

**PREFACE: THE CONGRESS “HYGRADE 2017”  
AND A BIOGRAPHICAL NOTE ON MARIO GIONFRIDDO**

FRANCESCO BELARDO <sup>a\*</sup> AND ANTOINETTE TRIPODI <sup>b</sup>  
(Guest Editors)

ABSTRACT. In this preface we give some details about the past Congress “HyGraDe 2017” and we briefly describe the academic career of Mario Gionfriddo, whose 70th birthday was celebrated during the congress.

**1. The Congress “HyGraDe 2017”**

The International Conference “HyGraDe 2017” can be ideally placed in a series of conferences on Combinatorics organized by Sicilian mathematicians since the eighties of the past century. The conference took place in June 20-24 2017, in Sicily at Elihotel, located in Sant’Alessio Siculo (Messina province), and it was organized by Francesco Belardo (University of Naples “Federico II”) and Giovanni Lo Faro (University of Messina), both serving as chair of the Organizing Committee, Luca Giuzzi (University of Brescia), Enzo M. Li Marzi (University of Messina), Lorenzo Milazzo (University of Catania), Salvatore Milici (University of Catania) and Antoinette Tripodi (University of Messina). The Scientific Committee consisted of Marco Buratti (University of Perugia), Giovanni Lo Faro, Guglielmo Lunardon (University of Naples “Federico II”) and Martin Milanič (University of Primorska).

The conference “HyGraDe” brought together scientists working in different disciplines of Combinatorics. There were 85 participants from 13 different countries, 10 invited talks and 35 contributed talks touching the latest developments in the corresponding research areas. The invited speakers were Richard Brualdi (University of Winsconsin), Marco Buratti (University of Perugia), Charlie Colbourn (Arizona State University), Klavdija Kutnar (University of Primorska), Josef Lauri (University of Malta), Curt Lindner (University of Auburn), Dragan Marušič (University of Primorska), Alex Rosa (McMaster University), Zsolt Tuza (Hungarian Academy of Sciences) and Vitaly Voloshin (Troy University). The title HyGraDe stands for HYpergraphs, GRaphs and DESign, research topics studied by Mario Gionfriddo during his long and successful academic career. Mario Gionfriddo was the honoured participant of the congress. Among the invited speakers, 6 of them have been Mario’s co-authors in several scientific papers.

The Organizing Committee thanks all who contributed to the successful organization of this event. In particular the Organizing Committee is grateful to the sponsors of this conference: Universities of Catania, Messina and Naples “Federico II”, the Department of Mathematics and Informatics of Catania, the Department MIFT of Messina, the INDAM-GNSAGA and the no-profit association “Combinatorics 2014”. We also recognize the kind support of the University of Primorska, the Department of Mathematics and Applications “R. Caccioppoli” of Naples and the Accademia Peloritana dei Pericolanti.



FIGURE 1. The Conference Photo.

## 2. Mario Gionfriddo and Combinatorics past events in Sicily

Mario Gionfriddo was born in Messina on November 6, 1946, he studied in Messina where he started his academic career, before moving to Catania where in 1981 he became Full Professor for Geometry. Mario learned about graphs in 1969 after some seminars given by F. Speranza, Full Professor of Differential Geometry at University of Messina. Speranza continued his studies in Differential Geometry and Graph Theory, later devoting his attention to Mathematics Education and Mathematical Logics. A few years later, it was Speranza who motivated Mario to consider Graph Theory as a research field, and, after the first of a long series of visits by Curt Lindner, Mario started his research in block-designs in 1978. Furthermore, we can very precisely say that the first paper in Sicily on Steiner systems is [M. Gionfriddo, C.C. Lindner, Construction of Steiner quadruple systems having a prescribed number of blocks in common, *Discrete Mathematics* 34 (1981), p. 31-42]. From that visit, many other researchers from Messina and Catania joined Mario in his investigations with Lindner, starting a long scientific cooperation which still continues today.

Another milestone in Mario's activity is the organization of the Congress "1st International Catania Combinatorial Conference: Graphs, Steiner Systems and Their Applications" held in Santa Tecla, September 12-17, 1986. Many well-known scholars of Graph Theory and Hypergraphs attended this congress, among them, C. Berge, F. Harary, C. Thomassen, S. Simić, S. Fiorini, G. Sabidussi, Zs. Tuza. As well as recognized researchers of Design Theory, such as C. Coulbourn, C.C. Lindner, A. Rosa, C. Rodger, L. Teirlink, K. Phelps. The second congress followed three years later, as "2nd International Catania Combinatorial Conference: Graphs, Designs and Combinatorial Geometries", Santa Tecla, September 3-9, 1989, with the notable presence of Paul Erdős, surely one of the greatest mathematicians of the XX century. The third congress took place in 1992. On that occasion, the congress became part of the International Congress Series "Combinatorics", which has been organized in Italy every two years till today: "3rd International Catania Combinatorial Conference: Combinatorics 1992", Santa Tecla, September 12-17, 1992. In that event, the number of participants exceeded 250, including once again among others Paul Erdős. After that congress a long series of yearly workshops stepwise organized in Catania, Messina and also Malta with J. Lauri. At the same time, since 1993, V. Voloshin, at that time at University of Kinishev in Moldavia, had started to visit the Departments of Mathematics in Catania and Messina: a scientific cooperation that even today is of current relevance. In 2004 another congress of the "Combinatorics" series took place, with the usual success in terms of participants and talks of great level: "4th International Catania Combinatorial Conference: Combinatorics 2004", Capomulini, September 12-17, 2004.

Mario was very active at that time, Combinatorics was a popular topic in the Mathematics, Computer Science and Engineering Degree Courses at University of Catania, and a significant number of PhD Students studied Combinatorics, under the supervision of Mario and his research group in Catania and Messina. Among promising researchers there was also his daughter Lucia Gionfriddo, who became a mathematician in the father's research field. Unfortunately, the premature death of Lucia in 2008 had a big impact on Mario's moral and research activity, especially in events organization. However Mario's dedication to Mathematics has never stopped, as he has continued to teach and publish papers, and his legacy is nowadays very active.

Today Mario is retired, but at the moment of writing he is under consideration for the title of Emeritus Professor at University of Catania.



FIGURE 2. Mario and Lucia Gionfriddo.

### 3. About this Special Issue

This special issue of “Atti della Accademia Peloritana dei Pericolanti – Classe di Scienze Fisiche, Matematiche e Naturali” contains contributions from the participants of the Congress “HyGraDe 2017”. We are grateful to the Editor-in-Chief Prof. Paolo V. Giaquinta for giving us the opportunity to host the Conference Proceedings of “HyGraDe 2017”. We also thank all the colleagues who have participated this initiative and the referees who have reviewed the papers. We would like to mention that a volume of the new journal “The Art of Discrete and Applied Mathematics – ADAM”, recently launched in Slovenia by the University of Primorska, contains other contributions from the participants of “HyGraDe 2017” (ADAM can be accessed at <https://adam-journal.eu/index.php/ADAM>).

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<sup>a</sup> Università di Napoli “Federico II”  
Dipartimento di Matematica e Applicazioni “R. Caccioppoli”  
Via Cintia, I-80126 Napoli, Italy

<sup>a</sup> Università degli Studi di Messina  
Dipartimento di Scienze Matematiche e Informatiche, Scienze Fisiche e Scienze della Terra  
Contrada Papardo, I-98166 Messina, Italy

\* To whom correspondence should be addressed | email: [fbelardo@unina.it](mailto:fbelardo@unina.it)

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