

## 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  
PostDoc

2015 - 2020 **Université Catholique de Louvain (ICTEAM)** Louvain la Neuve, Belgium  
PostDoc

2011 - 2015 **ISI Foundation** Torino, Italy  
PostDoc

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

## COMMITTEES

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

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

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

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

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

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

15 Dec 2016 **BeNet 2016** Louvain-la-Neuve, Belgium  
Organizing committee

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

21 Sep 2016	<b>Coarse-graining of Complex Systems</b> Organizing committee	CCS2016, Amsterdam, Netherlands
2 Jun 2014	<b>Quantum Frontiers for Network Science</b> Organizing committee	NetSci 2014, Berkeley, California

## 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	<b>LINMA2111 Algorithms and Complexity</b> Université Catholique de Louvain	Assistant Professor
2005	<b>Physics and Math at primary school</b> NEST	Hetauda, Nepal
2004	<b>guide in Science Museum</b> Organizer: INFN	Padova, Italy

## EDUCATION

2020	<b>24CFU</b>	Univestità telematica Pegaso
2011	<b>PhD in Physics</b> supervisor: Pierpaolo Bruscolini	University of Zaragoza
2007	<b>Master in Physics and Technology</b> supervisor: Pierpaolo Bruscolini	University of Zaragoza
2005	<b>MSc in Physics</b> supervisor: Enzo Orlandini	University of Padova

## 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. Boutachkout, 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. Migdal, 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. Migdal
- **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)

- 9 Nov 2022 **Data-driven mapping of tuberculosis incidence allows identifying communities with high circulation of tuberculosis in the Democratic Republic of Congo** Online  
The Union Conference 2022
- 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.** Online  
The Union Conference 2022
- 17 Oct 2022 **Use of compartmental models to detect high TB incidence rates in South-Kivu (DRC)** Palma de Mallorca/Online  
CCS 2022
- 30 May 2022 **Outreach of vaccine-critic content on French-speaking Twitter** Online  
CompleNet 2022
- 2 Dec 2021 **Autoinformation state aggregation** Madrid (Spain)  
Complex Networks 2021
- 30 Nov 2021 **Vaccine-critical discourse on French-speaking Twitter and its outreach** Madrid (Spain)  
Complex Networks 2021  
• 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	<b>Using predictive models and risk assessment tools to find unreported TB cases</b>	Washington DC, USA (online)
	Global Digital Health Forum 2020	
20-24 Oct 2020	<b>Data-driven TB active-case finding in South Kivu (DRC)</b>	Paris, France (online)
	The Union 2020	
10-12 Dec 2019	<b>Auto-information in non-Markovian diffusion systems</b>	Lisbon, Portugal
	Complex Networks 2019	
22 Feb. 2019	<b>Variable aggregation for dynamical systems on networks</b>	Hasselt, Belgium
	Benet 2019	
23-28 Sept. 2018	<b>A dynamical approach to block structure analysis</b>	Thessaloniki, Greece
	CCS 2018	
11-15 Jun 2018	<b>Dynamical Markov Modules</b>	Paris, France
	Netsci 2018	
21-24 Mar 2017	<b>Community detection in networks with non-Markovian dynamics</b>	Dubrovnik, Croatia
	CompleNet 2017	
30 Nov-2 Dec 2016	<b>Behind Communities: Dynamics Define Modules</b>	Milan, Italy
	ComplexNetworks 2016	
19-22 Sep 2016	<b>Beyond Communities: Dynamical Markov Modules</b>	Amsterdam, Netherlands
	CCS 2016	
May 30-June 3 2016	<b>Mesoscopic Structure And Diffusion Process Memory</b>	Seoul, Korea
	NetSci 2016	
10-15 Jan 2015	<b>Mesoscopic Structures and Diffusion Process Memory</b>	Wrocław, Poland
	NetSci-X 2016	
2-6 Jun 2015	<b>Structural controllability of EEG temporal causal networks</b>	Zaragoza, Spain
	NetSci 2015	
22-26 Sep 2014	<b>Quantum Approaches to Community Detection</b>	Lucca, Italy
	ECCS 2014	
12-14 Mar 2014	<b>Community detection on quantum systems</b>	Bologna, Italy
	CompleNet 2014	
22-24 Jan 2014	<b>Community Detection on Quantum Systems</b>	Zaragoza, Spain
	BIFI2014	
24-26 May 2013	<b>Degree distribution in quantum complex networks</b>	Waterloo, Canada
	IQC workshop on quantum computation and complex networks	
6-8 Nov 2012	<b>Ground state spin logic</b>	Torino, Italy
	Tensor Network States and Algebraic Geometry Workshop	
2-4 Feb 2011	<b>Equilibrium and kinetics of the ankyrin repeat protein Myotrophin through a simple statistical mechanical model</b>	Zaragoza, Spain
	V BIFI National Conference	
5-7 Feb 2009	<b>Bayesian Characterization of Protein Tandem Mass Spectra</b>	Zaragoza, Spain
	IV BIFI National Conference	
8-9 May 2008	<b>Noise description in MSMS mass spectrometry, looking for a de novo sequencing algorithm</b>	San Sebastian, Spain
	VI Jornadas Aragonesas de Estabilidad y Plegamiento de Proteínas	

## CONFERENCES (POSTER CONTRIBUTIONS)

1 Dec 2021	<b>Directed hyper-graphs and dynamical systems</b>	Madrid (Spain)
	Complex Networks 2021	
17-25 Sept 2020	<b>State aggregation in non-Markovian systems by auto-information maximization</b>	Rome, Italy
	Netsci 2020	
17-25 Sept 2020	<b>The variability of network structures inferred from time series data</b>	Rome, Italy
	Netsci 2020	
10-12 Dec 2019	<b>The variability of network structures inferred from time series data</b>	Lisbon, Portugal
	Complex Networks 2019	
1-3 July 2019	<b>Variable aggregation on (broadcasting) networks</b>	Trento, Italy
	CCS/Italy 2019	
23-25 Mar 2016	<b>Memory and Mesoscopic Structures in Diffusion Processes</b>	Dijon, France
	CompleNet 2016	
7-10 Jul 2010	<b>Folding Pathways Characterization for Ankyrin Repeat Protein Myotrophin</b>	Zaragoza, Spain
	IV Spanish Portuguese Biophysical Congress	

2-6 Jun 2008 **Statistical characterization of fragment ions in MSMS mass spectrometry**

Sitges, Spain

XXI Sitges Conference on Statistical Mechanics: Statistical Mechanics of Molecular Biophysics

## 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