Andrea T. Ricolfi

Associate Professor at SISSA | Via Bonomea 265, 34136, Trieste (IT) | Room A-708 • Tel: +39 040 3787 501

aricolfi@sissa.it | Webpage | ORCID | Zbmath | Scopus | Scholar

EMPLOYMENT HISTORY & EDUCATION

Assistant Professor (rtd-B) at SISSA	Jul 2022 – Sept 2024
Assistant Professor (rtd-B) at Università di Bologna	Sept 2021 – June 2022
Postdoc at SISSA, Trieste (*SISSA Mathematical Fellowship*)	Nov 2018 – Sept 2021
Postdoc at Max-Planck Institut für Mathematik, Bonn	Nov 2017 – Oct 2018
PhD in Mathematics at University of Stavanger (UiS Norway) Thesis (10 Nov 2017): *Local Donaldson–Thomas invariants and their refinements* Trial Lecture: *Symmetric obstruction theories and Joyce's perverse sheaves*	Sept 2013 – Oct 2017
M.S. in Mathematics (ALGANT Program: Padova & Bordeaux 1)	Oct 2010 – Jul 2012

VISITS AND SCOLARSHIPS

Imperial College London Visiting PhD (P.I. Prof. Richard Thomas)	Feb 2015 – June 2015
University of Copenhagen 4 short term visits (P.I. Prof. Lars H. Halle)	2015 – 2017
SISSA One month Research Scolarship	June 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 • 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.	25 Nov 2022
Master students	**Defense date**
○ Lorenzo Palcic (Università di Trieste)	ongoing
• Riccardo Redigolo (Università di Trieste), co-supervised with Prof. B. Fantechi.	12 Jul 2024

CONFERENCE ORGANISATION

The geometry of Hilbert schemes of points (Levico Terme)	6–10 May 2024
Quiver Representations, Quiver Varieties and Combinatorics (Bologna)	22–26 May 2023
Refined invariants in moduli theory (SISSA and UNITS)	2–5 May 2023
Moduli spaces: theory and coding (Les Diablerets)	27 Feb – 3 Mar 2023
Derived Categories and Moduli Spaces, local organiser (Stavanger)	8–10 Sept 2015

Published papers

25. Hyperquot schemes on curves: virtual class and motivic invariants, with S. Monavari, 2024.
To appear in Mathematische Annalen.

24. The geometry of double nested Hilbert schemes of points on curves, with M. Graffeo, P. Lella, S. Monavari and A. Sammartano, 2023.
To appear in Trans. Amer. Math. Soc.

23. On the stack of 0-dimensional coherent sheaves: structural aspects, with B. Fantechi, 2024.

To appear in BIRS-CMO proceedings in LMS Lecture Note series.

22. A sign that used to annoy me, and still does. J. Geom. Phys., Vol. **125** (2023).

21. The d-critical structure on the Quot scheme of points of a Calabi–Yau 3-fold, with M. Savvas. Commun. Contemp. Math., Vol. **415**, No. 8, 1–45 (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**, 3153–3183 (2023).

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

17. Sur la lissité du schéma Quot ponctuel emboîté, with S. Monavari. Canad. Math. Bull., Vol. **66**, Issue 1, March 2023, pp. 178–184.

16. Framed sheaves on projective space and Quot schemes, with A. Cazzaniga. Math. Z. **300**, 745–760 (2022).

15. Framed motivic Donaldson–Thomas invariants of small crepant resolutions, with A. Cazzaniga. Math. Nachr. Vol. **295**, Issue 6 (2022), 1096–1112.

14. 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, January 2023, pp. 97–122.

13. Higher rank K-theoretic Donaldson–Thomas theory of points, with N. Fasola and S. Monavari. Forum Math. Sigma, Vol. **9** E15 (2021) 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., **144** (2020), 50–68.

