

# Ziad Kobeissi

*Postdoctorate researcher*

## Research Interests

- **Partial Differential Eq.**
  - Optimal Control theory
  - Mean Field Games
  - Numerical Methods
- **Machine Learning**
  - Optimization
  - Reinforcement Learning
  - Deep Learning
- **Proba & Stats**
  - Stochastic Differential Eq.
  - Stochastic Algorithms
  - Markov Decision Process

## Position

2020–Present **Postdoctorate researcher at INRIA Paris (SIERRA team) and Institut Louis Bachelier Paris**, *Scientific supervisors: Francis Bach, Jean-Michel Lasry and Pierre-Louis Lions.*

## Education

- 2017–2020 **Ph.D thesis at University Paris-Cité, LJLL**, *Under the supervision of Yves Achdou and Pierre Cardaliaguet, Mean Field Games of Controls*, defended on October, 2nd 2020.
- 2016–2017 **Master 2 in Numerical Analysis and PDEs**, UPMC (Paris-Sorbonne).
- 2015–2016 **Master 2 in Probability**, ENS Lyon.
- 2015 **Erasmus exchange at Imperial College of London.**
- 2013–2014 **Bachelor in Mathematics**, ENS Lyon.
- 2013–2016 **ENS Lyon**, *Admitted to the examination (Normalien).*
- 2010–2013 **Classe préparatoire at Champollion and Lycée du Parc.**

## Publications

- Published **A Non-asymptotic Analysis of Non-parametric Temporal-Difference Learning**, with E. Berthier and F. Bach, 2022, NeurIPS 2022 (spotlight).
- Published **Mean Field Games with monotonous interactions through the law of controls**, 2022, NoDEA: Nonlinear Differential Equations and Applications.
- Published **On Classical Solutions of the Mean Field Game System of Controls**, 2021, CPDE: Communications in Partial Differential Equations.
- Published **Mean Field Games of Controls: Finite Difference Approximations**, with Y. Achdou, 2020, AIMS: Mathematics in Engineering.
- Published **On the implementation of a primal-dual algorithm for second order time-dependent mean field games with local couplings**, with L. Briceño-Arias, D. Kalise, M. Laurière, Á.M. González, F.J. Silva, 2019, ESAIM: ProcS.
- Preprint **Temporal Difference Learning with Continuous Time and State in the Stochastic Setting**, with F. Bach, 2022.
- Preprint **The tragedy of the commons: a mean field game approach to the reversal of travelling waves**, with I. Mazari-Fouquet and D. Ruiz-Balet, 2023.
- In preparation **Mean field game problems in the management of fisheries**, with I. Mazari-Fouquet and D. Ruiz-Balet, 2023.

## Talks & Reviewing

### Conferences:

- 28/06/2023 **21st INFORMS Applied Probability Society Conference, Nancy.**
- 13/12/2022 **Mean Field Games and Related Topics, Lagrange Center, Paris.**
- 13/12/2021 **Mathematical Advances in Mean Field Games, IMSI, Chicago.**
- 01/12/2021 **PGMO Days, EDF Saclay, Paris.**
- 18/09/2019 **FGS 2019, conference on optimization, University Nice Sophia Antipolis.**
- 13/09/2019 **Mean Field Games and Related Topics 5, Levico Terme.**
- 18/12/2018 **MFG Days 2018, University Paris Diderot.**
- 20/08/2017 **CEMRACS 2017, CIRM (Marseille).**

### Seminars:

- 13/04/2023 **Seminar of Télécom Paris.**
- 06/04/2023 **Seminar of financial mathematics of the LPSM at Sorbonne-University.**
- 26/10/2021 **Seminar of Sierra team at Inria Paris.**
- 28/03/2019 **Seminar of young researchers at University Paris-Dauphine.**
- 05/02/2019 **Seminar of Ph.D students of LJLL at University Paris-Sorbonne.**
- 04/06/2018 **Seminar of Ph.D students of LPSM at University Paris-Sorbonne.**

### Reviewing:

- 2023-Present **Reviewer, SIAM Journal on Numerical Analysis (SINUM).**
- 2022-Present **Reviewer, IEEE Control Systems Society Conference (IEEECCSS).**
- 2022-Present **Reviewer, Dynamical Games and Applications.**
- 2021-Present **Reviewer, SIAM Journal on Control and Optimization (SICON).**
- 2021-Present **Reviewer, Applied Mathematics and Optimization (AMOP).**

## Teaching

- 2018-2020 **2<sup>nd</sup>-year B.Sc. Exercice sessions in Probability, Paris-Cité.**
- 2017-2020 **1<sup>st</sup> and 2<sup>nd</sup>-year B.Sc. Exercice sessions in algebra and analysis, Paris-Cité.**
- 2017-2018 **1<sup>st</sup>-year M.Sc. Practical sessions: algorithmics and introduction to C, Paris Diderot.**
- 2016-2017 **1<sup>st</sup>-year B.Sc. Exercice sessions in maths for economics-major (ECS), Lycée Carnot.**
- 2015-2016 **2<sup>nd</sup>-year B.Sc. Exercice sessions for maths-major (MP\*), Lycée du Parc (Lyon).**

## Internships/Research projects

- 2017 **CEMRACS: 6-week research project on Numerics at CIRM (Marseille).**
- 2017 **4-month internship on Mean Field Games of Controls, Supervisors: Yves Achdou and Pierre Cardaliaguet, Paris Diderot.**
- 2016 **3-month internship on Data Assimilation and Optimal transport, Supervisor: Youssef Marzouk, MIT (Boston).**
- 2016 **1-month internship on Data Assimilation and Optimal transport, Supervisor: Ibrahim Hoteit, KAUST (Saudi Arabia).**
- 2015 **3-month internship in Stochastic Modeling, Supervisor: Roger Ghanem, USC (Los Angeles).**
- 2014 **2-month internship in Numerical Simulations on PDEs, Supervisor : Carola-Bibiane Schönlieb, University of Cambridge.**

## **Schools**

- 2021 **Introduction to Mean Field Games and Applications, IMSI, Chicago, USA.**
- 2021 **Reinforcement Learning Virtual School, ANITI, Toulouse, France.**
- 2019 **Second Nepal Winter school in AI, at Pokhara, Nepal.**
- 2019 **High Dimensional Probability and Algorithms, at ENS Paris, France.**
- 2019 **Summer School on MFG at Cetraro, Italy.**
- 2018 **Summer School on MFG at IPAM, UCLA, Los Angeles, USA.**
- 2017 **CEMRACS at CIRM, Marseille, France.**

## **Skills**

Programming **C++, C, Python, Pytorch, Matlab, Julia.**  
Languages **French: native, English: fluent.**