

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 *Politecnico di Milano* - Milano (Italy) 2/2023-present

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-present

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

- *“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

- *“5d Conformal Matter”*, with M. De Marco, M. Del Zotto, A. Sangiovanni 2023
- *“The geometry of double nested Hilbert schemes of points on curves”*, 2023
with P. Lella, S. Monavari, A. T. Ricolfi and A. Sammartano
- *“A counterexample to the parity conjecture”*, with F. Giovenzana, L. Giovenzana and P. Lella 2023
- *“Moduli spaces of $\mathbb{Z}/k\mathbb{Z}$ -constellations over \mathbb{A}^2 ”*. 2022

TEACHING

T.A. for Mathematical Analysis at *University of Trieste, School of Engineering* - Trieste (Italy) 9/2023-present

T.A. for Mathematical Analysis at *University of Trieste, School of Engineering* - Trieste (Italy) 9/2022-2/2023

T.A. for Mathematical Analysis at *University of Trieste, School of Engineering* - Trieste (Italy) 9/2021-2/2022

T.A. for Mathematical Analysis at *University of Trieste, School of Engineering* - Trieste (Italy) 9/2020-2/2021

T.A. for Mathematical Analysis at *University of Trieste, School of Engineering* - Trieste (Italy) 9/2019-2/2020

T.A. for Mathematical Analysis at *University of Pisa, School of Engineering* - Pisa (Italy) 9/2017-2/2018

T.A. for Linear Algebra at *University of Pisa, School of Engineering* - Pisa (Italy) 9/2017-2/2018

T.A. for Linear Algebra at *University of Pisa, School of Engineering* - Pisa (Italy) 9/2016-2/2017

HELD SEMINARS, POSTER SESSIONS & WRITTEN ESSAYS

- *“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 session at the Workshop “Integrable Probability, Classical and Quantum Integrability” 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

- “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
- “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
- “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

PRIZE

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

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
SISSA
bruzzo@sissa.it

Andrea Tobia Ricolfi
SISSA
aricolfi@sissa.it

ORGANISATION OF EVENTS & OTHER TASKS

- 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
- 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.