

Personal information

Surname(s) / First name(s) **Cavaleri, Matteo**

Nationality(-ies) Italian

Work address

Address Università degli Studi Niccolò Cusano - Telematica Roma, Via Don Gnocchi 3, 00166 Roma, Italia

Current position

6/2020- **Assegno di Ricerca** “Teoria algebrica e combinatoria dei grafi”, Prof. Alfredo Donno, Università degli Studi Niccolò Cusano

Previous positions

6/2017-5/2020 **Assegno di Ricerca** “Teoria geometrica e combinatoria dei gruppi”, Prof. Alfredo Donno, Università degli Studi Niccolò Cusano

15/07/2018-15/09/2018 **Junior Research Fellow**, ESI Vienna

5/2016-5/2017 **Project** PN-II-RU-TE-2014-4-0669, Institute of Mathematics of the Romanian Academy, Bucharest

2/2016 **Visiting PhD position**, University of Vienna

11/2012- 10/2015 **PhD student** at ‘Sapienza Università di Roma’

Education

8/4/2016 **PhD** in *Matematica* at ‘Sapienza Università di Roma’,

Thesis: Algorithms and quantifications in amenable and sofic groups, Advisor: *Tullio Ceccherini-Silberstein*, Classification: **excellent**

23/07/2012 **2nd level degree** in *Matematica* at ‘Sapienza Università di Roma’, 110/110 cum Laude

Thesis: Radial subalgebra of $\mathcal{L}(F_n)$, Supervisors: *Prof. F. Rădulescu, C. Pinzari*

29/10/2008 **1st level degree** in *Matematica* at ‘Sapienza Università di Roma’, 110/110 cum Laude

Thesis: p -adic numbers compared with real numbers, Supervisor: *Prof. A. Figà-Talamanca*

7/2005 **Diploma** Liceo Scientifico "L. Spallanzani", Tivoli (Rm), Italia

Papers

- 2021 *Gain-line graphs via G-phases and group representations*, Linear Algebra Appl., 613 (2021), 241–270 with D. D’Angeli and A. Donno
- 2020 *Graph automaton groups*, Adv. Group Theory Appl., in press, with D. D’Angeli, A. Donno and E. Rodaro
- 2020 *A group representation approach to balancedness of gain graphs*, J. Algebraic Combin., in press, with D. D’Angeli and A. Donno
- 2020 *Distance-balanced graphs and Travelling Salesman Problems*, Ars Math. Contemp., 19(2) (2020), 311–324, with A. Donno
- 2020 *Godsil McKay switching for gain graphs over the circle group*, Linear Algebra Appl., 614 (2021), 256–269 with F. Belardo, M. Brunetti and A. Donno
- 2020 *Partial Word and Equality problems and Banach densities*, Adv. Math. 368, (2020), 107133, 16pp., with A. Carnevale
- 2020 *Some degree and distance based invariants of wreath products of graphs*, Discrete Appl. Math. 277 (2020), 22–43, with A. Donno
- 2019 *Constructing cospectral signed graphs*, Linear Multilinear Algebra, in press, with F. Belardo, M. Brunetti and A. Donno
- 2019 *Permutational powers of a graph*, Electron. J. Comb. Vol 26 (4) (2019), P4.22, with D. D’Angeli and A. Donno
- 2019 *Total distance, Wiener index, and opportunity index in wreath products of star graphs*, Electron. J. Comb. Vol 26 (1) (2019), P1.21, with A. Donno and A. Scozzari
- 2019 *Two special subgroups of the universal sofic group*, Ergodic Theory Dynam. Systems, 39 (2019), 3250–3261, with R. B. Munteanu and L. Păunescu

