Francisco José Silva Álvarez

Associated professor
Team MOD "Modelling, Optimization, Dynamics"
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Faculté des Sciences et Techniques Université de Limoges
123 Avenue Albert Thomas
Box 87060
Limoges Cedex

Date of Birth: July 22, 1982.
Citizenship: Chilean and French.
Genre: Male.
Marital status: Married.
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http://www.unilim.fr/pages_perso/francisco.silva/
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Employment

- *September* 2012- *:* Associated professor, XLIM - DMI, Faculté des Sciences et Techniques, Université de Limoges.
- *September* 2017- *September* 2018 *:* Associated professor (délégation CNRS), Toulouse School of Economics, Université Toulouse I, Capitole.
- *March* 2011 - *August* 2012*:* Post-doctoral researcher at Dipartimento di Matematica "Guido Castelnuovo", Università La Sapienza, Rome, Italy.

  ◇ *Study subject:* Mean Field Games.

  ◇ *Supervisor:* I. Capuzzo-Dolcetta.

  ◇ *Secondment organisation:* Inria Saclay and Laboratoire Jacques-Louis Lions, Université Paris-Diderot (Paris 7), France.

Education

- 2016 *:* "Habilitation à diriger des recherches" at the University of Limoges.

  ◇ *Title of the thesis:* "Quelques contributions à la théorie de la commande optimale déterministe et stochastique".

  ◇ *Jury*: Y. Achdou (referee), G. Carlier (referee), E. Casas (referee), J.-F. Bonnans (examinator), P. Cardaliaguet (president of the jury), A. Jofré (examinator), F. Santambrogio (examinator), L. Thibault (examinator) and S. Adly (examinator).
- *September* 2007 - *November* 2010 *:* PhD. in Applied Mathematics at École Polytechnique, Palaiseau, France.

  ◇ *Title of the thesis:* "Interior penalty approximation for optimal control problems. Optimality conditions
  in stochastic optimal control theory".

  ◇ *Advisor:* J.F. Bonnans.

  ◇ *Jury:* J. F. Bonnans, J.P. Raymond (referee), A. Sulem (examinator), N. Touzi (president of the jury), S. Ulbrich (referee), J. Yong (referee).

  ◇ *Mention*: Très honorable.

- 2001 **-** 2007 **:** Mathematical Engineer, Universidad de Chile.
  - ◇ *Title of the thesis:* "Uniform Fragmentation Process".
  - ◇ *Advisor:* J. Fontbona.
  - ◇ *Jury:* J. Fontbona, S. Martínez (referee) and J. San Martín (president of the jury and referee).
  - ◇ *Mention*: Highest Distinction.

Fellowships and Awards

- *2016-:* Awarded with the "Prime d'encadrement doctoral et de recherche (PEDR)".
- *April 2011- September 2012*.- Marie Curie post-doctoral fellowship within the ITN Marie Curie network SADCO (Sensitivity Analysis for Deterministic Controller Design).
- *September 2007- November 2010*.- PhD. CORDI INRIA fellowship.
- *Award:* Jean-Claude DODU Prize, "Prix Jeunes de la Meilleure Communication" (second award) for the talk "First and second order necessary conditions for stochastic optimal control problems" at MODE 2010: Conférence de la SMAI sur l'optimisation et la décision.

