

ACTUAL POSITION

2023-today **DIMEC at University of Bologna** University of Bologna, Italy
Interests/Research line

- Use of complex systems and machine learning tools to detect antibiotic resistance
- Mesoscopic structures and their influence on the dynamical system
- Applied data analysis for disease control
- Analysis of information dynamics in social networks and medical systems

PROFESSIONAL EXPERIENCE

2021 - 2022 **Université de Paris, (CEPED and IRD)** Paris, France
Postdoctoral researcher

2015 - 2020 **Université Catholique de Louvain (ICTEAM)** Louvain la Neuve, Belgium
MOVE IN Louvain Research Fellow

2011 - 2015 **ISI Foundation** Torino, Italy
Junior researcher

2006 - 2011 **Bifi Institute** Zaragoza, Spain
PhD

FELLOWSHIPS AND PROJECTS

2021 - 2022 **TRACTRUST (ANR-20-COVI-0102)**

2017 - 2021 **Innoviris Iris-TB (D1.31402.007-F)**

2015 - 2017 **MOVE-IN Louvain Fellowship (with support of Marie Curie Actions)**

MEMBERSHIP

2018 - today **SICC - Italian Society for Chaos and Complexity**

2015 - today **Network Science Society**
Member

2014 - today **Complex Systems Society**
Member

2013 - today **Frontiers in Quantum Computing**
Review Editor

PROGRAM COMMITTEES

1 Dec 2021 **Complex Networks 2021** Madrid, Spain

1 Dec 2020 **Complex Networks 2020** Madrid, Spain

10 Dec 2019 **Complex Networks 2019** Lisbon, Portugal

22 Feb 2019 **BeNet 2019** Hasselt, Belgium

11 Dec 2018 **Complex Networks 2018** Cambridge, UK

29 Nov 2017 **Complex Networks 2017** Lyon, France

30 Nov 2016 **Complex Networks 2016** Milan, Italy

ORGANIZING COMMITTEES

August 2019 **Network Reconstruction Science-athon** Beaumont, Belgium
Coorganized with Alexandre Bovet, Benjamin Chiem, Leo Gutierrez, Alexey Medvedev, Leto Peel, Mridul Seth

- 15 Dec 2016 **Belgian Network Research Meeting (BeNet) 2016** Louvain-la-Neuve, Belgium
Coorganized with Sophie Béreau, Jean-Charles Delvenne, Yerali Gandica, Leo Gutierrez, Leto Peel, Michael Schaub
- 21 Sep 2016 **Conference on Complex Systems 2016 workshop on Coarse-graining Complex Systems** CCS2016, Amsterdam, Netherlands
Coorganized with Leto Peel, Renaud Lambiotte, Michael Schaub
- 2 Jun 2014 **Quantum Frontiers for Network Science** NetSci 2014, Berkeley, California
Coorganized with Filippo Radicchi and Zoltan Zimborás

REVIEWER

- Advances in Complex Systems
- Applied Network Science
- APS (Physical Review E)
- Journal of Complex Networks
- Journal of Statistical Mechanics
- Natural Computing
- PLOS ONE
- Science Advances
- Scientific Reports

TEACHING

- 2015-2020 **LINMA2111 Algorithms and Complexity** Assistant Professor
Université Catholique de Louvain
- 2005 **Physics and Math at primary school** Hetauda, Nepal
NEST
- 2004 **guide in Science Museum** Padova, Italy
Organizer: INFN

STUDENT ADVISING

- 2019 **G. Izzi** University of Turin
Computer Science (with A. Semeraro)
- 2016 **H. Devillez** UCLouvain
Applied Maths (with L. Peel)
- 2016 **M. Huet** UCLouvain
Elec. Eng. (with L. Peel)

EDUCATION

- 2020 **24CFU** Univesità telematica Pegaso
Discipline antropo-psico-pedagogiche e in metodologie e tecnologie didattiche
- 14 Sept 2012 **PhD in Physics** University of Zaragoza
supervisor: prof. Pierpaolo Bruscolini
Analysis and Development of Algorithms for the Characterization of Biopolymers and Application to Protein Sequencing and Protein Folding
- 15 Oct 2008 **Master in Physics and Technology** University of Zaragoza
supervisor: prof. Pierpaolo Bruscolini
Coevolution of Strategy and Population Structure in the Prisoner Dilemma
- 10 Oct 2005 **MSc in Physics** University of Padova
supervisor: prof. Enzo Orlandini
Beris Edwards Model Simulations for Liquid Crystals in Oscillatory Poiseuille Flux

MAINTAINED PROJECTS

- **AISA**
Python module aimed at partitioning a network through Autoinformation maximization
- **CartoTB**
Cartography of predicted tuberculosis in high burden settings