- 2019 *Erratum to the article ‘A lexicographic product for signed graphs’* Australas. J. Combin. 75 (2019), no. 2, 256-257. with M. Brunetti and A. Donno
- 2019 *A Lexicographic Product for Signed Graphs* Australas. J. Combin. 74 (2019), no. 2, 332-343. with M. Brunetti and A. Donno
- 2018 *Wreath product of a complete graph with a cyclic graph: Topological indices and spectrum*, Appl. Math. Comput. 336 (2018), 288–300 with F. Belardo and A. Donno
- 2018 *Spectral analysis of the wreath product of a complete graph with a Cocktail Party graph*, Atti Accad. Peloritana Pericolanti, Cl. Sci. Fis. Mat. Natur., Vol. 96, No. S2, A1 (2018) with F. Belardo and A. Donno
- 2018 *Følner functions and the generic word problem for finitely generated amenable groups*, J. Algebra, 511 (2018), 388–404
- 2017 *Computability of Folner sets*, Internat. J. Algebra Comput. 27 (2017), no. 7, 819–830

Preprints

- 2021 *Characterizations of line graphs in signed and gain graphs*, available at arXiv:2101.09677, with D. D’Angeli and A. Donno [submitted]
- 2021 *On an uncountable family of graphs whose spectrum is a Cantor set*, available at arXiv:2101.07547, with D. D’Angeli, A. Donno and E. Rodaro [submitted]

Teaching experience

- 2021/2022 “Analisi Matematica 1”, Titolare, Università degli Studi Niccolò Cusano
- 2018/2019 “Istituzioni di Matematica”, Titolare, Università degli Studi Niccolò Cusano
- 04/2021-06/2021 “Percorso Eccellenza” Analisi Matematica 1, Università degli Studi Niccolò Cusano
- 04/2021-06/2021 “Percorso Eccellenza” Analisi Matematica 2, Università degli Studi Niccolò Cusano
- 01/2021-03/2021 “Recupero Carenze Formative Analisi Matematica 2”, Università degli Studi Niccolò Cusano
- 10/2020-12/2020 “Recupero Carenze Formative Analisi Matematica 1”, Università degli Studi Niccolò Cusano
- 05/2020-07/2020 “Recupero Carenze Formative Geometria”, Università degli Studi Niccolò Cusano
- 04/2020-05/2020 “Recupero Carenze Formative Istituzioni di Matematica”, Università degli Studi Niccolò Cusano
- 01/2020-03/2020 “Recupero Carenze Formative Analisi Matematica 2”, Università degli Studi Niccolò Cusano
- 10/2019-12/2019 “Recupero Carenze Formative Analisi Matematica 1”, Università degli Studi Niccolò Cusano
- 05/2019-07/2019 “Recupero Carenze Formative Geometria”, Università degli Studi Niccolò Cusano
- 01/2019-03/2019 “Recupero Carenze Formative Analisi Matematica 2”, Università degli Studi Niccolò Cusano
- 10/2018-12/2018 “Recupero Carenze Formative Analisi Matematica 1”, Università degli Studi Niccolò Cusano
- 05/2018-07/2018 “Recupero Carenze Formative Istituzioni di Matematica”, Università degli Studi Niccolò Cusano
- 05/2018-07/2018 “Recupero Carenze Formative Geometria”, Università degli Studi Niccolò Cusano
- 01/2018-03/2018 “Recupero Carenze Formative Istituzioni di Matematica”, Università degli Studi Niccolò Cusano
- 01/2018-03/2018 “Recupero Carenze Formative Analisi Matematica 1”, Università degli Studi Niccolò Cusano
- 09/2017-11/2017 “Recupero Carenze Formative Geometria”, Università degli Studi Niccolò Cusano
- 09/2017-11/2017 “Recupero Carenze Formative Istituzioni di Matematica”, Università degli Studi Niccolò Cusano
- 06/2017-07/2017 “Recupero Carenze Formative Geometria”, Università degli Studi Niccolò Cusano
- 06/2017-07/2017 “Recupero Carenze Formative Istituzioni di Matematica”, Università degli Studi Niccolò Cusano
- 2015 Exercise sessions for the course Matematica, Economia e management, LUISS Roma
- 2013 Exercise sessions for the course GEOMETRIA, Ingegneria Civile, Sapienza Università di Roma
- 2013 Exercise sessions for the course GEOMETRIA, Ingegneria Energetica, Sapienza Università di Roma
- 2013 Exercise sessions for the course GEOMETRIA, Ingegneria Elettrotecnica, Sapienza Università di Roma

