

Federico Nutarelli

PERSONAL DETAILS

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ACADEMIC APPOINTMENTS

Visiting Scholar, Utrecht University	January 2025 - Currently
Visiting Scholar, MIT Sloan School of Management	March 2024 - September 2024
Assistant Professor in Economics, IMT School Lucca	September 2023 - Currently
Postdoc, Bocconi University ICRIOS <i>Under the supervision of Prof. Stefano Breschi.</i>	2022-2023
Research Assistant, IMT School for Advanced Studies <i>Under the supervision of Prof. Dr. M. Riccaboni</i>	May 2022

EDUCATION

PhD in Economics, Networks and Business Analytics <i>IMT School for Advanced Studies</i>	2017-2022
Master of Science in Economics <i>Sant'Anna School for Advanced Studies</i> 110/110 Summa cum Laude	2017
Bachelor Degree in Economics and Business <i>University of Pisa</i> 110/110 Summa cum Laude	2015

ADDITIONAL EDUCATION

Summer School <i>SIDE (Italian Econometrics Association), Bertinoro</i> "Machine Learning Algorithms for Econometricians"	2019
Summer School <i>TU Wien</i> "Machine Learning Methods and Data Analytics in Risk and Insurance" (VISS2018).	2018

EMPLOYMENT

Data Analysis <i>Roche</i> Supervision : Under Prof. Dr. Riccaboni M. and Giuliani G. About : Analysis of innovation in the biotechnological context and in the enhancement of advanced therapies.	2020-2023
Data Science <i>LVMH, Milan</i> Supervision : Under Dr. Romboli F. About : Efficient storage of the company data and click through rate analysis.	2019
Networks <i>ISTAT (Italian National Institute of Statistics)</i> Supervision : Under Dr. Reale A. and Prof. Dr. Drago C. About : Analysis of complex systems and Network theory.	2016

AWARDS AND SCHOLARSHIPS

CASD project: "Machine Learning Methods for Studying Firms' Responses to Unfavorable Trade Shocks" <i>Role: scientific manager</i>	2023-Currently
Principal Investigator (PI) <i>Innovation Diffusion: a consumer-side perspective. OpenLab Winner for Excellence research in Italy (MIUR) 2023</i>	2023-Currently
Scholarship Roche Holding AG <i>Role: research assistant</i>	2020-2023
Indam GNAMPA 2020 Project Funding <i>Role: co-investigator</i>	2020
Full Doctoral Scholarship, IMT School for Advanced Studies <i>Awarded with the highest score out of 3100 candidates (ex aequo)</i>	2017
ISTAT <i>Selected among the top 15 students</i>	2016
University of Pisa -Sant'Anna School for Advanced Studies <i>Selected as a student in MsC Economics</i>	2015
BCC Scholarship <i>Scholarship for deserving students in high-school</i>	2012

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., Baciagalupo 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 **Oxford Bulletin of Economics and Statistics**

2023 * *"Generalized economic complexity and forecasting competitiveness of global cities using machine learning"* (with Edet S., Riccaboni M., Gnecco G.). Under review **JEBO**.

2024 * *"The determinants of science-based green patenting"* (with Corrocher N., Morrison A.). Under review **Research Policy**.

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.) - internal publication Italian Institute of Statistics (ISTAT)

2. * "*The paradigms of innovation diffusion: novel insights*" (with Castellacci F., De Rassenfosse G).

3. * "*Product recalls, market size and innovation in the pharmaceutical industry*" (with Riccaboni M.)

4. * "*Optimal pricing strategy of advanced innovative gene and cell therapies*" (with Riccaboni M., Van Dyck W.)

5. * "*The power of modules in the innovation process.*"

6. * "*Ramsey pricing and price of molecules: estimating own and cross elasticities of active principles*" (with Büyükyazıcı D. and Riccaboni M.)

7. * "*Diffusion of import export through Production Network*" (with Huremovic K. and Serti F.)

Single-authored projects

- * "*Generative AI and innovation: a microeconomics perspective*"

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