Athena Picarelli

Personal Data

Curriculum Vitae

Given Name	Athena
Family Name	Picarelli
Nationality	Italian
Address	Ex-caserma Santa Marta, Via Cantarane 24 (Verona)
e-mail	athena.picarelli@univr.it
Web page	https://sites.google.com/site/athenapicarelli/

Current Position

Oct24- **Full Professor**,
Department of Economics, University of Verona

Positions held

Nov22-Sep24 **Associate Professor**,
Department of Economics, University of Verona

Nov19-Nov22 **Temporary Assistant Professor (RTDB)**,
Department of Economics, University of Verona

Apr18-Oct19 **Temporary Assistant Professor (RTDA)**,
Department of Economics, University of Verona

Oct17-Mar18 **CFM research fellowship**, *Mathematics Department, Imperial College London*

Jan17-Sep17 **Post-doc research fellowship**, *Mathematics Department (Mathematical and Computational Finance Group), University of Oxford*

Jan15-Dec16 **Nomura research fellowship**, *Mathematics Department (Mathematical and Computational Finance Group), University of Oxford*

Research interests

Stochastic control, Optimal control problems, Dynamic Programming, first and second order Hamilton-Jacobi equations, Numerical schemes for Hamilton-Jacobi equations, Semi-Lagrangian schemes, Error estimates, Computational Finance, Machine Learning.

Education

March 2011 **Master of Science in Applied Mathematics**, *Università di Roma "La Sapienza"*

January 2008 **Bachelor in Mathematics**, *Università di Roma "La Sapienza"*

PhD thesis

Nov11-Apr15 ITN SADCO Marie-Curie fellowship, FR7 EU program & INRIA-Saclay Île de France.

Thesis **On some stochastic control problems under state constraints**.

Supervisors Prof. Hasnaa Zidani, Prof. Olivier Bokanowski

Papers in peer-reviewed journals

2024 A. Gnoatto, S. Lavagnini, A. Picarelli. *Deep Quadratic Hedging*.
Mathematics of Operations Research, forthcoming.

2024 A. Fina, A. Gnoatto, A. Picarelli. *Quantization of stochastic volatility models: numerical tests and an open source implementation*.
Mathematics and Computers in Simulation, 225, pp. 29–51.

2023 A. Gnoatto, A. Picarelli, C. Reisinger. *Deep xVA solver – A Neural Network based Counterparty Credit Risk Management framework*.
SIAM J. Financial Mathematics, Vo. 14 (1)

2021 P. Gajardo, C. Hermosilla, A. Picarelli. *On the set of robust sustainable thresholds*.
Natural Resource Modeling, Vol. 34 (4)

2021 O. Bokanowski, A. Picarelli, C. Reisinger. *Stability results for second order backward differentiation schemes for parabolic Hamilton-Jacobi-Bellman equations*.
Numerische Mathematik, Vol. 148 (1), pp. 187-222

2020 G. Bouveret, A. Picarelli. *A Level-Set Approach for Stochastic Optimal Control Problems Under Controlled-Loss Constraints*.
J. Optimization Theory Applications, Vol. 186 (3), pp.779-805

2020 A. Picarelli, T. Vargiolu. *Optimal management of pumped hydroelectric production with state constrained optimal control*.
J. Economic Dynamics and Control, Vol. 126, pp. 1-21

2020 A. Picarelli, C. Reisinger. *Probabilistic error analysis for some approximation schemes to optimal control problems*.
Systems & Control Letters, Vol. 137, pp. 1-11

2020 A. Picarelli, C. Reisinger. *Duality-based a posteriori error estimates for some approximation schemes for optimal investment problems*.
Comuputer and Mathematics with applications. Vol. 79, pp. 2099-2118

2020 A. Picarelli, C. Reisinger, J. Rotaetxe. *Some regularity and convergence results for parabolic Hamilton-Jacobi-Bellman equations in bounded domains*.
J. of Differential Equations. Vol. 268 (12), pp. 7843-7876

2019 E. R. Jakobsen, A. Picarelli, C. Reisinger. *Improved order 1/4 convergence for piecewise constant policy approximation of stochastic control problems* . Electronic Communications in Probability, Vol. 24 (59), pp. 1-10