Organization of conferences

- 14-15/09/2020 *Algebraic Combinatorics and Graph Theory*, SBAI Rome. -Postponed due to the COVID-19 emergency-

Conference and Seminar Talks

- 10/09/2020 **Invited talk:** *Gain graphs, group algebra valued matrices and Fourier transform*, Groups in Galway 2020-Online Edition, NUI Galway

11/07/2019	Seminar: <i>Wreath product of graphs: centrality measures</i> , NUI Galway
21/02/2019	Seminar: <i>Wreath product of graphs: centrality measures</i> , Università degli Studi di Napoli Federico II
1-2/02/2018	Contributed talk: <i>Wreath product of graphs: spectrum and topological indices</i> , DISCRETALY, SBAI Rome
06/12/2017	Seminar: <i>A (non-)standard approach to soficity</i> , Oberseminar Gruppen und Geometrie, Bielefeld University
26-30/06/2017	Poster Presentation: <i>Computability in amenable groups</i> , Groups and Computation, Stevens Institute of Technology, Hoboken
22-24/2/2017	Contributed talk: <i>The universal sofic action</i> , Groups, probability, dynamics, SBAI Rome
26-30/9/2016	Invited talk: <i>Computability of Folner sets and sofic approximations</i> , Sofic Groups and Operator Algebra, IMAR Bucharest
24/2/2016	Seminar: <i>Computability of Folner sets and sofic approximations</i> , ESI Vienna
18/11/2015	Seminar: <i>Quantification and computation of soficity</i> , Sapienza Università di Roma
28/9/2015-4/10/2015	Invited talk: <i>Folner sets in Kharlampovich's group</i> , Group Theory and Operator Algebra, IMAR Bucharest
26-28/05/2015	Contributed talk: <i>Laplacian MASAs</i> , XXXV Convegno Nazionale di Analisi Armonica, Matera
29/9/2014-5/10/2014	Invited talk: <i>Effective soficity: questions and remarks</i> , Topics in Geometric Group Theory, IMAR Bucharest
Visiting	
20/2/2019-22/2/2019	Visiting , Università degli Studi di Napoli Federico II, project SGTACSMC2016 Prof. Belardo
15/07/2018-15/09/2018	Visiting Senior Research , University of Vienna, Prof. Arzhantseva
2/2016	Visiting PhD , University of Vienna
Erasmus+	
27/11/2019-29/11/2019	Erasmus+ training , Amazon London
5/7/2019-13/7/2019	Erasmus+ training , NUI Galway
5/12/2017-8/12/2017	Erasmus+ training , Bielefeld University
Schools and Workshops	
25-26/03/2021	Ischia Group Theory 2020/2021, A 24 hour online Conference
10/03/2021	Workshop on Graphs, Topology and Topological Groups (Online), University of Cape Town
9-11/09/2020	Groups in Galway 2020-Online Edition, NUI Galway
28/11/2019	Alexa Workshop Unicusano, London
6-11/11/2016	60 Faces to Groups, IAS Jerusalem
15-19/2/2016	ESI Conference: Measured group theory, ESI Vienna
1-12/2/2016	ESI winter school: Measured group theory, ESI Vienna
1-5/6/2015	Growth, Symbolic Dynamics and Combinatorics of Words in Groups, ENS Paris
24-28/2/2014, 27-31/1/2014	IHP trimester on random walks and asymptotic geometry of groups, Paris
6-17/1/2014	IHP trimester: Introductory school, Luminy
2-6/9/2013	Topics in Operator Algebras and Applications, Madrid
8-12/7/2013	Mathematics and Quantum Physics, Accademia Nazionale dei Lincei, Rome
17-19/12/2012	Noncommutative Geometry and Applications to Physics, Politecnico di Milano
1/8-3/9/2010	Scuola Matematica Interuniversitaria, Perugia (Analisi Funzionale A, 30/30)
Awards	
April 2020	Assegno di Ricerca Bando 2067, "Teoria algebrica e combinatoria dei grafi", Prof. Alfredo Donno, Università degli Studi Niccolò Cusano
June 2017	Assegno di Ricerca Bando 1358, "Teoria geometrica e combinatoria dei gruppi", Prof. Alfredo Donno, Università degli Studi Niccolò Cusano
1/11/2017-31/05/2018	Ernst Mach-Stipendien , supervisor prof. G. Arzhantseva, University of Vienna (declined)
1/09/2017-31/12/2017	ESI Junior Research Fellowship , Project: Approximations and computations in infinite groups, Research Centre Erwin Schrödinger International Institute for Mathematics and Physics. (Posticipate 15/07/2018-15/09/2018)
5/2016-5/2017	Project PN-II-RU-TE-2014-4-0669, Institute of Mathematics of the Romanian Academy, Bucharest