Visiting Positions

- *University Federico Santa María*: two weeks in August 2022. Invited by L. Briceño.
- KAUST: one week in June 2022. Invited by D. Gomes.
- *University Federico Santa María*: two weeks in January 2019. Invited by L. Briceño.
- *Imperial College*, one week in February 2018. Invited by D. Kalise.
- *University Federico Santa María*, March 2017. Invited by L. Briceño.
- *University Federico Santa María*, August 2016. Invited by L. Briceño.
- *University Federico Santa María*, January 2016. Invited by L. Briceño.
- *Center of Mathematical Modeling (CMM)*, August 2015. Invited by A. Jofré.
- KAUST, one week in June 2015. Invited by D. Gomes.
- RICAM, one week in March 2015. Invited by M.-T. Wolfram.
- INRIA *Saclay*, one week in October 2014. Invited by J.-F. Bonnans.
- *Toulouse School of Economics*, one week in April 2014. Invited by J. Bolte.
- INRIA *Saclay*, one week in April 2014. Invited by J.-F. Bonnans.
- INRIA *Saclay*, one week in January 2013. Invited by J.-F. Bonnans.
- *Université Montpellier II*, one week in April 2012. Invited by T. Bayen.
- *Toulouse School of Economics*, one week in November 2011. Invited by J. Bolte.
- *Center of Mathematical Modeling (CMM)*, July -August 2009. Invited by professor F. Alvarez.
- *Center of Mathematical Modeling (CMM)*, July -August 2008. Invited by professor F. Alvarez.

Research

Fields of Interest

- Optimal control theory.
- Mean field games.
- Analysis and numerical methods PDEs.

Publications

1. *A Lagrange-Galerkin scheme for first order mean field games systems*, en collaboration avec E. Carlini et A. Zorkot. **SIAM J. Numer. Anal**. To appear (2023).
2. *Approximation of deterministic mean field games under polynomial growth conditions on the data*, en collaboration avec J. Gianatti et A. Zorkot. **J. Dyn. Games**. To appear (2023).
3. J. Gianatti and F. J. Silva. *Approximation of deterministic mean field games with control-affine dynamics*. **Found. Comput. Math**, to appear (2023).
4. K. Pallier, O. Prot, S. Naldi, F. J. Silva, T. Denis, O. Giry, S. Leobon, E. Deluche et N. Tubiana-Mathieu. *Patient identification and tumor identification management: quality program in a cancer multicentric clinical data warehouse*. **Cancer Informatics**, to appear (2023).
5. O. Bachelier, T. Cluzeau, A. Rigaud, F. J. Silva, Na. Yeganefar, and Ni. Yeganefar. *On the connections between various stability notions for linear 2D discrete models*. **IEEE Trans. Automat. Control**, to appear (2023).
6. E. Calzola, E. Carlini, F. J. Silva, and X. Dupuis.*A semi-Lagrangian scheme for Hamilton-Jacobi-Bellman equations with oblique boundary conditions*. **Numer. Math.**, 153-1 (2023), pp. 49-84.
7. O. Bachelier, T. Cluzeau, A. Rigaud, F. J. Silva, and Ni. Yeganefar. *A necessary and sufficient condition of asymptotic stability for a class of Fornasini-Marchesini models*. **Linear Algebra Appl.**, 658 (2023), pp. 206-232.
8. L. Briceño-Arias, J. Deride, F. J. Silva, and S. López. *A primal-dual partial inverse algorithm for constrained monotone inclusions: applications to stochastic programming and mean field games*. **Appl. Math. and Optim.**, 87-2 (2023), Paper No. 21, 36 pp.
9. O. Bachelier, T. Cluzeau, A. Rigaud, F. J. Silva, and Ni. Yeganefar. *On exponential stability of a class of descriptor continuous linear 2D Roesser models*. **Internat. J. of Control**, 96-6 (2023), pp. 1582-1593.
10. M. Fischer and F. J. Silva. *On the asymptotic nature of first order mean field games*. **Appl. Math. and Optim**., 84-2 (2021), pp. 2327–2357.
11. A. Jourani and F. J. Silva. *Metric regularity under Gâteaux differentiability with applications to optimization and stochastic optimal control problems*. **SIAM J. Optim.**, 30-1 (2020), pp. 319-348.
12. O. Bachelier, T. Cluzeau, F. J. Silva, and Ni. Yeganefar. *Stability of one-dimensioned spatially interconnected systems*. **Multidim. Syst. Sign. P.**, 31-3 (2020), pp. 1005-1028.
13. P. J. Graber, A. R. Mészáros, F. J. Silva, and D. Tonon. *The planning problem in mean field games as a regularized mass transport*. **Calc. Var. and PDE**, 58-3 (2019), article 115, 28 pp.
14. S. Hadikhanloo and F. J. Silva. *Finite mean field games: fictitious play and convergence to a first order continuous mean field game*. **J. Math. Pures Appl.**, 132-9, (2019), pp. 369-397.

