

# Roberto Pagaria

roberto.pagaria@gmail.com; +39 334 736 0041; October 10<sup>th</sup> 1992, Italy

www.dm.unibo.it/~roberto.pagaria

## EXECUTIVE SUMMARY

Associate professor in algebraic topology at Bologna University qualified as Italian full professor. Several articles published in leading math journals. Advanced knowledge of abelian arrangements, matroids, representation theory, spectral sequences, configuration spaces, and quiver varieties, acquired during thesis works, research activities and teaching experiences. Currently supervising two PhD students.

## ACADEMIC EMPLOYMENT

- OCT 2024 – NOW Associate professor at Bologna University.
- OCT 2023 – 2034 Italian qualification as Full Professor (ASN I fascia) in Algebra and Geometry 01/A2, expires in 2034.
- MAR 2023 – NOW Tenure-track assistant professor at Bologna University (RTDb).
- JUL 2020 – MAR 2023 Research associate at Bologna University (RTDa).
- OCT 2019 – JUL 2020 Research fellow at Bologna University (Assegno di ricerca).  
Topology and combinatorics of toric and elliptic arrangements.
- 2016 – 2019 Ph.D. in Mathematics at Scuola Normale Superiore, Pisa.  
Thesis: *Cohomology and Combinatorics of Toric Arrangements*, Advisor Prof. Filippo Callegaro. Final grade: 70/70 cum laude.

## PUBLICATIONS

16 articles, 2 preprints (+2 erratum) published in important Math journals:

- Apr 2024 *Cohomology ring of non-compact abelian arrangements*, j/w E. Bazzocchi and M. Pismataro, ArXiv preprint.
- Oct 2023 *Inductive and divisional posets*, j/w M. Pismataro, T. Nhat Tran and L. Vecchi in J. London Math. Soc., 109: e12829.
- Sep 2023 *A rectangular analogue of the square paths conjecture and the univariate Delta conjecture*, j/w A. Iraci, G. Paolini, A. Vanden Wyngaer, in Comb. Theory 3(2).
- Aug 2023 *I lavori di June Huh*, j/w L. Migliorini in Matematica, Cultura e Società UMI
- Mar 2023 *Extra structure on the cohomology of configuration spaces of closed orientable surfaces* in Homology, Homotopy and Applications 2023 (25) 1, 127-146.
- Mar 2023 *Hodge Theory for Polymatroids* j/w G. M. Pezzoli in Int. Math. Res. Not. IMRN. 2023 (23), 20118–20168.
- Feb 2023 *Correction to “Lefschetz theory for exterior algebras and fermionic diagonal coinvariants”*, in Int. Math. Res. Not. IMRN.
- May 2022 Combinatorial decomposition theorem for Hitchin systems via zonotopes, j/w M. Mauri, L. Migliorini, ArXiv:2209.00621
- Jun 2022 *The Frobenius characteristic of the Orlik-Terao algebra of type A*, in Int. Math. Res. Not. IMRN. 2023 (13), 11577-11591.
- Apr 2022 *On the cohomology of arrangements of subtori*, j/w L. Moci in J. London Math. Soc., 106: 1999-2029.

- Mar 2022 *Asymptotic growth of Betti numbers of ordered configuration spaces on an elliptic curve* in Eur. J. Math. 8, 427–445 (2022).
- Aug 2021 *The homotopy type of elliptic arrangements* j/w E. Delucchi in Algebr. Geom. Topol 21 (2021) 2037–2063.
- Mar 2021 *Representations of torsion-free arithmetic matroids* j/w G. Paolini in European J. Combin. 93 (2021), 103272.
- Dec 2020 *The cohomology ring of unordered configuration spaces of the torus* in Algebr. Geom. Topol. 20 (2020) 2995-3012
- Jul 2020 *Erratum to “Orlik-Solomon-type presentations for the cohomology algebra of toric arrangements”* j/w F. Callegaro, M. D’Adderio, E. Delucchi, L. Migliorini in Trans. Amer. Math. Soc. 374 (2021), no. 5.
- Jun 2020 *Orientable arithmetic matroids* in Discrete Math. 343 (2020), no. 6, 111872.
- Jun 2020 *Poincaré polynomial of elliptic arrangements is not a specialization of the Tutte polynomial* in Discrete Math. 343 (2020), no. 6, 111710.
- Nov 2019 *Orlik-Solomon-type presentations for the cohomology algebra of toric arrangements* j/w F. Callegaro, M. D’Adderio, E. Delucchi, L. Migliorini in Trans. Amer. Math. Soc. 373 (2020), no. 3, 1909–1940.
- Oct 2019 *Two examples of toric arrangements* in J. Combin. Theory Ser. A 167 (2019), 389–402.
- Jun 2019 *Combinatorics of toric arrangements* in Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl. 30 (2019), no. 2, 317–349.

