Curriculum Vitae

Università degli Studi di Bari Aldo Moro
Dipartimento di Matematica
Via Edoardo Orabona, 4, 70125 Bari
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Full Professor
SSD STAT/04

Carlo Sgarra

Personal Information

Full Name	Carlo Sgarra
Date of Birth	August 14, 1957
Place of Birth	Turin
Nationality	Italian
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Current Position

Position	Full Professor
Institute	Università degli Studi di Bari Aldo Moro
Department	Dipartimento di Matematica
Starting date	September 15, 2023

Past Experiences

From Dec.16 2010 to Sep.15 2023 — Associate Professor

Institution: Politecnico di Milano, Dipartimento di Matematica

Scientific disciplinary sector: SECS-S/06 - Mathematical Methods of Economics, Actuarial and Financial Sciences

From Nov.1 2007 to Dec.16 2010 — Assistant Professor (Ricercatore TI)

Institution: Politecnico di Milano, Dipartimento di Matematica

Scientific disciplinary sector: SECS-S/06 - Mathematical Methods of Economics, Actuarial and Financial Sciences

From Jan.16 1990 to Nov.1 2007 — Assistant Professor (Ricercatore TI)

Institution: Politecnico di Milano, Dipartimento di Matematica

Scientific disciplinary sector: MAT/07 - Mathematical Physics

From Nov.1 1987 to Jan.16 1990 — Post-Doctoral Fellow (Ricercatore a contratto)

Institution: Politecnico di Milano, Dipartimento di Matematica

Scientific disciplinary sector: MAT/07 - Mathematical Physics

Education

1983–1987 Ph.D. in Mathematics: Methods and Applications, *Università degli studi di MIlano, Milano, Italy*

Date: November 18, 1988

Thesis: *Some Existence, Uniqueness and Stability Results for Kinetic Equations.*

Advisor: Prof. Carlo Cercignani

1980–1982 Master's Degree in Mathematics, *Università degli Studi Torino, Turin, Italy*

Graduation Marks: 110/110 cum laude

Thesis Title: *Some Remarks about higher-order poles in the Belinsky-Zakharov Method for Einstein Equations*

Advisor: Prof. Mauro Francaviglia

1980–1982 Master's Degree in Physics, *Università degli Studi Torino, Turin, Italy*

Graduation Marks: 109/110 cum laude

Thesis Title: *Hawking Radiation and Dynamic Stability of Black Holes*

Advisor: Prof. Tullio Regge

Research Interests

My research interests include Option Pricing, Portfolio Optimization and Quantitative Risk Management for incomplete financial and insurance market models, in particular stochastic volatility models and models with jumps.
Recently, I focused on Self-Exciting or Contagion models based on Hawkes Processes and Continuous Branching Processes with Immigration. I am studying pricing and hedging of derivatives on commodity markets and on fixed-income markets. I'm aldo trying to develop, in cooperation with other research groups abroad (Oslo, Norway) some Hilbert-Valued Stochastic Volatility models with jumps both for commodity and forward interest rate markets.
Some of my research projects have been supported by the Bachelier-LABEX Institution for Financial Mathematics.

Publications

- A Barndorff-Nielsen and Shephard model with leverage in Hilbert space for commodity forward markets, 2024. to appear on Finance and Stochastics (In cooperation with F. E. Benth). Available at https://papers/ssrn/com/sol3/papers.cfm?abstr = 383505
- Hawkes processes in energy markets: modelling, estimation and derivatives pricing, in Quantitatiove Energy Finance, Eds. F.E. Benth and A. Veraart, Springer, 2024. (In cooperation with R. Brignone and L. Gonzato).
- The Guaranteed Minimum Maturity Benefit under a self-exciting mortality model (2023). To appear on North-American Actuarial Journal. (In cooperation with D. Banos Ruiz and A. Hausken Sande).
- Forward Term Structure Driven by Hawkes Processes (2023) (In cooperation with G. Bernis, M. Garcin, S. Scotti). SIAM Journal of Financial Mathematics, 14 (4), 1062-1079.
- An optimal-reinsurance strategy with BSDEs in a partially observable model with jump clusters (2023). To appear on Finance and Stochastics . (In cooperation with M. Brachetta, G. Callegaro, C. Ceci).
- Commodity Asian option pricing and simulation in a 4-factor model with jump clusters, Annals of Operations Research, online-first, 1-32, 2023. doi.org/10.1007/s10479-022-05152-x (In cooperation with R. Brignone and L. Gonzato).

