

PERSONAL INFORMATION

Family name, First name: BIANCONI, Ginestra
Researcher unique identifier: ORCID 0000-0002-3380-887X
URL for web site: <https://www.qmul.ac.uk/math/profiles/bianconig.html>

EDUCATION

08/08/2002 PhD in Physics, Faculty of Natural Sciences, Physics Department, Notre Dame University, USA
1998 Laurea in Fisica, Faculty of Natural Sciences, Physics Department, Università di Roma "La Sapienza", Italy

CURRENT POSITIONS

2019 – Professor of Applied Mathematics, Faculty of Sciences and Engineering, School of Mathematical Sciences, Queen Mary University of London, United Kingdom
2018 – Alan Turing Fellow, The Alan Turing Institute, United Kingdom

PREVIOUS POSITIONS

2015 – 2019 Reader in Applied Mathematics, Faculty of Sciences and Engineering, School of Mathematical Sciences, Queen Mary University of London, United Kingdom
2013 – 2015 Lecturer in Applied Mathematics, Faculty of Sciences and Engineering, School of Mathematical Sciences, Queen Mary University of London, United Kingdom
2009 – 2013 Assistant Professor, Faculty of Sciences and Engineering, Physics Department, Northeastern University, USA
2003 – 2009 Visiting Scientists and Postdoctoral Research Associate, Statistical Physics Sector, The Abdus Salam Institute for Theoretical Physics, Italy
2002 – 2003 Postdoctoral Research Associate, Faculty of Sciences, Department of Physics, Fribourg University, CH

FELLOWSHIPS AND AWARDS

2020 Awards: Fellow of the Network Science Society
2022 Francqui Chair: Fondation Francqui
2017 APS Outstanding Referee

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

Supervised Postdocs: Dr. Anthony Baptista (2022-2024) Dr. Ivan Kryven (2019), Dr. Alexander Kartun-Giles (2018-2019), Dr. Zhihao Wu (2014-2015). **Supervised PhD students:** Hanlin Sun (2019-2023), Lucille Calmon (2020-2024), Reza Ghonbarchian (2018-2022), Owen Courtney (2015-2019), Jacopo Iacovacci (2013-2017), Arda Halu (2010-2014), Kun Zhao (2009-2013). **Supervised visiting PhD students:** Federica Baccini (2021-2022) Ana Paula Millan Vidal (2018-2019) Giulia Menichetti (2014-2015), supervised Master Students: more than 20. **External PhD examiner** of 26 PhD students in Europe, USA, Australia

TEACHING ACTIVITIES

In addition to my regular teaching at QMUL including the modules Complex Networks (2013-2020, 250 students/year)- Processes on networks (2015-2019, 40 students/year), Differential Equations (2021-2022, 350 students/year) I also held advanced courses including:

2022 London Mathematical Society Advanced PhD Course: Higher-order networks
2021 Erdos Centre, Renyi Institute, Budapest, Hungary PhD course: Higher-order networks

- 2019 – 2021 London Mathematical Society Basic PhD Course: Maximum Entropy Network Ensembles
- 2016 Excellence PhD course on Network Theory, Politecnico di Torino, Italy
- 2016 London Mathematical Society Intensive Course: Multilayer Networks
- 2014 Invited PhD Course on Multilayer Networks, Seoul National University, Korea

ORGANISATION OF SCIENTIFIC MEETINGS

In the programme committee of more than 30 international conferences in the past 5 years

- 09/2022 Organiser "4th IMA Conference: The Mathematical Challenges of Big Data" Institute of Mathematics and Applications (IMA) Oxford, UK
- 02/2022 Organiser "Applied Topology" QMUL
- 02/2022 Organiser "AAAI Satellite: 2nd workshop on Graphs and more Complex structures for learning and Reasoning (GCLR)
- 09/2019 Chair "Physics challenges for Machine Learning and Network Science" at QMUL, 150 participants UK
- 02/2018 Chair "Network Geometry Workshop" at QMUL, 60 participants UK
- 07/2015 Organisers "Applied Topology and Network Theory Workshop" at QMUL, 40 participants UK
- 05/2010 NetSci2010 The International Conference on Network Science, Boston, about 500 participants, USA

