

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

- “*Unexpected but recurrent phenomena for Quot and Hilbert schemes of points*”, 2024
with F. Giovenzana, L. Giovenzana and P. Lella.
To appear in *Rendiconti del Seminario Matematico - Politecnico di Torino*
- “*5d Conformal Matter*”, 2024
with M. De Marco, M. Del Zotto, A. Sangiovanni.
JHEP, Volume 2024, article number 306, (2024)
- “*The geometry of double nested Hilbert schemes of points on curves*”, 2024
with P. Lella, S. Monavari, A. T. Ricolfi and A. Sammartano.
To appear in *TAMS*
- “*Moduli spaces of $\mathbb{Z}/k\mathbb{Z}$ -constellations over \mathbb{A}^2* ”. 2024
Communications in Contemporary Mathematics
- “*A counterexample to the parity conjecture*”, 2024
with F. Giovenzana, L. Giovenzana and P. Lella.
To appear in *Algebraic Geometry*
- “*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

- “*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”,
with S. Monavari, R. Moschetti and A. T. Ricolfi

2024

TEACHING

T.A. for <i>Topics in advanced algebra</i> at SISSA - Trieste (Italy)	2022-2023
T.A. for <i>Algebraic Geometry</i> at SISSA - Trieste (Italy)	2023-2024
T.A. for <i>Mathematical Analysis</i> at University of Trieste, School of Engineering - Trieste (Italy)	9/2023-2/2024
T.A. for <i>Algebraic Geometry</i> at SISSA - Trieste (Italy)	2022-2023
T.A. for <i>Mathematical Analysis</i> at University of Trieste, School of Engineering - Trieste (Italy)	9/2022-2/2023
T.A. for <i>Mathematical Analysis</i> at University of Trieste, School of Engineering - Trieste (Italy)	9/2021-2/2022
T.A. for <i>Mathematical Analysis</i> at University of Trieste, School of Engineering - Trieste (Italy)	9/2020-2/2021
T.A. for <i>Mathematical Analysis</i> at University of Trieste, School of Engineering - Trieste (Italy)	9/2019-2/2020
T.A. for <i>Mathematical Analysis</i> at University of Pisa, School of Engineering - Pisa (Italy)	9/2017-2/2018
T.A. for <i>Linear Algebra</i> at University of Pisa, School of Engineering - Pisa (Italy)	9/2017-2/2018
T.A. for <i>Linear Algebra</i> at University of Pisa, School of Engineering - Pisa (Italy)	9/2016-2/2017

HELD SEMINARS, POSTER SESSIONS & WRITTEN ESSAYS

• “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

• (Poster session) “Syzygies and Hilbert Schemes” Jagiellonian University (Krakow)	Fall 2024
• (Invited speaker) “Algebraic-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 Fall 2024-present

LANGUAGES & IT SKILLS

- Italian: native; English: fluent; French: basic.
- Macaulay2, 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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Andrea Tobia Ricolfi
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aricolfi@sisssa.it

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. G. Otero, D. H. Serrano, D. S. Gómez of the conference "WAGP24P" 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.