Andrea T. Ricolfi

Associate Professor at SISSA
Geometry and Mathematical Physics
Via Bonomea 265, 34136, Trieste (Italy)
Room A-708 • Tel: +39 040 3787 501

Email: aricolfi@sissa.it
Home Page
Professional Webpage
ORCID: 0000-0002-8172-2026

EMPLOYMENT HISTORY & EDUCATION

Assistant Professor (rtd-B) at SISSA — 7/2022-9/2024
Assistant Professor (rtd-B) at Università di Bologna — 9/2021-6/2022
Postdoc at SISSA, Trieste (*SISSA Mathematical Fellowship*) — 11/2018-9/2021
Postdoc at Max-Planck Institut für Mathematik, Bonn — 11/2017-10/2018
PhD in Mathematics at University of Stavanger (UiS Norway) — 9/2013-10/2017
Thesis: *Local Donaldson–Thomas invariants and their refinements*
ISBN: 978-82-7644-734-7 ISSN: 1890-1387 PhD thesis no. 363. Available here
Trial Lecture: *Symmetric obstruction theories and Joyce's perverse sheaves*
Advisors: Proff. Martin Gulbrandsen, Lars H. Halle
M.S. in Mathematics (ALGANT Program: Università di Padova & Université Bordeaux 1) — 10/2010-7/2012

VISITS AND SCOLARSHIPS

Imperial College London Visiting PhD (P.I. Prof. Richard Thomas) — 2/2015-6/2015
University of Copenhagen 4 short term visits (P.I. Prof. Lars H. Halle) — 2015-17
SISSA: One month Research Scolarship — 6/2013

RESEARCH INTERESTS

Enumerative geometry of moduli spaces of sheaves, Hilbert and Quot schemes, Donaldson–Thomas invariants, virtual classes, virtual localisation • Moduli stacks, quiver representations, d-critical loci, derived algebraic geometry • Grothendieck rings of varieties, motivic invariants, Hall algebras • Moduli spaces of curves, compactified Jacobians

SUPERVISION

PhD students	**Defense date**
◦ Nicolò Bignami (SISSA), co-supervised with Prof. A. Marian.	ongoing
◦ Andrea Grossutti (SISSA), co-supervised with Prof. M. Del Zotto.	ongoing
◦ Solomiya Mizyuk (SISSA), co-supervised with Prof. B. Fantechi.	ongoing
• Michele Graffeo (SISSA). Co-supervised with Prof. U. Bruzzo. PhD thesis: *Zero-dimensional sheaves, group actions and blowups.*	25/11/2022

Master students	**Defense date**
• Riccardo Redigolo (Università di Trieste), co-supervised with Prof. B. Fantechi.	12/7/2024

PUBLICATIONS

Articles

24. *The geometry of double nested Hilbert schemes of points on curves*, with M. Graffeo, P. Lella, S. Monavari and A. Sammartano.
Accepted for publication in Trans. Amer. Math. Soc.

23. *On the stack of 0-dimensional coherent sheaves: structural aspects*, with B. Fantechi.
Accepted for publication in BIRS-CMO proceedings in LMS Lecture Note series.

22. *A sign that used to annoy me, and still does*.
J. Geom. Phys. Vol. **195**, January 2024, 105032.

21. *The d-critical structure on the Quot scheme of points of a Calabi–Yau 3-fold*, with M. Savvas.
Commun. Contemp. Math. Vol. **26**, No. 08, 2350038 (2024).

20. *On the Behrend function and the blowup of some fat points*, with M. Graffeo.
Adv. Math., Vol. **415**, (2023), 108896.

19. *Hilbert squares of degeneracy loci*, with E. Fatighenti, F. Meazzini, G. Mongardi.
Rend. Circ. Mat. Palermo (2), **72** (2023), 3153–3183.

18. *On the motive of the nested Quot scheme of points on a curve*, with S. Monavari.
J. Algebra, Vol. **610**, (2022), 99–118.

17. *Higher rank motivic Donaldson–Thomas invariants of $\mathbb{A}^3$ via wall-crossing, and asymptotics*, with A. Cazzaniga and D. Ralaivaosaona.
Math. Proc. Cambridge Philos. Soc., Vol. **174**, Issue 1 (2023), 97–122.