## INVITED TALKS

Invited speaker in 19 international conferences around the world:

- July 2024 “Shellability of non  $\omega$ -integral partition poset” at the session *Discrete and Combinatorial Algebraic Topology, Theory and Applications* of the AMS-UMI 2nd Joint Meeting
- Feb 2024 Mini-course “Hitchin fibrations and related combinatorics” 5h at the winter school “Geometry, Algebra and Combinatorics of Moduli Spaces and Configurations VI” in Dobbiaco (IT).
- Dec 2023 “Cohomology rings of abelian arrangements” at the conference Hyperplane Arrangements 2023 in Tokyo.
- Sep 2023 *Combinatorial decomposition theorem for Hitchin systems via zonotopes* at the XXII UMI Congress.
- July 2023 *Combinatorial decomposition theorem for Hitchin fibrations* at the Tenth Congress of Romanian Mathematicians
- May 2023 *Cohomology Rings of Toric Wonderful Models* at the workshop Tropical Days In Bristol.
- Mar 2023 *Integral points in graphical zonotopes: an application to the Hitchin fibrations* at the 89th Sèminaire Lotharingien de Combinatoire in Bertinoro (IT).
- Feb 2023 *Decomposition theorem for Hitchin Fibrations and poset of non-integral flats* at the winter school “Geometry, Algebra and Combinatorics of Moduli Spaces and Configurations” in Dobbiaco (IT).
- June 2022 *The  $S_n$ -action on the Orlik-Terao algebra of type  $A_{n-1}$*  at SUPSI in Locarno (CH).
- May 2022 *Hodge theory for polymatroids* at the Göran Gustafsson Symposium in the Mittag-Leffler institute (Stockholm).
- Nov 2021 *Betti numbers of ordered configuration spaces on an elliptic curve* at the Workshop Homology and homotopy of configuration spaces (University of Copenhagen).
- June 2021 *Hodge theory for polymatroids* at virtual Workshop Arrangements at Home IV: Geometry and Topology.
- May 2020 *Wonderful models for toric arrangements* at virtual Workshop Arrangements at Home: Combinatorial Aspects.
- Sep 2019 *Orlik-Solomon type presentations for the cohomology algebra of toric arrangements* at Heilbronn Institute (Bristol).

- Jul 2019 *Arithmetic matroids, posets and cohomology of toric arrangements* at Bern – SIAM conference.
- May 2019 *Unordered configuration spaces of surfaces* at Western University (London, Canada).
- Jun 2018 *Combinatorics and cohomology algebra of toric arrangements* at RIMS, Kyoto University.
- Feb 2018 *Orlik-Solomon relations for toric arrangements* at the winter school Geometry, Algebra and Combinatorics of Moduli Spaces and Configurations II (Dobbiaco/Toblach).
- May 2017 *Toric arrangements* at the conference Combinatorics of Root Systems (Cortona).

Moreover, I gave 15 talks in Math seminars around Europe and USA.

## VISITS

---

- Feb – Apr 2022 Two months research visit at MIT (Boston) invited by Prof. Alexander Postnikov and funded by H2020 Marie Skłodowska-Curie Actions RISE project GHAIA – n. 777822.
- May 2019 “Arrangements at Western” intensive research period at University of Western Ontario (London).
- Nov 2018 Research visit at university of Fribourg (Switzerland) working with Prof. Emanuele Delucchi.

