, to appear in Ann. Fac. Sci. Toulouse Math.

H. Abban, I. Cheltsov, A. Kasprzyk, Y. Liu, A. Petracci, *On K -moduli of quartic threefolds*, preprint arXiv:2210.14781, to appear in Algebraic Geometry

PREPRINTS

A. Corti, P. Hacking, A. Petracci, *Smoothing toric Fano 3-folds*, in preparation.

A. Petracci, *K -moduli of Fano 3-folds can have embedded points*, preprint arXiv:2105.02307

COLLOQUIA

Algebra, Geometry and Combinatorics colloquium
McMaster University, Canada — online

May 2021

Geometry and TACoS
University of Florence — online
<https://youtu.be/bQx4ohtn1oQ>

April 2021

MINICOURSES
IN RESEARCH SCHOOLS

Minicourse “Toric singularities”, 4 hours and 30 minutes, in the Autumn School and Workshop “Singularities and Torus Actions”, Oldenburg (Germany), September 2023

Minicourse “Toric geometry, deformation theory and applications to K -moduli of Fano varieties”, 4 hours and 30 minutes, in the SinG School in Geometry “ K -stability of Fano varieties and birational invariants”, Trento (Italy), January 2023

INVITED TALKS AT CONFERENCES	“Fano varieties in Cetraro” conference Cetraro, Italy	September 2024
	“K-Stability, Birational Geometry and Mirror Symmetry” workshop MFO, Oberwolfach, Germany	March 2024
	“Torus Actions in Symplectic and Algebraic Geometry” workshop IBS Center for Complex Geometry, Daejeon, Korea	January 2024
	“Algebraic Geometry, Lipschitz Geometry and Singularities” conference Pipa, Brazil	December 2023
	“Explicit moduli problems in higher dimensions” workshop BIRS, Banff, Canada	March 2023
	Edge days 2022 workshop “Birational Geometry and K-stability of Fano Varieties” Edinburgh, UK	November 2022
	“Toric degenerations and Mirror Symmetry” workshop Kumamoto, Japan	October 2022
	“Group actions in algebraic geometry” conference Cetraro, Italy	July 2022
	Symplectic versus algebraic geometry workshop University of Warwick, UK and online	May 2022
	“Toric Geometry” workshop MFO, Oberwolfach, Germany	March 2022
	EDGE workshop “Explicit K-stability and moduli problems” Edinburgh, UK	November 2021
	Newton–Okounkov bodies and Fanosearch workshop Levico Terme, Italy	October 2021
	EDGE workshop “Explicit K-stability and moduli problems” Edinburgh, UK — online	December 2020
	Workshop “Toric Fano Varieties and Beyond” Palermo, Italy — online	December 2020
	3CinG Workshop 2020 “Algebraic and tropical geometry” London, UK — online	September 2020
	Workshop “Superpotentials in Algebra and Geometry” MFO, Oberwolfach, Germany	February 2020
	North German Algebraic Geometry Seminar	January 2020

Leibniz Universität Hannover

Einstein Workshop on Polytopes and Algebraic Geometry
Freie Universität Berlin December 2019

Workshop “Toric Geometry”
MFO, Oberwolfach, Germany September 2019

Workshop “Mutations: Mirror Symmetry, Deformations”
BIRS, Banff, Canada August 2019

Workshop “Del Pezzo surfaces and Fano varieties”
Universität Düsseldorf July 2019

Workshop “Young perspectives in deformation theory”
Università di Torino November 2018

Conference “Giornate di Geometria Algebrica e argomenti correlati”
Università di Genova June 2018

Workshop on moduli spaces of curves and mirror symmetry
Institut Mittag-Leffler, Stockholm March 2018

Mirror Symmetry and applications conference
Higher School of Economics, Moscow December 2017

Experimental Classification of Fano varieties workshop
Universität Tübingen, Germany August 2017

Higher dimensional birational geometry workshop
University of Warwick July 2017

Postgraduate Conference in Complex Geometry
University of Cambridge September 2015
Mirror Symmetry of del Pezzo surfaces

University of Cambridge, CALF Seminar
On the quantum periods of del Pezzo surfaces December 2014

Summer School in Gromov–Witten Theory 2014
Pingree Park, Colorado (US) July 2014
Quantum periods of del Pezzo surfaces with $\frac{1}{3}(1, 1)$ singularities

INVITED TALKS
AT SEMINARS

Algebra and Geometry seminar
Sapienza Università di Roma, Italy June 2024

Number Theory and Algebraic Geometry Seminar
Simon Fraser University, Burnaby, Canada November 2023

