

EDIT RROJI

Curriculum Vitae

PERSONAL DETAILS

Address: via Bicocca degli Arcimboldi 8, Milano Italy
E-mail: edit.rroji@unimib.it
Date of Birth: 24/08/1987, Shkoder (Albania)

CURRENT POSITION

November, 2022 - present *Associate Professor*, Department of Statistics and Quantitative Methods, University of Milano-Bicocca, SECS-S/06 Mathematical methods of economics, finance and actuarial sciences

October 2018 - October 2029 *National Scientific Habilitation* (ASN) for the position of Associate Professor, SECS-S/06-Mathematical methods of economics, finance and actuarial sciences.

PREVIOUS ACADEMIC POSITIONS

November 2019 – October 2022 *Assistant Professor* (tenure track)
Department of Statistics and Quantitative Methods, University of Milano-Bicocca

September 2018 – October 2019 *Assistant Professor*
Department of Mathematics, Politecnico di Milano.

January 2017 - August 2018 *Postdoctoral researcher*
Research project: "New statistical and mathematical tools for finance"
Supervisor: Prof. Fabio Bellini, University of Milano-Bicocca

June 2015 - December 2016 *Postdoctoral researcher*
Research project: "Quantitative analysis and assessment of risks in finance and insurance"
Supervisor: Prof. Ermanno Pitacco, University of Trieste

WORK EXPERIENCE

September 2014 - March 2015 *Research Consultant* for Symmys Llc (now ARPM Llc)
December 2012 - July 2013 *Internship* at StatPro Italia S.r.l

EDUCATION

December 2013 - PhD in Applied Math for Finance, University of Milano-Bicocca
Title of thesis: "*Risk Decomposition and semi heavy tailed distributions*"

September 2010-Master Degree (cum laude) in Economics and Finance, University of Milano-Bicocca
Title of thesis: "*Option pricing with mixtures of normals*"

September 2008 – Bachelor Degree (cum laude) in Banking and Insurance, University of Milano-Bicocca
Title of thesis: "*Credit Rationing in Banks*"

SCHOLARSHIPS AND AWARDS

October 2018 "Premio giovani talenti 2018" (*Euro 1000* ranked in the top three) assigned to Postdoctoral Researchers at the University of Milano-Bicocca. Evaluation performed by *Accademia Nazionale dei Lincei*.

April 2014 Winner of the “MaF 2014 Award for Young researchers” for the paper “*Risk measurement using the Mixed Tempered Stable distribution*”

November 2010 – November 2013, scholarship for the Ph.D in “Matematica per l’Analisi dei Mercati Finanziari” University of Milano-Bicocca.

August 2012 Scuola Matematica Interuniversitaria’s (SMI) scholarship from Consorzio per l’Alta Formazione in Matematica (CIAFM) and the Ministry of University and Research.

GRANTS

Received research grants:

Principal Investigator for the research project **PRIN 2022** “*The effects of climate change in the evaluation of financial instruments*” members: Allaj E., Barbiero A., Mercuri L., and Pederzoli C. Euro 155.354,00.

Member of the research project **GNAMPA 2020** “*Fractional and anomalous diffusions on fractal domains with reflection and Yuima Project*” funded by INDAM (Istituto Nazionale di Alta Matematica) P.I: D’Ovidio M., L. Beghin, De Gregorio A., Capitanelli R., Vivaldi M. A., Mercuri L., Rroji E. Euro 3.150

Responsible for the **local projects** (2020-ATE-0312 and 2021-ATE-0431) “*Risk measures and their applications in finance and insurance*” Members: Bellini F., Bignozzi V. funded by the University of Milano-Bicocca Euro 11.000

Principal Investigator for the research project **GNAMPA 2018** “*Infinitely divisible distributions for portfolio allocation*” funded by INDAM (Istituto Nazionale di Alta Matematica) Members: Hitaj A., Macci C. and Rosazza Gianin E. Euro 3.000

Member of the **project. n. 35364** “*Advanced Methods for Portfolio Optimization*” of the “**MIUR-DAAD Joint Mobility Program**” P.I. Mercuri L., members: Paterlini S. and Margherita G. (German unit), Hitaj A. and Rroji E. (Italian unit) Euro 10.000

Project evaluation:

Served as External evaluator for a research proposal submitted to **NSERC** in response to the call “*Strengthening Canada's quantum research and innovation capacity*” of the Alliance Quantum grant (August 2023).

