Giulia Codenotti

Curriculum Vitae

Personal Information

Place and date of birth	Berkeley, CA (USA), 03.03.1992
Children	1, born 2023
Citizenship	Italian, USA

Work Experience

October 2022 - present **Junior Professor**, *Discrete Geometry and Topological Combinatorics working group*, Free University of Berlin, Germany.
Research in discrete, combinatorial and convex geometry.

November 2022 - October 2023 **Maternity leave**, *child's primary caregiver*.

March 2020- October 2022 **Wissenschaftliche Mitarbeiterin (Postdoc)**, *Discrete Mathematics working group*, Goethe University of Frankfurt, Germany.

Education

2016-2020 **PhD in Mathematics**, *Berlin Mathematical School*, Advised by Prof. Francisco Santos, Free University of Berlin, Germany.
magna cum laude

2013-2016 **Master of Science in Mathematics**, University of Pisa, Italy.
110/110 cum laude

2010-2013 **Bachelor of Science in Mathematics**, University of Pisa, Italy.
110/110 cum laude

Grants and Fellowships

2024-2027 **Extremal convex bodies with respect to lattice functionals (DFG grant)**, *Principal Investigator together with G. Averkov (Cottbus) and A. Freyer (Vienna) of a three year project studying flatness problems funded by the DFG (German research funding agency), within the Germany-wide program titled "Combinatorial Synergies"*, funding one Postdoc and one PhD position and expenses; total 420.000 €, `https://www.combinatorial-synergies.de/projects/?elem=Extremal-convex-bodies-with-respect-to-lattice-functionals`.

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2023 **ML & Data science fellowship**, *Worked on a machine learning project for Moirai Biodesign, only member of team of 5 selected to continue as freelance ML devolper*, Goal: develop ML algorithms to find stable mRNA coding for any input protein, a fundamental task for new generation mRNA vaccines and cancer treatments.

2021-2022 **Fokus Funding**, *7.500 € grant of the Goethe University to promote top early-career researchers across all fields.*

2016-2020 **Einstein Scholarship**, *PhD funded by the Einstein Foundation Berlin.*

2012 **Budapest Semester in Mathematics**, *Completed with highest honors.*

2010-2013 **INDAM Fellowship**, *3-year fellowship for top 10 Mathematics students in Italy, awarded by the National Institute for higher Mathematics.*

Scientific visits

May 2022 **Ehrhart polynomials: inequalities and extremal constructions**, *AIM*, San Jose, USA.

August 2018 **Summer Workshop on Lattice Polytopes in Osaka**, *Osaka University*, Japan.

Fall 2017 **Geometric and Topological Combinatorics semester program**, *Mathematical Sciences Research Institute*, Berkeley, USA.

Organization of scientific events

September 2025 **Modern perspectives on geometry of numbers**, Brandenburgische Technische Universität Cottbus.

June 2025 **q, t-Combinatorics in Algebra, Geometry and Topology**, *Incontro INdAM*, Palazzone di Cortona, Italy.

April 2021 **(Polytop)ics conference: recent advances on polytopes**, Online, hosted by Max Planck Institute Leipzig.

February 2019 **Graduate student meeting in applied algebra and combinatorics**, Max Planck Institute Leipzig.

2018-2019 **Student seminar of the discrete geometry group**, Freie Universität Berlin.

October 2018 **Einstein Workshop Geometric and Topological Combinatorics**, Freie Universität Berlin.

Teaching

Summer '24 **Discrete Geometry II**, *Lecturer*, Free University of Berlin.

Summer '24 **Seminar in Discrete Geometry**, *Lecturer*, Free University of Berlin.

Winter 23/24 **Discrete Geometry I**, *Lecturer*, Free University of Berlin.

Summer '22 **Diskrete Mathematik**, *Assistant*, Goethe University of Frankurt.

Summer '22 **Seminar Schöne Beweise**, *Assistant*, Goethe University of Frankurt.

Winter 21/22 **Einführung in die computerorientierte Mathematik**, *Assistant*, Goethe University of Frankurt.

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Winter 21/22 **Seminar on reflection groups**, *Assistant*, Goethe University of Frankurt.

Summer '21 **Seminar Kombinatorische tropische Geometrie**, *Assistant*, Goethe University of Frankurt.