Algebra and Geometry seminar October 2023

University of Genova, Italy	
Geometry and Topology seminar University of Aarhus, Denmark	September 2023
Arithmetic and Algebraic Geometry seminar University of Amsterdam, Netherlands	May 2023
Algebraic geometry seminar Center for Complex Geometry, Institute for Basic Sciences, Korea – online	November 2022
Geometry seminar Università di Firenze, Italy	November 2022
Algebraic geometry seminar Università di Roma Tor Vergata, Italy	November 2022
Algebraic geometry seminar Università di Torino, Italy	May 2022
Algebraic and Arithmetic Geometry Seminar Scuola Normale Superiore di Pisa and University of Pisa, Italy	February 2022
Geometry Seminar Università di Ferrara, Italy	January 2022
Algebra and geometry seminar Università di Bologna, Italy	November 2021
Algebraic geometry seminar École Polytechnique Fédérale de Lausanne, Switzerland	October 2021
Algebraic geometry seminar Princeton University, US — online	July 2021
Algebraic geometry seminar University of Milan, Italy — online	June 2021
Algebra and Geometry seminar Frankfurt, Germany — online	May 2021
Iskovskikh Seminar, Steklov Mathematical Institute Moscow, Russia — online	April 2021
Algebra and Geometry seminar, University of Trieste Trieste, Italy — online	February 2021
Online Algebraic Geometry Seminar Nottingham, UK — online	August 2020
Séminaire d'algèbre et géométrie	March 2019

Université de Versailles

Università di Torino, Seminario di Geometria May 2018

Seminar Algebraische Geometrie April 2018
Freie Universität Berlin
Mirror Symmetry, Fano varieties and deformations of toric varieties

EDGE Seminar November 2017
University of Edinburgh
Deformations of toric singularities and Mirror Symmetry

IMPA, Algebra seminar February 2017
Rio de Janeiro, Brazil
Deformations of toric Gorenstein singularities

KTH & University of Stockholm, Algebra and Geometry Seminar June 2014
On the quantum cohomology of a particular type of Del Pezzo surfaces

SOME RESEARCH
VISITS

University of Bath, UK, 1st-5th July 2024, invited by Liana Heuberger and sponsored by the London Mathematical Society

Sapienza Università di Roma, Italy, 16th-21st June 2024, invited by Francesco Meazzini

Simon Fraser University, Burnaby, Canada, 1th-17th November 2023, invited by Nathan Ilten

Imperial College London and Brunel University, London, United Kingdom, 5th-15th June 2023, invited by Alessio Corti and Anne-Sophie Kaloghiros

University of Osaka and University of Kumamoto, Japan, 2nd-20th October 2022, invited by Akihiro Higashitani and Naoki Fujita

Simons Centre for Geometry and Physics, Stony Brook University, US, 22nd-26th August 2022, invited by Paolo Cascini, Ivan Cheltsov, James McKernan and Chenyang Xu and sponsored by the Simons Foundation

Universität Hamburg, Hamburg, Germany, 9th-14th November 2021, invited by Helge Ruddat

Imperial College London, United Kingdom, 22nd February - 2nd March 2019, hosted by Alessio Corti

PARTICIPATION IN
RESEARCH PROJECTS

Participation in the research group of Antonella Grassi at the University of Bologna, funded by PRIN2022 "Geometry of Algebraic Structures: Moduli, Invariants, Deformations" (PI: Ugo Bruzzo), supported by Italian Ministry of University and Research, from November 2023.

Participation in the research group of Giovanni Mongardi at the University of Bologna, funded by PRIN2020 “Curves, Ricci flat Varieties and their Interactions” (id: 2020KKWT53), supported by Italian Ministry of University and Research, from March 2022 to December 2023.

Post-Doctoral Research Associate in the research group of Alexander Kasprzyk at the University of Nottingham, funded by “The Combinatorics of Mirror Symmetry” EPSRC Fellowship, supported by Engineering and Physical Sciences Research Council, from October 2017 to September 2018.

<https://gow.epsrc.ukri.org/NGBOViewGrant.aspx?GrantRef=EP/N022513/1>

Research Assistant in the research group of Tom Coates at Imperial College London, funded by “Gromov-Witten Theory: Mirror Symmetry, Birational Geometry, and the Classification of Fano Manifolds” ERC Consolidator Grant, financed by European Research Council, April-July 2017.

<https://cordis.europa.eu/project/id/682603>

GRADUATE
TEACHING

Course of *Toric geometry* for PhD students in algebra and geometry, at the University of Bologna, in total 20h, from December 2023 to March 2024

UNDERGRADUATE
TEACHING

at the University of Bologna

- Spring 2024: exercise classes of *Geometria 2* (topology for 2nd year students in maths, 1h per week, in total 12h, the main instructor was Giovanni Mongardi);
lectures (main instructor) of *Teoria degli schemi* (scheme theory for master students in maths, 4h per week, in total 48h, <https://www.dm.unibo.it/~andrea.petracci3/2024Schemi/>)
- Spring 2023: exercise classes of *Geometria 2* (topology for 2nd year students in maths, 1h per week, in total 12h, the main instructor was Giovanni Mongardi);
lectures (main instructor) of *Teoria degli schemi* (scheme theory for master students in maths, 4h per week, in total 48h, <https://www.dm.unibo.it/~andrea.petracci3/2023Schemi/>)
- Spring 2022: exercise classes of *Geometria 2* (topology for 2nd year students in maths, 1h per week, in total 12h, the main instructor was Giovanni Mongardi);
lectures (main instructor) of *Teoria degli schemi* (scheme theory for master students in maths, 4h per week, in total 48h, <https://www.dm.unibo.it/~andrea.petracci3/2022Schemi/>)
- Autumn 2021: some lectures of *Geometria e Algebra* (linear algebra for 1st year mechanical engineers, in total 19h, the main instructor was Stefano Francaviglia, [link](#))

at Freie Universität Berlin

- Summer Semester 2021: exercise classes of *Algebra II* (algebraic geometry for master students, 2h per week, the main instructor was Alexander Schmitt);
seminar on algebraic surfaces (for master students, 2h per week, <https://www.dm.unibo.it/~andrea.petracci3/2021ForschungsmodulAlgebra/>)