VISITING

Research period at **ESADE Business School**, Barcelona (Spain) May 21st-May 25th, 2018. Invited by Dr. Carlo Sala.

ATTENDED COURSES

34th Summer School of the Swiss Association of Actuaries, Univ. Lausanne, September 10-15 (2023)
“Modelling and Quantifying Climate and Cyber Risks” Professors: Scherer M, Chavez-Demoulin V and Koch E.

Vienna International Summer School TU Wien, Austria, July 9-July 13 (2018)
"Machine Learning Methods and Data Analytics in Risk and Insurance" Main Speakers: Prof. Peters G. and Prof. Shevchenko P.

Winter School, Ascona, Switzerland, January 8-13 (2017)
“Perspectives for young researchers in actuarial mathematics” Organized by Arnold S. and Constantinescu C.

Summer School in Economics and Finance Canazei (Italy), July 22-26 (2013)
“Quantitative Methods in Risk Management” Prof. Hubalek F.

SMI (Scuola Matematica Interuniversitaria), Perugia (Italy) July 29-August 31 (2012)
“Stochastic Differential Equations” Prof. Baldi P. “Mathematical Statistics” Prof. Rinott Y.

Summer School in Economics and Finance Canazei (Italy), July 16-20 (2012)
“Credit Risk-Main issues and derivative pricing” Professors: Schaefer S., Berardi A. and Plazzi A.

RESEARCH ACTIVITY

Articles in refereed journals:

[20] Mercuri L., Perchiazzo, A., and Rroji, E. (2024). “A Hawkes model with CARMA (p, q) intensity” **Insurance: Mathematics and Economics** (doi: 10.1016/j.insmatheco.2024.01.007)

[19] Batoon A. J. and Rroji, E. (2024). “Analyzing the Impact of Carbon Risk on Firms’ Creditworthiness in the Context of Rising Interest Rates” **Risks**, 12(1), p.1-16.

[18] Barucci E., Marazzina D, and Rroji, E. (2023). “An Investigation of the Volatility Adjustment” **Decisions in Economics and Finance**, p.1-31

[17] Bellini F., Rroji, E., and Sala, C. (2022). “Implicit quantiles and expectiles” **Annals of Operations Research**, 313(2), p. 733–753

[16] Bianchi F., Mercuri, L., and Rroji, E. (2022). “Portfolio Selection with Irregular Time Grids: an example using an ICA-COGARCH (1,1) approach” **Financial Markets and Portfolio Management**, 36(1), p. 57-85

[15] Mercuri L., Perchiazzo, A., and Rroji, E. (2021). “Finite Mixture Approximation of CARMA (p, q) models”. **SIAM Journal on Financial Mathematics**, 12(4), p. 1416-1458

[14] Barucci E., Bonollo, M., Poli, F., and Rroji, E. (2021). “A machine learning algorithm for stock picking built on information based outliers” **Expert Systems with Applications**, 184, 115497

[13] Bellini F., Mercuri L. and Rroji E. (2020) “On the dependence structure between S&P500, VIX and implicit Interexpectile Differences” **Quantitative Finance** 20(11), p. 1839-1848

[12] Barucci E., Colozza T., Marazzina D. and Rroji E.(2020) “The determinants of lapse rates in the Italian life insurance market” **European Actuarial Journal**, 10, p. 149-178

[11] Hitaj A., Mercuri L. and Rroji E. (2019) “Lévy CARMA models for shocks in mortality” **Decisions in Economics and Finance** 42, 205-227

[10] Hitaj A., Mercuri L. and Rroji E. (2019) “Sensitivity analysis of the Mixed Tempered Stable distribution with implications in portfolio optimization” **Computational Management Science** 16(1-2), p. 71-95

[9] Bellini F., Mercuri L. and Rroji E. (2018) “Implicit expectiles and measures of implied volatility” **Quantitative Finance** 18(11) p. 1851- 1864