15. J.-F. Bonnans, J. Gianatti, and F.-J. Silva. *On the time discretization of stochastic optimal control problems: The dynamic programming approach.* **ESAIM Control Optim. Calc. Var.**, 25 (2019), article 63, 30 pp.

16. L. Briceño-Arias, D. Kalise, Z. Kobeissi, M. Laurière, A. Mateos González, and F. J. Silva. *On the implementation of a primal-dual algorithm for second order time-dependent mean field games with local couplings*. **ESAIM: Proc. Surveys.**, 65 (2019), pp. 330-348.

17. E. Carlini, F.-J. Silva. *On the discretization of some nonlinear Fokker-Planck-Kolmogorov equations and applications.* **SIAM J. Numer. Anal.**, 56-4 (2018), pp. 2148-2177.

18. J. Backhoff and and F.-J. Silva. *Sensitivity analysis for expected utility maximization in incomplete Brownian market models*. **Math. Financ. Econ.** , 12-3 (2018), pp. 387-411.

19. L. Briceño-Arias, D. Kalise and F.-J. Silva. *Proximal methods for stationary mean field games with local couplings*, **SIAM J. Control Optim.**, 56-2 (2018), pp. 801-836.

20. A.-R. Mészáros and F.-J. Silva. *On the variational formulation of some stationary second order mean field games*. **SIAM J. Math. Anal.**, 52-1 (2018), pp. 1255-1577.

21. J. F. Bonnans, B. Heymann, P. Martinon, F. Lanas et G. Jimenez and F.-J. Silva. *Continuous Optimal Control Approaches to Microgrid Energy Management*. **Energy Sys.**, 9-1 (2018), pp. 59-77.

22. R. David, O. Bachelier, T. Cluzeau F.-J. Silva, Na. Yeganefar and Ni. Yeganefar. *Structual stability, asymptotic stability, and exponential stability for linear multidimensional systems*. **Internat. J. of Control**, 91-12 (2018), pp. 2714-2725.

23. E. Carlini, A. Festa, M.-T. Wolfram and F.-J. Silva. *A Semi-Lagrangian scheme for a modified version of the Hughes model for pedestrian flow*. **Dyn. Games Appl.**, 7-4 (2017), pp. 683-705.

24. J. Backhoff and F.-J. Silva. *Sensitivity results in stochastic optimal control: A Lagrangian perspective*-**ESAIM: COCV**, 23-1 (2017), pp. 39-70.

25. T. Bayen and F.-J. Silva. *Second order analysis for strong solutions in the optimal control of parabolic equations.* **SIAM J. Control Optim.**, 54-2 (2016), pp. 819-844.

26. J.-F. Bonnans, J. Gianatti and F.-J. Silva. *On the convergence of the Sakawa-Shindo algorithm in stochastic control*. **Math. Control and Relat. Fields**, 6-3 (2016), pp. 391-406.

27. F.-J. Silva. *Second order analysis for the optimal control of parabolic equations under control and final state constraints*. **Set-Valued Var. Anal.**, 24-1 (2016), pp. 57-81.

28. A. R. Mészáros and F.-J. Silva. *A variational approach for second order mean field games with density constraints: the stationary case*.**J. Math. Pures Appl.**, 104-6 (2015), pp. 1135-1159.

29. E. Carlini and F. J. Silva. *A semi-Lagrangian scheme for a degenerate second order mean field game system*. **Discrete Contin. Dyn. Sys. A**, 35-9 (2015), pp. 4269-4292.

30. E. Carlini and F.-J. Silva *A fully-discrete Semi-Lagrangian scheme for a first order mean field game problem*. **SIAM J. Numer. Anal.**, 52-1 (2014), pp. 45–67.

