Athena Picarelli

Curriculum Vitae

Personal Data

Given Name	Athena
Family Name	Picarelli
Nationality	Italian
Address	Ex-caserma Santa Marta, Via Cantarane 24 (Verona)
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Current Position

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

Positions held

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 approach, first and second order Hamilton-Jacobi equations, numerical schemes for solving Hamilton-Jacobi equations, Computational Finance.

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

2020 A. Picarelli, C. Reisinger. *Probabilistic error analysis for some approximation schemes to optimal control problems*.
Systems & Control Letters. To appear. https://arxiv.org/abs/1810.04691

2019 A. Picarelli, C. Reisinger. *Duality-based a posteriori error estimates for some approximation schemes for optimal investment problems*.
Comuputer and Mathematics with applications. To appear. https://hal.archives-ouvertes.fr/hal-01538617

2019 A. Picarelli, C. Reisinger, J. Rotaetxe. *Some regularity and convergence results for parabolic Hamilton-Jacobi-Bellman equations in bounded domains*.
J. of Differential Equations. To appear. https://hal.archives-ouvertes.fr/hal-01585766

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. 69-97.

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

G. Bouveret, A. Picarelli. *Optimal control under controlled-loss constraints via reachability approach and compactification*.
Submitted. Preprint https://arxiv.org/abs/1810.04267.

O. Bokanowski, A. Picarelli, C. Reisinger. *Stability results for second order backward differentiation schemes for parabolic Hamilton-Jacobi-Bellman equations*.
Submitted. Preprint https://hal.archives-ouvertes.fr/hal-01628040.

A. Picarelli, T. Vargiolu. *Optimal management of pumped hydroelectric production with state constrained optimal control*.
Submitted. Preprint https://arxiv.org/submit/2845524

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

Research visits

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*.

Administration and Collective responsibilities

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

July 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 for the journals: SIAM Journal on Control and Optim., SIAM Journal on Scientific Computing, Journal of Optimization Theory and Applications, Communications on Pure and Applied Analysis, Appl. Math. Optim., Set-valued and Variational Analysis, IMA Journal of Numerical Analysis, Numerische Mathematik.

Invited conference and seminar talks

Dec 2019 Differential Numerical Modeling Seminar, Università di Roma "La Sapienza", Italy.
Talk: *A Semi-Lagrangian scheme for a Hamilton-Jacobi-Bellman equation arising in stochastic exit time control problems.*

Sep 2019 Mathematics Seminar, Universidad Técnica Federico Santa Maria, Valparaíso, Chile.
Talk: *High-order filtered schemes for time-dependent second order Hamilton-Jacobi-Bellman equations.*

Sep 2019 Workshop, Control of State-Constrained Dynamical Systems, Universidad Técnica Federico Santa Maria, Valparaìso, Chile.
Talk: *Optimal management of pumped hydroelectric production with state constrained optimal control.*

Mar 2019 Differential Numerical Modeling Seminar, Università di Roma "La Sapienza", Italy.
Talk: *Some high order filtered schemes for parabolic Hamilton-Jacobi-Bellman equations.*

Mar 2019 Stochastic Finance Seminar, University of Warwick, UK.
Talk: *Optimal control under controlled loss constraints via reachability approach and compactification.*

Nov 2018 Workshop in Financial Mathematics, Università di Padova, Italy.
Talk: *Optimal control under controlled loss constraints via reachability approach and compactification.*

Jun 2018 Workshop, Stochastic Modeling and Financial Applications, Università di Verona, Italy.
Talk: *Optimal control under controlled loss constraints via reachability approach and compactification.*

May 2018 Workshop, Stochastic Control and Applications, Università di Verona, Italy.
Talk: *Some high order schemes for parabolic Hamilton-Jacobi-Bellman equations.*

Apr 2018 Risk & Stochastic Conference, LSE, UK.
Talk: *State constrained optimal control problems via reachability approach.*

Mar 2018 Workshop, Stochastic analysis and Applications, University of Santiago, Chile.
Talk: *State constrained optimal control problems via reachability approach.*

Jan 2018 Mathematical and Computational Finance Seminar, University of Oxford, UK.
Talk: *State constrained optimal control problems via reachability approach.*

Jan 2018 Differential Equations and their Applications Seminar, Università di Padova, Italy.
Talk: *State constrained optimal control problems via reachability approach.*

Dec 2017 Verona-Paris Conference on Stochastic Modeling, Università di Verona, Italy.
Talk: *State constrained optimal control problems via reachability approach.*

Nov 2017 Numerical Analysis Seminar, University of Sussex, UK.
Talk: *Error bounds for monotone schemes for parabolic Hamilton-Jacobi-Bellman equations in bounded domains.*

Oct 2017 Numerical Analysis Seminar, University of Oxford, UK.
Talk: *Error bounds for monotone schemes for parabolic Hamilton-Jacobi-Bellman equations in bounded domains.*

Oct 2017 Mathematical Finance Seminar, Politecnico di Milano, Italy.
Talk: *High-order filtered schemes for second order time dependent HJB equations.*

Jan 2017 Risk & Stochastics and Financial Mathematics Seminar, LSE, UK.
Talk: *High-order filtered schemes for second order time dependent HJB equations.*

