

MICHELE GRAFFEO

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RESEARCH INTERESTS

• Algebraic Geometry • Birational Geometry • Resolution of singularities • Hilbert schemes & Moduli spaces of sheaves • Representation theory • Toric Geometry • Enumerative Geometry • Minimal Model Program • Derived Category

ACADEMIC POSITIONS

Postdoctoral Fellow at SISSA - Trieste (Italy)	1/2024-present
Project: “Geometry of Hilbert schemes”	
Mentor: A. T. Ricolfi	
Postdoctoral Fellow at Politecnico di Milano - Milano (Italy)	2/2023-12/2023
Project: PRIN 2020 “Squarefree Gröbner degenerations, special varieties and related topics” (MUR, project number 2020355B8Y)	
Mentor: P. Lella	
Visiting Fellow at SISSA - Trieste (Italy)	1/2023-12/2023
Project: “Nested Hilbert schemes and GIT stability conditions”	
Mentor: U. Bruzzo	

EDUCATION

PhD in Geometry and Mathematical Physics (cum Laude) at SISSA - Trieste (Italy)	10/2018-11/2022
Thesis: “Zero-dimensional sheaves, group actions and blowups”	
Supervisors: U. Bruzzo & A. T. Ricolfi	
Master of Science in Mathematics (cum Laude) at University of Pisa - Pisa (Italy)	9/2015-9/2018
Thesis: “Koszul cohomology and Hilbert schemes of points”	
Supervisors: M. Franciosi	
Bachelor in Mathematics at University of Pisa - Pisa (Italy)	9/2010-5/2015
Thesis: “Il teorema degli zeri in algebre analitiche reali e complesse”	
Supervisors: F. Acquistapace	
Scientific High School diploma at Liceo Scientifico “Enrico Fermi” - Siacca (Italy)	9/2003-8/2008

TO APPEAR AND PUBLISHED

- “The geometry of double nested Hilbert schemes of points on curves”,
with P. Lella, S. Monavari, A. T. Ricolfi and A. Sammartano.
Transactions of the American Mathematical Society 378, 6013–6047 (2025) 2025
- “A counterexample to the parity conjecture”,
with F. Giovenzana, L. Giovenzana and P. Lella.
Algebraic Geometry, 12 (2025), no. 2, 173–188 2025
- “Unexpected but recurrent phenomena for Quot and Hilbert schemes of points”,
with F. Giovenzana, L. Giovenzana and P. Lella.
Rendiconti del Seminario Matematico - Politecnico di Torino, 82 (2024), no. 1, 145–170. 2024
- “5d Conformal Matter”,
with M. De Marco, M. Del Zotto and A. Sangiovanni.
JHEP, Volume 2024, article number 306, (2024) 2024
- “Moduli spaces of $\mathbb{Z}/k\mathbb{Z}$ -constellations over \mathbb{A}^2 ”.
Communications in Contemporary Mathematics 27 (2025), no. 03, 2450019 2024
- “Growth and integrability of some birational maps in dimension three”, with G. Gubbiotti.
Annales Henri Poincaré, 13 July 2023 2023
- “On the Behrend function and the blowup of some fat points”, with A. T. Ricolfi.
Advances in Mathematics, Volume 415, 15 February 2023, 108896 2023

PREPRINTS

- “New components of Hilbert schemes of points and 2-step ideals”,
with F. Giovenzana, L. Giovenzana and P. Lella. 2025

- “Invariants of nested Hilbert and Quot Schemes on surfaces”,
with N. Fasola, D. Lewański and A. T. Ricolfi 2025
- “Enumeration of partitions via socle reduction”,
with S. Monavari, R. Moschetti and A. T. Ricolfi 2025
- “The Painlevé equivalence problem for a constrained 3D system”,
with G. Filipuk, G. Gubbiotti and A. Stokes 2024
- “The motive of the Hilbert scheme of points in all dimensions”,
with S. Monavari, R. Moschetti and A. T. Ricolfi 2024