- A self-exciting modelling framework for forward prices in power markets, Applied Stochastic Models in Business and Industry, 38(1), 1-22, 2022. (In cooperation with G. Callegaro, A. Mazzoran).
- Self-Exciting Jumps in the Oil Market: Bayesian Estimation and Dynamic Hedging, Energy Economics, 99, (105279) 1-13, 2021. (In cooperation with L. Gonzato).
- A Gamma Ornstein-Uhlenbeck model driven by a Hawkes process, Mathematics and Financial Economics, 15, 747-773, 2021. (In cooperation with G. Bernis, R. Brignone, S. Scotti).
- Asian Option Pricing in Hawkes-Type Jump-Diffusion Models, Annals of Finance, 16, 101-119, 2020. (In cooperation with R. Brignone).
- A Branching Process Approach to Power Markets, Energy Economics, 79, 144-156, 2019. (In cooperation with Y. Jiao, C. Ma, S. Scotti).
- A particle filtering approach to oil futures price calibration and forecasting, Journal of Commodity Markets, 9, 21-34, 2018. (In cooperation with G. Fileccia).
- Geometric Asian option pricing in general affine stochastic volatility models with jumps, Quantitative Finance, 17(6), 873-888, 2017. (In cooperation with F. Hubalek, M. Keller-Ressel).
- Optimal investment in markets with over and under-reaction to information, Mathematics and Financial Economics, 11, 299-322, 2017. (In cooperation with G. Callegaro, M. Gaigi, S. Scotti).
- European Option Pricing with Transaction Costs and Stochastic Volatility: an Asymptotic Analysis, IMA Journal of Applied Mathematics, 80, 981-1008, 2015. (In cooperation with R. Caflisch, G. Gambino and M. Sammartino).
- Historical and Risk-Neutral Parameters Estimation in a two-factors Commodity Market Model with Stochastic Volatility, International Journal of Computational Economics and Econometrics, 5(4), 451-479, 2015. (In cooperation with G. Fileccia).
- Stochastic Comparison of GARCH Models. Journal of Applied Probability, 51(3), 685-698, 2014. (In cooperation with F. Bellini, F. Pellerey and S. Yasaey Sekeh).
- American Option Valuation in a Stochastic Volatility Model with Transaction Costs, Stochastics: an International Journal of Probability and Stochastic Processes, 87(3), 518-536, 2015. (In cooperation with A. Cosso and D. Marazzina).
- Acceptability Indexes via g-expectations: an Application to Liquidity Risk, Mathematics and Financial Economics, 4(7), 457-475, 2013. (In cooperation with E. RosazzaGianin).
- The Risk Premium and the Esscher Transform in Power Markets, Stochastic Analysis and Applications, 30(1), 20-43, 2012. (In cooperation with F.E. Benth).
- Convex Ordering of Esscher and Minimal Entropy Martingale Measures in Discrete time Models, in Mathematical and Statistical Methods in Actuarial Sciences and Finance (C. Perna, M. Sibillo Eds.), Springer, 2011. (Contributo su Volume. In cooperation with F. Bellini).
- On the explicit valuation of geometric asian options in stochastic volatility models with jumps, Journal of Computational and Applied Mathematics, 235(11), 3355-3365. . (In cooperation with F. Hubalek).
- A Finite Element Discretization Method for Option Pricing with the Bates Model ,SeMA Journal, 55, 23-40, 2011. (In cooperation with E. Miglio).