PUBLICATIONS

- **Measuring dynamical systems on directed hypergraphs** Phys Rev E, 106 (034306), 2022
M. Faccin
- **Assessing the influence of French vaccine critics during the two first years of the COVID-19 pandemic** PLOS ONE, 17(8): e0271157
M. Faccin, F. Gargiulo, L. Atlani-Duault, J.K. Ward
- **Data-driven identification of communities with high levels of tuberculosis infection in the Democratic Republic of Congo.** Sci Rep 12, 3912 (2022)
M. Faccin, O. Rusumba, A. Ushindi, M. Riziki, T. Habiragi, F. Boutachkourt, E. André
- **State aggregations in Markov chains and block models of networks** Phys. Rev. Lett., 127, 078301 (2021)
M. Faccin, M.T. Schaub and J.-C. Delvenne
Figure selected for the journal cover
- **Complex Networks from Classical to Quantum** Communications Physics 2-53 (2019)
J. Biamonte, M. Faccin, M. De Domenico
- **Outbreak of multidrug-resistant tuberculosis in South Africa undetected by WHO-endorsed commercial tests: an observational study** The Lancet Infectious Diseases 2018
Makhado, Matabane, Faccin, Pinçon, Jouet, Boutachkourt, Goeminne, Gaudin, Maphalala, Beckert, Niemann, Delvenne, Delmée, Razwiedani, Nchabeleng, Supply, de Jong, André
- **Entrograms and coarse graining of dynamics on complex networks** Journal of Complex Networks
M. Faccin, M.T. Schaub, J.-C. Delvenne
- **Chiral Quantum Walks** Phys. Rev. A 93, 042302
D. L. Lu, J. D. Biamonte, J. Li, H. Li, T. H. Johnson, V. Bergholm, M. Faccin, Z. Zimborás, R. Laflamme, J. Baugh, and S. Lloyd
- **Mapping the topography of a protein energy landscape** J. Am. Chem. Soc., 2015, 137 (46), pp 14610–14625
R. D. Hutton, J. Wilkinson, M. Faccin, E. M. Sivertsson, A. Pelizzola, A. R. Lowe, P. Bruscolini, L. S. Itzhaki
- **Community Detection in Quantum Complex Networks** Phys. Rev. X 4 (4 2014), p. 041012
M. Faccin, P. Migdał, T. H. Johnson, V. Bergholm, and J. D. Biamonte
- **Degree Distribution in Quantum Walks on Complex Networks** Phys. Rev. X 3 (4 2013), p. 041007
M. Faccin, T. Johnson, J. Biamonte, S. Kais, and P. Migdał
- **Quantum Transport Enhancement by Time-Reversal Symmetry Breaking** Sci. Rep. 3 (2013). Ed. by NPG, p. 2361
Z. Zimboras, M. Faccin, Z. Kadar, J. Whitfield, B. Lanyon, and J. Biamonte
- **MS/MS Spectra Interpretation as a Statistical-Mechanics Problem** Analytical Chemistry 85.10 (2013), pp. 4884–4892
M. Faccin and P. Bruscolini
- **Ground-state spin logic** Europhysics Letters 99.5 (2012), p. 57004
J. D. Whitfield, M. Faccin, and J. D. Biamonte
- **Analysis of the equilibrium and kinetics of the ankyrin repeat protein myotrophin** The Journal of Chemical Physics 134.7, 075102 (2011), p. 075102
M. Faccin, P. Bruscolini, and A. Pelizzola

CONFERENCES (ORAL CONTRIBUTIONS)

