Curriculum Vitae
EMANUELE BRUGNOLI

Education

- **Doctor of Philosophy (Ph.D.) in Mathematics and Computer Science, University of Perugia, Perugia, IT (Jan 2016).**
  Research Area: Graph theory, Design theory
  Thesis: Graph decompositions via integer compositions
  Advisor: Marco Buratti

- **Master's degree in Mathematics,**
  University of Perugia, Perugia, IT (May 2012).
  Research Area: Graph theory, Design theory
  Thesis: A non-isomorphism testing algorithm for cyclic designs
  Advisor: Marco Buratti

- **Post-graduate course in "Metodi e tecniche per l'analisi e il contrasto delle fake news",**
  University Campus Bio-Medico of Rome, Rome, IT (Oct 2018).

Research Experience

- **Department of Environment, Informatics and Statistics** Jul 2020 - Sep 2020
  Ca' Foscari University of Venice, Venice, IT

  Working on data science and complexity. Development and application of data analysis techniques and natural language processing (NLP), supporting the preparation of reports on i) social media and the spread of (mis)information about Covid-19, ii) cognitive mechanisms and the interpretation of reality in the digital society.

- **Institute for Complex Systems (ISC), CNR** May 2018 - May 2020
  University of Rome "La Sapienza", Rome, IT

Post-Doc research fellow in "*Analysis and modeling of social media*" - Working on data science and dynamic processes on complex networks with focus on the information and misinformation diffusion, news consumption and online users' polarization. Information extraction from social network contents by means of NLP techniques, clustering analysis, machine learning, statistical and analytical methods.

- **DIID Department** Jan 2017 - Jan 2018
  University of Palermo, Palermo, IT

  Research fellow in "*Design of data techniques in distributed systems through processing of discrete graph signals*" - Worked on graphs as representations describing the geometric structures of Big Data domains, analysis and processing of graph signal via spectral graph theory. Proposed numerical methods for signal reconstruction on graphs and conducted MATLAB simulation experiments to compare the proposed algorithms and the other existing algorithms. Investigated techniques for graph partition with balance constraint and enumeration of combinatorial cyclic designs of prime orders.

- **Department of Mathematics and Computer Science** Jan 2016 - Jan 2017
  University of Palermo, Palermo, IT

  Research fellow in "*Models and methods for engineering of ubiquituum services*" - Worked on analysis and processing of Big Data with application to social and sensor networks, detection of efficient "spreaders" of information through graph partitioning with balance constraint.

- **Department of Mathematics and Computer Science** Jan 2013 - Jan 2016
  University of Perugia, Perugia, IT

  Doctoral research in combinatorial design theory and graph theory - Investigated the relationship between graph decompositions and integer compositions giving a complete solution to the problem of enumerating the Walecki-type Hamiltonian cycle systems. Generalized to (v, k, λ) designs, with $\lambda > 1$, a previous result about enumeration of cyclic $(v, k, 1)$ designs.

- **Department of Mathematics and Computer Science** Dec 2010 - May 2012
  University of Perugia, Perugia, IT

  Master's thesis research in combinatorial design theory - Defined an equivalence relation between difference families and designed a non-isomorphism testing algorithm for cyclic $(v, k, 1)$ designs.

Teaching Experience

- **Teaching Assistant, Numerical Methods (MAT/08)** 2017 Spring
  DICGIM Department - University of Palermo, Palermo, IT
- **Adjunct Professor, Geometry (MAT/03)** 2016 Winter
  DICGIM Department - University of Palermo, Palermo, IT
- **Teaching Assistant, Mathematical Analysis (MAT/05)** 2016 Spring
  Department of Pharmaceutical Sciences - University of Perugia, Perugia, IT
- **Teaching Assistant, Geometry (MAT/03)** 2015 Winter
  Department of Engineering - University of Perugia, Perugia, IT
- **Teaching Assistant, Geometry (MAT/03)** 2014 Winter
  Department of Engineering - University of Perugia, Perugia, IT