TEACHING

Lecturer

- (PhD course) *Computations in Algebraic Geometry* at UFMG - Belo Horizonte (MG, Brazil) 2025
- (Advanced mini-course) *Classical Algebraic Geometry and Integrable Systems* at ASIDE - Milan (Italy) 2025
- (PhD course) *Complex algebraic surfaces* at SISSA - Trieste (Italy) 2025
- (PhD course) *Computations in Algebraic Geometry* at IMECC/UNICAMP - Campinas (SP, Brazil) 2025

Teaching Assistant

- (PhD course) *Topics in advanced algebra* at SISSA - Trieste (Italy) 2024-2025
- (PhD course) *Algebraic Geometry* at SISSA - Trieste (Italy) 2024-2025
- (PhD course) *Topics in advanced algebra* at SISSA - Trieste (Italy) 2023-2024
- (PhD course) *Algebraic Geometry* at SISSA - Trieste (Italy) 2023-2024
- Mathematical Analysis* at University of Trieste, School of Engineering - Trieste (Italy) 9/2023-2/2024
- (PhD course) *Algebraic Geometry* at SISSA - Trieste (Italy) 2022-2023
- Mathematical Analysis* at University of Trieste, School of Engineering - Trieste (Italy) 9/2022-2/2023
- Mathematical Analysis* at University of Trieste, School of Engineering - Trieste (Italy) 9/2021-2/2022
- Mathematical Analysis* at University of Trieste, School of Engineering - Trieste (Italy) 9/2020-2/2021
- Mathematical Analysis* at University of Trieste, School of Engineering - Trieste (Italy) 9/2019-2/2020
- Mathematical Analysis* at University of Pisa, School of Engineering - Pisa (Italy) 9/2017-2/2018
- Linear Algebra* at University of Pisa, School of Engineering - Pisa (Italy) 9/2017-2/2018
- Linear Algebra* at University of Pisa, School of Engineering - Pisa (Italy) 9/2016-2/2017

HELD SEMINARS, POSTER SESSIONS & WRITTEN ESSAYS

- “New components of Hilbert schemes of points and 2-step ideals” UFF Niterói (RJ, Brazil)
- “Double nested Hilbert schemes of points on smooth curves” IMPA Rio de Janeiro (Brazil)
- “The geometry of the Hilbert scheme of points, and its nested variants” Razlog (Bulgaria)
- “La geometria dello schema di Hilbert di punti, e sue varianti” Isola delle Femmine (Palermo)
- “Irreducibility of the Hilbert scheme of points and the class of 2-step algebras” IME-USP São Paulo (Brazil)
- “Motives of the Hilbert schemes of points in all dimensions” ETH Zürich
- “Algebraic curves and one-dimensional complex manifolds” SISSA
- “The geometry of the Hilbert scheme of points and its variants” EPFL
- “Toric singularities” SISSA
- “The motive of the Hilbert scheme of points in all dimensions” University of Pisa
- Poster “Syzygies, Iarrobino’s example on 78 points and new components of Hilbert schemes” Jagiellonian University (Krakow)
- “Double nested Hilbert schemes of points” SISSA/IGAP
- “On the motives of the Hilbert schemes of points” University of Milan
- “Reducibility of $\text{Hilb}^{78}(\mathbb{A}^3)$ ” SISSA
- “Integrable systems and the Cremona-cubes group” University of Trieste
- “Nested variants of the Hilbert scheme of points” University of Milan
- “Nested variants of the Hilbert scheme of points on smooth curves” SISSA
- “Double nested Hilbert schemes & reverse plane partitions” Politecnico di Milano
- “Double nested Hilbert scheme of points on curves” MIMUW
- “The geometry of double nested Hilbert schemes” ETH Zürich
- “Some open problems and recent progress on the Hilbert schemes of points on smooth threefolds” MPI MiS
- “The algebraic entropy and the Reye configuration” TU Chemnitz
- “On the number twelve in algebraic geometry” SISSA
- “On the dynamics of some birational maps of \mathbb{P}^3 ” Politecnico di Milano
- “Behrend number and blowups of planar fat points” Politecnico di Milano
- “Dynamics of some birational maps of the projective 3-space” University of Genova
- “Dynamics of some birational maps of \mathbb{P}^3 ” SISSA

