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Employment

- Since 04/2024 PostDoc** Bologna University, Bologna, Italy.
Mentor: Alessandro Gimigliano.
Employed under the NextGenerationEU Prin 2022 - Prot n. 2022E2Z4AK.
- 04/2023 - 03/2024 PostDoc** Osnabrück University, Osnabrück, Germany.
Mentor: Paul Breiding.
Employed under the DFG grant – Projektnummer 445466444.
- 03/2022 - 03/2023 PostDoc** Max-Planck Institute for Mathematics in the Sciences, Leipzig, Germany.
Mentor: Bernd Strumfels.
Employed under the SAXAG grant from the Sächsisches Staatsministerium für Wissenschaft, Kultur und Tourismus from July to December 2022. Employed under DFG grant – Projektnummer 445466444 from January 2023 to March 2023.

Education

- 11/2018 - 01/2022 Ph.D. in Mathematics** University of Trento, Trento, Italy.
Thesis: *Identifiability of small rank tensors and related problems* defended on 01/04/2022.
Supervisor: Alessandra Bernardi.
- 10/2015 - 03/2018 M.Sc. in Mathematics** University of Bologna, Bologna, Italy.
Mark: 110/110 cum laude.
- 10/2011 - 03/2015 B.Sc. in Mathematics** University of Basilicata, Potenza, Italy.
Mark: 104/110.

Research

The aim of my research is to exploit techniques coming from algebraic geometry and related derivations to tackle problems in multilinear algebra and its applications in data science.

Pre-prints and Publications, including research data

The authors in the following appear in alphabetic order and the order of the authors bears no relation to the relative amount of contribution.

10. F. Galuppi, P. Santarsiero: *Rank and symmetries of signature tensors*, arXiv preprint arXiv:2407.20405, 2024, submitted.
9. A. Bernardi, A. Oneto, P. Santarsiero: *Decomposition loci of tensors*, arXiv preprint, arXiv:2407.18138, 2024, submitted [Supplementary material: [DecompositionLoci](#)].
8. P. Breiding, P. Santarsiero: *Degree of the subspace variety*, arXiv preprint, arXiv:2402.12217, 2024, submitted.

7. F. Galuppi, P. Santarsiero, D. A. Torrance, E. Teixeira Turatti: *Geometry of first nonempty Terracini loci*, arXiv preprint, arXiv:2311.09067, 2023, submitted [Supplementary material: [TerraciniLoci](#)].
6. C. Améndola, F. Galuppi, Á. D. Ríos Ortiz, P. Santarsiero, T. Seynnaeve: *Decomposing tensor spaces via path signatures*, J. Pure Appl. Algebra, accepted for publication, 2024 [Supplementary material: [TensorSpacesViaSignatures](#)].
5. J. Lindberg, P. Santarsiero: *The symmetric geometric rank of symmetric tensors*, arXiv preprint, arXiv: 2303.17537, submitted.
4. P. Breiding, S. Fairchild, P. Santarsiero, E. Shehu: *Average degree of the essential variety*, arXiv preprint, arXiv: 2212.01596, 2022, La Matematica 3, 753–776, 2024 [Supplementary material: [averageDegree](#)].
3. P. Santarsiero: *An algorithm for the non-identifiability of rank-3 tensors*, Boll. Unione Mat. Ital., 16, 595–624, 2023 [Code implementation: [rank3identifiability](#)].
2. E. Ballico, A. Bernardi, P. Santarsiero: *Terracini locus for three points on a Segre variety*, Asian J. Math., 27(3), 2023.
1. E. Ballico, A. Bernardi, P. Santarsiero: *Identifiability of rank-3 tensors*, Mediterr. J. Math. 18, 174, 2021.

Research stays

- 10/2022** 6 weeks research visit at IMPAN, Poland, to participate at *Algebraic Geometry with Applications to Tensors and Secants (AGATES)* semester.
- 01/2022** 6 weeks research visit to Nick Vannieuwenhoven, KU Leuven, Belgium.
- 09/2020** 2 weeks research visit to Luca Chiantini, University of Siena, Italy.
- 02/2020** 2 weeks research visit to Luca Chiantini, University of Siena, Italy.

Presentations

Conference presentation

- 07/2024** *Degree of subspace varieties*, Effective Methods in Algebraic Geometry MEGA2024, Leipzig, Germany.
- 07/2024** *An algebraic perspective on signature tensors*, Kick-off meeting of the INABAG research group, Torino, Italy.
- 06/2024** *A geometric perspective on condition numbers for tensor decomposition*, II Meeting UMI for doctoral students, Napoli, Italy.
- 05/2024** *The symmetric geometric rank of symmetric tensors*, SIAM Conference on Applied Linear Algebra LA 24, Paris, France.
- 07/2023** *The symmetric geometric rank of symmetric tensors*, SIAM Conference on Applied Algebraic Geometry AG 23, TU Eindhoven, The Netherlands.
- 11/2022** *Representation theory of signature tensors*, Pfaffians, tensors and applications, Max-Planck in Leipzig, Germany.
- 09/2022** *On the Terracini locus of a (Segre) variety*, Moduli day, Max-Planck in Leipzig, Germany.