31. T. Bayen, J.-F. Bonnans and F.-J. Silva. *Characterization of local quadratic growth for strong minima in the optimal control of semi-linear elliptic equations*. **Trans. Amer. Math. Soc.**, 66-4 (2014), pp. 2063-2087.

32. J. F. Bonnans and F.-J. Silva. *First and second order necessary conditions for stochastic optimal control problems.* **Appl. Math. and Optim.**, 65-3 (2012), pp. 403-439..

33. F. Camilli and F.-J. Silva. *A semi-discrete approximation for a first order mean field game problem.* **Netw. Heterog. Media**, 7(2012), pp. 263-277.

34. J. F. Bonnans and F.-J. Silva. *Error estimates for the logarithmic barrier method in linear quadratic stochastic optimal control problems*. **Systems Control Lett.**, 61 (2012), pp. 143-147.

35. F. Álvarez, J. Bolte, J.-F. Bonnans and F.-J. Silva. *Asymptotic expansions for interior penalty solutions of control constrained linear-quadratic problems*. **Math. Program. Ser. A**, 135-1 (2012), pp. 473-507.

36. J. F. Bonnans and F.-J. Silva. *Asymptotic expansion for the solutions of control constrained semilinear elliptic problems with interior penalties*. **SIAM J. Control Optim.**, 49-6 (2011), pp. 2494-2517.

Preprints

1. *Proximity operators of perspective functions with nonlinear scaling*, with L. Briceño-Arias and P.-L. Combettes.

2. *Forward-backward algorithm for functions with locally Lipschitz gradient: applications to mean field games*, with L. Briceño-Arias and X. Yang.

3. *Perspective functions with nonlinear scaling*, with L. Briceño-Arias and P.-L. Combettes.

4. *A high-order scheme for mean field games*, with E. Calzola and E. Carlini.

Book chapters

1. E. Carlini and F. J. Silva. *A fully discrete scheme for systems of nonlinear Fokker-Planck-Kolmogorov equations.* In *PDE Models for Multi-Agent Phenomena*. **Springer INdAm Series** 28-1 (2018), pp. 195-218.

2. M. S. Aronna, D. Tonon, A. Boccia, C. Campos, M. Mazzola, L. V. Nguyen, M. Palladino, T. Scarinci, and F. J. Silva. *On second order conditions in the optimal control of partial differential equations*. In *Novel Directions in Optimization, Control and Games with Applications*. **Lecture Notes in Mathematics, Springer.** (2017).

3. A. Festa, R. Guglielmi, C. Hermosilla, A. Picarelli, S. Sahu, A. Sassi, and F. J. Silva. *A Brief Survey on Semi-Lagrangian Schemes for Mean Field Games*.In *Novel Directions in Optimization, Control and Games with Applications*. **Lecture Notes in Mathematics, Springer.** (2017).

Publications in proceedings with referee reports

1. O. Bachelier, T. Cluzeau, A. Rigaud, F. J. Silva, and N. Yeganefar. *Equivalence between different stability definitions for 2D linear discrete Roesser models*. **61st IEEE Conference on Decision and Control** (2022)

2. J. Fontbona, H. Ramírez, V. Riquelme and F.-J. Silva. *Stochastic modelling and control of bioreactors*. **IFAC-PapersOnLine**. 50-1 (2017), pp. 12611-12616.

3. R. David, O. Bachelier, T. Cluzeau, F.-J. Silva, Na. Yeganefar and Ni. Yeganefar. *Structural and asymptotic stability: A counterexample*. **IFAC-PapersOnLine**. 50-1 (2017), pp. 1853-1858.

4. E. Carlini, A. Festa and F.-J. Silva. *The Hughes model for pedestrian dynamics and congestion modelling*. **IFAC-PapersOnLine**. 50-1 (2017), pp. 1655-1660.