- 7 March 2023 **Dynamical systems as a mean for complex systems analysis**
seminar at the University of Bologna
M. Faccin
- 9 Nov 2022 **Data-driven mapping of tuberculosis incidence allows identifying communities with high circulation of tuberculosis in the Democratic Republic of Congo**
The Union Conference 2022 – Online
M. Faccin, C. Nsop Mulaj, E. Swana Kawana, T. Yav Ikum, E. André
- 9 Nov 2022 **Identification of urban areas presenting high incidence of tuberculosis using satellite images allows increasing the yield of active case finding in Kigali, Rwanda.**
The Union Conference 2022 – Online
M. Faccin, P. Uwizeye, F. Nsabimana, P. Migambi, E. André
- 17 Oct 2022 **Use of compartmental models to detect high TB incidence rates in South-Kivu (DRC)**
CCS 2022 @ Palma de Mallorca/Online
M. Faccin, E. André
- **Reach of vaccine-critical content on Twitter during the COVID-19 pandemic**
French Regional Conf. on Complex Systems (FRCCS) @ Paris
M. Faccin, F. Gargiulo
- 30 May 2022 **Outreach of vaccine-critic content on French-speaking Twitter**
CompleNet 2022 – Online
M. Faccin, F. Gargiulo, J. Ward
- 2 Dec 2021 **Autoinformation state aggregation**
Complex Networks 2021 @ Madrid (Spain)
M. Faccin, M. T. Schaub, J-C. Delvenne
- 30 Nov 2021 **Vaccine-critical discourse on French-speaking Twitter and its outreach**
Complex Networks 2021 @ Madrid (Spain)
M. Faccin, F. Gargiulo, J. Ward
Best lightning talk award
- 19 Oct 2021 **State aggregation for dynamical systems: An information-theoretic approach**
Math Dept, Oxford University, (UK – Online)
Network Seminar 2021
- 7-9 Dec 2020 **Using predictive models and risk assessment tools to find unreported TB cases**
Washington DC, USA (online)
Global Digital Health Forum 2020
- 20-24 Oct 2020 **Data-driven TB active-case finding in South Kivu (DRC)**
Paris, France (online)
The Union 2020
- 10-12 Dec 2019 **Auto-information in non-Markovian diffusion systems**
Lisbon, Portugal
Complex Networks 2019
- 22 Feb. 2019 **Variable aggregation for dynamical systems on networks**
Hasselt, Belgium
Benet 2019
- 23-28 Sept. 2018 **A dynamical approach to block structure analysis**
Thessaloniki, Greece
CCS 2018
- 11-15 Jun 2018 **Dynamical Markov Modules**
Paris, France
Netsci 2018
- 21-24 Mar 2017 **Community detection in networks with non-Markovian dynamics**
Dubrovnik, Croatia
CompleNet 2017
- 30 Nov-2 Dec 2016 **Behind Communities: Dynamics Define Modules**
Milan, Italy
ComplexNetworks 2016
- 19-22 Sep 2016 **Beyond Communities: Dynamical Markov Modules**
Amsterdam, Netherlands
CCS 2016
- May 30-June 3 2016 **Mesoscopic Structure And Diffusion Process Memory**
Seoul, Korea
NetSci 2016
- 10-15 Jan 2015 **Mesoscopic Structures and Diffusion Process Memory**
Wrocław, Poland
NetSci-X 2016
- 2-6 Jun 2015 **Structural controllability of EEG temporal causal networks**
Zaragoza, Spain
NetSci 2015
- 22-26 Sep 2014 **Quantum Approaches to Community Detection**
Lucca, Italy
ECCS 2014
- 12-14 Mar 2014 **Community detection on quantum systems**
Bologna, Italy
CompleNet 2014
- 22-24 Jan 2014 **Community Detection on Quantum Systems**
Zaragoza, Spain
BIFI2014

24-26 May 2013	Degree distribution in quantum complex networks IQC workshop on quantum computation and complex networks	Waterloo, Canada
6-8 Nov 2012	Ground state spin logic Tensor Network States and Algebraic Geometry Workshop	Torino, Italy
2-4 Feb 2011	Equilibrium and kinetics of the ankyrin repeat protein Myotrophin through a simple statistical mechanical model V BIFI National Conference	Zaragoza, Spain
5-7 Feb 2009	Bayesian Characterization of Protein Tandem Mass Spectra IV BIFI National Conference	Zaragoza, Spain
8-9 May 2008	Noise description in MSMS mass spectrometry, looking for a de novo sequencing algorithm VI Jornadas Aragonesas de Estabilidad y Plegamiento de Proteínas	San Sebastian, Spain

CONFERENCES (POSTER CONTRIBUTIONS)

1 Dec 2021	Directed hyper-graphs and dynamical systems M. Faccin, F. Gargiulo	Complex Networks 2021 @ Madrid (Spain)
17-25 Sept 2020	State aggregation in non-Markovian systems by auto-information maximization Netsci 2020	Rome, Italy
17-25 Sept 2020	The variability of network structures inferred from time series data Netsci 2020	Rome, Italy
10-12 Dec 2019	The variability of network structures inferred from time series data Complex Networks 2019	Lisbon, Portugal
1-3 July 2019	Variable aggregation on (broadcasting) networks CCS/Italy 2019	Trento, Italy
23-25 Mar 2016	Memory and Mesoscopic Structures in Diffusion Processes CompleNet 2016	Dijon, France
7-10 Jul 2010	Folding Pathways Characterization for Ankyrin Repeat Protein Myotrophin IV Spanish Portuguese Biophysical Congress	Zaragoza, Spain
2-6 Jun 2008	Statistical characterization of fragment ions in MSMS mass spectrometry XXI Sitges Conference on Statistical Mechanics: Statistical Mechanics of Molecular Biophysics	Sitges, Spain

COMPUTER SKILLS

Coding	Python, C, Matlab, Fortran
Shell	Bash, iPython/Jupyter
Versioning	GIT, Subversion, Mercurial
Plotting	Gnuplot, Matplotlib, PGFPlots(LaTeX)
Typesetting	LaTeX, LibreOffice, MSOffice, Markdown
Imaging	Gimp (Raster), Tikz (LaTeX), Inkscape (Vectorial), Rawtherapee (RAW)
Web	HTML5, CSS/SCSS, static site generators, Wordpress

LANGUAGES

Italian	Mother tongue
English	Fluent
Spanish	Fluent
French	Fair

Mauro Faccin