10. Virtual classes and virtual motives of Quot schemes on threefolds. Adv. Math., Vol. **369**, 107182 (2020).

9. The local motivic DT/PT correspondence, with B. Davison. J. Lond. Math. Soc., Vol. **104**, Issue 3, 1384–1432 (2021).

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. Volume **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), pp. 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, pp. 73–79.

Preprints

1. Enumeration of partitions via socle reduction, with M. Graffeo, S. Monavari, R. Moschetti, 2025.
2. Derived hyperquot schemes, with S. Monavari, E. Pavia, 2024.
3. The motive of the Hilbert scheme of points in all dimensions, with M. Graffeo, S. Monavari, R. Moschetti, 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 and S. Okawa, 2020. With an appendix coauthored with W. Lowen.

Books

1. An Invitation to Modern Enumerative Geometry Springer, SISSA Lecture Series, Vol. 3 (2022).

TALKS AT INTERNATIONAL CONFERENCES AND WORKSHOPS

– Modern Methods in Moduli — Nov 2024
The motive of the Hilbert scheme of points

– From Schubert Calculus to Representation Theory (Aracaju, Brazil) — Sept 2024
The motive of the Hilbert scheme of points

– Categorified Enumerative Geometry and Representation Theory (EPFL, Lausanne) — Sept 2023
Structures on the Quot scheme of points of a Calabi–Yau 3-fold

– Higher Structures in Geometry and Mathematical Physics (IHP, Paris - online) — June 2023
d-critical structure(s) on the Quot scheme of points of a Calabi–Yau 3-fold

– IV Congresso Brasileiro de Jovens Pesquisadores (João Pessoa, Brazil) — Oct 2022
Higher rank K-theoreric Donaldson–Thomas theory

– Young Researchers Meeting in Algebra and Geometry 2022 (SISSA, Trieste) — Sept 2022
A tale of two d-critical structures

– Bandoleros 2022 (Ankara, online) — May 2022
A tale of two d-critical structures

– Grothendieck ring and Derived category: a gathering (Turin) — Apr 2022
A motivic wall-crossing formula

– Bandoleros 2021 (Campinas, online) — Feb 2021
Virtual invariants of Quot schemes on 3-folds

– HMI Workshop on Gauge theory and virtual invariants (Dublin) — May 2019
Virtual classes and virtual motives of Quot schemes on 3-folds

– Workshop in Algebraic Geometry (Milan) — Dec 2018
A higher rank local DT/PT correspondence

– Algebraic Geometry and Foliations: Vainsencher 70 (Belo Horizonte, Brazil) — Nov 2018
A component of the Hilbert scheme of hyperelliptic Jacobians

– Motives of Calabi–Yau manifolds (Kraków) — May 2018
A motivic wall-crossing formula for sheaves on 3-folds

– A Fall Meeting in Algebraic Geometry and related topics (Turin) — Oct 2017
The DT/PT correspondence for smooth curves

– National Algebra meeting (Oslo) — Nov 2016
Local contributions to DT invariants

– National Algebra meeting (Oslo) — Nov 2015
Critical loci and their virtual motives

– Moduli Spaces and Derived Categories (Warwick) — Feb 2015
Partitions and generalized Kummer varieties