2018 A. Kröner, A. Picarelli, H. Zidani. *Infinite horizon stochastic optimal control problems with running maximum cost*.
SIAM J. Control and Optimization, Vol. 56 (5), pp. 3296-3319

2018 O. Bokanowski, A. Picarelli, C. Reisinger. *High-order filtered schemes for time-dependent second order HJB equations*. ESAIM: M2AN, Vol. 54 (1), pp. 69-9

2016 O. Bokanowski, A. Picarelli, H. Zidani. *State-constrained stochastic optimal control problems via reachability approach*. SIAM J. Control and Optimization, Vol. 54 (5), pp. 2568-2593

2015 L. Grüne, A. Picarelli. *Zubov's method for controlled diffusions with state constraints*. Nonlinear Differential Equations and Applications, Vol. 22 (6), pp. 1765-1799

2015 O. Bokanowski, A. Picarelli, H. Zidani. *Dynamic Programming and error estimates for stochastic control problems with maximum cost.* Applied Mathematics and Optimization, Vol. 71 (1), pp. 125-163

2012 S. Cacace, E. Cristiani, M. Falcone, A. Picarelli. *A patchy dynamic programming scheme for a class of Hamilton-Jacobi-Bellman equations.* SIAM J. Scientific Computing, Vol. 34 (5) , pp. A2625-A2649

Papers in peer-reviewed proceedings and book chapters

2018 M. Assellaou, A. Picarelli. *A Hamilton-Jacobi-Bellman approach for the numerical computation of probabilistic state constrained reachable sets*. In Falcone et al. (Ed.) "Numerical methods for Optimal Control problems". Springer INDAM Series.

2018 A. Picarelli, C. Reisinger, J. Rotaetxe. *Boundary Mesh Refinement for Semi-Lagrangian Schemes*. In Kalise et al (Ed.), "Hamilton-Jacobi-Bellman Equations. Numerical Methods and Applications in Optimal Control" (pp. 167—188). Radon Series on Computational and Applied Mathematics, De Gruyter (2018).

2017 A. Festa, R. Guglielmi, C. Hermosilla, A. Picarelli, S. Sahu, A. Sassi, F. Silva. *Recent results in Hamilton-Jacobi-Bellman theory.* Book chapter in "Optimal Control Design: Novel Directions and Applications". Springer, Lecture notes in Mathematics. DOI: 10.1007/978-3-319-60771-9.

Preprints and ongoing works

A. Gnoatto, M. Patacca, A. Picarelli. *A deep solver for BSDEs with jumps*. submitted https://arxiv.org/abs/2211.04349.

E. Carlini, A. Picarelli, F. Silva. *A Semi-Lagrangian scheme for Bellman equations arising in stochastic exit time control problems*.
Ongoing work.

A. Gnoatto, K. Oberpriller, A. Picarelli. *Error estimates for the deep BSDE solver with jumps*.
Ongoing work.

A. Picarelli, M. Scaratti, J. Tam. *A numerical scheme for extended mean field control problems and application to energy distribution*.
Ongoing work.

Research visits

Mar 2024 **Université Paris 7 (France)**, *Visiting Prof. Chassagneux and Prof. Bokanowski*

Oct 2019 **Universidad Técnica Federico Santa Maria (Valparaíso, Chile)**, *Visiting Prof. Hermosilla*

Nov13–Feb14 **Universitá degli studi di Padova (Italy)**, *Visiting Prof. Bardi and Prof. Cesaroni*

May-Jun 14 **Universität Bayreuth (Germany)**, *Visiting Prof. Grüne*

Awards

2023 Funding PRIN PNRR 2022 "Probabilistic Methods for Energy Transition" (Local coordinator and vice PI, PI: Luciano Campi, 224.563 EUR)

2023 Italian scientific habilitation (ASN) for the role of Full Professor in the sector 13/D4 (Mathematical Methods for Economics and Finance) and for the role of Associate Professor in the sectors: 01/A3 (Analysis, Probability and Statistics), 01/A5 (Numerical Analysis)

2023 Funding from the "Visiting Program" of the University of Verona (visitor: Prof. Reisinger, 480 EUR)

2018 Funding from the "Visiting Program" of the University of Verona (visitor: Dr. Bouveret, 2000 EUR)

Jan 2016 Qualification aux fonctions de Maître de Conférences (French system)

Nov 2015 INDAM (Italian Institute of High Mathematics) grant for young researchers, group GNCS (Group on Numerics and Computer Science), 1000 EUR.

