

Dr. Jessica Bariffi

Curriculum Vitae

TUM School of Computation, Information and Technology
Technical University of Munich
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Personal Data

Name Jessica (female)
Surname Bariffi
Birthplace Zurich, Switzerland
Citizenship Swiss and Italian
Current position Postdoc at the Technical University of Munich (Germany),
in the group of Prof. Antonia Wachter-Zeh

Education

July 2020 - April 2024 **Ph.D. Program in Mathematics**,
PhD Thesis: *Analysis and Decoding of Linear Lee-Metric Codes with Application to Code-Based Cryptography*
Advisor: Prof. Joachim Rosenthal, University of Zurich.
Zurich, Switzerland

April 2018 - June 2020 **M.Sc. in Mathematics**,
Master Thesis: *A Finite Geometry Construction for MDPC Codes*
Advisor: Prof. Joachim Rosenthal, University of Zurich.
Zurich, Switzerland

September 2014 - March 2018 **B.Sc. in Mathematics**,
University of Zurich.
Zurich, Switzerland

Work Experience

July 2024 - Present **Postdoctoral Researcher**, in the group of Prof. Antonia Wachter-Zeh,
Institute for Communications Engineering,
Technical University of Munich.
Munich, Germany

July 2020 - June 2024 **Research Assistant**, in the group of Dr. Hannes Bartz,
Institute of Communications and Navigation,
German Aerospace Center (DLR).
Munich, Germany

May 2018 - June 2020 **Mathematics Teacher**,
Academia Group.
Zurich, Switzerland

Co-Lecturing

Channel Coding Institute of Communications Engineering, together with Prof. Antonia Wachter-Zeh, Technical University of Munich.

- Winter Semester 2025
- Winter Semester 2024

- Coding Theory for Storage and Networks Institute of Communications Engineering, *together with Dr. Rawad Bitar*, Technical University of Munich.
 ◦ Summer Semester 2025
- Security in Communications and Storage Institute of Communications Engineering, *together with Prof. Antonia Wachter-Zeh*, Technical University of Munich.
 ◦ Winter Semester 2024

Teaching Assistance

- Linear Algebra Institute of Mathematics, University of Zurich.
 ◦ Fall Semester 2022
 ◦ Spring Semester 2020 (for the Pedagogical High School).
 ◦ Fall Semester 2017 (for Sciences).
- Cryptography Institute of Mathematics, University of Zurich.
 ◦ Spring Semester 2022
- Programming in MatLab Institute of Mathematics, University of Zurich.
 ◦ Fall Semester 2021
- Geometry Institute of Mathematics, University of Zurich.
 ◦ Fall Semester 2018 (for the Pedagogical High School).
- Foundations of Mathematics Institute of Mathematics, University of Zurich.
 ◦ Spring Semester 2018 (for the Pedagogical High School).

Organization of Conferences

- SIAM AG23 Co-Organizer of Minisymposium, *Advances in Code-based Signatures*, with Dr. Violetta Weger.

Publications

Journals

1. H. Sauerbier Couvée, T. Jerkovits, J. Bariffi. *Bounds on Sphere Sizes in the Sum-rank Metric and Coordinate-additive Metrics*. (Accepted in *Designs, Codes and Cryptography*), 2025.
2. J. Bariffi, H. Bartz, G. Liva, J. Rosenthal. *Error-Correction Performance of Regular Ring-Linear LDPC Codes over Lee Channels*. (Accepted in *IEEE Transactions on Information Theory*), 2024.
3. J. Bariffi, S. Mattheus, A. Neri, J. Rosenthal. *Moderate Density Parity-Check Codes from Projective Bundles*. (Accepted in *Designs Codes and Cryptography*), 2022.

Conference Proceedings and Chapters

1. J. Bariffi, A. Wachter-Zeh, E. Yaakobi. *Sequence Reconstruction over Coloring Channels for Protein Identification*. 2025 IEEE International Symposium on Information Theory (ISIT25), Ann Arbor (MI), USA.
2. H. Sauerbier Couvée, T. Jerkovits, J. Bariffi. *Bounds on Sphere Sizes in the Sum-rank Metric and Coordinate-additive Metrics*. Workshop of Coding and Cryptography, 2024.
3. J. Bariffi, K. Khathuria, V. Weger. *Information Set Decoding for Lee-Metric Codes using Restricted Balls*. Code-Based Cryptography 10th International Workshop, CBCrypto 2022, Trondheim, Norway, May 29–30, 2022, Revised Selected Papers, 2022.
4. J. Bariffi, H. Bartz, G. Liva, J. Rosenthal. *Analysis of Low-Density Parity-Check Codes over Finite Integer Rings for the Lee Channel*. IEEE Globecom 2022, Rio de Janeiro, Brazil.
5. J. Bariffi, H. Bartz, G. Liva, J. Rosenthal. *On the Properties of Error Patterns in the Constant Lee Weight Channel*. International Zurich Seminar on Information and Communication 2022, Zurich, Switzerland.