INSTITUTIONAL RESPONSIBILITIES

- 2018 – 2021 Member of the Senate, Queen Mary University of London, UK
- 2017 – 2019 Head of the Networks and Complex Systems Group at the School of Mathematical Sciences, Queen Mary University of London, UK

EDITORIAL AND REVIEWING ACTIVITIES

- 2020 – Chief Editor, JPhys Complexity, IOP
- 2019 – Scientific Advisory Board, Max Planck Institute for Climate Impact Research, Germany
- 2018 – Editorial Board, Scientific Reports, Plos One, Entropy, Chaos Solitons Fractals

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- 2018 – Member, American Physical Society and European Statistical Physics Society
- 2022 – Member, Complex Systems Society
- 2018 – Member, European Women in Mathematics Society
- 2017 – Member, London Mathematical Society

MAJOR COLLABORATIONS (IN THE LAST TEN YEARS)

Prof. Alex Arenas (Rovira y Virgili University, ES), Dr. Stefano Boccaletti (University of Firenze, IT), Prof. Timoteo Carletti (Namur University, BE), Dr. Sergey Dorogovstev (Aveiro University, PO), Prof. Santo Fortunato (Indiana University, USA), Prof. Laurent Herbert-Dufresne (University of Vermont, USA), Prof. Desmond Higham (Edinburgh University, UK), Prof. Filippo Radicchi (Indiana University, USA), Prof. Juan G. Restrepo (Bulder University, USA), Dr. Ruben Sanchez-Garcia (Southampton University, UK), Prof. Joaquin J. Torres (Granada University, ES), Prof. Robert M. Ziff (Michigan University, USA).

GINESTRA BIANCONI

Ginestra Bianconi is a theoretical physicist and a network scientist. She is well known for her work on statistical mechanics of networks including network modelling and critical phenomena on multilayer networks. She is an expert on equilibrium and non-equilibrium approaches leading to the formulation of the Bose-Einstein condensation in complex networks. She has been awarded the network Science Fellowship with citation "For foundational contributions to network science, in particular the formulation of the Bose-Einstein condensation in complex networks and advances on the structure and dynamics of multilayer networks." Recently her research focus is on the investigation of the interplay between topology and dynamics in higher-order networks and simplicial complexes. She is author of more than 170 articles, 4 book chapters, 1 Physics Reports review article in multilayer networks (+2700 citations). The published articles received a total of more than 18k citations - h-index 60 according to Google Scholar. Single author of the books *Multilayer Networks: Structure and Function* (Oxford University Press, 2018), *Higher-order networks: An introduction to simplicial complexes* (Cambridge University Press, 2021). Editor of the book *Networks of Networks in Biology* (Cambridge University Press, 2021).

She has been invited to more than 100 talks at international conferences and workshops in Europe, USA and Asia, and seminars in Universities in Europe and USA. Invited to hold entire PhD courses at Seoul National University (South Korea) at Politecnico di Torino (Italy). and the Renyi Institute (Hungary). She has organized of numerous international conferences.

LIST OF RELEVANT PAPERS

NETWORK THEORY

- Bianconi, G. and Barabási, A.L., 2001. Bose-Einstein condensation in complex networks. *Physical Review Letters*, 86(24), p.5632
- Bianconi, G. and Barabási, A.L., 2001. Competition and multiscaling in evolving networks. *EPL (Europhysics Letters)*, 54(4), pp.436-442.
- Bianconi, G., Pin, P. and Marsili, M., 2009. Assessing the relevance of node features for network structure. *Proceedings of the National Academy of Sciences*, 106(28), pp.11433-11438.
- Anand, K. and Bianconi, G., 2009. Entropy measures for networks: Toward an information theory of complex topologies. *Physical Review E*, 80(4), p.045102.
- Anand, K., Bianconi, G. and Severini, S., 2011. Shannon and von Neumann entropy of random networks with heterogeneous expected degree. *Physical Review E*, 83(3), p.036109.
- Anand, K. and Bianconi, G., 2010. Gibbs entropy of network ensembles by cavity methods. *Physical Review E*, 82(1), p.011116.