July 2014 Financial support award for the participation to the conference HYP2014, Rio de Janeiro, Brazil, 28 July- 1 August 2014.

Nov 2011 ITN Marie-Curie SADCO 3 years fellowship.

Administration and Collective responsibilities

Oct 24 - Coordinator of the PhD program in Economics and Finance, Università di Verona.

Jan 23 - Associate editor for the SIAM J. Financial Mathematics.

Jul 18 - Associate editor for the J. of Computational Finance.

Scheduled Co-organizer and member of the Scientific Committee for the 12th General AMAMEF Conference, Università di Verona, Italy.

Scheduled Co-organizer of the special session "Probabilistic Methods for Energy Transition" at the 4th Italian Meeting on Probability and Mathematical Statistics, Rome, Italy.

Dec 2022 Co-organizer of the Verona Workshop on Financial Mathematics, Università di Verona, Italy.

Jan 2021 Co-organizer of the XXII Workshop on Quantitative Finance, Università di Verona, Italy (online).

Jul 2018 Co-organizer of the special session "Modeling and Computational Methods for Financial Applications" at the Conference ORCOS (Viennese Conference on Optimal Control and Dynamic Games), TU Wien, Austria.

Sep-Dec 2016 Co-organizer of the Mathematical Finance internal seminar, University of Oxford.

June 2013 Co-organizer of the SADCO 'Doctoral Days' at ENSTA ParisTech.

Referee Mathematical Finance, SIAM Journal on Control and Optim., SIAM Journal on Scientific Computing, Quantitative Finance, SIAM J. Financial Mathematics, Operations Research, Electronic Journal of Probability, Journal of Optimization Theory and Applications, Communications on Pure and Applied Analysis, BIT Numerical Mathematics, Applied Mathematics and Optimization, Set-valued and Variational Analysis, IMA Journal of Numerical Analysis, Numerische Mathematik.

Recruiting Tenured Assistant Professor (RTT) (LUISS, 2024), Post-doc fellowship AdR 4398 (Università di Verona, 2023), Post-doc fellowship AdR 4192 (Università di Verona, 2023), Post-doc fellowship AdR 4191 (Università di Verona, 2023), Tenured Assistant Professor (RTDB) 2023rtdb003 (Università di Verona, 2023), PhD admissions (Università di Verona, 2023)

PhD jury PhD thesis of Dr. Lorenzo Croissant (Universitè Paris Dauphine, 2023)

Invited conference and seminar talks

Mar 2024 Seminaire du GdT en Probabilité et Analyse Numérique, Université Paris 7, France.

Jan 2024 SIAM seminar series (online).

Nov 2023 LMU Workshop, Munich, Germany.

June 2023 The 11th AMAMEF Conference, Bielefeld, Germany.

May 2023 Conference, Nonlinear partial differential equations: theory, numerics and applications - A conference in memory of Maurizio Falcone, Roma, Italy.

Oct 2022 Seminaire d'Analyse Numérique, INSA Rouen, France.

Sep 2022 Workshop, Machine Learning for PDEs, LSE & Imperial College London, UK.

Jul 2022 Workshop, New directions in stochastic control, Imperial College, London, UK.

Jun 2022 Third Italian Meeting on Probability and Mathematical Statistics, Bologna, Italy.

Jun 2022 Conference, Theory and Numerics of Mean Field Games and Hamilton-Jacobi equations, Roma, Italy.

Mar 2022 The 5th Women in Quantitative Finance Hybrid Conference (online), London, UK.

Mar 2022 Control and Optimisation Seminars (online), Imperial College, UK.

Feb 2022 De Vinci Seminar (online), Paris, France.

Dec 2021 Probability and Finance Seminar (online), Università degli Studi di Padova, Italy.

Oct 2020 Scientific Computation Seminar (online), University of Nottingham, UK.

Jun 2020 Differential Numerical Modeling Seminar (online), Università di Roma "La Sapienza", Italy.