## GRANTS AND AWARDS

---

- July 2024 Selected for the “Top Ten Project” of the *Accademia delle scienze dell’istituto di Bologna*.
- May 2024 Grant 15.000€ from INDAM to organize a workshop “ $q, t$ -Combinatorics in Algebra, Geometry and Topology” in June 2025, role: PI.
- 2024 – 2027 Nominated as member of the EMS Young Academy.
- 2024 – 2025 Participant to GNSAGA research project “Rectangular Delta conjecture” 3.000 €.
- 2023 – 2025 Participant to PRIN 2022 “ALgebraic and TOPological combinatorics (ALTOP)”, nr. 2022A7L229.
- 2022 – 2024 Participant to Unibo grant *Bando Structure* “Shapes, Symmetries and Arrangements: Algebraic Geometry and Combinatorics”, 19.350€.
- 2020 – 2024 Personal research fund from the Bologna math department: RFO2024 2.037€, RFO2023 1.810€, RFO2022 1.645€, RFO2021 1.472€ and RFO2020 2.020€.
- May 2023 Winner of a grant 8.500€ for organizing a Blended Intensive Programme (BIPs) on *Quiver representations, quiver varieties and combinatorics*.
- Feb 2022 Participation to the conference *Braids in Representation Theory and Algebraic Combinatorics* funded by National Science Foundation (1.150 €).
- 2020 Participant to PRIN 2017 “Moduli and Lie Theory”, nr. 2017YRA3LK002.
- 2019 SIAM Student Travel Awards 500 CHF (450€).

## EDUCATION

---

- 2011 – 2016 **Master’s Degree at Scuola Normale Superiore, Pisa.**  
4<sup>th</sup> year colloquium: *Decomposition formula for tensor product of representations of Lie algebras*, Advisor Prof. Andrea Maffei.
- 2014 – 2016 **Master’s Degree in Mathematics at University of Pisa.**  
Thesis: *The geometry of quiver varieties*, Advisor Prof. Andrea Maffei. Final grade: 110/110 cum laude.
- 2011 – 2014 **Bachelor’s Degree in Mathematics at University of Pisa.**  
Thesis: *The Brauer group of local fields*, Advisors Prof. Angelo Vistoli and Prof. Ilaria Del Corso. Final grade: 110/110 cum laude.

## REFeree WORK

I worked as a referee for the following journals: Annals of Combinatorics, International Mathematics Research Notices, European Journal of Combinatorics, Pure and applied Mathematics Quarterly, SIAM Journal on Discrete Mathematics, Advances in Applied Mathematics, Portugaliae Mathematica, Rendiconti Lincei Matematica e Applicazioni, MathSciNet, zbMATH and FPSAC 2020 and FPSAC 2021 (Formal Power Series and Algebraic Combinatorics) conferences. I have been an external reviewer for VQR 2015-2019, the Italian Research Quality Assessment.

## STUDENTS

I supervised 5 Bachelor's students, 5 Master's students, and 4 PhD students in the last three years:

- present Supervisor (together with prof. G. Röhrle) of Lorenzo Giordani's Phd started in January 2023 on *Combinatorial and geometric aspects of arrangements*.
- present Supervisor of Maddalena Pismataro's Phd started in November 2021 on *Topology and combinatorics of Abelian arrangements*.
- present Supervisor of two Master's students and two Bachelor's students.
- Sep 2024 Supervisor of Riccardo Zaccaria's Bachelor's Thesis "Arrangiamenti di iperpiani e polinomio cromatico di grafi".
- Jun 2024 Supervisor of Marcello Lambertini's Master's Thesis "Representations of quivers over finite fields".
- 2021–2024 Supervisor of Evienia Bazzocchi's Phd.
- Jul 2023 Supervisor of Michele Tamagnone's Bachelor's Thesis "The Borel Construction of Equivariant Cohomology".
- 2019–2022 Supervisor of Gian Marco Pezzoli's Phd started in November 2019 on *Homological and Hodge-Theoretic Aspects of Matroids and Polymatroids*. PhD graduation obtained in December 2022.
- Jun 2022 Co-supervisor of Federica Gavazzi's Master's thesis (advisor prof. Luis Paris) "The  $K(\pi; 1)$ -conjecture and the Pure Virtual Braid Group"
- May 2022 Supervisor of Lorenzo Giordani's Master's Thesis, "On the combinatorics and cohomology of wonderful models for subspace arrangements".
- May 2022 Supervisor of Andrea Dal Monte's Bachelor's Thesis, "On the Discrete Morse theory".
- Apr 2022 Supervisor of Annamaria Villanova's Bachelor's Thesis, "Homotopy theory and the Whitehead theorem".
- Oct 2021 Supervisor of Maddalena Pismataro's Master's Thesis, "On the Salvetti Complex for Abelian Arrangements".
- May 2021 Supervisor of Evienia Bazzocchi's Master's Thesis, "On the Homology of Configuration Spaces of Graphs".
- Sep 2020 Supervisor of Francesco Tosello's Bachelor's Thesis, "On the Braid Group".
- Dec 2019 Co-supervisor (together with prof. Luca Moci) of Claudia Agosti's Master's Thesis, "Cohomology of hyperplane and toric arrangements".

