

Federico Nutarelli

PERSONAL DETAILS

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ACADEMIC APPOINTMENTS

Assistant Professor in Economics, IMT School for Advanced Studies Currently
Postdoc, Bocconi University ICRIOS 2022-2023
Under the supervision of Prof. Stefano Breschi.
Research Assistant, IMT School for Advanced Studies May 2022
Under the supervision of Prof. Dr. M. Riccaboni

EDUCATION

PhD in Economics, Networks and Business Analytics 2017-2022
IMT School for Advanced Studies

Master of Science in Economics 2017
Sant'Anna School for Advanced Studies
110/110 Summa cum Laude

Bachelor Degree in Economics and Business 2015
University of Pisa
110/110 Summa cum Laude

ADDITIONAL EDUCATION

Summer School 2019
SIDE (Italian Econometrics Association), Bertinoro
"Machine Learning Algorithms for Econometricians"

Summer School 2018
TU Wien
"Machine Learning Methods and Data Analytics in Risk and Insurance" (VISS2018).

EMPLOYMENT

Data Analysis 2020-Currently
Roche

Supervision : Under Prof. Dr. Riccaboni M. and Giuliani G.
About : Analysis of innovation in the biotechnological context and in the enhancement of advanced therapies.

Data Science 2019
LVMH, Milan

Supervision : Under Dr. Romboli F.
About : Efficient storage of the company data and click through rate analysis.

Networks 2016
ISTAT (Italian National Institute of Statistics)

Supervision : Under Dr. Reale A. and Prof. Dr. Drago C.
About : Analysis of complex systems and Network theory.

AWARDS AND SCHOLARSHIPS

CASD project: "Machine Learning Methods for Studying Firms' Responses to Unfavorable Trade Shocks" 2023-Currently
Role: scientific manager

Principal Investigator (PI) 2023-Currently
Innovation Diffusion: a consumer-side perspective. OpenLab Winner for Excellence research in Italy (MIUR) 2023

Scholarship Roche Holding AG 2020-2023
Role: research assistant

Indam GNAMPA 2020 Project Funding 2020
Role: co-investigator

Full Doctoral Scholarship, IMT School for Advanced Studies 2017
Awarded with the highest score out of 3100 candidates (ex aequo)

ISTAT 2016
Selected among the top 15 students

University of Pisa -Sant'Anna School for Advanced Studies 2015
Selected as a student in MsC Economics

BCC Scholarship 2012
Scholarship for deserving students in high-school

RESEARCH INTERESTS

Innovation, Pharmaceutical Industry, Machine Learning, Causal Inference, Industrial Economics, Mathematical Economics

PUBLICATIONS (PEER REVIEWED)

* Indicates the publications where I contributed as first author or the co-first author.

Journal Publications

2021 * *Optimal data collection design in machine learning: the case of the fixed effects generalized least squares panel data model.* (with G. Gnecco and Selvi D.), **Machine Learning**, 2021, DOI: 10.1007/s10994-021-05976-x

2020 * *Optimal trade-off between sample size, the precision of supervision, and selection probabilities for the unbalanced fixed effects panel data model.* (with G. Gnecco and Selvi D.), **Soft Computing**, 2020, 24, 15937–15949

2019 * *On the trade-off between number of examples and precision of supervision in machine learning problems* (with G. Gnecco), **Optimization Letters**, DOI: 10.1007/s11590-019-01486-x

2022 * *A machine learning approach to economic complexity based on matrix completion* (with M. Riccaboni and G. Gnecco), **Nature-Scientific Reports**, DOI: <https://doi.org/10.1038/s41598-022-13206-0>

2022 * *"On automatic dispersion curve identification"* (with Gnecco G., Bacigalupo A., De Bellis M.L.), **Nature-Scientific Reports**, DOI: <https://doi.org/10.1038/s41598-022-23491-4>

2023 * *"The matrix completion of world trade: an analysis of interpretability through SHapley values"* (with Gnecco G., Riccaboni M.), **The World Economy**, DOI: 10.1111/twec.13457

Under Review

2022 * *"Assessing the Impact of COVID-19 on Trade: a Machine Learning Counterfactual Analysis"* (with Dueñas M., Riccaboni M., Ortíz V., Serti F.). Under review at **Jornal of International Economics**

Conference Proceedings

2020 * *"Optimal trade-off between sample size and precision of supervision for the fixed effects panel data model"* (with Gnecco G.) **Proceedings of the 5th Int. Conf. on Machine Learning, Optimization & Data science (LOD 2019)**, Lecture Notes in Computer Science

2019 * *"On the trade-off between number of examples and precision of supervision in regression problems"* (with Gnecco G.) **Proceedings of the 4th Int. Conf. of the International Neural Network Society on Big Data and Deep Learning (INNS BDDL 2019)**, vol. 1, pp. 1-6, Springer International Publishing, 2019. ISBN: 978-3-030-16840-7.