16. *Sur la lissité du schéma Quot ponctuel emboîté*, with S. MONAVARI (in French).
Canad. Math. Bull., Vol. **66**, Issue 1 (2023), 78–184
15. *Framed sheaves on projective space and Quot schemes*, with A. CAZZANIGA.
Math. Z., **300** (2022), 745–760.
14. *Framed motivic Donaldson–Thomas invariants of small crepant resolutions*, with A. CAZZANIGA.
Math. Nachr., Vol. **295**, Issue 6 (2022), 1096–1112.
13. *Higher rank K-theoretic Donaldson–Thomas theory of points*, with N. FASOLA and S. MONAVARI.
Forum Math. Sigma, Vol. **9**, 2021, E15, 1–51.
12. *The equivariant Atiyah class*.
C. R. Math. Acad. Sci. Paris. Vol. **359**, Issue 3 (2021) 257–282.
11. *On the motive of the Quot scheme of finite quotients of a locally free sheaf*.
J. Math. Pures Appl., Vol. **144**, 2020, 50–68.
10. *Virtual classes and virtual motives of Quot schemes on threefolds*.
Adv. Math., **369** (2020) 107182.
9. *The local motivic DT/PT correspondence*, with B. DAVISON.
J. Lond. Math. Soc., Vol. **104**, Issue 3 (2021), 1384–1432.
8. *Virtual counts on Quot schemes and the higher rank local DT/PT correspondence*, with S. BEENTJES.
Math. Res. Lett., Vol. **28**, no. 4 (2021), 967–1032.
7. *Pullbacks of universal Brill–Noether classes via Abel–Jacobi morphisms*, with N. PAGANI and J. VAN ZELM.
Math. Nachr., Vol. **293**, Issue 11 (2020), 2187–2207.
6. *The Hilbert scheme of hyperelliptic Jacobians and moduli of Picard sheaves*.
Algebra Number Theory **14**, no. 6 (2020), 1381–1397.
5. *Jet bundles on Gorenstein curves and applications*, with L. GATTO.
J. Singul., Vol. **21** (2020), 50–83.
4. *The DT/PT correspondence for smooth curves*.
Math. Z., **290** (2018), no. 1-2, 699–710.
3. *On coherent sheaves of small length on the affine plane*, with R. MOSCHETTI.
J. Algebra, **516** (2018), 471–489.
2. *Local contributions to Donaldson–Thomas invariants*.
Int. Math. Res. Not. IMRN, **2018** (2018), no. 19, 5995–6025.
1. *The Euler characteristic of the generalized Kummer scheme of an Abelian threefold*, with M. GULBRANDSEN.
Geom. Dedicata, **182** (2016), Issue 1, 73–79.

Preprints

1. *Derived hyperquot schemes*, with S. MONAVARI, E. PAVIA (2024).
2. *The motive of the Hilbert scheme of points in all dimensions*, with M. GRAFFEO, S. MONAVARI, R. MOSCHETTI (2024).
3. *Hyperquot schemes on curves: virtual class and motivic invariants*, with S. MONAVARI (2024).
4. *On the stack of 0-dimensional coherent sheaves: motivic aspects*, with B. FANTECHI (2024).
5. *Motivic classes of noncommutative Quot schemes* (2023).
6. *Indecomposability of derived categories in families*, with F. BASTIANELLI, P. BELMANS and S. OKAWA (2020).
7. *Moduli spaces of semiorthogonal decompositions in families*, with P. BELMANS, S. OKAWA, and with an appendix coauthored with W. LOWEN (2020).

Books

1. *An invitation to modern enumerative geometry*. Springer, SISSA lecture series, Vol. 3 (2022).