[8] Mercuri L. and Rroji E. (2018) “Option Pricing in an Exponential MixedTS Lèvy process” **Annals of Operations Research** 260 (1-2) p. 353-374

[7] Mercuri L. and Rroji E. (2018) “Risk Parity for Mixed Tempered Stable distributed sources of risk” **Annals of Operations Research** 260(1-2) p. 375-393

[6] Iacus S. M., Mercuri L. and Rroji E. (2018) “Discrete time approximation of a COGARCH(p, q) model and its estimation” **Journal of Time Series Analysis** 39(5) p.787-809

[5] Hitaj A., Hubalek F., Mercuri L. and Rroji E. (2018) “On properties of the MixedTS and its multivariate extension” **International Statistical Review** 86(3) p.512-540

[4] Iacus S. M., Mercuri L. and Rroji E. (2017) “COGARCH(p, q): Simulation and Inference with yuima Package” **Journal of Statistical Software** 80(4) p. 1-49

[3] Hitaj A., Mercuri L. and Rroji E. (2015) "Portfolio Selection with Independent Component Analysis" **Finance Research Letters** 15 p. 146–159

[2] Rroji E. and Mercuri L. (2015) "Mixed Tempered Stable distribution" **Quantitative Finance** 15 (9) p. 1559-1569

[1] Loregian A., Mercuri L. and Rroji E. (2012) "Approximation of the variance gamma model with a finite mixture of normals" **Statistics & Probability Letters** 82(2) p. 217-224

Book chapters:

[4] Mercuri L., Perchiazzo A. and Rroji E. "Pricing of Futures with a CARMA(p,q) Model Driven by a Time Changed Brownian Motion" in **Mathematical and Statistical Methods for Actuarial Sciences and Finance** Springer (2021)

[3] Hitaj, A., Mercuri L. and Rroji E. "Some empirical evidence on the need of more advanced approaches in mortality modelling" in **Mathematical and Statistical Methods for Actuarial Sciences and Finance** Springer (2018)

[2] Hitaj, A., Mercuri L. and Rroji E. "VIX computation based on affine stochastic volatility models in discrete time." in **International Series in Operations Research and Management Science** Springer (2018)

[1] Mercuri L. and Rroji E. "Risk Measurement Using the Mixed Tempered Stable Distribution" in **Mathematical and Statistical Methods for Actuarial Sciences and Finance** Springer (2014)

Submitted papers

[1] "Thinning simulation algorithm for CARMA(p,q)-Hawkes models" with Mercuri L. and Perchiazzo A.

[2] "Investigating short-term dynamics of green bond prices" with Mercuri L. and Perchiazzo A.

Editorial Board:

Risks (ISSN: 2227-9091) served as Topical Advisory Panel (since February 2024).

Review Activity:

"Annals of Operations Research", "European Journal of Finance", "Insurance, Mathematics and Economics", "Decisions in Economics and Finance" "Journal of Statistical Software", "Risks" and "North American Actuarial Journal", "Oxford Bulletin of Economics and Statistics"...

CONFERENCES AND SEMINARS

Conference/seminar organization:

- *Member* of the **Organizing Committee** for the Conference *AMASES XLVII-th edition*, University of Milano-Bicocca, September 20-22, 2023, Milan, Italy
- **Program committee** for the "8th International conference on Time Series and Forecasting", Gran Canaria, Spain 2022
- **Organizer** of the *POLIMI Lunch Seminars* for the academic year 2018/19.
- **Special session** co-organizer for the *AMASES conference*: Sept. 2018 (4 talks), Sept 2019 (16 talks), Sept 2022 (12 talks) and Sept 2023 (8 talks)
- **Invited to organize** a special session for the ERCIM 2024 Conference, London, UK

Invited Talks at Conferences:

- ERCIM, December 16-18, 2023, **HTW Berlin, University of Applied Sciences, Germany** "Bivariate CARMA-Hawkes model: theory and applications"
- *Amases XLVII-th ed.*, September 20-22, **2023, University of Milano-Bicocca, Italy** "The

effect of green finance on the life insurance market”

