

Alekos Cecchin | Curriculum Vitae

Born 5 December 1991 in Cittadella (PD), Italy • Italian nationality

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Current position

Ricercatore a tempo determinato tipo A

Dipartimento di Matematica

University of Padova

March 2022 -

Previous positions

Post-Doc

Centre de Mathématiques Appliquées, 91128 Palaiseau (FR)

Supervisor Prof. Nizar Touzi

École Polytechnique

August 2020 - February 2022

Post-Doc

Laboratoire J.A Dieudonné, 06108 Nice (FR)

Supervisor Prof. François Delarue

Université Côte d'Azur

February 2019 - July 2020

Education

Ph.D. in Mathematical Sciences

Curriculum Computational Mathematics

Supervisor Prof. Markus Fischer

University of Padova

October 2015 - September 2018

Thesis: Finite state N -player and mean field games

Defended on 14 January 2019, *cum laude*

Master in Mathematics (Laurea Magistrale)

Curriculum Probability and Financial Mathematics

Final Mark: 110/110 cum laude - Exams average 29.8/30

University of Padova

October 2013 - July 2015

Thesis: Mean field limit optimization for fragmentation-coagulation models

Supervisor in Padova: Prof. Paolo Dai Pra

Erasmus program

I prepared my dissertation and 4 exams

Under the supervision of Prof. Vassili N. Kolokoltsov

University of Warwick

September 2014 - June 2015

Degree in Mathematics (Laurea Triennale)

Curriculum Application

Final Mark: 110/110 cum laude - Exams average: 29/30

University of Padova

October 2010 - July 2013

Thesis: Il teorema di Berry-Esseen

Supervisor: Paolo Dai Pra

Scientific Maturity: July 2010 at Liceo T.L. Caro in Cittadella (PD)

Qualification

Qualification aux fonctions de maître de conférences:

Section 25: Mathématiques

February 2021

Research activity

My research so far has focused largely on the recent theory of mean field games and mean field control problems, especially in the finite state space setting, where the areas of interacting particle systems, stochastic control, and game theory intersect. More broadly, I am interested in many topics in probability theory, such as weakly interacting systems, limits of stochastic processes, and large deviations. Moreover, I have been working on the analytical counterpart of mean field games, which involves nonlinear PDEs and their entropy or viscosity solutions.

Research stays

Nice: ERC guest of Prof. François Delarue	25 - 30 September 2023
École Polytechnique: Guest of Prof. Giovanni Conforti	17 - 22 October 2022
Nice: Guest of Prof. François Delarue	12 - 16 July 2021
Warwick: Guest of Prof. Vassili Kolokoltsov	1 - 30 November 2016

Publications and preprints

1. M. Burzoni, A. Cecchin and A. Cosso. A Tikhonov theorem for McKean-Vlasov two-scale systems and a new application to mean field optimal control problems. Preprint 2024, arXiv:2212.12293.

Journal publications

1. A. Cecchin and F. Delarue. Weak solutions to the master equation of potential mean field games. Accepted for publication in *Memoirs of the American Mathematical Society*, 2024+. arXiv:2204.04315.
2. A. Cecchin and C. Bertucci. Mean field games master equations: from discrete to continuous state space. Accepted for *SIAM Journal on Mathematical Analysis*, 56(2), 2569-2610, doi.org/10.1137/23M1552528, 2024.
3. C. Alasseur, M. Basei, C. Bertucci, and A. Cecchin. A mean field model for the development of renewable capacities. *Mathematics and Financial Economics*, 17(4), 695-719, doi.org/10.1007/s11579-023-00348-6, 2023.
4. E. Bayraktar, A. Cecchin, and P. Chakraborty. Mean field control and finite dimensional approximation for regime-switching jump diffusions. *Applied Mathematics and Optimization*, 88, n. 36, doi.org/10.1007/s00245-023-10015-3, 2023.
5. E. Bayraktar, A. Cecchin, A. Cohen, and F. Delarue. Finite state mean field games with Wright-Fisher common noise as limits of N -player weighted games. *Mathematics of Operations Research*, 47 (4), 2840-2890, doi.org/10.1287/moor.2021.1230, 2022.
6. A. Cecchin and F. Delarue. Selection by vanishing common noise for potential finite state mean field games. *Communications in Partial Differential Equations*, 47 (1), 89-168, doi.org/10.1080/03605302.2021.1955256, 2022.
7. A. Cecchin. Finite state N -agent and mean field control problems. *ESAIM: Control, Optimization and Calculus of Variations*, 27, n. 31, doi.org/10.1051/cocv/2021032, 2021.
8. E. Bayraktar, A. Cecchin, A. Cohen, and F. Delarue. Finite state mean field games with Wright-Fisher common noise. *Journal de Mathématiques Pures et Appliquées*, 147, 98-162, doi.org/10.1016/j.matpur.2021.01.003, 2021.
9. A. Cecchin and M. Fischer. Probabilistic approach to finite state mean field games. *Applied Mathematics and optimization*, 81, 253-300, doi.org/10.1007/s00245-018-9488-7, 2020.