TALKS AT INTERNATIONAL CONFERENCES AND WORKSHOPS

- *The motive of the Hilbert scheme of points*
From Schubert Calculus to Representation Theory (Aracaju, Brazil) 9/2024
- *Structures on the Quot scheme of points of a Calabi–Yau 3-fold*
Categorified Enumerative Geometry and Representation Theory (EPFL, Lausanne) 9/2023
- *d-critical structure(s) on the Quot scheme of points on a Calabi–Yau 3-fold*
Higher Structures in Geometry and Mathematical Physics (IHP, Paris - online) 6/2023
- *Higher rank K-theoreric Donaldson–Thomas theory*
IV Congresso Brasileiro de Jovens Pesquisadores em Matemática pura, aplicada e estatística (João Pessoa, Brazil) 10/2022
- *A tale of two d-critical structures*
Young Researchers Meeting in Algebra and Geometry 2022 (SISSA, Trieste) 9/2022

- *A tale of two d-critical structures*
  Bandoleros 2022 (Ankara, Turkey - online) 5/2022
- *A motivic wall-crossing formula*
  Grothendieck ring and Derived category: a gathering (Turin) 4/2022
- *Virtual invariants of Quot schemes on 3-folds*
  Bandoleros 2021 – Campinas Algebraic Geometry Summer Meeting 2021 (online) 2/2021
- *Virtual classes and virtual motives of Quot schemes on 3-folds*
  HMI Workshop on Gauge theory and virtual invariants (Dublin) 5/2019
- *A higher rank local DT/PT correspondence*
  Workshop in Algebraic Geometry (Milan) 12/2018
- *A component of the Hilbert scheme of hyperelliptic Jacobians*
  Algebraic Geometry and Foliations: in celebration of Israel Vainsencher's
  70th Birthday, (Belo Horizonte, Brazil) 11/2018
- *A motivic wall-crossing formula for sheaves on* 3*-folds*
  Motives of Calabi–Yau manifolds (Kraków) 5/2018
- *Motivic local DT invariants*
  IMPAN (Kraków) 3/2018
- *The DT/PT correspondence for smooth curves*
  A Fall Meeting in Algebraic Geometry and related topics (Turin) 10/2017
- *Local contributions to DT invariants*
  National Algebra Meeting (Oslo) 11/2016
- *Critical loci and their virtual motives*
  National Algebra Meeting (Oslo) 11/2015
- *Partitions and generalized Kummer varieties*
  Moduli Spaces and Derived Categories (Warwick) 2/2015
- *Motivic Donaldson–Thomas Invariants*
  GAeL XXII (SISSA, Trieste) 6/2014
- *Limits of Special Weierstrass Points*
  National Algebra Meeting (Oslo) 11/2013

SELECTED SEMINAR TALKS

- *The motive of the Hilbert scheme of points* (University of Utrecht) 4/2024
- *Geometry of Hilbert schemes, and the two numbers* $+1, -1$ (Politecnico di Milano) 4/2023
- *Quot schemes and their d-critical structure(s)* (Firenze) 3/2023
- *Enumerative invariants of Quot schemes and their virtual refinements* (ICTP) 2/2023
- *Quot schemes and their d-critical structure(s)* (Pisa) 11/2022
- *Quot schemes and their d-critical structure(s)* (Bonn) 11/2022
- *K-theoretic sheaf counting* (Genova) 5/2022
- *A motivic DT/PT correspondence* (Lausanne) 5/2022
- *Refined invariants of moduli spaces* (Mathematical Colloquium, João Pessoa, Brazil) 4/2022
- *Refined sheaf counting* (Trento) 2/2022
- *Sheaf counting and Quot schemes* (Milano) 11/2021
- *d-critical structure(s) on the Quot scheme of points on a 3-fold* (CMSA Harvard University) 10/2021
- *The d-critical structure on the Quot scheme of points on a 3-fold* (SISSA, Trieste) 5/2021
- *Refinements of higher rank DT invariants* (KIAS Seoul, remote) 3/2021
- *Higher rank motivic DT invariants* (SISSA, Trieste) 2/2021
- *Higher rank K-theoretic Donaldson–Thomas theory of points* (Kansas University, remote) 10/2020
- *Higher rank K-theoretic Donaldson–Thomas theory of points* (Bologna) 10/2020
- *A moduli space of semiorthogonal decompositions* (Rutgers New Jersey, remote) 9/2020
- *Higher rank K-theoretic Donaldson–Thomas theory of points* (UCSD San Diego, remote) 4/2020
- *Moduli of semiorthogonal decompositions* (Stavanger) 11/2019
- *A motivic DT/PT correspondence via Quot schemes* (Oxford) 11/2019
- *Virtual invariants of Quot schemes on 3-folds* (Copenhagen) 5/2019
- *A component of the Hilbert scheme of hyperelliptic Jacobians* (Rome) 4/2019
- *Le schéma de Hilbert d'une Jacobienne hypérelliptique* (Nancy) 10/2018
- *The DT/PT correspondence for smooth curves* (University of Edinburgh) 1/2018
- *Curve counting via Quot schemes* (Utrecht University) 12/2018
- *The DT/PT correspondence for smooth curves* (KTH, Stockholm) 11/2017
- *Counting rational curves on toric threefolds* (Copenhagen) 2/2016
- *Families of Abel–Jacobi curves* (Turin, Italy) 12/2015
- *Curve counting on threefolds* (Bergen, Norway) 10/2015
- *Introduction to Motivic Integration* (Imperial College London) 4/2015
- *Refined curve counting on Calabi–Yau threefolds* (KU Leuven) 3/2015