- “GIT stability conditions on the space of G-Constellations” University of Milan
- “Minimal resolutions of A_k singularities as moduli spaces of $\mathbb{Z}/(k+1)\mathbb{Z}$ -constellations” Federal University of Paraíba
- Poster “Moduli spaces of $\mathbb{Z}/k\mathbb{Z}$ -constellations over \mathbb{A}^2 ” SISSA
- “Moduli spaces of $\mathbb{Z}/k\mathbb{Z}$ -constellations over the affine plane” University of Utrecht
- “On the Behrend function and the blowup of some fat points” University of Bologna
- “How to get your hands dirty with canonical singularities” SISSA
- “Crepan resolutions of symplectic quotient singularities as moduli spaces of constellations” SISSA
- “Introduction to K3 surfaces” SISSA
- “Moduli of representation of quivers and first examples of scattering diagrams” SISSA/ICTP
- “Intersection theory and tautological ring of moduli space of curves” SISSA
- “Blowups: some properties and funny examples” SISSA
- “Towards the Kodaira vanishing theorem” SISSA
- “Playing with quotient singularities” SISSA
- “The real nullstellensatz” University of Pisa
- “Normalization of complex spaces” University of Pisa
- Fifty-pages extended essay on “Markov’s Theorem” based on in-class lectures and individual research

ATTENDED SCHOOLS, WORKSHOPS & ADVANCED COURSES

- **(Invited speaker)** “Geometry in Algebra, Algebra in Geometry” IMPA (Rio de Janeiro) Fall 2025
- “Geometry In Bicocca” Università di Milano-Bicocca Summer 2025
- **(Invited speaker)** “WAGP - Geometry And Physics of Higgs Moduli” (Razlog) Summer 2025
- “Jordan Types of Artinian Algebras and Geometry of Punctual Hilbert Schemes” Université Côte d’Azur Summer 2025
- “Modules & Rings: Recent Developments in Commutative Algebra” University of Genova Spring 2025
- **(Invited speaker)** “Abecedarian of SIDE (ASIDE)” University of Milan Spring 2025
- **(Invited speaker)** “Giornate di Geometria Algebrica e Argomenti Correlati XVII” Isola delle Femmine (Palermo) Spring 2025
- “GC Legacy - A meeting in Algebraic Geometry” Politecnico di Torino Winter 2025
- **(Poster session)** “Syzygies and Hilbert Schemes” Jagiellonian University (Krakow) Fall 2024
- **(Invited speaker)** “Algebro-geometric techniques for physics: bundles, stacks and supergeometry” SISSA/IGAP Spring 2024
- “The Geometry of Hilbert Schemes of Points” CIRM - Levico Terme Spring 2024
- **(Invited speaker)** “Genova-Torino-Milano Seminar” University of Milan Winter 2024
- “Enumerative geometry of the Hilbert scheme of points” SRS Research Station (Les Diablerets) Winter 2024
- “A day on Hilbert scheme of points” Humboldt University (Berlin) Fall 2023
- “Geometry In Bicocca” Università di Milano-Bicocca Summer 2023
- “A workshop on Geometry and Commutative algebra” Politecnico di Milano Summer 2023
- “Genova-Torino-Milano Seminar” Università degli studi di Genova Spring 2023
- “Hilbert schemes, moduli spaces, and symplectic varieties” Université de Nantes Spring 2023
- “Commutative Algebra TOWARDS Applications” (Torino) Spring 2023
- “Mini-school: Real and complex birational geometry” at University of Milan (Milano) Spring 2023
- “Refined invariants in Moduli Theory” (Trieste) Spring 2023
- **(Invited speaker)** “5th Christmas Workshop on Moduli Spaces and Integrable Systems” (Genova) Winter 2022
- “AGATES-Deformation theory workshop” at IMPAN (Warsaw) Winter 2022
- “Young Researchers Meeting in Algebra and Geometry 2022” conference at SISSA (Trieste) Fall 2022
- “Recent Advances in Classical Algebraic Geometry” conference at Jagiellonian University (Krakow) Summer 2022
- “Mini-workshop on Quiver Varieties and Related Topics” workshop at University of Oxford Summer 2022
- **(Poster session)** “Integrable Probability, Classical and Quantum Integrability” workshop at SISSA Spring 2022
- “New Perspectives on Hyperkähler Manifolds” workshop at Levico Terme Spring 2022
- “Moduli Spaces and Stability Conditions” school & workshop at Levico Terme Spring 2022
- “Derived Functors” PhD course by U. Bruzzo Fall 2020
- “Hilbert schemes, McKay correspondence and singularities” winter school at Univ. Paris Diderot (Paris) Winter 2019
- “Localisation in Enumerative Geometry” PhD course by A. T. Ricolfi Fall 2019
- “Differentiable Orbifolds” PhD course by B. Fantechi Fall 2019
- “Foliations in algebraic geometry” summer school at Institut Fourier (Grenoble) Summer 2019
- “Gauge Theory” PhD course by A. Tikhomirov Spring 2019
- “Advanced topics in algebraic geometry” PhD course by E. Arbarello Fall 2018
- “Algebraic surfaces: the cubic surface, the Cayley cubic, lines on smooth surfaces” PhD course by F. Catanese Fall 2018
- “Cones of divisors and positivity” PhD course by L. Lombardi Fall 2018
- “Integrable systems from moduli spaces of stable curves” PhD course by P. Rossi Fall 2018