2/2016 **PhD visiting position**, University of Vienna
 11/2012- 10/2015 **PhD fellowship** at ‘Sapienza Università di Roma’
 2007 **Scholarship** of ‘Dipartimento di Matematica La Sapienza’

Research interests

Graph Theory finite graphs, spectral properties, adjacency matrices, Laplacians, distances, topological indices, signed graphs, gain graphs, cover graphs, product of graphs, composition of graphs, centrality measures
 Combinatorial Group Theory Cayley graphs, Schreier graphs, amenability, soficity, computably presented groups, word problem, decision problems, generic decision problems

Partecipazione in research projects

2020 Part of the Research project 2020 financed by ‘Sapienza Università di Roma’: “*Algebre di operatori, geometria noncommutativa, gruppi quantistici e applicazioni alla teoria quantistica dei campi, la combinatoria e la teoria dei numeri*”. Director: Prof. R. Conti
 2019 Part of the Research project 2019 financed by ‘Sapienza Università di Roma’: “*Algebre di operatori, analisi armonica, geometria noncommutativa ed applicazioni alla fisica quantistica, la combinatoria e la teoria dei numeri*”. Director: Prof. R. Conti
 2018 Part of the Research project 2018 financed by ‘Sapienza Università di Roma’: “*Analisi e geometria noncommutative con applicazioni quantistiche, probabilistiche e alla teoria dei numeri*”. Director: Prof. F. Scarabotti
 2017 Part of the Research project 2017 financed by ‘Sapienza Università di Roma’: “*Algebre di operatori e analisi armonica non-commutativa*”. Director: Prof. R. Conti
 2015 Part of the Research project 2015 financed by ‘Sapienza Università di Roma’: “*Algebre di Operatori, Geometria non Commutativa e Gruppi Quantistici*”. Director: Prof. C. Pinzari
 2014 Part of the Research project 2014 financed by ‘Sapienza Università di Roma’: “*Algebre di Operatori, Geometria non Commutativa e Gruppi Quantistici*”. Director: Prof. C. Pinzari

Affiliations

2015, 2016, 2018, 2019,2020,2021 Gruppo Indam G.N.S.A.G.A. –Strutture algebriche e Geometria combinatoria.

Referee activities

2020- Referee for *Linear Algebra and its Applications*, *Archive for Mathematical Logic*, *The Electronic Journal of Linear Algebra* and *Punjab University Journal of Mathematics*
 2019- Reviewer for *Mathematical Reviews* (American Mathematical Society).

Language skills

Mother tongue Italian
 Foreign languages English (good)

Information technology skills

Operative systems Windows, MacOS, Unix
 E-learning LIM, Teleskill, ActivInspire
 Programming languages C, C++
 Mathematical softwares Maple, Mathematica, Matlab
 ECDL (European Computer Driving Licence) yes

20/07/2021