

Roberto Pagaria

EXECUTIVE SUMMARY

I am a researcher in algebraic topology at Bologna University. Several articles published in leading math journals. Advanced knowledge of abelian arrangements, configuration spaces, matroids, representation theory, spectral sequences and quiver variety, acquired during thesis works and research activities.

ACADEMIC EMPLOYMENT

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- JUL 2020 – 2024** Research associate at Bologna University (RTDA)
- 2019 – 2020** Research fellow at Bologna University.
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.

EDUCATION

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- 2011 – 2016** Master's Degree at Scuola Normale Superiore, Pisa.
4th 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.

PUBLICATIONS

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- May 2021 *Hodge Theory for Polymatroids* j/w G. M. Pezzoli arXiv:2105.04214
- 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.
- 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.
- May 2020 *Asymptotic growth of Betti numbers of ordered configuration spaces on an elliptic curve* arXiv:2005.02106
- 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.
- Jan 2020 *On the cohomology of arrangements of subtori* j/w L. Moci arXiv:2001.05180.
- 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.
- Nov 2019 *The homotopy type of elliptic arrangements* j/w E. Delucchi arXiv:1911.02905 to appear in Algebr. Geom. Topol.
- 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.
- May 2019 *Cohomology of configuration spaces of surfaces* arXiv:1905.04724.
- May 2018 *The connection between combinatorics and cohomology of elliptic arrangements* arXiv:1805.04906.

INVITED TALKS

- Mar 2021 *Log-concavity of chromatic polynomial of graphs* at Topics in Mathematics (Bologna University)
- Dec 2020 *Representation theory and configuration spaces* at “Seminar on Combinatorics, Lie Theory, and Topology” (University of Pisa)
- May 2020 *Wonderful models for toric arrangements* at Arrangements at Home: Combinatorial Aspects (Western University)
- Nov 2019 *Configuration spaces of surfaces* at Università degli studi di Padova.
- 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.
- May 2019 *Unordered configuration spaces of surfaces* at Western University (London).
- Apr 2019 *Arithmetic matroids and their Representations* at KTH (Stockholm).
- Mar 2019 *Toric Arrangements* at Bologna University.
- Mar 2019 *Configuration spaces of points on surfaces* at Pisa University.
- Nov 2018 *Cohomology ring of configuration of points in \mathbb{T}^2* at University of Neuchâtel
- Sep 2018 *Counting regions* at summer school Pisa-Hokkaido-Roma2.
- 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).

GRANTS

- 2020 Participant to PRIN 2017 “Moduli and Lie Theory”, nr. 2017YRA3LK002
- 2019 SIAM Student Travel Awards 500 CHF (450€)
- 2011 INdAM university scholarship 4000€/year (declined)

REFEREE WORK

I was a referee of the following journals: Annals of Combinatorics, International Mathematics Research Notices, European Journal of Combinatorics, Rendiconti Lincei Matematica e Applicazioni, Mathscinet, and FPSAC (Formal Power Series and Algebraic Combinatorics) conferences.

VISITS

- Nov 2018 Research visit at university of Fribourg (Switzerland) working with Professor Emanuele Delucchi.
- May 2019 “Arrangements at Western” intensive research period at University of Western Ontario.

SOFTWARE DEVELOPER

- Jul 2019 I developed the SageMath package arithmat together with G. Paolini.
- Computer skills
- software development (Python, C/C++, Turbo Pascal, OCaml);
 - mathematical software (Sage, Singular, M2, Mathematica, MATLAB, Octave, CoCoA);
 - document preparation, especially for scientific works (LaTeX, Word, Excel).

TEACHING

- 2020 – 2021 “Advanced Geometry 2” at Bologna University, 48h.
2020 – 2021 “Geometry and Algebra” at Chemical and Biochemical Engineering, Bologna University, 30h.
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” course at Physics Faculty, University of Pisa, 60h.

STUDENTS

- present Supervisor of Master’s thesis of Maddalena Prismataro and of Lorenzo Giordani. Supervisor of Bachelor’s Thesis of Annamaria Villanova and of Andrea Dal Monte.
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 of Claudia Agosti’s Master’s Thesis, “Cohomology of hyperplane and toric arrangements”.

PERSONAL SKILLS

- Languages Italian: mother tongue. English: advanced (C1).
Communication skills I have attended the “Training course for tutors” on active listening aimed at helping people in difficulty (University of Pisa 2015/2016), “Writing course for academic” (Scuola Normale Superiore di Pisa 2019).

PERSONAL INTERESTS

- 2012 – present I am a passionate player of Go. I competed in the international tournament “European Go Congress” twice.
Sports I am a football player, a skier, and an amateur chess player. I have practised sport climbing and sailing.
Awards – Italian Mathematical Olympiad, Gold medallist (2010 and 2011).
– Kangaroo (mathematical Italian competition), First place (2011).
2011 – 2015 Organizer of National Mathematics Olympiad for UMI. Preparation and evaluation of tests at (local and national) Italian Mathematical Olympiad.