5. E. Carlini and F.-J. Silva. *A Semi-Lagrangian scheme for the Fokker-Planck equation*. **IFAC-PapersOnLine**. 49-8 (2016) pp. 272-277.

6. B. Heymann, J.-F. Bonnans, G. Jiménez and F.-J. Silva. *A Stochastic Continuous Time Model for Microgrid Energy Management*. **European Control Conference (ECC)** (2016).

7. R. David, N. Yeganefar, F.-J. Silva and O. Bachelier. *Existence and uniqueness of solutions of continuous nonlinear 2D Roesser models: the locally Lipschitz case*. **9th international Workshop on Multidimensional (nD) Systems (nDS'15), Vila Real** (2015).
8. R. David, N. Yeganefar, F.-J. Silva and O. Bachelier. *Existence and uniqueness of the solutions of continuous nonlinear 2D Roesser models*. **European Control Conference (ECC)**, (2015).
9. E. Carlini and F.-J. Silva. *Semi-Lagrangian schemes for mean field game models*. **52nd IEEE Conference on Decision and Control**, (2013).
10. T. Bayen and F.-J. Silva. *Weak and strong minima : from calculus of variation towards PDE optimization*. **IFAC Proceedings Volumes**, 46-26 (2013), pp. 150-154.
11. F. Alvarez, J. Bolte, J.-F. Bonnans and F.-J. Silva. *Error estimates for the solution of a control constrained optimal control problem with interior penalties*. **IFAC Proceedings Volumes**, 42-2 (2009), pp. 120-123.

Teaching Experience

2022-2023: 218 hours

- *Reinforcement learning and stochastic optimization*. M2 Acsyon, Université de Limoges.
- *Stochastic processes*. M1 Acsyon, Université de Limoges.
- *Statistical techniques*. M1 Acsyon and Cryptis, Université de Limoges.
- *Complex variables*. Université de Limoges.
- *Algebra*. Université de Limoges and ENSIL-ENSCI.
- *Optimization refresher*. Université de Toulouse I.

2021-2022: 260 hours

- *Reinforcement learning and stochastic optimization*. M2 Acsyon, Université de Limoges.
- *Stochastic processes*. M1 Acsyon, Université de Limoges.
- *Complex variables*. Université de Limoges.
- *Algebra*. Université de Limoges.
- *Optimization refresher*. Université de Toulouse I.
- *Invited course on the numerical approximation of mean field game systems*, KAUST, Saudi Arabia.
- *Invited course on mean field games*. Università Roma I, La Sapienza.

2020-2021: 296 hours.

- *Statistical techniques*. M1 Acsyon and Cryptis, Université de Limoges.
- *Stochastic processes*. M1 Acsyon, Université de Limoges. Université de Limoges.
- *Optimization*. M1 Acsyon. Université de Limoges.
- *Complex variables*. Université de Limoges.
- *Numerical analysis*. Université de Limoges.
- *Algebra*. Université de Limoges.
- *Optimization refresher*. Université de Toulouse I.
- *Invited course on stochastic differential equations. CIMPA 2020: Optimal control and its applications in economics, engineering and the environment*. Rabat, Maroc
- *Invited course on first order mean field games*. KAUST, Saudi Arabia (online).

2019-2020: 273 hours.

- *Statistical techniques*. M1 Acsyon and Cryptis, Université de Limoges.
- *Stochastic processes*. M1 Acsyon, Université de Limoges. Université de Limoges.
- *Numerical analysis*. Université de Limoges.
- *Algebra*. Université de Limoges.
- *Probability*. Université de Limoges.
- *Optimization refresher*. Université de Toulouse I.

2018-2019: 237 hours

- *Mathematical tools in Sciences*. Université de Limoges.
- *Algebra*. Université de Limoges.
- *Linear algebra*. Université de Limoges.
- *Probability*. Université de Limoges.
- *Optimization refresher*. Université de Toulouse I.

2017-2018: Délégation CNRS (no teaching).