Nov 2016 Workshop, Numerical Methods for HJ equations in Optimal Control, RICAM, Austria.
Talk: *High-order filtered schemes for second order time dependent HJB equations.*

March 2016 Workshop, Analysis and Applications of Stochastic Systems, IMPA, Brasil.
Talk: *Duality-based error estimates for some approximation schemes for optimal investment problems.*

Jan 2016 Numerical Analysis Seminar, University of Durham, UK.
Talk: *Duality-based error estimates for some approximation schemes for optimal investment problems.*

Jan 2016 Chilean Workshop on Numerical Analysis of PDEs, Universidad de Conception, Chile.
Talk: *Duality-based error estimates for some approximation schemes for optimal investment problems.*

Nov 2015 9th Oxford-Princeton Workshop on Financial Mathematics, University of Princeton, USA.
Talk: *Duality-based error estimates for some approximation schemes for optimal investment problems.*

Nov 2014 Workshop, New Perspectives in Optimal Control and Games, Rome, Italy.
Talk: *Zubov method for controlled diffusions under state-constraints.*

Oct 2013 Differential Equations and their Applications Seminar, University of Padova, Italy

March 2013 Differential Numerical Modeling Seminar, Università di Roma "La Sapienza", Italy.

Feb 2013 Probability Seminar, Evry University, France.

Nov 2012 Probability, Statistics and Control Seminar, ENSTA ParisTech, France.

Selected contributed talks

Feb 2020 Energy Finance Italia, Università "Roma Tre", Italy.
Talk: *Optimal management of pumped hydroelectric production with state constrained optimal control.*

Jan 2020 Quantitative Finance, Napoli, Italy.
Talk: *A deep XVA solver.*

Sep 2019 43rd Annual Meeting of the Italian Association for Mathematics Applied to Economic and Social Sciences (AMASES), Perugia, Italy.
Talk: *Optimal management of pumped hydroelectric production with state constrained optimal control.*

Jul 2019 International Conference on Computational Finance, La Coruña, Spain.
Talk: *A Semi-Lagrangian scheme for a Hamilton-Jacobi-Bellman equation arising in stochastic exit time control problems.*

Apr 2019 Workshop,“Investments, Energy, and Green Economy”, Università di Brescia, Italy
Talk: *Optimal management of pumped hydroelectric production with state constrained optimal control.*

Sep 2017 International Conference on Computational Finance, Lisbon, Portugal.
Talk: *Some high order schemes for parabolic Hamilton-Jacobi-Bellman equations.*

Jun 2017 Workshop, Numerical methods for optimal control problems, Università di Roma "La Sapienza", Italy.
Talk: *Some stability properties for a BDF2-type scheme for parabolic equations .*

July 2015 SIAM conference on Control and its applications, Paris, France.
Talk: *Zubov method for controlled diffusions under state-constraints.*

July 2014 HYP2014, XV International conference on hyperbolic problems, IMPA, Rio de Janeiro, Brazil.
Talk: *Dynamic Programming and HJB equations for optimal control problems in a maximum form.*

July 2013 ICCOPT International Conference on Continuous Optimization, Lisbon, Portugal.
Talk: New approach for stochastic target problems with state-constraints.

Courses and Schools

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

Oct-Dec 2019 Probability theory
Lectures, *Università di Padova, PhD in Statistics.*

Oct-Dec 2018, 2019 Mathematical Models for business and economics (optimization and ordinary differential equations)
Lectures, *Università di Verona, MSc in Economics.*

Oct-Dec 2018 Mathematics (optimization)
Lectures, *Università di Verona, PhD in Economical Sciences.*

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

Jan-Jun 2016 Calculus (1st year), Calculus of variations (2nd year).
Tutorials, *St Catherine's College, University of Oxford.*

Oct-Dec 2015 Probability (1st year), Differential Equations (2nd year).
Tutorials, *St Catherine's College, University of Oxford.*

Jan-Feb 2015 Introduction to Stochastic control (Prof. Xunyu Zhou).
Tutorials, *University of Oxford, MSc in Mathematical and Computational Finance.*

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

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

Supervisions

2017 Co-supervision of the Master project of Qi Huang
"A comparison of hybrid and filtered schemes for HJB equations".

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

Awards

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).

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.

Languages

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

Computer skills

Mathematica, C, C++, OpenOffice, Linux, Microsoft Windows, LaTeX, MatLab

Possible contacts for references

- **Christoph Reisinger**: University of Oxford, christoph.reisinger@maths.ox.ac.uk +44 1865 273525
- **Hasnaa Zidani**: ENSTA ParisTech, housnaa.zidani@ensta-paristech.fr +33 1 81872117
- **Olivier Bokanowski**: Université Paris 7,olivier.bokanowski@gmail.com +33 1 57279119
- **Maurizio Falcone**: Università La Sapienza di Roma, falcone@mat.uniroma1.it +39 6 49913279
- **Lars Grüne**: University of Bayreuth, lars.gruene@uni-bayreuth.de +49 921 553270
- **Bruno Bouchard**: Université Paris Dauphine, bouchard@ceremade.dauphine.fr
- **Rama Cont**: Imperial College, r.cont@imperial.ac.uk

Verona, February 26, 2020