PRIZES

- Lutman Prize for the best PhD thesis SISSA in Mathematics, 2023.

MEMBERSHIPS

COMMITTEE MEMBER

- Committee member for master degree at EPFL, Switzerland Winter 2025
- Committee member for PhD degree at Federal University of Paraíba, Brazil Winter 2025

LANGUAGES & IT SKILLS

- Italian: native; English: fluent; French: basic.
- Macaulay2, Sagemath, GAP, Latex, Unity, Windows OS, Android OS (Developer), Microsoft application, Office suite (ECDL) (Advanced), Ubuntu, C programming language, html.

REFEREES

Ugo Bruzzo
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Paolo Lella
Politecnico di Milano
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Andrea Tobia Ricolfi
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ORGANISATION OF EVENTS

- Co-organiser with U. Bruzzo, E. Pavia of the conference "TULSF - IX" Trieste (Italy) November 24
- Co-organiser with U. Bruzzo, B. Graña Otero, D. H. Serrano, D. S. Gómez of the conference "WAGP24" Trieste (Italy) June 24
- Co-organiser with P. Lella, S. Monavari, A. Ricolfi, A. Sammartano of the conference "GHiSP" Levico Terme (Italy) May 24
- Co-organiser of the Algebraic Geometry seminar in SISSA 2021-22
- Co-organiser of the Algebraic Geometry seminar in SISSA/IGAP 2020-21
- Co-organiser of the Algebraic Geometry seminar joint between SISSA and ICTP 2019-20
- Co-organiser of the Algebraic Geometry seminar in SISSA 2018-19

OTHER TASKS

- Museum guide of a Mathematics exhibition named "*Mathematics in ancient Greece*" Pisa (Italy) 2018
- Developed strong analytical, problem-solving and time management skills, throughout my PhD studies at SISSA.
- Proven excellent communication, coaching and leadership skills, when working as a teaching assistant.
- Learnt how to be a team-player and how to get the best from joint outcome when working in a group.
- Learnt how to work and deliver results in high-pressure situations, such as studying and working at the same time.
- Volunteer work with both the needy and the elderly.
- Interests and hobbies: music, politics and chess.