

Special-Issue of AMC

Algebraic and Geometric Perspectives on Coding Theory

1 Description

Ever since their first mention, error correcting codes have played an important role in modern communication. Over the last decades they have gained in importance, due to the ever-increasing amount of data that we store and communicate in our daily lives. To construct efficient error correcting codes, and their corresponding decoding algorithms, various mathematical tools from finite algebra, geometry, group theory, combinatorics, and many more, have proven extremely useful. The use of such mathematical tools in coding theory is generally called *algebraic coding theory*.

This Special Issue aims to provide an overview of recent advances in algebraic coding theory, with a particular focus on the algebraic and geometric aspects of codes over finite fields. We want to emphasize this interdisciplinary connection, since many good error correcting codes have interesting algebraic or geometrical counterparts, which gives rise to powerful tools for classifying, characterizing and investigating certain types of codes.

We therefore welcome original mathematically-oriented contributions on the following (non-exhaustive list of) topics:

- AG codes
- Codes for distributed storage (locally recoverable/repairable/decodable)
- Group codes (cyclic codes, dihedral codes, abelian codes etc.) and quasi-cyclic codes
- Quantum codes
- Rank metric codes
- Self-dual codes
- Subspace codes
- Interactions between coding theory and cryptography

2 Timeline

There should be at least a 6 months period between the publicity and the deadline of submission of papers. The other dates then depend on the date of publicity.

- Publicity: February 2021
- Submission of papers: 31 August 2021
- Notification: 31 October 2021 (two months later)
- Revised manuscript due: 30 November 2021 (one month later)
- Publication: ??

3 Guest editors

- **Daniele Bartoli** (Università degli Studi di Perugia) was born in Molfetta, Italy, on September 22, 1985. He received his master degree in Mathematics from the University of Perugia, Italy, in 2009. In 2012 he got his Ph.D. in Mathematics from the same university with a dissertation on geometrical objects over finite fields with applications in coding theory and cryptography. From 2014 to 2015 he was Marie-Curie fellow at the Department of Mathematics, Ghent University, Belgium. Since September 2015 he is researcher at the University of Perugia, Italy and currently he holds a tenure-track position with the Department of Mathematics and Computer Science. His research interests are in coding theory, including quantum coding, and Galois geometries.
- **Martino Borello** (Université Paris 8) was born in Milano, Italy, on July 28, 1986. He received the master degree in Mathematics from the University of Milan, Italy, in 2010, and the Ph.D. degree in Pure and Applied Mathematics from the University of Milan-Bicocca, Italy, in 2014, with a dissertation from coding theory. From 2014 to 2016 he was a Postdoctoral fellow at the EPF Lausanne, Switzerland. Since September 2016, he is an associate professor of Mathematics at the University of Paris 8, France, in the laboratory LAGA. His research interests include algebraic coding theory, in particular automorphisms of codes, group codes, minimal codes and their relations with combinatorial structures and geometry.
- **Anna-Lena Horlemann** (University of St. Gallen) received the Diploma degree in mathematics from the University of Bochum, Germany, in 2007 and the Ph.D. degree in mathematics from the University of Zurich, Switzerland, in 2013. From 2013 until 2015 she was a research fellow at the Department of Electrical and Electronic Engineering at the University of Melbourne and at the Department of Electrical and Computer Systems Engineering at Monash University, both in Melbourne, Australia. She was

a Postdoctoral fellow at the EPF Lausanne, Switzerland, from 2015 until 2017. Since then she has been an assistant professor for mathematics and information technology at the University of St. Gallen in Switzerland, where she was recently appointed associate professor in theoretical computer science. Her research interests include various aspects of coding theory, in particular rank-metric, subspace, lattice and integer codes, codes for distributed storage, private information retrieval, as well as post-quantum cryptography.

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