

Education

- 01/11/2021 - present **PhD in Systems Science**, IMT School for Advanced Studies Lucca, under the supervision of Prof. Tiziano Squartini and Prof. Diego Garlaschelli, Research Unit NETWORKS.
- 18/01/2025 - 18/04/2025 **Visiting PhD Student**, University of Oxford, Mathematical Institute, under the supervision of Prof. Renaud Lambiotte.
- 14/07/2021 **Master's Degree in Mathematics**, University of Florence, Florence, Italy, 110/110 cum Laude.
- 17/07/2019 **Bachelor's Degree in Mathematics**, University of Florence, Florence, Italy, 110/110 cum Laude.
- 04/07/2016 **Scientific High School Diploma**, Liceo Scientifico A.M.E. Agnoletti, Sesto F.No, Italy, 100/100 cum Laude.

Invited Talks

- 14/05/2025 **Pisan Young Seminars in Applied and Numerical Mathematics**, seminar series organised by PhD students from the University of Pisa and the Scuola Normale Superiore.
Statistical mechanics of signed graphs.
<https://pysanum.dm.unipi.it/>
- 25/02/2025 **Networks Seminar**, University of Oxford.
Statistical mechanics of signed graphs
<https://www.maths.ox.ac.uk/node/70623>
- 12/12/2024 **Young Seminars SIFS**, online seminar at the *Young Seminars* organized by the Italian Society of Statistical Physics.
Statistical mechanics of signed graph
<https://www.fisicastatistica.org/young-seminars-sifs>
- 02/09/2024 **Frameworks, Research and applications in complex Networks with signed edgeS**, satellite of the Conference on Complex Systems 2024, Exeter (United Kingdom).
Testing structural balance theories in undirected and directed signed networks
<https://signet-friends.github.io/>
- 15/05-17/05/2024 **Signed Relations and Structural Balance in Complex Systems: From Data to Models**, ETH Workshop, Zurich (Switzerland).
Assessing frustration in real-world signed networks: towards a statistical theory of balance
<https://www.sg.ethz.ch/events/workshop-structural-balance-may-2024/>
- 29/11/2023 **Series of Seminars *Insalate di Matematica***, University of Milano-Bicocca (Italy).
Strong, weak or no balance? Testing structural hypothesis in real heterogeneous networks
<https://sites.google.com/view/insalate-di-matematica/speakers/20232024>
- 02/03/2023 **Network for Statistical and Causal Inference (NESCI)**, Lucca (Italy).
Causal or Casual? A Network Approach to the Analysis of Inference
<https://www.santannapisa.it/it/news/nesci-kick-meeting-march-2-2023-lucca>
- 18/07/2022 **Workshop *Francesca Romana Nardi: a life in probability, building communities across Europe***, Florence (Italy).

Tunneling behavior of the q -state Potts model with zero external magnetic field

<https://www.eurandom.tue.nl/event/celebrating-francesca/>

14/03/2022 **Probability & Statistics Seminar**, TU Delft (The Netherlands)

Critical configurations and tube of typical trajectories for the Potts model with zero external magnetic field evolving under Glauber dynamics

<https://www.tudelft.nl/en/eemcs/the-faculty/departments/applied-mathematics/applied-probability/events/past-events/seminar-archives>

Contributed Talks

02/09- **Conference on Complex Systems 2024 (CCS'24)**, Exeter (England).

06/09/2024 *Assessing frustration in real-world signed networks: towards a statistical theory of balance*

<https://ccs24.cssociety.org/programme-2/>

16/06- **International School and Conference on Network Science 2024 (NetSci)**, Québec City
21/06/2024 (Canada).

Assessing frustration in real-world signed networks: towards a statistical theory of balance

<https://netsci2024.com/en/program>

10/07/2023 **International Conference on Statistical Physics - SigmaPhi 2023**, Chania-Crete (Greece).

Strong, weak or no balance? Testing structural hypotheses against real networks

<http://www.sigmaphi.polito.it/>

15/09/2021 **Young Applied Mathematicians in Leuca**, Santa Maria di Leuca (Italy).