2016-2017: 192 hours

- *Probability and statistics.* ENSIL.
- *Mathematical tools in Sciences*. Université de Limoges.
- *Mathematics III*. Université de Limoges.
- *Numerical analysis*. Université de Limoges.

2015-2016: 192 hours

- *Probability and statistics*. ENSIL.
- *Statistics for biology*. Université de Limoges.
- *Mathematics III*. Université de Limoges.
- *Numerical analysis*. Université de Limoges.
- *Invited course on optimal control*. *"ECOPT 2015"*. Universidad Federico Santa María, Santiago, Chile.

2014-2015: 162 hours

- *Probability and statistics*. ENSIL.
- *Statistics for biology*. Université de Limoges.
- *Mathematics III*. Université de Limoges.
- *Mathematics II*. Université de Limoges.
- *Mini-cours on mean field games*. "École d'été pluridisciplinaire en théorie de jeux", Aussois, France.
- *Mini-cours on mean field games*. CMM, Santiago, Chili.

2013-2014: 128 hours

- *Statistics for biology*. Université de Limoges.
- *Numerical analysis*. Université de Limoges.
- *Convex analysis*. Université de Limoges.
- *Optimal control*. Université de Limoges.

2012-2013 : 128 hours

- *Mini-cours on mean field games*. Workshop SADCO, Funchal, Portugal.
- *Statistics for biology*. Université de Limoges.

- *Numerical analysis*. Université de Limoges.
- *Optimization*. Université de Limoges.
- *Optimal control*. Université de Limoges.

2012 : 8 hours

- *Stochastic optimal control*. Université La Sapienza.

2010 : 16 hours

- *Practical sessions on Quadratic Optimization*. ENSTA.

2007–2008 : 60 hours

- *Practical sessions on Optimization* . Universidad de Chile.
- *Practical sessions on Statistics*. Universidad de Chile.
- *Practical sessions on Stochastic Processes and Applications*. Universidad de Chile.

2006–2007 : 120 hours

- *Practical sessions on Introduction to Algebra*. Universidad de Chile.
- *Practical sessions on Nonlinear Optimizaion*. Universidad de Chile.
- *Practical sessionson Linear Algebra*. Universidad de Chile.
- *Practical sessions on Statistics*. Universidad de Chile.
- *Practical sessions on Probability and Stochastic Processes*. Universidad de Chile.

2005–2006 : 80 hours

- *Practical sessions on Calculus of Several Variables*. Universidad de Chile.
- *Practical sessions on Probability and Stochastic Processes*. Universidad de Chile.
- *Practical sessions on Linear Algebra*. Universidad de Chile.

2004–2005 : 20 hours

- *Practical sessions on Calculus of Several Variables*. Universidad de Chile.

Administrative responsibilities, supervision, thesis committee, participation to research projects and colloquium organization

- Responsibilities
  - **2023** - : Coordinator of the Master 2 degree in Applied Mathematics ACSYON.
  - **2020** - : Coordinator of the Master program ACSYON.
  - **2013-2019**: Secretary of the group SMAI-MODE (Mathématiques de l'Optimisation et de la Décision).
- Supervision
  - **2022-**: Co-advisor of Jules Berry's PhD thesis *Jeux à champ moyen dans des cas dégénérés.*.
  - **2020-**: Co-advisor of Ahmad Zorkot's PhD thesis, *Approximation numérique d'équilibres de jeux à champ moyen.*.
  - **2022**: Supervision of Jules Berry's internship *Jeux à champ moyen sur les réseaux*.
  - **2018-2021**: Co-advisor of Elisa Calzola's PhD thesis, *Numerical methods for nonlinear PDEs with applications to Mean Field Games and Fluid mechanics*.

- **2017** : Supervision of Thi Nhu-Thao Nguyen's internship *Nonsmooth analysis and optimal control theory. An overview*.
- **2017** : Co-supervision of the students A. Mateos Gonzales and Z. Kobeissi on a numerical project about Mean Field Games in the framework of the summer school CEMARCS 2017.

