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"* - Sciacca (Italy)   9/2003-8/2008

TO APPEAR AND PUBLISHED

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

PREPRINTS

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

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

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

"The Hilbert scheme of points and its motive"	*João Pessoa (PB, Brazil)*
"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 $\mathrm{Hilb}^{78}(\mathbb{A}^3)$*"*	*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*
- *"Crepant 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) *"WAGP - Moduli Spaces in (Super)Geometry and Mathematical Physics" (João Pessoa)*	Fall 2025
(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" Politecico di Torino	Winter 2025
"TULSF IX - A one-day algebraic geometry meeting" SISSA (Trieste)	Fall 2024
(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 Istitut 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

- GNSAGA–INdAM, Italy $\hfill$ Fall 2024-present

COMMITTEE MEMBER

- Committee member for master degree at EPFL, Switzerland $\hfill$ Winter 2025
- Committee member for PhD degree at Federal University of Paraíba, Brazil $\hfill$ 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	**Paolo Lella**	**Andrea Tobia Ricolfi**
SISSA	Politecnico di Milano	SISSA
bruzzo@sissa.it	paolo.lella@polimi.it	aricolfi@sissa.it

ORGANISATION OF EVENTS

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

OTHER TASKS

- Museum guide of a Mathematics exhibition named *"Mathematics in ancient Greece"* $\hfill$ 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.