- *1st Conference on Sustainable Banking and Finance*, June 23, 2023 **Napoli, Italy** “On the microstructure of green bonds”
- *Amases XLVI-th ed.* September 22-24, **2022, Palermo, Italy**, “On the Use of CARMA(p, q) Models for the Intensity of Point Processes”
- *Big Data and Machine Learning in Finance Conference*, June 10-11, **2021 (virtual conference)** Politecnico di Milano, **Italy** “A machine learning algorithm for stock picking built on information based outliers”
- *Mathematical and Statistical Methods for Actuarial Sciences and Finance conference* April 6-8 **2018, Madrid, Spain** “Some empirical evidence on the need of more advanced approaches in mortality modelling”
- *XIV-th conference on Computational Management Science* May 30,31 and June 1, **2017, Bergamo, Italy** “Portfolio Optimization using Multivariate Mixed Tempered Stable distribution”

Contributed Talks at Conferences:

- *26th International Congress on Insurance, Mathematics and Economics* July 4-7, **2023 Edinburgh** “On the microstructure of green bonds”
- *Quantitative Finance Workshop*, April 20-22, **2023 Gaeta, Italy** “On the microstructure of green bonds”
- *Energy Finance Italia*, February 8-10, **2023, Politecnico di Milano, Italy** “On the microstructure of green bonds”
- *ITISE 2022*, June 27-30, **2022, Gran Canaria, Spain** “CARMA Hawkes (p,q) models”
- *10th International Conference on Mathematical and statistical methods for actuarial sciences and finance* April 20-22, **2022, Salerno, Italy** “On the Volatility Adjustment”
- *Amases XLV-th ed.* September 13-18, **2021 (virtual conference)**, Università di Reggio Calabria, Italy, “Hawkes CARMA(p, q) Models In Ruin Theory”
- *31st European Conference on Operations Research* July, 11-14, **2021 (virtual conference)** University of West Attica, Greece “Hawkes CARMA(p, q) Models In Ruin Theory”
- *IME 2021 (27th International Congress on Insurance, Mathematics and Economics)* July 5-9, **2021 (virtual conference)** “Hawkes CARMA(p, q) Models In Ruin Theory”
- *eMAF2020 (9th International Conference on Mathematical and statistical methods for actuarial sciences and finance)* September 18, 22 and 25, **2020 (virtual conference)** “Pricing of futures with a CARMA(p, q) model driven by a time changed Brownian motion”
- *International Conference in Actuarial science, data science and finance* April 28- 29, **2020 (virtual conference)** “The determinants of lapse rates in the Italian life insurance market”
- *Amases XLIII-th ed* September 9-11, **2019 Perugia, Italy** “Measuring risk with COGARCH(p, q) models”
- *25th International Congress on Insurance, Mathematics and Economics* July 10-12, **2019 Munich, Germany** “Lapse risk in life insurance”
- *Quantitative Finance Workshop* January **2019, Zurich, Switzerland.** “Information content of implicit quantile and implicit expectile curves”
- *Amases XLII-th ed.* September **2018, Napoli, Italy** “Multivariate modeling for financial applications”

- *Quantitative Finance workshop* January **2018 Rome, Italy**
“Copula-based study of the dependence structure between VIX and S&P 500”
- *ERCIM (CFE) conference* December **2017 London, UK**
“Copula-based study of the dependence structure between VIX and S&P 500”
- *Amases XLI-th ed.* September **2017 Cagliari, Italy**
“An expectile-based measure of implied volatility”
- *IME Conference* July **2017 Vienna, Austria**
“Dealing with mortality at highest age groups”
- *Quantitative Finance workshop* January **2017 Milan, Italy**
“Stochastic mortality modelling: some extensions based on Lévy CARMA models”
- *Workshop on Perspectives for young researchers in actuarial mathematics* January **2017 Ascona, Switzerland** “Assessing longevity risk in a portfolio of life annuities”
- *UNIS Actuarial School*, October **2016 Salerno, Italy**
“Assessing longevity risk in a portfolio of life annuities”
- *Amases XL-th ed.*, September **2016 Catania, Italy**
“Assessing longevity risk in a portfolio of life annuities”
- *EUROWORKING GROUP 54-th meeting*, December **2014 Milan, Italy**
“Portfolio Selection with ICA”
- *MAF Conference*, April **2014 Salerno, Italy**
“Risk Measurement Using the Mixed Tempered Stable Distribution”
- *Amases XXXVII-th ed.* September **2013 Stresa, Italy**
“Risk Decomposition in Multifactor models”
- *LaBeX-ReFi*, June **2013 Paris, France**
“Constructing a class of stochastic models: empirical investigation using VIX data”
- *Amases XXXVI-th ed.* September **2012 Vieste, Italy**
“A new class of stochastic volatility models”