– GAel XXII (SISSA) — June 2014
Motivic DT invariants

– National Algebra meeting (Oslo) Nov 2013
Limits of special Weierstrass points

SELECTED SEMINAR TALKS

– *The motive of the Hilbert scheme of points* (University of Utrecht) Apr 2024
– *Geometry of Hilbert schemes, and the two numbers* $+1, -1$ (Politecnico di Milano) Apr 2023
– *Quot schemes and their d-critical structure(s)* (Firenze) Mar 2023
– *Enumerative invariants of Quot schemes and their virtual refinements* (ICTP) Feb 2023
– *Quot schemes and their d-critical structure(s)* (Pisa) Nov 2022
– *Quot schemes and their d-critical structure(s)* (Bonn) Nov 2022
– *K-theoretic sheaf counting* (Genova) May 2022
– *A motivic DT/PT correspondence* (EPFL, Lausanne) May 2022
– *Refined invariants of moduli spaces* (Math. Colloquium, João Pessoa, Brazil) Apr 2022
– *Refined sheaf counting* (Trento) Feb 2022
– *Sheaf counting and Quot schemes* (Milan) Nov 2021
– *d-critical structure(s) on the Quot scheme of points on a 3-fold* (CMSA Harvard) Oct 2021
– *The d-critical structure on the Quot scheme of points on a 3-fold* (SISSA) May 2021
– *Refinements of higher rank DT invariants* (KIAS Seoul, remote) May 2021
– *Higher rank motivic DT invariants* (SISSA) Feb 2021
– *Higher rank K-theoretic Donaldson–Thomas theory of points* (Kansas, remote) Oct 2020
– *Higher rank K-theoretic Donaldson–Thomas theory of points* (Bologna) Oct 2020
– *A moduli space of semiorthogonal decompositions* (Rutgers New Jersey, remote) Sept 2020
– *Higher rank K-theoretic Donaldson–Thomas theory of points* (UCSD, remote) Apr 2020
– *Moduli of semiorthogonal decompositions* (Stavanger) Nov 2019
– *A motivic DT/PT correspondence via Quot schemes* (Oxford) Nov 2019
– *Virtual invariants of Quot schemes on 3-folds* (Copenhagen) May 2019
– *A component of the Hilbert scheme of hyperelliptic Jacobians* (Rome) Apr 2019
– *Curve counting via Quot schemes* (Utrecht University) Dec 2018
– *Le schéma de Hilbert d'une Jacobienne hypérelliptique* (Nancy) Oct 2018
– *The DT/PT correspondence for smooth curves* (University of Edinburgh) Jan 2018
– *The DT/PT correspondence for smooth curves* (KTH, Stockholm) Nov 2017
– *Counting rational curves on toric 3-folds* (Copenhagen) Feb 2016
– *Families of Abel–Jacobi curves* (Turin) Dec 2015
– *Curve counting on threefolds* (Bergen) Oct 2015
– *Introduction to Motivic Integration* (Imperial College London) Apr 2015
– *Refined curve counting on Calabi–Yau 3-folds* (KU Leuven) Mar 2015
– *Localisation in Donaldson–Thomas theory* (UCL,London) Feb 2015
– *A Hamilton's Principle in Algebraic Geometry* (Turin) Dec 2014
– *Curve Counting and Box Counting* (Turin) June 2014
– *Curve Counting Invariants and Euler Characteristics* (Bergen) Feb 2014

TEACHING

Algebraic Geometry (2^{nd} Year Master Università di Trieste and SISSA PhD) Fall 2024
Algebraic Geometry (2^{nd} Year Master Università di Trieste and SISSA PhD) Fall 2023
Algebraic Geometry (2^{nd} Year Master Università di Trieste and SISSA PhD) Fall 2022
Geometria e Algebra T (60h, Ingegneria Chimica e Biochimica, Bologna) Fall 2021
Localisation in Enumerative Geometry (20h, SISSA PhD course) Spring 2021
Techniques in Enumerative Geometry (20h, SISSA PhD course) Fall 2019
Algebraic Geometry MAT630 (40h, Master course, University of Stavanger) Spring 2017
Mathematical Methods 2 MAT200 (T.A. Bachelor, University of Stavanger) Spring 2016
Linear Algebra MAT110 (T.A. Bachelor, University of Stavanger) Fall 2015
Discrete Mathematics MAT120 (40h, Bachelor course, University of Stavanger) Fall 2014
Geometria e Algebra Lineare (T.A. Bachelor, Politecnico di Torino) Spring 2013

OTHER TASKS

Member of *Collegio dei docenti di Dottorato* (SISSA)	1 July 2022–
Organiser of SISSA AG Seminar, TRINO and SISSA-ICTP Quot Seminar	1 Oct 2022–