Eleonora **Andreotti**

RESEARCHER (PH.D.)
FBK - Fondazione Bruno Kessler

✉ eandreotti@fbk.eu | 🏠 eleonoraandreotti8.wixsite.com/website | ⓘ 0000-0002-4500-2435 | ℝ

researchgate.net/profile/Eleonora-Andreotti-3 | ⓞ eleonoraandreotti | 🔗 eleonora-andreotti-5b3898168

Areas of interest

- *Statistical modeling and data analysis*
- *AI, Machine learning and optimization*
- *Complex networks, community structure and detection*
- *Numerical simulation and mathematical models*
- *Graph and hypergraph theory*

Work Experience

Researcher

FBK - Fondazione Bruno Kessler
RESEARCHER

Trento, Italy
Gen 2025 - Today

- Talea - Analysis and Modelling of Human Behaviour from Digital Traces

CINECA
SENIOR DATA SCIENTIST

Bologna, Italy
Sep 2021 - Oct 2024

- Developing and carrying on optimization and AI-based projects
- Teaching in the Master *Digital Transformation e Data Analysis per la Pubblica Amministrazione e le Imprese* held by CINECA and Rimini University. In particular, I taught in the "*Predictive Analysis*" module

Chalmers University of Technology
POSTDOCTORAL RESEARCHER

Göteborg, Sweden
Aug 2019 - Aug 2021

- Safety and mobility autonomous vehicles in mixed traffic.
- Heterogeneous traffic groups cooperative driving behaviours research under mixed traffic condition.
  Partners: Volvo Cars, Volvo Group, Geely Automobile, The Swedish National Road and Transport Research Institute (VTI), Research Institute of Highway (RIOH), Tongji University, Tsinghua University and Jingwei Hirain Technologies.

University of Torino
POSTDOCTORAL RESEARCHER

Torino, Italy
Apr 2018 - Aug 2019

- Mechanical-Statistical Methods and Network Theory for the study of gene regulation

Naxis, Namur Instiute for Complex Systems
VISITING RESEARCHER

Namur, Belgium
Jun 2018

- Fractional diffusion on undirected multilayer networks
Collaboration with T. Carletti

Max Planck Institute for Mathematics in the Sciences
VISITING RESEARCHER

Leipzig, Germany
Aug 2017 - Apr 2018

- Spectra of hypergraphs
Collaboration with R. Mulas

University of Bologna
PRE-PHD SCHOLARSHIP RESEARCH

Bologna, Italy
May 2014 - Oct 2014

- Data analysis, traffic patterns and reconstruction of the dynamics of accidents by accelerometers and GPS systems
  Partner: Unipol Group

Education

University of L'Aquila   *L'Aquila, Italy*
PHD IN MATHEMATICS - HONOURS OBTAINED: EXCELLENT CUM LAUDE   *Nov 2014–Oct 2017*
- Constrained Fiedler graph partitioning and Laplacians eigenvalues multiplicity
  This is a citation to my PhD Thesis [13]

University of Bologna   *Bologna, Italy*
M.S. IN APPLIED MATHEMATICS   *Oct 2010–Oct 2013*
- Studio della dinamica del traffico su una rete stradale (Study of traffic dynamics on a road network)
  This is a citation to my Master Thesis [15]

University of Ferrara   *Ferrara, Italy*
B.S. IN APPLIED MATHEMATICS   *Oct. 2007 - Oct. 2010*
- L'Equazione delle onde (The Wave Equation)

Professional training

2024	**Data Intelligence Day**, Databricks Workshop	*Milano, Italy*
2021	**Machine Learning with Python**, IBM	*Online*
2021	**Python for Data Science and AI**, IBM	*Online*
2021	**Tools for Data Science**, IBM	*Online*
2016	**III Mediterranean School of Complex Networks**,	*Salina, Italy*
2016	**Complex Networks: Theory, Methods and Applications II**, Lake Como School of Advanced Studies	*Como, Italy*
2015	**Complex Networks: Theory, Methods and Applications**, Lake Como School of Advanced Studies	*Como, Italy*

Skills

Programming	Python, Matlab
Databases	Oracle SQL
Tools	GitHub, Azure Databricks, Microsoft Power BI, Jira
Markup Language	Latex
Traffic simulation software	SUMO
Network analysis and visualization software	Gephi, MuxViz
Languages	English (advanced), Italian (native)

Publications

1. E. Andreotti, Selpi, P. Boyraz. *Potential impact of Autonomous Vehicles in mixed traffic from simulation using real traffic flow*, Journal of Intelligent and Connected Vehicles, vol. 6, no. 1, pp. 1-15, March 2023, doi: 10.26599/JICV.2023.9210001 (2023)

2. E. Andreotti, Selpi, M. Aramrattana. *Cooperative merging strategy between connected autonomous vehicles in mixed traffic*, IEEE Open Journal of Intelligent Transportation Systems, vol. 3, pp. 825-837, 2022, doi: 10.1109/OJITS.2022.3179125 (2022)

3. X. Jing, X. Pei, S. Yan, C. Han, Selpi, E. Andreotti, J. Ding. *Safety benefit of cooperative control for heterogeneous traffic on-ramp merging*, Transportation Safety and Environment 4, Volume 4, Issue 4, December 2022, tdac031, doi: 10.1093/tse/tdac031 (2022)