Seminars (invited):

- November **2023**, University of **Parma, Italy**, “Extracting information from option prices: the computation of the VIX index”
- June **2023**, Università del **Piemonte Orientale, Italy** “On the microstructure of green bonds”
- November **2017**, University of **Verona, Italy** “An expectile-based measure of implied volatility”
- September **2017**, University of **Pavia, Italy**, “An expectile-based measure of implied volatility”
- November **2016**, University of **Trieste, Italy** “Assessing longevity risk in a portfolio of life annuities”

TEACHING – PhD Courses

PhD in Business for Society (Nov. 3 – 18, 2021), (Nov. 3 -18, 2022) and (Nov. 2-17, 2023) **University of Milano-Bicocca**, course: “Mathematics & Statistics” (16 hours for each academic year)

PhD in Mathematical Models and Methods in Engineering (June 13-July 1 2019) **Politecnico di Milano**.
Course “Machine Learning in Finance” (5 hours)

TEACHING – UNDERGRADUATE AND POSTGRADUATE

University of Milano-Bicocca

Lecturer for the undergraduate course *Matematica generale* (2019-2022, 40 hrs/a.y., 2023- now, 56 hrs/a.y.)

Lecturer for the postgraduate course *Equity Derivatives* (2020-now, 28 hrs/a.y.)

Lecturer for the postgraduate course *Interest Rate Derivatives* (2022-now, 28 hrs/a.y.)

Lecturer for the undergraduate course *Matematica generale* (2017-2018, 24 hrs)

Teaching Assistant for the postgraduate course *Derivatives* (2022- 2023, 12 hrs)

Tutor for the postgraduate course *Advanced Risk and Portfolio Management* (2019-2020, 48 hrs and 2021-22, 12 hrs)

Teaching Assistant for the postgraduate course *Risk Measures* (2012- 2018, 12 hrs/a.y.)

Teaching Assistant for the postgraduate course *Actuarial Mathematics* (2017- 2018, 12 hrs)

Teaching Assistant for the undergraduate course *Matematica Generale* (2014-2015, 12 hrs)

Teaching Assistant for the postgraduate course *Advanced Derivatives* (2011-2012, 2012-2013 and 2013-2014, 12 hrs/a.y.)

Tutor for the use of the data provider *Bloomberg* (November 2010-September 2011, 80 hrs)

MIP School of Business

Lecturer for the postgraduate course *Econometria* (2018-2019, 2019-2020 and 2020-2021, 16 hrs/a.y.)

Politecnico di Milano

Lecturer for the postgraduate course *Econometrics and Insurance* (2018-2019, 80 hrs taught in English)

Master Fintech Allianz (Cefriel, Milan)

Lecturer for the postgraduate course *Fondamenti di Finanza*, Master in "Finance, Insurance and New Technologies" (16hrs, January 11-17, 2021)

University of Pavia

Lecturer for the postgraduate course *Metodi matematici per le applicazioni aziendali* (2017-2018, 44 hrs)

University of Milan

Lecturer for the postgraduate course *Risk Assessment and Management* (2014-2015 and 2016-2017, 40 hours/a.y. taught in English)

University of Trieste

Teaching Assistant for the undergraduate course *Matematica* (2015-2016 and 2016-2017, 30 hrs/a.y.)