## TEACHING

I taught 8 courses in the last four years and I worked as Teaching Assistant since 2015. Four of them were Master courses in Math under my responsibility.

- 2024 – 2025 Teacher and course manager of "Geometrica e Algebra Lineare 1" master course at Bologna University, 60h.
- 2024 – 2025 Teacher of "Commutative Algebra" master course at Bologna University, 26h in collaboration with Prof. Alessandro D'Andrea.

- 2023 – 2024 Teacher and course manager of “Geometric and topological tools for applications” master course at Bologna University, 52h.
- 2023 – 2024 Teacher of “Commutative Algebra” master course at Bologna University, 12h in collaboration with Prof. Alessandro D’Andrea.
- 2022 – 2023 Teacher and course manager of “Representation theory of quivers and homological algebra” master course at Bologna University, 52h.
- 2022 – 2023 Teacher and course manager of “Commutative Algebra” master course at Bologna University, 26h in collaboration with Prof. Mirella Manaresi.
- 2021 – 2022 Teacher and course manager of “Commutative Algebra” master course at Bologna University, 26h in collaboration with Prof. Mirella Manaresi.
- 2021 – 2022 Teacher and course manager of “Configuration spaces and braid groups” master course at Bologna University, 48h.
- 2020 – 2021 Teacher and course manager of “Advanced Geometry 2” master course at Bologna University, 48h.
- 2020 – 2021 “Geometry and Algebra” at Chemical and Biochemical Engineering, Bologna University, 30h in collaboration with Prof. Luca Moci.
- 2019 – 2020 Teaching Assistant for “Algebraic Topology” course, University of Pisa, 20h.
- 2018 – 2019 Teaching Assistant for “Algebraic Topology” course, University of Pisa, 20h.
- 2017 – 2018 Teaching Assistant for “Algebra 1” course, University of Pisa, 14h.
- 2016 – 2017 Teaching Assistant for “Institution of Algebra” course, University of Pisa, 30h.
- 2015 – 2016 Tutor, University of Pisa. I have tutored students in their first two years, 150h.
- 2014 – 2015 Teaching Assistant for “Mathematical analysis” at Physics Faculty, University of Pisa, 60h.

## INSTITUTIONAL ACTIVITIES

---

- 2024 – 2027 Manager and member of the departmental commission for VQR, the Italian Research Quality Assessment.
- 2024 – 2027 Member of the departmental commission for space management.
- 2023 – now Manager of five Erasmus+ Exchanges: University of Durham, Universiteit Van Amsterdam, Georg-August-Universität Göttingen, Technische Universität München, Universidad Complutense De Madrid
- 2023 – 2025 Nominated in the “Collegio dei Docenti” for the PhD in mathematics at Bologna University.
- 2022 – 2024 Member of three commissions for postdoc positions at Bologna University.
- 2021 – 2024 Elected in the council of Math Department (Giunta di Dipartimento).
- 2021 – 2023 I organized a competition on Group Theory between students of the Department.
- 2021, 2022 I organized a cycle of seminars on CV for master students of the Department.

## OTHER SKILLS

---

- Jul 2019 I developed the SageMath package arithmat together with G. Paolini.
- Languages Italian: mother tongue. English: advanced (C1).