- Some Results on Correlation Matrices for Interest Rates, Acta Applicandae Mathematicae, 115(3), 291-318, 2011. (In cooperation with E. Salinelli).
- The Evaluation of American Options in a Stochastic Volatility Model with Jumps: an Efficient Finite Element Approach, Computers and Mathematics with Applications, 60(6), 1571-1590, 2010. (In cooperation with L. Ballestra).
- On the Esscher Transforms and other equivalent martingale measures for Barndorff- Nielsen and Shephard stochastic volatility models with jumps, Stochastic Processes and their Applications, 119(7), 2137-2157, 2009. (In cooperation with F. Hubalek).
- Shift, Slope and Curvature for a Class of Yields Correlation Matrices (In cooperation with E. Salinelli), Linear Algebra and its Applications, 426 (1-2), 650-666, 2007.
- Quadratic Hedging for the Bates Model, International Journal of Theoretical and Applied Finance, 10(5), 873-885, 2007. (In cooperation with F. Hubalek).
- On the Esscher Transform and Entropy for Exponential Levy Models Quantitative Finance, 6(2) ,125-145, 2006. (In cooperation with F. Hubalek).
- An Exact Analytical Solution for Discrete Barrier Options, Finance and Stochastics, 10(1), 1-26, 2006. (In cooperation with D.I. Abrahams e G. Fusai).
- Correlation matrices for yields and total positivity (In cooperation with E. Salinelli). Linear Algebra and its Applications, 418(1-2), 682-692, 2006.
- Rotations which make Strain and Stress Coaxial, Journal of Elasticity, 48, 211-218, 1997. (In cooperation with M. Vianello).
- Directions of Coaxiality between pure Strain and Stress in Linear Elasticity, Journal of Elasticity, 46, 263-265, 1997. (In cooperation with M. Vianello).
- Comments on 'Extension of the Mott-Smith Method to denser gases' [Phys. Fluids A 4, 1856 (1992)], Physics of Fluids, 7(6), 1507-1509, 1995. (In cooperation with C. Cercignani and A. Frezzotti).
- Numerical Analysis of a Shock-Wave Solution of the Enskog Equation Obtained via a Monte Carlo Method, Journal of Statistical Physics, 73(1/2), 193-207, 1993. (In cooperation with A. Frezzotti).
- Half-Range Completeness for the Fokker-Planck Equation with an External Force, Journal of Statistical Physics, 66(5/6), 1575-1582, 1992. (In cooperation with C. Cercignani).
- On the Relation between the Scattering Kernel and the Standard Formulation of the Boltzmann Equation, Il Nuovo Cimento B, 101(5), 523-531, 1988. (In cooperation with C. Cercignani and M. Lampis).
- L2-Stability near Equilibrium of the Solution of the Homogeneous Boltzmann Equation in the case of Maxwellian Molecules, Meccanica, 23, 15-18, 1988. (In cooperation with C. Cercignani and M. Lampis).
- Numerical Analysis of Two-Soliton Solutions on a Bianchi Type-II Background, General Relativity and Gravitation, 18(7), 745-765, 1986. (In cooperation with A. Curir and M. Francaviglia).
- Remarks about Higher-Order Poles in the Belinsky-Zakharov Method for Einstein Equations, Il Nuovo Cimento B, 80(2), 223-230, 1984. (In cooperation with M. Francaviglia).

Textbooks

- MATHEMATICAL FINANCE: THEORY REVIEW AND EXERCISES, SPRINGER(Unitext) 2013, in cooperation with E. Rosazza Gianin. (New Edition available since May 1, 2023).
- INGEGNERIA FINANZIARIA: Una Introduzione Quantitativa, EGEA 2009, in cooperation with E. Barucci, C. Marsala, M. Nencini (Italian Language).
- ESERCIZI DI FINANZA MATEMATICA, Springer 2007 (Unitext), in cooperation with E. Rosazza Gianin (Italian Language).

Editorial Activity

- Member of the Editorial Board of the INTERNATIONAL JOURNAL OF COMPUTATIONAL ECONOMICS AND ECONOMETRICS
- Guest Editor of the Special Issue "Energy Finance and Climate Change" of the Journal APPLIED STOCHASTIC MODELS IN BUSINESS AND INDUSTRY (2023)
- Guest Editor of the Special Issue "Energy Finance and Energy Economics" of the journal ENERGY ECONOMICS (2024)