SUPERVISION

Post-doc

Ilaria Stefani PhD (March 2024-now) Title of the project “*The effects of climate change in the evaluation of financial contracts*” University of Milano-Bicocca

Master theses at the University of Milano-Bicocca (Role: supervisor)

1. **Luca Brembilla** (25/03/2024) “SABR Model: theoretical insights and applications”
2. **Carlo Daniele Urbano** (25/03/2024) “The energy transition in Europe: profitability and emission efficiency as drivers of companies’ commitment to lead change”
3. **Manuel Perrino** (25/03/2024) “Exploring the dynamics of commodities through stochastic models”
4. **Gianluca Pogliana** (25/03/2024) “Stochastic volatility models: an application for Autocallable pricing”
5. **Francesco Venneri** (25/03/2024) “Frequency connectedness spillovers between green bond and green equity markets in the post-pandemic era”
6. **Niccolò Andrea Ghezzi** (28/11/2023) “Crash risk and hedging strategies”
7. **Nicolò Pezzo** (28/11/2023) “An analysis of the Option-Adjusted Spread (OAS)”
8. **Aimee Jean Battoon** (06/10/2023) “Analyzing the impact of carbon risk on firms’ creditworthiness”

9. **Giulio Gironi** (06/10/2023) "Liquidity measures and jumps in financial markets"
10. **Giorgia Agnoli** (06/06/2023) "Exotic Target Volatility options: analysis and pricing"
11. **Tristan Arlati** (29/03/2023) "Valuation adjustment for derivatives pricing"
12. **Elia Brambilla** (29/03/2023) "Bitcoin: synchronicity and crash risk"
13. **Leonardo Nava** (29/03/2023) "The FMM-SABR model for the transition from LIBOR to Risk-Free-Rates"
14. **Sara Proserpi** (29/03/2023) "Comparing pricing models for Asian options"
15. **Francesco Surace** (29/03/2023) "Hawkes models for the analysis of the microstructure"
16. **Costanza Gambino** (24/11/ 2022) "Inflation prediction through a MIDAS model"
17. **Lorenzo Tozzo** (24/11/2022) "Prediction of yield curves: classical models and artificial neural networks"
18. **Alessio Piattoni** (29/09/ 2022) "CVA of an interest rate swap using MATLAB"
19. **Giuseppe Federico Carrino** (29/09/2022) "A comparison of models for Real Estate pricing"
20. **Arianna Pierdomenico** (27/07/2022) "Pricing of American options: from Longstaff- Schwartz to neural networks"
21. **Marco Meregalli** (24/03/2022) "SDPPI: a framework for portfolio and risk management"
22. **Claudio Tornari** (24/03/2022) "Study of synchronicity and return prediction through networks"
23. **Marco Harald Brix** (24/03/2022) "Volatility surface 'calibration' using machine learning techniques".
24. **Danilo Grasso** (23/11/2021) "Calibration of stochastic models for structured products"
25. **Elena Prina** (24/03/ 2021) "Pricing of reverse mortgages using neural networks"
26. **Marco Pozzi** (24/03/ 2021) "Forward looking measures for return prediction"

INSTITUTIONAL SERVICE

September 2022 - present Chair of the "Commissione Paritetica dei Docenti e degli Studenti" for the Department of Statistics and Quantitative Methods at the University of Milano-Bicocca

June 2020 – present member of the **Admission board** for the postgraduate course "*Economics and Finance*" at the University of Milano-Bicocca

March 2019-.present member of several evaluation committees for research (2 post-docs at Politecnico di Milano, 1 post-doc at Univ. Milano-Bicocca, 1 post-doc at Univ. Parma) and teaching fellows.

MEMBERSHIP

June 2012 - present member of the **AMASES** (Association of Applied Math for Social and Economics Science) association.

January 2018 – present member of the National group for Mathematical Analysis, Probability and their Applications (**GNAMPA**) of the National Institute of Mathematics (INdAM).

October 2018 – October 2019 member of **SIde** (Italian Society of Econometricians).

October 2018 – October 2019 member of the **Nicola Liberati Quantitative Finance Lab** (*QFinLab*) at the Department of Mathematics at Politecnico di Milano

March 2024

Autorizzo il trattamento dei miei dati personali presenti nel cv ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali" e del GDPR (Regolamento UE 2016/679).