Metastability for the Potts and Ising Models with zero and non-zero external magnetic field evolving under Glauber dynamics

<https://www.uzerbinati.eu/Conference/2021/index.html>

Poster Sessions

06/10/2021 **Junior female researchers in probability**, Berlin/Online (Germany).

Metastability for the Potts and Ising Models with zero and non-zero external magnetic field evolving under Glauber dynamics

<https://www.wias-berlin.de/workshops/JFRP20/>

Attendance at international summer schools

28/08 - **School of the Italian Society of Statistical Physics - II Edition**, IMT School for Advanced
07/09/2023 Studies Lucca. Main course taught by Diego Garlaschelli (*Networks*) and Francesco Ginelli (*Active Matter*); seminar courses taught by Paolo Politi (*Non Equilibrium Phase Transitions*), Andrea Gambassi (*Quantum statistical systems out of equilibrium*), Enrico Maria Malatesta (*Statistical mechanics of artificial neural networks*) and Rosario Mantegna (*Econophysics*).

29/08- **First School of the Italian Society of Statistical Physics**, IMT School for Advanced Studies
08/09/2022 Lucca. Main course taught by Roberto Benzi (*Hydrodynamics and Turbulence*) and Alessandro Sarracino (*Stochastic Thermodynamics*); seminar courses taught by Franco Bagnoli (*Computational Lab*), Diego Garlaschelli (*Statistical Physics of Networks*), Andrea Puglisi (*Granular materials*) and Luca Salasnich (*Quantum Statistical Physics with cold atoms*).

07/07- **Summer Graduate School on Random Graphs** at the Mathematical Science Research Institute
15/07/2022 (MSRI), Berkeley (California). Main course taught by Remco van der Hofstad.

02/09- **Probability - Summer School**, Fundacao Calouste Gulbenkian, Lisboa (Portugal). Course
 06/09/2019 "Shuffling cards and adding numbers: a peek at Markov chains", Persi Diaconis (Stanford University). Course "Mixing times of Markov chains: famous problems and the techniques behind their solutions", Evita Nestoridi (Princeton University). Course "Random walks, electrical networks and uniform spanning trees", Perla Sousi (University of Cambridge).

Scientific Publications

- 2025 ○ A. G., F. Saracco, T. Squartini, **Statistically validated projection of bipartite signed networks**, *npj Complexity* (2025).
- A. G., F. Saracco, R. Lambiotte, D. Garlaschelli, T. Squartini, **Patterns of link reciprocity in directed, signed networks**, *Physical Review E*, **111**, 024312 (2025).
<https://journals.aps.org/pre/abstract/10.1103/PhysRevE.111.024312>
- 2024 ○ A. G., D. Garlaschelli, T. Squartini, **Assessing frustration in real-world signed networks: A statistical theory of balance**, *Physical Review Research*, **6**, L042065 (2024).
<https://journals.aps.org/prresearch/abstract/10.1103/PhysRevResearch.6.L042065>
- A. G., D. Garlaschelli, R. Lambiotte, F. Saracco, T. Squartini, **Testing structural balance theories in heterogeneous signed networks**, *Communications Physics*, **7**, 154 (2024).
<https://doi.org/10.1038/s42005-024-01640-7>
- G. Bet, A. G., F.R. Nardi, **Metastability for the degenerate Potts Model with positive external magnetic field under Glauber dynamics**, *Stochastic Processes and Their Applications*, **172**, 104343 (2024).
<https://doi.org/10.1016/j.spa.2024.104343>
- 2023 ○ S. Baldassarri, A. G., V. Jacquier, A. Zocca, **Ising model on clustered networks: A model for opinion dynamics**, *Physics A: Statistical Mechanics and its Applications*, **623**(1):128811 (2023).
<https://doi.org/10.1016/j.physa.2023.128811>
- G. Bet, A. G., S. Kim, **Metastability of the three-state Potts model with general interactions**, *Electronic Journal of Probability*, **28**, 1-37 (2023).
<https://doi.org/10.1214/23-EJP1003>
- 2022 ○ G. Bet, A. G., F.R. Nardi, **Metastability for the degenerate Potts Model with negative external magnetic field under Glauber dynamics**, *Journal of Mathematical Physics*, **63**, 123303 (2022).
<https://doi.org/10.1063/5.0099480>
- 2021 ○ G. Bet, A. G., F.R. Nardi, **Critical Configurations and Tube of Typical Trajectories for the Potts and Ising Models with Zero External Field**, *Journal of Statistical Physics*, **184**, 30 (2021).
<https://doi.org/10.1007/s10955-021-02814-1>