- *Localisation in Donaldson–Thomas theory* (UCL, London) 2/2015
- *A Hamilton's Principle in Algebraic Geometry* (Turin, Italy) 12/2014
- *Curve Counting and Box Counting* (Turin, Italy) 6/2014
- *Curve Counting Invariants and Euler Characteristics* (Bergen, Norway) 2/2014

CONFERENCE ORGANISATION

- *The geometry of Hilbert schemes of points* (Levico Terme) 6–10 May 2024
- *Quiver Representations, Quiver Varieties and Combinatorics* (Università di Bologna) 22–26 May 2023
- *Refined invariants in moduli theory* (SISSA and Università di Trieste) 2–5 May 2023.
- *Moduli spaces: theory and coding* (Les Diablerets) 27/2 – 3/3 2023
- *Derived Categories and Moduli Spaces*, local organiser (Stavanger) 9/2015

TEACHING

- Algebraic Geometry (2nd Year Master Università di Trieste and SISSA PhD) Fall 2024
- Algebraic Geometry (2nd Year Master Università di Trieste and SISSA PhD) Fall 2023
- Algebraic Geometry (2nd Year Master Università di Trieste and SISSA PhD) Fall 2022
- *Geometria e Algebra T*; Bachelor Course (60 hours – Ingegneria Chimica e Biochimica, Bologna) Fall 2021
- *Localisation in Enumerative Geometry*; PhD Course (20 hours – SISSA, Trieste) Spring 2021
- *Techniques in Enumerative Geometry*; PhD Course (20 hours – SISSA, Trieste) Fall 2019
- *Algebraic Geometry* MAT630 (Master course, University of Stavanger) Spring 2017
- T.A. for *Mathematical Methods 2* MAT200 (Bachelor, University of Stavanger) Spring 2016
- T.A. for *Linear Algebra* MAT110 (Bachelor, University of Stavanger) Fall 2015
- *Discrete Mathematics* MAT120 (Bachelor, University of Stavanger) Fall 2014
- T.A. for *Geometria e Algebra Lineare* (Politecnico di Torino) Spring 2013

SEMINAR ORGANISATION AND OTHER TASKS

- Board member for the admission to the SISSA PhD program in Geometry and Math. Physics 2/2023
- Member of *Collegio di Dottorato* (SISSA) 7/2022-
- Co-organiser of *TRINO*, aka *Triplice Seminario Triestino* 2022-
- Co-organiser of the Algebraic Geometry seminar (SISSA) 2022-
- Co-organiser of the Algebraic Geometry seminar (SISSA–University of Trieste) 2020-21
- Co-organiser of the Algebraic Geometry seminar (SISSA–IGAP) 2020-21
- Co-organiser of the Algebraic Geometry seminar (SISSA–ICTP) 2019-20
- I was part of the board examining the following theses.

  Master degree
  - Giordano Crimi (Università di Trieste) 18/9/2024
  - Dario Antolini (Università di Trieste) 23/10/2023
  - Pietro Ciusa (Università di Trieste) 18/10/2022
  - Luca Fiorindo (Università di Trieste) 20/7/2022

  PhD degree
  - Felix Thimm (University of Oslo) 7/8/2024
  - Simon Schirren (Roma Tre) 5/2024
  - Paolo Tomasini (SISSA) 6/12/2023
  - Warren Cattani (SISSA) 20/11/2023
  - Blessing Oni (ICTP & SISSA) 12/12/2022