Teaching Activity

a.y. 2023/2024	Metodi Analitici per la Finanza (SSD SECS-S/06, SC 13/D4), 7 CFU, 56 hours, Master in Mathematics *Università degli Studi di Bari*, Dipartimento di Matematica
a.y. 2023/2024	Econometria e Teoria Matematica del Portafoglio (SSD SECS-S/06, SC 13/D4), 7 CFU, 56 hours, Master in Mathematics *Università degli Studi di Bari*, Dipartimento di Matematica
a.y. 2023/2024	Istituzioni di Economia Matematica (SSD SECS-S/06, SC 13/D4), 7 CFU, 56 hours, Master in Mathematics *Università degli Studi di Bari*, Dipartimento di Matematica
a.y. 2004/2005-2022/2023	Mathematical Finance II (SSD SECS-S/06, SC 13/D4) 10 CFU, 100 hours, Master in Mathematical Engineering *Politecnico di Milano*, Dipartimento di Matematica
a.y. 2020/2021-2022/2023	Insurance and Econometrics (SECS-S/06, SC 13/D4) 10 CFU, 100 hours, Master in Mathematical Engineering *Politecnico di Milano*, Dipartimento di Matematica
a.y. 2008/2009-2009/2010	Computational Finance (SSD SECS-S/06, SC 13/D4) 10 CFU, , 100 hours, Master in Mathematical Engineering *Politecnico di Milano*, Dipartimento di Matematica
a.y. 2012/2013	Financial Engineering (SSD SECS-S/06, SC 13/D4) 10 CFU, , 100 hours, Master in Mathematical Engineering *Politecnico di Milano*, Dipartimento di Matematica
a.y. 2007/2008-2009/2011	Mathematical Finance 5 CFU Post-Graduate Executive Master Students, 30 hours, *Politecnico di Milano*, MIP (Master Impresa Politecnico)
a.y. 2019/2020	Hawkes Processes and their Applications in Finance, 5 CFU, 30 hours, PhD Course *Politecnico di Milano*, Dipartimento di Matematica
a.y. 2014/2015	Stochastic Models for Energy Markets, 5 CFU, 30 hours, PhD Course *Technical University, Vienna*, Institut fur Versicherung und Finanzmathematik

Funding and Research Projects

2006-2010 Participation to the PRIN 2006 Project - *Credit Risk and Levy Processes*

2004-2008 Participation to the PRIN 2004 Project - *Duality in Mathematical Finance*

2018-2022 Member of the research project *Bachelier Institute -LABEX Project 2018 "Clusters and Information Flows: Modelling, Analysis and Implications"*.

Invited talks

- Ole Barndorff-Nielsen Memorial Conference, Aarhus, May 29-31, 2024.
- Meeting on Quant Finance, Pisa, May 6-8, 2024.
- Frontiers in Stochastic Modelling for Finance, Palermo, October 25-27, 2023.
- Stochastics, Statistics, Machine Learning and their Applications to Sustainable Finance and Energy Markets, Vienna, September 11-16, 2023.
- CONTROPT 2023 Pisa, May 8-10 , 2023.
- Stochastic Control and Financial Risk Workshop, Hammamet, April 24-27 , 2023.
- STORM group conference on Stochastic Analysis and Applications, Oslo, September , 2022.
- CASF conference (Conference on Actuarial Sciences and Finance), Samos, May 23-29, 2022.
- Florence-Paris Workshop on Mathematical Finance, Florence, October 27-29, 2021.
- 10-th General AMAMEF (Advanced MAthematical MEthods in Finance) Conference, Padova (online), June 22-25, 2021.
- WPI (Wolfgang Pauli Institute) Workshop on High-Dimensional Stochastics with Applications, Vienna (online), September 7-9, 2020.
- Vienna Conference on Mathematical Finance, Vienna, September 9-11, 2019.
- Conference on Stochastic Analysis and Applications, Risør (Norway), August 25-30, 2019.
- International Conference on Mathematical Finance and Data Science, Siem Reap (Cambodia), February 26-March 2, 2019.
- International Conference on Control, Games and Stochastic Analysis, Hammamet, October 29-November 1, 2018.
- Workshop on Stochastic Methods in Finance and Physics, Crete, July 23-27, 2018.
- International Conference on Branching Processes and their Applications, Shanghai, May 20-27, 2018.
- Verona Conference on Stochastic Models in Finance, Verona, December 10-14, 2017.
- Second Paris-Asia Conference on Mathematical Finance, Sozhou, May 23-27, 2017.
- Conference The Mathematics of Energy Markets, WPI, Vienna , July 2-7, 2016.