Dec 2019 Differential Numerical Modeling Seminar, Università di Roma "La Sapienza", Italy.

Sep 2019 Mathematics Seminar, Universidad Técnica Federico Santa Maria, Valparaíso, Chile.

Sep 2019 Workshop, Control of State-Constrained Dynamical Systems, Universidad Técnica Federico Santa Maria, Valparaìso, Chile.

Mar 2019 Differential Numerical Modeling Seminar, Università di Roma "La Sapienza", Italy.

Mar 2019 Stochastic Finance Seminar, University of Warwick, UK.

Nov 2018 Workshop in Financial Mathematics, Università di Padova, Italy.

Jun 2018 Workshop, Stochastic Modeling and Financial Applications, Università di Verona, Italy.

May 2018 Workshop, Stochastic Control and Applications, Università di Verona, Italy.

Apr 2018 Risk & Stochastic Conference, London, UK.

Mar 2018 Workshop, Stochastic analysis applied to economics, finance and insurance, University of Santiago, Chile.

Jan 2018	Mathematical and Computational Finance Seminar, University of Oxford, UK.
Jan 2018	Differential Equations and their Applications Seminar, Università di Padova, Italy.
Dec 2017	Verona-Paris Conference on Stochastic Modeling, Verona, Italy.
Nov 2017	Numerical Analysis Seminar, University of Sussex, UK.
Oct 2017	Numerical Analysis Seminar, University of Oxford, UK.
Oct 2017	Mathematical Finance Seminar, Politecnico di Milano, Italy.
Jan 2017	Risk & Stochastics and Financial Mathematics Seminar, LSE, UK.
Nov 2016	Workshop, Numerical Methods for HJ equations in Optimal Control, RICAM, Austria.
March 2016	Workshop, Analysis and Applications of Stochastic Systems, IMPA, Brasil.
Jan 2016	Numerical Analysis Seminar, University of Durham, UK.
Jan 2016	Chilean Workshop on Numerical Analysis of PDEs, Universidad de Conception, Chile.
Nov 2015	9th Oxford-Princeton Workshop on Financial Mathematics, University of Princeton, USA.
Nov 2014	Workshop, New Perspectives in Optimal Control and Games, Rome, Italy.
Feb 2013	Probability Seminar, Université d'Evry, France.
Nov 2012	Probability, Statistics and Control Seminar, ENSTA ParisTech, France.

Selected contributed talks

Apr 2023	The XXIV Quantitative Finance Workshop, Gaeta, Italy.
Jun 2021	The 10th AMAMEF Conference, Università di Padova, Italy (online).
Jun 2021	SIAM Conference on Financial Mathematics and Engineering, US (online).
Feb 2020	Energy Finance Italia, Università "Roma Tre", Italy.
Jan 2020	The XXIII Quantitative Finance Workshop, Università di Napoli Parthenope, Italy.
Sep 2019	43rd Annual Meeting of the Italian Association for Mathematics Applied to Economic and Social Sciences (AMASES), Perugia, Italy.
Jul 2019	International Conference on Computational Finance, La Coruña, Spain.
Apr 2019	Workshop, Investments, Energy, and Green Economy, Università di Brescia, Italy
Sep 2017	International Conference on Computational Finance, Lisbon, Portugal.
Jun 2017	Workshop, Numerical methods for optimal control problems, Università di Roma "La Sapienza", Italy.
July 2015	SIAM conference on Control and its applications, Paris, France.
July 2014	HYP2014, XV International conference on hyperbolic problems, IMPA, Rio de Janeiro, Brazil.
July 2013	ICCOPT International Conference on Continuous Optimization, Lisbon, Portugal.

Courses and Schools

Scheduled	Summer School on *Machine Learning and Optimal Control*, Gaeta, Italy.
Sept 2013	Summer School on *Optimal and Model Predictive Control*, Bayreuth, Germany.

Sept 2012 Summer School on *New Trends in Optimal Control*, Ravello, Italy.

April 2012 Spring School on *Applied and numerical Optimal Control*, Paris, France.

Oct-Dec 2011 Course on *Deterministic and stochastic control*, École Polytechnique, France.