10. A. Cecchin, P. Dai Pra, M. Fischer, and G. Pelino. On the convergence problem in mean field games: a two state model without uniqueness. *SIAM Journal on control and optimization*, 57(4), 2443-2466, doi.org/10.1137/18M1222454, 2019.
11. A. Cecchin and G. Pelino. Convergence, fluctuations and large deviations for finite state mean field games via the master equation. *Stochastic Processes and their Applications*, 129(11), 4510-4555, doi.org/10.1016/j.spa.2018.12.002, 2019.

Chapter in Book

1. A. Cecchin and V. N. Kolokoltsov. Evolutionary game of coalition building under external pressure. In: J. Apaloo and B. Viscolani (eds), *Advances in Dynamic and Mean Field Games*, pp. 71-106. Annals of the International Society of Dynamic Games, vol. 15, Birkhauser, Cham, doi.org/10.1007/978-3-319-70619-1-4, 2017.

Thesis

1. A. Cecchin. Finite state N -player and mean field games. Ph.D. Thesis, Department of Mathematics, University of Padova, Catalogue: paduaresearch.cab.unipd.it/11590. Defended on 14 January 2019, *cum laude*.

Teaching (in Italiano)

Presso l'Università di Padova:

Matematica 2: Laurea in Scienza dei Materiali (titolare, 70 ore) Marzo - Giugno 2024

Matematica 2: Laurea in Scienza dei Materiali (titolare, 48 ore) Marzo - Giugno 2023

Statistica Matematica: Laurea in Matematica (24 ore) Ottobre 2022- Gennaio 2023

Matematica 2: Laurea in Scienza dei Materiali (titolare, 48 ore) Marzo - Giugno 2022

Inoltre, ho tenuto il corso di dottorato:

Stochastic and mean field optimal control: Dottorato in Matematica (16 ore) Novembre 2023

In passato, ho svolto la Didattica di Supporto presso l'Università di Padova per i seguenti corsi:

Statistica: Laurea in Biologia (25 ore) Marzo - Giugno 2016

Probabilità e Statistica: Laurea in Matematica (25 ore) Marzo - Giugno 2017

Analisi Matematica I: Laurea in Ingegneria Meccanica (24 ore) Ottobre 2017 - Gennaio 2018

Calcolo Numerico: Laurea in Ingegneria Meccanica (24 ore) Marzo - Giugno 2018

Analisi Matematica I: Laurea in Ingegneria Meccanica (24 ore) Ottobre 2018 - Gennaio 2019

Fundings

Mathematics Department, University of Padova P.I., 7 members

Project: Equilibrium approaches in financial and energy markets October 2022 - September 2024
24.000 €

GNAMPA (INdAM) P.I., 7 members

Project: Stochastic mean field models May 2023 - April 2024
3.500 €

PRIN 2022 (MIUR) Member, P.I. T. De angelis

Project: Stochastic control and games: the role of information October 2023 - September 2025
187.272 €

PRIN PNRR (MIUR) Member, P.I. L. Campi

Project: Probabilistic methods for Energy transition November 2023 - October 2026
224.563 €

STARS Starting grant (University of Padova)

