# Ziad Kobeissi

*Permanent researcher (ISFP)*

## 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

**from 10/2023**   **Inria Starting Faculty Position (ISFP) at INRIA Saclay (DISCO team) and Laboratory of Signals and Systems (L2S) from Paris-Saclay University**.

**2020–2023**   **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.

**Submitted**   ***Temporal Difference Learning with Continuous Time and State in the Stochastic Setting***, *with F. Bach*, 2022.

**Submitted**   ***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.

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| Submitted | **_Discrete-Time Control for Internet of Things based on Mean Field Approximation_**, with C. Bertucci and J.-M. Lasry, 2023. |
| In preparation | **_Mean field game problems in the management of fisheries_**, with I. Mazari-Fouquet and D. Ruiz-Balet, 2023. |

## Talks & Reviewing

Conferences:

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| 28/06/2023 | **21st INFORMS Applied Pobability 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:

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| 20/10/2023 | **Seminar of the chair _"Finance and Sustainable Development"_ at IHP, Paris**. |
| 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:

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| 2023-Present | **Reviewer**, _SIAM Journal on Numerical Analysis (SINUM)_. |
| 2022-Present | **Reviewer**, _IEEE Control Systems Society Conference (IEEECSS)_. |
| 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

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| 2023-2024 | **$3^{rd}$-year B.Sc. Exercice sessions in Analysis, Probability and PDEs**, _CentraleSupelec_. |
| 2018-2020 | **$2^{nd}$-year B.Sc. Exercice sessions in Probability**, _Paris-Cité_. |
| 2017-2020 | **$1^{st}$ and $2^{nd}$-year B.Sc. Exercice sessions in algebra and analysis**, _Paris-Cité_. |
| 2017-2018 | **$1^{st}$-year M.Sc. Pratical sessions: algorithmics and introduction to C**, _Paris Diderot_. |
| 2016-2017 | **$1^{st}$-year B.Sc. Exercice sessions in maths for economics-major (ECS)**, _Lycée Carnot_. |
| 2015-2016 | **$2^{nd}$-year B.Sc. Exercice sessions for maths-major (MP*)**, _Lycée du Parc (Lyon)_. |

## Internships/Research projects

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| 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). |

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| 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

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| 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

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