HIGHER-ORDER NETWORKS

- Wu, Z., Menichetti, G., Rahmede, C. and Bianconi, G., 2015. Emergent complex network geometry. *Scientific Reports*, 5(1), pp.1-12.
- Bianconi, G. and Rahmede, C., 2017. Emergent hyperbolic network geometry. *Scientific reports*, 7(1), pp.1-9.
- Courtney, O.T. and Bianconi, G., 2016. Generalized network structures: The configuration model and the canonical ensemble of simplicial complexes. *Physical Review E*, 93(6), p.062311.
- Millán, A.P., Torres, J.J. and Bianconi, G., 2020. Explosive higher-order Kuramoto dynamics on simplicial complexes. *Physical Review Letters*, 124(21), p.218301.
- St-Onge, G., Sun, H., Allard, A., Hébert-Dufresne, L. and Bianconi, G., 2021. Universal nonlinear infection kernel from heterogeneous exposure on higher-order networks. *Physical Review Letters*, 127(15), p.158301.
- Bianconi, G., 2021. The topological Dirac equation of networks and simplicial complexes. *JPhys Complexity* 2, p. 035022.

- Calmon, L., Restrepo, J.G., Torres, J.J. and Bianconi, G., 2022. Dirac synchronization is rhythmic and explosive. *Communications Physics*, 5(1), pp.1-17.

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MULTIPLEX NETWORKS

- Radicchi, F. and Bianconi, G., 2017. Redundant interdependencies boost the robustness of multiplex networks. *Physical Review X*, 7(1), p.011013.
- Bianconi, G., 2013. Statistical mechanics of multiplex networks: Entropy and overlap. *Physical Review E*, 87(6), p.062806.
- Menichetti, G., Remondini, D., Panzarasa, P., Mondragón, R.J. and Bianconi, G., 2014. Weighted multiplex networks. *PloS one*, 9(6), p.e97857.
- Halu, A., Mondragón, R.J., Panzarasa, P. and Bianconi, G., 2013. Multiplex pagerank. *PloS one*, 8(10), p.e78293.
- Bianconi, G. and Dorogovtsev, S.N., 2014. Multiple percolation transitions in a configuration model of a network of networks. *Physical Review E*, 89(6), p.062814.
- Cellai, D., Dorogovtsev, S.N. and Bianconi, G., 2016. Message passing theory for percolation models on multiplex networks with link overlap. *Physical Review E*, 94(3), p.032301.

LIST OF BOOKS (TWO MONOGRAPHS AND ONE EDITED BOOK)

- Bianconi, G., 2018. *Multilayer networks: structure and function*. Oxford University Press.
- Bianconi, G., 2021. *Higher-order networks: an introduction to simplicial complexes*. Cambridge University Press.
- Kiani, N.A., Gomez-Cabrero, D. and Bianconi, G. eds., 2021. *Networks of Networks in Biology: Concepts, Tools and Applications*. Cambridge University Press.

LIST OF REVIEW ARTICLES

- Bianconi, G., 2015. Interdisciplinary and physics challenges of network theory. *EPL (Europhysics Letters)*, 111(5), p.56001.
- Battiston, F., Amico, E., Barrat, A., Bianconi, G., Ferraz de Arruda, G., Franceschiello, B., Iacopini, I., Kéfi, S., Latora, V., Moreno, Y. and Murray, M.M., 2021. The physics of higher-order interactions in complex systems. *Nature Physics*, 17(10), pp.1093-1098.
- Boccaletti, S., Bianconi, G., Criado, R., Del Genio, C.I., Gómez-Gardenes, J., Romance, M., Sendina-Nadal, I., Wang, Z. and Zanin, M., 2014. The structure and dynamics of multilayer networks. *Physics reports*, 544(1), pp.1-122.
- Bianconi, G., 2014. Dangerous liaisons?. *Nature Physics*, 10(10), pp.712-714.