- Winter Semester 2020/21: lab course in *Computer Algebra* for undergraduates in maths (intensive class about implementing Berlekamp algorithm and Gröbner bases on computer algebra software, taught together with Karin Schaller, link)
- Summer Semester 2020: lectures (main instructor) and exercise classes of *Funktionentheorie* (complex analysis in one variable, for undergraduates in maths, 6h per week, the teaching was done online and what I wrote during the lectures can be found at <https://www.dm.unibo.it/~andrea.petracci3/2020Complex/>)
- Winter Semester 2019/20: lab course in *Computer Algebra* for undergraduates in maths (intensive class about implementing Berlekamp algorithm and Gröbner bases on computer algebra software, taught together with Alexandru Constantinescu)
- Summer Semester 2019: lectures (main instructor) and exercise classes of *Funktionentheorie* (complex analysis in one variable, for undergraduates in maths, 6h per week, link)
- Winter Semester 2018/19: exercise classes of *Algebra I* (commutative algebra for master students, 4h per week, the main instructor was Klaus Altmann)

at Imperial College London

- In the academic year 2016/2017 I was a teaching assistant for the undergraduate courses *Real analysis* and *Metric spaces and Topology*
- In the academic year 2015/2016 I was a teaching assistant for the undergraduate course *Foundations of mathematical analysis*
- In the academic year 2014/2015 I was a teaching assistant for the undergraduate courses *Foundations of mathematical analysis* and *Algebraic topology*
- In May 2014 I taught revision classes for the undergraduate courses linear algebra, real analysis, fundamentals of analysis.

STUDENT
SUPERVISION

At the University of Bologna I supervised the following theses.

MSc theses:

- Filippo Belfiori, topic: moduli spaces and deformation theory, ongoing
- Davide Ricci, *A result of Esnault in arithmetic geometry*, March 2024

BSc theses:

- Emanuele Pazzini, *Coomologia di de Rham e isomorfismo con la coomologia singolare*, September 2024
- Elia Pini, *Sulla K-teoria: il problema delle sfere parallelizzabili*, September 2024
- Marco Simone Cencini, *Teorema di Bézout: un approccio algebrico*, July 2024
- Maria Esmeralda Minelli, *Sulle superfici di Riemann: il teorema di Riemann-Roch*, July 2024
- Guido Battistini, *Su alcune nozioni di topologia differenziale*, September 2023
- Lorenzo Zanichelli, *An introduction to the Kodaira dimension of algebraic varieties*, July 2023

- Lorenzo Barbolla, *On the topology of complex algebraic curves*, June 2023

At Freie Universität Berlin I co-supervised (together with Victoria Hoskins) the BSc thesis by Michael Mavroskoufis during the Summer Semester 2019

PROFESSIONAL
SERVICE

Referee for some international journals:
Compositio Mathematica,
International Mathematics Research Notices,
Electronic J. of Combinatorics,
European J. of Mathematics.

Reviewer for Mathscinet and zbMATH.

Member of the committee responsible for the admissions to the PhD programme in mathematics at the University of Bologna, June 2023

Member of the committee of the PhD defence of Simone Billi at the University of Bologna, December 2023

ORGANISING
ACTIVITIES

In September 2023 I co-organised an *Algebraic Geometry workshop* at the University of Bologna

In October 2019 I co-organised the opening conference of the Einstein semester on Algebraic Geometry in Berlin

In July 2018 I co-organised the *Cluster algebras and algebraic geometry* workshop at the University of Nottingham

In the academic year 2014/2015 I co-organised the *Junior Geometry Seminar* at Imperial College London.

In April 2014 I co-organised *Traumatic Workshop: Birational Geometry and Fano Varieties* at Imperial College London.

COMPUTER
SKILLS

I can use the following computer algebra softwares: MAGMA, Macaulay2, Singular

LANGUAGE
SKILLS

Italian (mother tongue), English (fluent), German (B2)

REFERENCES

Alessio Corti (Imperial College London)	a.corti@imperial.ac.uk
Klaus Altmann (Freie Universität Berlin)	kaltmann@math.fu-berlin.de
Antonella Grassi (Università di Bologna)	antonella.grassi3@unibo.it
Luca Migliorini (Università di Bologna)	luca.migliorini@unibo.it
Richard Thomas (Imperial College London)	rpwt@ic.ac.uk
Mark Gross (University of Cambridge)	M.Gross@dpmms.cam.ac.uk

Bologna, 13th October 2024

Andrea Petracchi