Disseminational and Tutoring Activities

- 29/09/2023 Tutor at the Bright Night of European Researchers, IMT School for Advanced Studies, Lucca.
<https://www.bright-night.it/2023/stand-della-ricerca/>
- 2020-2022 Tutor for OpenLab at the University of Florence.
<https://www.openlab.unifi.it/>
- 20/03/2021 Tutor at *Gara Matematica*, University of Florence.

- 1-4/02/2021 Tutor at *Settimana Matematica Fiorentina*, University of Florence.
2-5/02/2020 Tutor at *Settimana Matematica Fiorentina*, University of Florence.

Reviewing Activity

- 2023-present **Referee.**
Network Science, *MathSciNet (AMS)*
<https://www.webofscience.com/wos/author/record/HTQ-3439-2023>

Fellowships and membership in societies

- 2024 - 2025 Member of Complex Systems Society (CCS).
<https://cssociety.org/members>
- 2024 - present Member of Women in Network Science (WiNS) society.
<https://sites.google.com/view/womeninnetworkscience/home?authuser=0>
- 2022 - present Adherent to GNAMPA - INdAM (Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni).
<https://www.altamatematica.it/gnampa/>

Mentions, awards and honors

- 2023 ○ **Strong, weak or no balance? Testing structural hypotheses against real networks** - Mentioned by *Data For Science* in the section 'Fresh From Press' as one of the most interesting academic papers published recently.
- 2022 ○ *Premio di Laurea 'Alberto Bardazzi'* - best student in the scientific disciplines at the University of Florence in the academic year 2020/2021 (Italy).
<https://www.unifi.it/art-6242-proclamati-i-vincitori-del-premio-di-studio-alberto-bardazzi.html>
<https://www.tvprato.it/video/18esima-edizione-del-premio-di-studio-alberto-bardazzi/>
<http://www.notiziediprato.it/news/anna-gallo-e-jacopo-gronchi-sono-i-vincitori-della-diciottesima-edizione-del-premio-alberto-bardazzi>
<https://met.cittametropolitana.fi.it/news.aspx?n=361419>
- *Premio Manacorda* for the academic career and for the best original thesis in mathematical modeling, mechanics or mathematical physics for the academic year 2020/2021, Florence (Italy).
- Master's degree prize in Mathematics and Informatics at the University of Florence (Italy), academic year 2020/2021, first place.
- 2021 ○ Financial refund for productivity and merit during the academic year 2010/2021 at the University of Florence (Italy).
- 2020 ○ Bachelor's degree prize in Mathematics and Informatics at the University of Florence (Italy), academic year 2018/2019, second place.
<https://www.dimai.unifi.it/art-357-consegna-premi-laurea-e-manacorda.html>
- Financial refund for productivity and merit during the academic year 2019/2020 at the University of Florence (Italy).

- 2019 ○ Financial refund for productivity and merit during the academic year 2018/2019 at the University of Florence (Italy).
- 2018 ○ Financial refund for productivity and merit during the academic year 2017/2018 at the University of Florence (Italy).
- 2016 ○ *Premio Eccellenza dei diplomati con 100 e Lode*, 2015/2016, INDIRE, at Liceo Scientifico A.M.E. Agnoletti, Sesto Fiorentino (Italy).