SELECTED INVITED PRESENTATIONS (IN THE LAST SIX YEARS)-(*) STANDS FOR ONLINE EVENTS:

- Kavli Salon: Network Science Meets Neuroscience, Los Angeles, USA Oct 3- 6 2022
- NORDITA: WINQ Workshop on Complex Dynamical Networks, Stockholm, Sweden, Jun 13-15 2022
- NetSci 2022* (plenary talk) Shanghai, China 25-29 July
- SIAM Conference: Mathematics of Data Science* San Diego Sep 23-30 2022
- IPAM Workshop: Reconstructing Network Dynamics from Data: Application to neuroscience and Beyond* Aug 29-Sep 2 2022 UCLA, USA
- Applied Topology in Frontier Sciences*, Singapore 11-22 July 2022
- IUPAP Conference on Computational Physics* University of Texas 1-4 Auguts 2022
- Blockchain Kaigi 2022* Tokio, Japan Aug 3-4 2022
- Future Directions in Multilevel and Multilayer Systems*, Northeastern University, USA, July 15-16 2022
- Complex Networks 2021 Madrid, Spain 30 Nov-3 Dic 2021
- Beyond TDA - Persistent functions and their applications in data sciences* NTU Singapore Aug 28 2021

- Dynamics Days Asia Pacific*, (plenary speaker), Singapore, November 17 2020
- MECO45* 14-18 Sep 2020
- StatPhys, (invited speaker) Buenos Aires, July 2019
- Quantum Gravity in Paris, Paris, Institute Henri Poincare, 15-19 April 2019
- APS March Meeting, Boston, 20 years of Network Science 7 March 2019
- CCS2018 (plenary speaker) Thessaloniki, Greece 23-28 September 2018
- MECO43, Krakow, Poland, 1-4 May 2018
- NetSci18x (plenary speaker) China 5-9 January 2018
- Complex Networks 2017 Lyon, France 29 Nov-1 Dec 2017
- Royal Statistical Society Discussion Meeting, Proposing the Vote of Thanks, London, 10 May 2017
- School and Conference in Applied Algebraic Topology, Bonn, Germany 2017
- Beyond Center for fundamental concepts in science, Information and non-equilibrium thermodynamics, Arizona University, USA, 18-20 Apr 2017
- Network Science and its Applications, Newton Institute 25-26 Aug 2016
- Graphs Limits and Statistics, Newton Institute, Cambridge 11-15 Jul 2016
- NetSci 2016 (plenary talk) Seoul, Korea, 30 May - 3 Jun 2016
- Critical and collective effects in graphs and networks, Moscow Institute of Physics and Technology, Moscow 25-29 Apr 2016.
- Generalized Network Structures and Dynamics, MBI Columbus, Ohio, USA 20-25 Mar 2016.

INVITED PHD COURSES AT INTERNATIONAL INSTITUTIONS

- Course on Multilayer Networks, (9 hours), Department of Physics, Seoul National University 2014
- Intensive Course on Higher-order networks (10 hours), London Mathematical Society, 2016 London UK
- Excellence PhD course on Network Theory-Multilayer and Higher-order networks (15 hours), Department of Mathematics, Politecnico di Torino 11-16 December 2016
- Course on Higher-order networks (6 hours) School on Mathematics of Large Networks, Erdos Center, Renyi Institute, Budapest
- Course on Higher-order networks (3 hours), Lipari School
- Advanced Course on Higher-order networks (10 hours), London Mathematical Society (year 2022/2023) London UK