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*,
Institue 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

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. 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. H. Sauerbier Couvée, T. Jerkovits, J. Bariffi. *Bounds on Sphere Sizes in the Sum-rank Metric and Coordinate-additive Metrics*. (accepted in Workshop of Coding and Cryptography), 2024.
2. J. Bariffi, K. Khathuria, V. Weger *Information Set Decoding for Lee-Metric Codes using Restricted Balls*. (Accepted in Code-Based Cryptography 10th International Workshop, CBCrypto 2022, Trondheim, Norway, May 29–30, 2022, Revised Selected Papers, 2022).
3. J. Bariffi, H. Bartz, G. Liva, J. Rosenthal. *Analysis of Low-Density Parity-Check Codes over Finite Integer Rings for the Lee Channel*. (Accepted in IEEE Globecom 2022).
4. J. Bariffi, H. Bartz, G. Liva, J. Rosenthal. *On the Properties of Error Patterns in the Constant Lee Weight Channel*. (Accepted in International Zurich Seminar on Information and Communication 2022).

Preprint

1. J. Bariffi, H. Bartz, G. Liva, J. Rosenthal. *Error-Correction Performance of Regular Ring-Linear LDPC Codes over Lee Channels*. (submitted to IEEE T-IT) arXiv:2312.14674, 2023.
2. J. Bariffi, V. Weger *Better Bounds on the Minimum Lee Distance*. (submitted to SIAM Journal of Discrete Mathematics) arXiv:2307.06079, 2023.

Talks

Invited Talks

- *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

- *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).

Reviewing and Supervising Activities

Reviewer **Conferences**.

- ISIT 2023, Taipei, Taiwan.
- ICC 2022, Seoul, South Korea.
- Globecom 2021, Madrid, Spain.
- CBCrypto 2021, Munich, Germany.

Reviewer **Journals**.

- IEEE Transactions on Communications, July 2024.
- IEEE Communcation Letters, November 2023.
- Theoretical Computer Science, September 2023.
- IEEE Open Journal of the Communications Society, May 2022.

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.

Participation to Conferences, Workshops and Schools

In-Person

- International Conference on Algebraic Geometry, Coding Theory and Combinatorics, December 2023 (Hyderabad, India).
- SIAM Conference on Applied Algebraic Geometry (AG23), July 10-14, 2023 (Eindhoven, The Netherlands).
- Workshop on Combinatorics in Digital Communications, April 2023 (Eindhoven, The Netherlands).
- IEEE Globecom 2022, December 2022 (Rio de Janeiro, Brazil).
- Summer School on Post-Quantum Cryptography, August 2022 (Budapest, Hungary).
- Coding theory and cryptography - A conference in honor of Joachim Rosenthal's 60th birthday, July 2022 (Zurich Switzerland).
- Algebraic Coding Theory Summer School (ACT22), July 2022 (Zurich, Switzerland).
- Eurocrypt 2022, June 2022 (Trondheim, Norway).
- International Workshop on Code-Based Cryptography (CBCrypto 2022), May 2022 (Trondheim, Norway).

Virtual

- International Workshop on Code-Based Cryptography (CBCrypto 2021), June 2021.
- Algebraic Coding Theory e-Summer School (ACT21), June 2021.
- International Workshop on Cryptography and Coding Theory (IWCC), March 2021.
- Regular participant of virtual seminars (ACCESS, Swiss e-Seminar, PICSeminar).

Language Skills

Native (Swiss) German.

Other Italian, *fluent*.

English, *fluent*.

French, *intermediate*.