4. E. Andreotti, R. Mulas. *Signless normalized Laplacian for hypergraphs*, Electronic journal of graph theory and applications, vol. 10, n. 2, doi: 10.5614/ejgta.2022.10.2.1 (2022)

5. E. Andreotti. *Spectra of hyperstars*, Australasian Journal of Combinatorics, Volume 82(1), Pages 74-94, ISSN: 2202-3518 (2021)

6. E. Andreotti, D. Edelmann, N. Guglielmi, C. Lubich. *Measuring stability of spectral clustering*, Linear Algebra and Its Applications journal, doi: 10.1016/j.laa.2020.10.015 (2021)

7. E. Andreotti, P. Boyraz, Selpi. *Safety-centred analysis of transition stages to traffic with fully autonomous vehicles*, IEEE ITSC2020, Rhodes, Greece, 2020, pp. 1-6, doi: 10.1109/ITSC45102.2020.9294644 (2020)

8. E. Andreotti, P. Boyraz, Selpi. *Mathematical Definitions of Scene and Scenario for Analysis of Automated Driving Systems in Mixed-Traffic Simulations*, IEEE T-IV, vol. 6, no. 2, pp. 366-375, June 2021, doi: 10.1109/TIV.2020.3031981 (2020)

9. P. Freguglia, E. Andreotti, A. Bazzani. *Modelling Ecological Systems from a Niche Theory to Lotka-Volterra Equations.* doi: 10.1007/978-3-030-41120-6_1. In: Current Trends in Dynamical Systems in Biology and Natural Sciences. SEMA SIMAI Springer Series, vol 21. Springer, Cham (2020)

10. E. Andreotti, D. Edelmann, N. Guglielmi, C. Lubich. *Constrained Graph Partitioning via Matrix Differential Equations*, SIAM Journal on Matrix Analysis and Applications 40 (1), 1-22, doi: 10.1137/17M1160987 (2019)

11. E. Andreotti, D. Edelmann, N. Guglielmi, C. Lubich. *Graph partitioning using matrix differential equations.* 16th Cologne-Twente Workshop on Graphs and Combinatorial Optimization, CTW 2018 - Proceedings of the Workshop, pp. 96-99, doi: 10.48550/arXiv.1712.05993 (2019)

12. E. Andreotti, D. Remondini, G. Servizi, A. Bazzani. *On the multiplicity of Laplacian eigenvalues and Fiedler partitions*, Linear Algebra and Its Applications journal, 544C, pp. 206-222, doi: 10.1016/j.laa.2018.01.009 (2018)

13. E. Andreotti. *Constrained fiedler graph partitioning and Laplacians eigenval- ues multiplicity* : dottorato di ricerca in matematica e modelli. PhD thesis. L'Aquila (2017)

14. E. Andreotti, A. Bazzani, S. Rambaldi, P. Freguglia, N. Guglielmi. *Modeling traffic fluctuations and congestion on a road network*, Advances in Complex Systems 18, World Scientific Publishing Company. doi: 10.1142/S0219525915500095 (2015)

15. E. Andreotti. *Studio della dinamica del traffico su una rete stradale*. MA thesis. University of Bologna (2013)

Academic presentations - A selection

2021	*Potential impact of Autonomous Vehicles in mixed traffic from simulation using real traffic flow*, Chalmers University of Technology	*Göteborg, Sweden*
2020	*Safety-centred Analysis of Transition Stages to Traffic with Fully Autonomous Vehicles*, SAFER: China Sweden Traffic Safety Centre (CTS)	*Göteborg, Sweden*
2020	*Safety-centred Analysis of Transition Stages to Traffic with Fully Autonomous Vehicles*, The 23rd IEEE International Conference on Intelligent Transportation Systems	*Rhodes, Greece*
2018	*Statistical properties of non linear random walks on networks*, Naxis, Namur Institute for Complex Systems	*Namur, Belgium*
2017	*Statistical properties of non linear random walks on networks*, Max Planck Institute for the Physics of Complex Systems	*Dresden, Germany*
2017	*On the multiplicity of Laplacian eigenvalues and Fiedler partitions*, Summer Solstice 2017, 9th International Conference on Discrete Models of Complex Systems, University of Catania	*Catania, Italy*
2016	*Partition of a graph using Fiedler's theory: some properties*, Workshop Biophys '16, Univeristy of Bari	*Bari, Italy*
2015	*Non linear random walks on networks*, Workshop Biophys '15, University of Florence	*Florence, Italy*
2014	*Stochastic model for traffic on a simple road network*, Workshop Biophys '14, University of Bologna	*Bologna, Italy*

Additional Information

Interests	• Climate Change and Environmental Sustainability • Shiatsu - V level at IES, European Shiatsu Institute • Cycling • Choral Singing
Data collection	for *Tourist flows experimental tracking:* During the Venice Carnival 2017 (from February 23 to March 02). I cooperated with the "Laboratorio di Fisica dei Sistemi Complessi" (University of Bologna) for the data-gathering on-site.
Reviewer	for: *Communications in Nonlinear Science and Numerical Simulation* (Since 2017). for: *Scientific Reports - Nature* (Since 2018). for: *Advances in Complex Systems* (Since 2019). for: *IEEE ITS* (Since 2020). for: *Discrete Mathematics Journal* (Since 2020). for: *IEEE Access* (Since 2023).