

Iacopo Iacopini

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Resume

I am a physicist with a strong interest in applied sciences. My research interests include complex networks and data science, in particular, spatial networks, trade networks, social networks and urban mobility. I am particularly interested in the data driven application of network science to the urban system. My work consists of developing computational methodologies for extracting mesoscopic information from data and building mathematical models aiming to reproduce the statistical properties observed and the emerging behaviours. I am currently focusing on reinforced random walks on complex networks, spatial interaction models, the definition of productivity for cities, urban scaling laws, spatial segregation analysis using social media traces, and innovation diffusion.

Education

- 2016-present **PhD in Mathematics**, *Queen Mary University of London*, London, UK.
Complex Systems and Networks research group.
Supervisors: V. Latora (QMUL), E. Arcaute (Centre for Advanced Spatial Analysis - UCL).
Topic: The mathematical modelling of urban systems.
- 2013-2015 **MSc. in Physics of Complex Systems (with honors)**, *University of Turin*, Italy.
Socioeconomics curriculum, mainly focusing on Statistical Mechanics, Stochastic Processes, A-B Modeling, Data Mining, Machine Learning, Complex Networks, Systems Biology.
Thesis supervisor: C. Cattuto.
Topic of the thesis: Spatio-temporal analysis of car crash occurrences.
- 2009-2013 **BSc. in Physics**, *University of Bologna*, Italy.
Thesis supervisor: S. Rambaldi.
Topic of the thesis: Dynamic Model of a Urban Mobility Network.
- 2004-2009 **Scientific high school diploma**, *Liceo Scientifico T.C.O.*, Fermo, Italy.
Informatics specialization.

Experience

- Sept 2017 **Enrichment Doctoral Student**, *The Alan Turing Institute*, London, UK.
present
- October 2016 **Postgraduate Researcher**, *School of Mathematical Sciences*, QMUL, UK.
present
- Oct 2016 **Computational Support Assistant**, *School of Mathematical Sciences*, QMUL, UK.
present
Dynamical Systems & Statistical Physics research group.
EPSRC grant: Nash equilibria for load balancing in networked power systems.
Project website: <https://iaciac.github.io/lobanet/>.

- May 2016 **Researcher**, *ISI Foundation*, Turin, Italy.
- Sept 2016 Data Science Lab and Mathematics & Foundation of Complex Systems research group.
 - Systematic analysis of the structure and dynamics of the International Postal Network aiming to identify new socio-economic indicators from the hidden spatial and temporal information.
 - Temporal network analysis using statistical mechanics and algebraic topology tools.
 - Analysis of the co-evolution of edges in time and pattern detection.
 - Development of a configuration model for directed weighted networks.
- Sep 2015 **Data Science Intern**, *UPU - United Nations Specialized Agency*, Bern, Switzerland.
- Mar 2016 Supervisor: J. Anson.
 - Database structuring and geocoding.
 - Data cleaning and outlier detection.
 - Construction and analysis of the International Postal Network (IPN).
 - Analysis and community detection of the IPN in its temporal representation.
 - Predictive modelling for shipping times and volumes (prEDI project).
 - Development of an interactive visualization framework to display regional Quality-of-Service.
 - Collection and text mining of Twitter data.
 - CO₂ emissions analysis of postal transportation networks.
- Mar 2015 **Student Intern**, *ISI Foundation*, Turin, Italy.
- Oct 2015 Research advisers: L. Gauvin, G. Petri.
 - Acquisition and preprocessing of several datasets related to urban structure and mobility (GIS road network and zipcode areas, car crashes, inductive loop detectors and FCD data).
 - Geocoding and data aggregation (GIS-based methods, Voronoi tessellation, NetKDE, Wavelet power spectrum, temporal clustering).
 - Comparison of different spatial density estimation techniques, data analysis and hotspot detection.
- Nov 2012 **Student Intern**, *University of Bologna*, Bologna, Italy.
- Mar 2013
 - Modelling of a urban mobility network (C++) with different topologies.
 - Generation of a stochastic OD demand and time scheduling.
 - Design and implementation of an adaptive one-way flipping mechanism.
 - Analysis of simulation results.

Teaching

- Jan 2017 **Teaching Assistant**, *School of Electronic Engineering and Computer Science*, QMUL. Network Modelling and Performance.
- Mar 2017 **Teaching Assistant**, *School of Mathematical Sciences*, QMUL. Introduction to Statistics.

Skills

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|-------------------|---|-----------|--------------------|
| OSes | Linux, OS X, Windows. | DB | MySQL, PostgreSQL. |
| Languages | Python, C, C++, NetLogo (R, HTML/CSS, JavaScript, OpenMP – basic knowledge). | | |
| Miscellany | GitHub, Gephi, QGIS, Mathematica, Gimp, Blender, Audacity, Presonus Studio One. | | |
| Text | L ^A T _E X, Microsoft Office. | | |

Publications

- Jan 2018 I. Iacopini, S. Milojević, V. Latora, *Network dynamics of innovation processes*, Physical Review Letters **120** 048301 (2018).

Awards

- Mar 2017 **Turing PhD Enrichment Scheme**, The Alan Turing Institute, London, UK.
- Mar 2017 **Travel Grant**, *Summer School - Methods for Computational Social Science*, Sardinia, IT.
- Jan 2017 **Travel Grant**, *The Future of Urban Network Research*, Ghent University, BE.

May 2016 **Queen Mary Principal's Award**, *Research Studentship*, QMUL, UK.

Conferences and Courses

- Nov 2017 **European Symposium Series**, *on Societal Challenges in Computational Social Science*, London, UK.
- Sept 2017 **Symposium**, *The Future of Urban Networks Research*, Ghent University, Ghent, BE.
- Jul 2017 **Summer School**, *Methods for Computational Social Science*, Sant'Antioco, IT.
- Jun 2017 **Cambridge Networks Day 2017**, University of Cambridge, Cambridge, UK.
- Jan 2017 **Mathematics and Economics of Energy Markets**, National Grid, Wokingham, UK.
- Nov 2016 **Multilayer Networks**, *by Ginestra Bianconi*, LTCC, London, UK.
Structure and Dynamics
- Oct-Nov 2014 **Complex Economics**, *by Alan Kirman*, Collegio Carlo Alberto, Turin, IT.
Individual and Collective Rationality.

Languages knowledge

- Italian Native speaker
- English Very good knowledge - Academic IELTS score 8.0

References

Dr Vito Latora, *Professor*, Queen Mary University of London, London, UK.
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Dr Ciro Cattuto, *Scientific Director*, ISI foundation, Turin, IT.
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Dr José Anson, *Data Scientist and Economist*, UPU, Bern, Switzerland.
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