- 09/2022** *On the Terracini locus of a Segre variety*, Kickoff workshop AGATES semester, Warsaw University, Poland.
- 05/2022** *A geometrical perspective on tensors and the identifiability problem*, Saxonian Seminar Day on Algebra and Geometry, TU Dresden, Germany.
- 08/2021** *On the Terracini locus of a Segre variety*, SIAM Conference on Applied Algebraic Geometry AG21, online.
- 06/2021** *Identifiability of rank-3 tensors*, Effective Methods in Algebraic Geometry MEGA2021, online.

Seminars and colloquium talks

- 12/2023** *On the rank and symmetries of signature tensors*, Algebraic Geometry seminar, MIMUW, Poland.
- 06/2023** *The symmetric geometric rank of symmetric tensors*, Oberseminar, Bielefeld University, Germany.
- 05/2023** *The symmetric geometric rank of symmetric tensors*, Nonlinear Algebra seminar, Max-Planck in Leipzig, Germany.
- 05/2023** *The symmetric geometric rank of symmetric tensors*, Oberseminar, Osnabrück University, Germany.
- 02/2023** *On the symmetric geometric rank*, Oberseminar, OvGU Magdeburg, Germany.
- 04/2022** *Identifiability of small rank tensors and related problems*, Trento University, Italy.
- 04/2022** *Identifiability of small rank tensors and related problems*, Nonlinear Algebra seminar, Max-Planck in Leipzig, Germany.
- 10/2021** *Identifiability of rank-3 tensors*, IMPAN, Poland.
- 05/2021** *On the Terracini locus of a Segre variety*, Algebraic Geometry seminar, Trento University, Italy, online.

Fundings

- 07/2024** Travel reimbursement to attend the conference Effective Methods in Algebraic Geometry MEGA24, Leipzig, Germany.
- 10/2023** Accommodation to attend the workshop *Women in commutative algebra II* held Trento, Italy.
- 06/2023** Travel reimbursement and accommodation to attend the seminar *Metric Algebraic Geometry* held in Oberwolfach, Germany.
- 10/2022** Travel and accommodation reimbursement and daily allowance to attend the first four weeks of *Algebraic Geometry with Applications to Tensors and Secants (AGATES)* semester, IMPAN, Poland.
- 05/2022** Travel and accommodation reimbursement and daily allowance to attend the *Saxonian Seminar Day on Algebra and Geometry*, TU Dresden, Germany.
- 08/2021** Student Travel Award for the *SIAM AG Conference* in 2021. Since the conference moved online, I received the travel award in the form of a registration waive for the conference.
- 07/2019** Travel reimbursement and accommodation to attend the summer school *Scuola Matematica Interuniversitaria SMI* held in Perugia, Italy.

Teaching

- 2024/2025** Instructor of the PhD course *The geometry of tensor decomposition*, Bologna University, Italy.
- 2022/2023** Instructor of the seminar *The geometry of tensor decomposition*, Osnabrück University, Germany.

2020/2021 Teaching assistant of *Geometria 1* for the Bachelor Degree in Physics, University of Trento, Italy.

2019/2020 Teaching assistant of *Geometria 1* for the Bachelor Degree in Physics, University of Trento, Italy.

2017/2018 Teaching tutor for *Algebra 1* for the Bachelor Degree in Mathematics, University of Bologna, Italy.

Service

- Organizer of the school TIME 2025 – Invariant Theory: from classics to modern developments at the Lie-Størmer Center in Tromsø, Norway, happening in May 2025. Together with Kathlén Kohn, Alessandro Oneto, Ettore Teixeira Turatti we are organizing a graduate school on Invariant Theory, providing the participants with a multifaceted viewpoint on the theory of invariants, connecting the classical theory of XIX century and its development through computational algebra, modern algebraic geometry and applications to other applied sciences.
- Organizer of the *Conference on Applied Algebra* at the Osnabrück University, Germany, happening in September 2023. Together with Paul Breiding, Tobias Boege, Lukas Gustafsson, Tim Römer and Timo de Wolff we organized a workshop that brings together researchers working in applied algebra, with particular focus on data science.
- Organizer of the minisymposium *Tensors in Applications* at SIAM AG 23, July 2023. Together with Francesco Galuppi, Neriman Tokcan and Nick Vannieuwenhoven, we organized the Minisymposium of four sessions on an applied perspective of tensor methods.
- Organizer of *preparatory lectures for ICM 2022*, at the Max-Planck in Leipzig, Germany, June 2022. Together with Julia Lindberg, Sachi Haschimoto and Stefano Mereta we organized local preparatory lectures and viewing sessions for the 2022 International Congress of Mathematics.
- Organizer of *online Tensor Ph.D. seminars* in the academic year 2021/2022. Together with Claudia de Lazzari and Reynaldo Staffolani we organized weakly meetings with PhD students in Italy working on the field of tensor decomposition.

Outreach

- Stand/Hands-on *La moltiplicazione* at MUSE (Science Museum Trento), Trento, Italy, for the European Researchers' Night 2019.
- Stand/Hands-on *I tensori e le loro scomposizioni*, Bologna, Italy, for the European Researchers' Night 2024.

Skills

- Languages: Italian (native), English (fluent), French (intermediate), German (beginner).
- Programming: Macaulay2 (advanced), Sagemath (beginner), Julia (beginner).