Winter 20/21 **Seminar Reelle Polynome und Optimierung**, *Assistant*, Goethe University of Frankurt.

Summer '20 **Polynomials**, *Assistant*, Goethe University of Frankurt.

Advising and mentoring

Supporting younger researchers and students has always been a core part of my mathematical vision. I have advised a bachelor thesis (completed in September 2022) and am currently advising two master thesis and one bachelor thesis. Since October 2024 I am co-advisor of a PhD student within our grant on extremal convex bodies funded by the German research funding agency (DFG). I have also always been involved in groups supporting women in mathematics.

Scientific outreach

2017-2024 **Girls' Day**, Organizer of workshops at the Girl's Day at the Freie Universität, an event aimed at furthering high school girls' interest in Mathematics.

May 2022 **Klartext Wettbewerb**, *"Toddler geometry"*.
Essay contribution explaining my PhD topic to the public.

June 2019 **Soapbox science speaker**, *"On pyramids and hypercubes: how we see the fourth dimension"*, Popularization of science event in Berlin.

2016-2017 **Graduate Student Women's group**, Organizer of a group for female graduate students of the Berlin Mathematical School.

2014-2016 **Made@Dm**, Organizer in a student group for the popularization of mathematics.

Technical skills

Python, *advanced*.

Git, *intermediate*.

Google Cloud, *beginner*.

Languages

English **Native speaker**

Italian **Native speaker**

German **C2**

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Publications

2019 **On f- and h- vectors of relative simplicial complexes**, *Alg. Comb., 2 (2019) no. 3, pp. 343-353*, joint with L. Katthän and R. Sanyal, DOI: 10.5802/alco.38.

2019 **Finding a fully mixed cell in a mixed subdivision of polytopes**, *Chapter in "Algebraic and Geometric Combinatorics on Lattice Polytopes." June 2019, 147-164*, with L. Walter, DOI: 10.1142/9789811200489-0009.

2020 **Average betti numbers of induced subcomplexes in triangulations of manifolds**, *Electron. J. Combin. 27:3 (2020), P3.40*, joint with F. Santos and J. Spreer, DOI: 10.37236/8564.

2020 **Hollow polytopes of large width**, *Proc. Amer. Math. Soc. 148(2): 835-850 (2020)*, joint with F. Santos, DOI: 10.1090/proc/14721.

2021 **Octahedralizing 3-colorable 3-polytopes**, *Discret. Comput. Geom. 66(4): 1429–1445 (2021)*, joint with L. Venturello, DOI: 10.1007/s00454-020-00262-4.

2021 **A local maximizer for lattice width of 3-dimensional hollow bodies**, *Discrete Applied Mathematics, Volume 298 (2021), pp. 129-142*, with G. Averkov, A. Macchia and F. Santos, DOI: 10.1016/j.dam.2021.04.009.

2022 **The covering radius and a discrete surface area for non-hollow simplices**, *Discret. Comput. Geom. 67(1): 65-111 (2022)*, joint with F. Santos and M. Schymura, DOI: 10.1007/s00454-021-00330-3.

2023 **Unimodular covers of lattice parallelepipides and nef Cayley polytopes**, *Combinatorial Theory 3(3) (2023), #2*, joint with F. Santos, DOI: 10.5070/C63362785.

2023 **Combinatorics and preservation of conically stable polynomials**, *J. Algebraic Combinatorics 58, 811-836, 2023*, joint with S. Gardoll and T. Theobald, DOI: 10.1007/s10801-023-01249-z.

2024 **Lattice reduced and complete convex bodies**, *Journal of the London Mathematical Society Volume 110, Issue 4 (2024)*, joint with A. Freyer, DOI: 10.1112/jlms.12982.

2025 **Local h^*-polynomials for one-row Hermite normal form simplices**, *accepted for publication in Contributions to Algebra and Geometry*, joint with E. Bajo, B. Braun, J. Hofscheier, A. Vindas-Meléndez.

Ph.D. Thesis

2020 **Covering properties of lattice polytopes**, *Freie Universität Berlin*, Available at https://refubium.fu-berlin.de/handle/fub188/26773.

Preprints

2021 **Generalized flatness constants in dimension 2**, *Preprint at arXiv:2110.02770*, joint with T. Hall and J. Hofscheier.

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