- Thesis committee

  - **April 2023:** *Rapporteur* of Adrien Séguret's PhD thesis. Université Paris Dauphine-PSL. Advisors: P. Cardaliaguet et C. Wan.
  - **July 2022:** Rapporteur of Luciano Marzufero's PhD thesis. Università di Trento. Advisors : F. Bagagiolo.
  - **January 2022:** Rapporteur of Laura Aquilanti's PhD thesis. Università di Roma, La Sapienza. Advisor : F. Camilli.
  - **November 2021:** Examinateur of Cristian Mendico's PhD thesis. Grand Sasso Science Institute and Université Paris Dauphine-PSL. Advisors : P. Cannarsa et P. Cardaliaguet.
  - **November 2020:** Examinateur of Gaurav Dhar's PhD thesis. Université de Limoges. Advisors : S. Adly and L. Bourdin.
  - **March 2019:** Examinateur of Charafeddine Mouzouni's PhD thesis. École Centrale de Lyon. Advisors : P. Cardaliaguet et E. Mironescu.
  - **October 2018:** Rapporteur of Manh Khang Dao's PhD thesis. Université Rennes I. Advisors : Y. Achdou, O. Ley et N. Tchou.
  - **April** 2018**:** Examinateur of Rossana Capuani's PhD thesis. Université Roma II, Tor-Vergata. Advisors: P. Cannarsa and P. Cardaliaguet.
  - **November** 2017**:** Examinateur of Sylvain Gibaud's PhD thesis. Université Toulouse III - Paul Sabatier. Advisors: L. Miclo and J. Renault.
  - **November** 2016**:** Examinateur of Mathieu Laurière's PhD thesis. Université Paris-Diderot. Advisor: Y. Achdou.
  - **September** 2016**:** Examinateur of Victor Riquelme's PhD thesis. Unversidad de Chile. Advisors: H. Ramírez and A. Rapaport.
  - **September** 2015**:** Examinateur Alpar R. Mészáros's PhD thesis, Laboratoire de mathématiques d'Orsay. Advisor: F. Santambrogio.

- Projects

  - **2023-2026:** Member of the project *COSS: COntrol on Stratified Structures*.
  - **2022-2025:** Member of the KAUST project *Mean field games: models, theory, and computational aspects*.
  - **2018-2021:** Member of the KAUST project *Mean-field games and applications*.
  - **2016-2021:** Member of the ANR project *MFG: Mean Field Games*.
  - **2016 - :** Member of the PGMO project *VarPDEMFG: "Variational and PDE methods in Mean Field Games"*.
  - **2016-2017:** Coordinator of the project *PEPS-INSMI, "Some open problems in Mean Field Games"*.
  - **2014-2018:** Member of the project ANR *MSDOS: "Systèmes multidimensionnelles, digression sur la stabilité"*.

- **2014-2016:** Member of the project *MathAmsud 15MATH-02: "Sparse Optimal Control of Differential Equations: Algorithms and Applications".*
- **2012-2016:** Coordinator of the project PGMO : *PASTOR: "Perturbation analysis for deterministic and stochastic optimal control problems".*
- **2013-2014:** Coordinator of the project XLIM-VIP: *"Une nouvelle approche Mathématique pour la Gestion de l'Energie dans les Réseaux Intelligents".*

- Scientific committee
  - **June 2022:** Member of the international scientific committee in the conference *"SMAI MODE 2022"*, Limoges, France.
  - **June 2020:** Member of the international scientific committee in the conference *"19th International Symposium on Dynamic Games and Applications"*, juin 2020, Porto, Portugal.
  - **July 2018:** Member of the international scientific committee in the conference *"18th International Symposium on Dynamic Games and Applications"*, Grenoble, France.