Publications

- (with M. Cinelli, W. Quattrociocchi, A. Galeazzi, et al.) **The COVID-19 Social Media Infodemic**, Sci Rep, accepted for publication
- (with A. Scala, A. Flori, A. Spelta, et al.) **Time, Space and Social Interactions: Exit Mechanisms for the Covid-19 Epidemics**, Sci Rep 10, 13764 (2020). doi.org/10.1038/s41598-020-70631-9
- (with M. Cinelli, A.L. Schmidt, F. Zollo, et al.) **Selective exposure shapes the Facebook news diet,** PLOS ONE 15(3): e0229129 (2020). doi.org/10.1371/journal.pone.0229129
- (with E. Toscano and C. Vetro) **Iterative reconstruction of signals on graph,** in IEEE Signal Processing Letters, vol. 27, 76–80 (2020) doi.org/10.1109/LSP.2019.2956670
- (with M. Cinelli, W. Quattrociocchi and A. Scala) **Recursive patterns in online echo chambers,** Sci Rep 9, 20118 (2019). doi.org/10.1038/s41598-019-56191-7

- **Enumerating the Walecki-type Hamiltonian cycle systems,** J. Comb. Des., 25, 481–493 (2017) doi.org/10.1002/jcd.21558
- (with M. Buratti) **New designs by changing the signs,** El. Notes Discrete Math., 40, 49–52 (2013) doi.org/10.1016/j.endm.2013.05.010

Preprints

- (with M. Cinelli, F. Zollo, W. Quattrociocchi and A. Scala) **Lexical convergence and collective identities on Facebook**, http://arxiv.org/abs/1903.11452
- (with M. Buratti and M. Muzychuk) **Some bounds on the number of cyclic Steiner** 2 **designs**
- **On the number of similar non-isomorphic difference families**

Conference and Seminar Talks

- **A study on lexical behavior and lexical convergence among Facebook interacting users,** Naples – University of Naples L'Orientale, Apr 9, 2019
- **Prevenzione e catastrofi: Social media e relative metodologie di intelligence,** "Terremoto in centro Italia oggi: teoria della prevenzione ed intelligence ambientale", Campotosto (AQ) – Oct 27, 2018
- **Graph clustering methods and community detection in online social networks. Are we living in a world of tribes?,** Discrete Mathematics Seminars, Modena – Università di Modena e Reggio Emilia, Nov 20, 2018
- **Symmetries and isomorphism classes of the Walecki tournaments,** Combinatorics 2018, Arco (TN) – University of Brescia, Padova and Verona, Jun 3–9, 2018
- **Some bounds on the number of cyclic Steiner 2-designs,** BA80 & DM65, Graphs, groups, and more: celebrating Brian Alspach's 80th and Dragan Marušič's 65th birthdays, UP FHS, Koper, Slovenia, May 28- Jun 1, 2018
- **The "Golden Cow" construction,** Discretaly, a workshop in Discrete Mathematics, SBAI Department, Sapienza University of Rome, Feb 1–2, 2018
- **Graph decompositions via integer compositions,** Department of Mathematics, Polytechnic University of Milan, Sep 27, 2016
- **Iterative methods for signal reconstruction on graphs,** SIMAI 2016, Polytechnic University of Milan, Sep 13–16, 2016

- **Disegni combinatori: il gioco è una cosa seria,** Department of Mathematics and Computer Science, University of Palermo, Jun 14, 2016
- **Enumerating the Walecki-type Hamiltonian cycle systems,** Combinatorics 2016, Maratea (PZ) – University of Basilicata, May 29 - Jun 04, 2016
- **Enumerating the Walecki-type Hamiltonian cycle systems,** Giornate di Geometria 2015, Department of Mathematics and Physics, S.U.N., Caserta, Sep 17–19, 2015
- **New designs by changing the signs,** Combinatorics 2012, Department of Mathematics and Computer Science, University of Perugia, Sep 09–15, 2012

Reviewer – Journal

- **Discrete Mathematics**, Elsevier
- **Ars Mathematica Contemporanea**
- **Plos One**

Membership in Scientific Committees

- AGCOM Data Science Task Force on misinformation online during COVID-19 outbreak, together with Pietro Gravino (SONY Computer Science Lab di Parigi), Vittorio Loreto ("La Sapienza" University of Rome and SONY Computer Science Lab of Paris), Luciano Pietronero ("La Sapienza" University of Rome and Istituto Enrico Fermi of Rome), Walter Quattrociocchi e Fabiana Zollo (Ca' Foscari University of Venice), Antonio Scala (ISC -CNR of Rome). Research updates published at `https://agcom-ses.github.io/COVID`.

Relevant Skills

- Mother tongue **Italian**
- Other language **English**

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
B2	C1	B2	B2	C1

- R, Python, C, C++, PHP and MATLAB programming skills

- SQL and noSQL DBMS

Trattamento dati personali

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 “Codice in materia di protezione dei dati personali”

28/09/2020

Emanuele Brugnoli

Firma apposta con Aruba Firma