Preprints

1. J. Bariffi, G. Cavicchioni, V. Weger *The Existence of MacWilliams-Type Identities for the Lee, Homogeneous and Subfield Metric*. arXiv:2409.11926, 2024.
2. J. Bariffi, V. Weger *Better Bounds on the Minimum Lee Distance*. (submitted) arXiv:2307.06079, 2023.

Talks

Invited Talks

- *Information-theoretic Bounds on the Size of Spheres in the Lee Metric*, SIAM Conference on Applied Algebraic Geometry, July 2025, Madison, Wisconsin (US)
- *Sequence Reconstruction over Coloring Channels for Protein Identification*, Workshop on Post-Shannon Theory and Molecular Communication, March/April 2025, Braunschweig (Germany)
- *Constructing Moderate-Density Parity-Check Codes from Projective Bundles*, SIAM Conference on Applied Algebraic Geometry, July 2023, Eindhoven (The Netherlands).
- *Analysis and Properties of Error Patterns in the Lee Channel*, Baby Seminar, Eindhoven University of Technology, October 2021.
- *Channel Coding in the Lee Metric*, Postgraduate International Coding Theory Seminar (PICS), September 2021 (virtual).

Contributed Talks

- *Sequence Reconstruction over Coloring Channels for Protein Identification*, IEEE International Symposium on Information Theory (ISIT), June 2025, Ann Arbor, Michigan (US)
- *MacWilliams-Type Identities in the Lee and Homogeneous Metric*, Doctoral Seminar, Technical University of Munich, July 2024, Munich (Germany).
- *The Existence of MacWilliams-Type Identities for the Lee, Homogeneous and Subfield Metric*, Combinatorics 2024, June 2024, Carovigno (Italy).
- *Analysis and Decoding of Ring-Linear Lee-Metric codes with Application to Code-Based Cryptography*, Swiss Seminar, University of Zurich, April 2024, Zurich (Switzerland).
- *Bounds on the Minimum Lee Distance*, Institute Colloquium, German Aerospace Center, October 2023, Munich (Germany).
- *The Geometry and Error Probability of the Lee channel*, Workshop on Combinatorics in Digital Communications, April 2023, Eindhoven (Netherlands).
- *Analysis of Low-Density Parity-Check Codes over Finite Integer Rings for the Lee Channel*, IEEE Global Communications Conference, December 2022, Rio de Janeiro (Brasil).
- *What is Lattice-Based Cryptography?*, PhD Seminar, German Aerospace Center, September 2022, Munich (Germany).
- *The Marginal Distribution of the Lee Channel and its Applications*, Coding theory and cryptography - A conference in honor of Joachim Rosenthal's 60th birthday, July 2022, Zurich (Switzerland).
- *Information Set Decoding in the Lee Metric*, Institute Colloquium, German Aerospace Center, July 2022, Munich (Germany).
- *Information Set Decoding for Lee-Metric Codes using Restricted Spheres*, CBCrypto (affiliated event of EuroCrypt 2022), May 2022, Trondheim (Norway).
- *On the Scalar Multiplication Problem in the Lee Metric*, PhD Seminar, German Aerospace Center, June 2021, Munich (Germany).
- *Decoding Performance of LDPC Codes over the Lee Channel*, Institute Colloquium, German Aerospace Center, June 2021, Munich (Germany).
- *Analysis of Low-Density Parity-Check Codes over Finite Integer Rings for the Lee Channel*, Algebraic Coding Theory e-Summer School (ACT21), June 2021 (virtual).
- *A Finite Geometry Construction for MDPC-Codes*, Swiss Seminar, University of Zurich, March 2020, Zurich (Switzerland).

Supervising Activities

- Co-Supervisor **Master Thesis**, *University of Zurich*.
- Yves Krähenbühl,
Thesis Title: *Overview of Classes of MDP Convolutional Codes and Their Erasure Decoding Algorithms*

Grants

- Travel Grants** PhD Student Travel Grant, (*February 2023*).
In connection with the workshop on combinatorics in digital communication.
- ComSoc Student Travel Grant, (*November 2022*).
In connection with the 2022 IEEE Globecom Conference.

Language Skills

- Native (Swiss) German.
- Other Italian, *fluent*.
English, *fluent*.
French, *intermediate*.