July 2011 Summer School on *Challenges in Applied Control and Optimal Design*, BCAM (Basque Center for Applied Mathematics), Bilbao, Spain.

Teaching Experience

2023–2024 -Stochastic Optimization and Control
Lectures, *Università di Verona, PhD in Mathematics and Data Analytics for Finance.*

-Probability theory
Lectures, *Università di Padova, PhD in Statistics.*

-Mathematics
Lectures, *Università di Verona, BSc Economics and Business.*

-Mathematical and computational methods for Business and Economics
Lectures, *Università di Verona, MSc in Economics and Data Analysis.*

2022–2023 -Financial Markets Models
Lectures, *Università di Verona, BSc Economics and Business.*

-Asset Pricing Models
Lectures, *Università di Verona, MSc in Banking and Finance.*

-Mathematical and computational methods for Business and Economics
Lectures, *Università di Verona, MSc in Economics and Data Analysis.*

2021–2022 -Asset Pricing Models
Lectures, *Università di Verona, MSc in Banking and Finance.*

-Computational Methods for Finance
Lectures, *Università di Verona, MSc in Banking and Finance.*

-Mathematical and computational methods for Business and Economics
Lectures, *Università di Verona, MSc in Economics and Data Analysis.*

2020–2021 -Asset Pricing Models
Lectures, *Università di Verona, MSc in Banking and Finance.*

-Computational Methods for Finance
Lectures, *Università di Verona, MSc in Banking and Finance.*

-Mathematical and computational methods for Business and Economics
Lectures, *Università di Verona, MSc in Economics and Data Analysis.*

2019–2020 -Probability theory
Lectures, *Università di Padova, PhD in Statistics.*

-Asset Pricing Models
Lectures, *Università di Verona, MSc in Banking and Finance.*

-Mathematical Models for business and economics
Lectures, *Università di Verona, MSc in Economics.*

2018–2019 -Mathematical Models for business and economics
Lectures, *Università di Verona, MSc in Economics.*

-Mathematics
Lectures, *Università di Verona, PhD in Economical Sciences.*

2016-2017 Finite difference methods
Lectures, *University of Oxford, MSc in Mathematical and Computational Finance.*

2015-2016 Calculus, Calculus of variations.
Tutorials, *St Catherine's College, University of Oxford.*
Probability, Differential Equations.
Tutorials, *St Catherine's College, University of Oxford.*
Introduction to Stochastic control (Prof. Xunyu Zhou).
Tutorials, *University of Oxford, MSc in Mathematical and Computational Finance.*

2013-2014 SADCO-WIAS Young researchers Workshop, Berlin, Germany, 29-31 January 2014.
Mini-course on Stochastic Optimal Control.

2012–2013 Numerical methods for PDEs in finance (Prof. Olivier Bokanowski).
Tutorials, *ENSTA ParisTech, Paris, France.*

Supervisions

ongoing Supervision of the PhD thesis of Marco Scaratti, University of Verona.

2019– Supervision of more than 20 Master projects for the CdLM in Banking and Finance and 1 Master project for the CdLM in Economics, Università di Verona.

2017 Supervision of 1 Master project, MSc in Mathematical Finance, University of Oxford.

2016 Co-supervision of the PhD thesis of Julen Rotaetxe, University of Oxford *"Boundary treatment and multigrid preconditioning for semi-Lagrangian schemes applied to Hamilton-Jacobi-Bellman equations"*.

Languages

	Writing skill	Reading skill	Speaking skill
Italian	Mother tongue		
English	Advanced	Advanced	Advanced
French	Advanced	Advanced	Advanced
Spanish	Beginner	Beginner	Beginner

Possible contacts for references

- **Christoph Reisinger**: University of Oxford, christoph.reisinger@maths.ox.ac.uk
- **Hasnaa Zidani**: ENSTA ParisTech, housnaa.zidani@ensta-paristech.fr
- **Olivier Bokanowski**: Université Paris 7,olivier.bokanowski@gmail.com
- **Lars Grüne**: University of Bayreuth, lars.gruene@uni-bayreuth.de
- **Bruno Bouchard**: Université Paris Dauphine, bouchard@ceremade.dauphine.fr

Verona, October 22, 2024