- Frontiers in Stochastic Modelling for Finance, Padova, February 8-12, 2016.
- Stochastic Analysis, Controlled Dynamical Systems and applications, Jena, March 9-13, 2015.
- Paris-Southeast Asia Conference on Mathematical Finance, Siem Reap, Cambodia, February 5-11, 2015.
- Italian-German Workshop on Stochastic Modeling of Financial Crises, Wupperthal, December 9-11, 2013.
- Spring School Stochastic Methods in Finance and Insurance Mathematics, Jena, March 20-27, 2011.

Visiting Activity

- Department of Mathematics, Oslo University, Oslo, December 5-16, 2021.
- ENSIIE (Ecole Normale Supérieure d'Industrie et d'Informatique pour l'Entreprise), Paris, November 1, 2018 - September 15, 2019 (Sabbatical Year).
- Laboratoire del Mathématiques e Modélisation d'Evry, Evry (Paris), October 1-15, 2017.
- Laboratoire de Probabilité et Modèles Aléatoires, Université Paris Diderot, October 2-26, 2015.
- FAM (Financial and Actuarial Mathematics) Institut , Technische Universitat Wien, July 12-19, 2014.
- Institut fur Stokastik, University of Wuppertal, December 9-11, 2013.
- Institut fur Stokastik, University of Jena, April 22-28, 2012.
- FAM (Financial and Actuarial Mathematics) Institut , Technische Universitat Wien, February 20-27, 2011.
- Thiele Center for Applied Probability and Statistics, Aarhus University, Aarhus, February 10- February 11, 2005.
- Thiele Center for Applied Probability and Statistics, Aarhus University, Aarhus, January 7- May 31, 2003.
- OCIAAM Center for Applied and Industrial Mathematics, Oxford University, Oxford, September 14- December 20, 1999.
- Department of Mathematics, Chalmers Tekniska Hogskolan, Gothenburg, July 1- November 20, 1986 (Visiting Junior as a PhD Student).

Conference Organization

- Member of the scientific committee for the workshop *EFI 2024, Energy Finance Italy*, University of Bari Aldo Moro, Department of Economics on February 12-14, 2024.
- Member of the scientific and organizing committee for the workshop *EFI 2023, Energy Finance Italy*, Politecnico di Milano, Department of Mathematics on February 11-13, 2023.
- Workshop on Quantitative Finance, Politecnico di Milano, Department of Mathematics January 28/29, 2009.

Management Activities (Terza Missione)

Nov.2023-Nov.2024	Coordinator of the Committee for Teaching of Dept. Of Mathematics, *Università degli Studi di Bari*
Nov.2023-Nov.2024	Coordinator of the Committee for Courses and Classrooms Scheduling of Dept. Of Mathematics, *Università degli Studi di Bari*
Nov.2015-Nov.201	President of the Final Degree Committees (it. Commissioni di Laurea e Laurea Magistrale) for the MATHEMATICAL ENGINEERING Course, *Politecnico di Milano*
Nov.2010-Nov.2020	Member of the Committee for admission to the master course in Mathematical Engineering, *Politecnico di Milano*
Nov.2012-Nov.2014	Reference Fellow at Politecnico di Milano for the International Cooperation Program Italy-Palestine EPLUS-MATHEMATICAL MODELS FOR THE MANAGEMENT OF DEVELOPMENT of the Ministry of Foreign Affairs.*Politecnico di Milano*
Nov.2010-Nov.2024	Member of several recruiting committees (University of Milan, University of Milano Bicocca, University of Rome "La Sapienza", University of Bologna, etc...) for Assistant Professors positions (RTDA and RTDB), Postdocs, etc...
Nov.2010-Nov.2024	Member of several recruiting committees (University of Milan, University of Milano Bicocca, University of Rome "La Sapienza", University of Bologna, etc...) for Ph.D. Theses.
Nov.2018-Nov.2019	Reference Fellow and Member of the Evaluation Committee for the BRUTI-LIBERATI Prize assignment of the BACHELIER FINANCE SOCIETY.*Politecnico di Milano*
Nov.2018-Nov.2024	Reference Fellow and responsible of the International Exchange Program and Double Degree Agreement between Politecnico di Milano (POLIMI) and Ecole Normale Supérieure d' Informatique pour L'Industrie et l'Entreprise (ENSIIE).*Politecnico di Milano*
May 2020- May 2024	MEMBER of the FACULTY for the PHD PROGRAM "Mathematical Models and Methods for Engineering" at the Mathematics Department.*Politecnico di Milano*