Mean field control and games, Personal project

193.300 €

Principal Intestigator

March 2023 - August 2026

Conferences

Talks

I have been *invited* to give a talk at the following

Padova: Project meeting Large Scale Random Structures	3 - 4 July 2018
KAUST, Saudi Arabia: Project meeting on Mean Field Games	19 - 20 November 2018
Paris: Journées projet ANR Mean Field Games	7 - 8 December 2018
Paris: Séminaire Bachelier	28 February 2020
Les Andelys: Two days online workshop on Mean Field Games	18 - 19 June 2020
Berlin: Berlin Probability Colloquium	24 November 2021
Chicago: Workshop: Mathematical advances in mean field games	13 - 17 December 2021
Berlin: SIAM conference on Analysis of PDE	14 - 18 March 2022
Padova: Third spring colloquium on Probability and Finance	28-29 April 2022
Annecy: 9th International Colloquium on BSDEs and Mean Field Systems	27 June - 1 July 2022
L'Aquila: Workshop in honor of Paolo Dai Pra's 60th birthday	21 - 24 September 2022
Paris: Workshop Mean field games and applications	12 - 14 December 2022
Chicago: Distributed Solutions to Complex Societal Problems Workshop	20 - 23 February 2023
Napoli: 13th International Society of Dynamic Games Workshop	7 - 9 June 2023
Lisbon: 43rd Conference on Stochastic Processes and their Applications	24 - 28 July 2023
Pisa: XXII Congresso dell'Unione Matematica Italiana	4 - 9 September 2023
Nice: Seminar ERC ELISA	28 September 2023
Padova: Workshop: Control Problems and MFG in Life Sciences and Economics	30 November - 1 December 2023
Hong Kong: International conference on applied mathematics	28 May - 1 June 2024
Rio de Janeiro: 12th world congress of the Bachelier Finance Society	8 - 12 July 2024

I gave a *contributed* talk at the international conferences

Turin: First Italian meeting on probability and statistics	19 - 22 June 2017
Freiburg: 13th German probability and statistics days	February 27 - March 2 2018
Grenoble: 18th Symposium on Dynamic Games and Applications	2 - 12 July 2018
Pavia: Optimal control and mean field games	19 - 21 September 2018
Vietri sul mare: 2nd Italian meeting on probability and statistics	17 - 20 June 2019
Levico terme: Mean field games and related topics - 5	9 - 13 September 2019
Marseille, CIRM: Schrödinger Problem and Mean-field PDE Systems	15 - 19 November 2021
Bologna: Third Italian meeting on probability and statistics	13 - 16 June 2022

I also held seminars for the local community

Padova: Graduate seminar	22 November 2017
Padova: Seminar of differential equations and applications	9 April 2018

Nice: Seminar of probability and statistics

14 May 2019

Padova: Seminar of differential equations and applications

29 October 2019

Organization

I am co-organizer of the following conferences:

Padova: Stochastic control and games: the role of information

12 - 13 January 2023

Palermo: Special session at the 2nd UMI-AMS meeting

23 - 26 July 2024

Padova: Large scale behaviour of interacting diffusion

18 - 20 September 2024

I also organize the monthly seminar of the Probability and Finance group of the University of Padova.

Service

I have been reviewing papers submitted to *Annals of Applied Probability*, *Stochastic Processes and their Applications*, *Finance and Stochastics*, *Electronic Journal of Probability*, *SIAM Journal on Control and Optimization*, *Mathematische Annalen*, *Applied Mathematics and Optimization*, *Nonlinear Differential Equations and Applications*, *Journal of Optimization Theory and Applications*, *ESAIM: Control, Optimization and Calculus of Variations*, *Mathematics of Operations Research*, *Dynamic Games and Applications*, *Stochastic Analysis and Applications*, *Probability in the Engineering and Informational Sciences*, *Journal of Dynamics and Games*, *IEEE Transactions on Automatic Control*.

Skills

Computer

Advanced knowledge: software Matlab and Mathematica, program Latex, and Microsoft Office

Languages

Italian: mother language

English: very good

French: good

Padova, 30 May 2024