2019 * *"Network Analysis of the Mediterranean Food Footprint flows"* (with Facchini A., Galli A., Caldarelli G.) **CCS2019: Conference on Complex Systems 2019**, number 286

Book Chapters

2020 * *"Lecture Notes in Computer Science"*, LOD (2019)

WORKING PAPERS

1. * *"Testing the quality of the delineation of Local Labour Market Areas"* (with Reale A. and Drago C.)
2. * *"Commuting Flows in Tuscany: a general analysis"* (with Reale A). - internal publication at ISTAT
3. * *"Product recalls, market size and innovation in the pharmaceutical industry"* (with Riccaboni M.)
4. * *"Optimal pricing strategy of advanced therapies"* (with Riccaboni M., Giuliani G., Ferrario M.)
5. * *"A unified principal agent theory on price-volume agreement"* (with Gnecco G. and Biancalani F.)
6. * *"Ramsey pricing and price of molecules: estimating own and cross elasticities of active principles"* (with Büyükyazıcı D. and Riccaboni M.)
7. * *"Generalized economic complexity and forecasting competitiveness of global cities using machine learning"* (with Edet S., Riccaboni M., Gnecco G.)
8. * *"Diffusion of import export through Production Network"* (with Huremovic K. and Serti F.)

ONGOING RESEARCH PROJECTS

9. * *"Revising Innovation Diffusion: a consumer perspective"* (with Castellacci F.)
10. * *"Assessing the determinants of science-based green innovation"* (with Morrison A. and Corrocher N.)
11. * *"The key players of regional diversification"* (with Büyükyazıcı D.)
12. * *"The effect of non-green innovation on green patenting in firms"* (with Pinelli F. and Riccaboni M.)

Single-authored projects

- * *"Measuring the unmeasurable: an index for latent innovation"*

TEACHING EXPERIENCE

Lecturer at IMT School for Advanced Studies	June 2023
<i>Graduate course: Machine-Learning and Causal Inference</i>	
Tutoring at Sant'Anna School for Advanced Studies	March 2022-May 2022
<i>Undergraduate course: Advanced Econometrics</i>	
Lecturer at IMT School for Advanced Studies	2020-2021
<i>Graduate course: Applied Data Science</i>	
Lecturer at IMT School for Advanced Studies	2022-2023

CONFERENCES AND INVITED SEMINARS

2023 **MIT Fall Innovation Lab**, MIT

2023 ”**Complex system approaches to 21st century challenges: inequality, climate change, and new technologies**”, Santa Fe Institute.

2023 **DRUID 2023**, Nova Business School, Portugal.

2023 **EAI Intetain 2023** Held online. Role: Organizer

2022 **Research Policy (RP) 4th conference for Early Career Researchers**
Held online.

2022 **DRUID 2022**, Copenhagen Business School, Denmark.

2022 **ASSA 2022**, American Economic Association.

2021 **YETI 2021**, YETI, Young Economists of Tuscan Institutions Conference,
Pisa

2021 **AMASES 2021**, “Networks, Big Data, and Artificial Intelligence in Economics, Finance, and Social Sciences” Parallel Session.

2021 **ODS 2021** “International Conference on Optimization and Decision Science (ODS2021)” Parallel Session

2020 **ISOR Kolloquium**, Department of Statistics and Operations Research of the University of Wien, Organizer: Immanuel Bomze.

2019-2020 **IMT Reading group**, Presented several machine learning papers as a speaker at the ”Reading Group in Machine Learning and Networks”.

2019 **LOD 2019**, speaker as The Fifth International Conference on Machine Learning, Optimization, and Data Science (LOD2019)

2019 **ODS 2019**, in Program of the International Conference on Optimization and Decision Science (ODS 2019), p. 16, Genoa, Italy, September 4 th -7 th, 2019.

2019 **AMASES 2019**, in Program of the 43rd Annual Meeting of the Italian Association for Mathematics Applied to Social and Economic Sciences (AMASES 2019), p. 4, Perugia, Italy, September 9 th -11 th, 2019.

PROFESSIONAL SERVICE

Reviewer for: Dynamic Games and Applications (DGAA), NEUROCOMPUTING, LOD 2022, Economics of Innovation and New Technology, Soft Computing (SOCO), DRUID23

AFFILIATIONS

Association for Mathematics Applied to Social and Economic Sciences, AMASES, , The National Institute for Advanced Mathematics of Italy (INdAM), GNAMPA group (National Group for Mathematical Analysis, Probability and their Applications), Membro ordinario Società Italiana Statistica (SiS). LOD

LANGUAGES

<i>Italian</i>	Mother tongue
<i>English</i>	Full Professional Proficiency
<i>German</i>	Advanced

COMPUTER SKILLS

Programming Languages	PYTHON
Statistical Software:	R, STATA, MATLAB
Mark up languages	L ^A T _E X, Beamer
Other Software	GIT/GITHUB

EXTRA CURRICULAR ACTIVITIES

1. Member of Chess Club
2. Boxe
3. Guitar