- Colloquium organization
  - Co-organizer of the session *"New developments in Mean Field Games and Hamilton-Jacobi equations"* in the conference LACIAM 2023, January 2023, Rio de Janeiro, Brazil.
  - Co-chair of the conference SMAI MODE 2022, June 2022, Limoges, France.
  - Co-organizer of the online workshop *"Two-days online workshop on mean field games"*, juin 2020, Les Andelys, France.
  - Co-organizer of the session *"Mean Field Games: New Trends and Applications"* in the conference ICIAM 2019, juillet 2019, Valence, Espagne.
  - Organizer of a session on Mean Field Games in the conference *"18th International Symposium on Dynamic Games and Applications"*, July, 2018, Grenoble, France.
  - Co-organizer of the session *"Mean Field Games and applications"* in the conference *"12th AIMS Conference on Dynamical Systems, Differential Equations and Applications"*, July, 2018, Taipei, Taïwan.
  - Co-organizer of the conference *"Control and Optimization Conference on the occasion of Frédéric Bonnans 60th birthday"*, November, 2017, Palaiseau, France.
  - Co-organizer of the session *"Mean Field Games and applications"* in the conference *journées PGMO*, November, 2017, Palaiseau, France.
  - Co-organizer of the mini-symposium *"Jeux à champ moyen et applications"* in the conference *SMAI 2017*, June, 2017, Ronce-les-Bains, France.
  - Co-organizer of the mini-symposium *"Recent developments in numerical methods for Hamilton-Jacobi-Bellman equations and multi-agents systems"* in the conference *WONAPDE 2016*, January, 2016, Concepción, Chile.
  - Co-organizer of the workshop *"Stochastic Optimization: Theory and applications to energy management"*, June, 2014, Limoges, France.
  - Co-organizer of the mini-symposium *"Stochastic optimal control and applications"* in the conference *SIAM conference on optimization*, May, 2014, San Diego, USA.
  - Organizer of the mini-symposium *"Optimality conditions in optimal control of PDEs"* in the conference *ICCOPT 2013, The Fourth International Conference on Continuous Optimization*, August, 2013, Lisbon, Portugal.

Conference Presentations and Seminars

- Invited presentations:
  - *On nonlocal and nonlinear PDEs*, May 2023, Trondheim, Norway.
  - *Advances in nonlinear elliptic and parabolic PDEs*, May 2023, KAUST, Saudi Arabia.
  - *25th International Symposium on Mathematical Theory of Networks and Systems* (MTNS 2022), September 2022, Bayreuth, Germany.
  - *Neuvièmes Journées Franco-Chiliennes d'Optimisation*, June 2022, Perpignan, France.
  - *Theory and numerics of Mean Field Games and Hamilton-Jacobi equations*, Mai 2022, Rome, Italy.
  - *SIAM 2022 Conference on Analysis of Partial Differential Equations*, Mai 2022, Berlin, Germany (online).
  - *IPAM Workshop III: Mean Field Games and Applications*, Mai 2020, Los Angeles, USA (online).
  - *Workshop of PDE constrained optimization under uncertainty and mean field games*, January 2020, Berlin, Germany.
  - *Interaction models: Mean Field Games, pattern formation and related topics*, January, 2018, Padoue, Italy.
  - *Mean field games and related topics - 4*, June, 2017, Rome, Italy.
  - *PDE Models for Multi-agent Phenomena*, November, 2016, Rome, Italy.
  - *First Joint Meeting Brazil – Italy in Mathematics*, August, 2016, Rio de Janeiro, Brazil.
  - *6th Conference ALEL*, June, 2016, Cartagena, Spain.
  - *Workshop on Optimal Control of Partial and Ordinary Differential Equations*, November, 2015, Palaiseau, France.
  - *4th LAWOC conference*, July, 2014, Lima, Peru.
  - *5th Conference ALEL*, June, 2014, Seville, Spain.
  - *2nd International Conference on Variational Analysis and Optimization en l'honneur de Lionel Thibault*, January, 2014, Santiago, Chile.
  - *2ème rencontre ANR: "Hamilton-Jacobi equations on heterogeneous structures and networks"*, June, 2013, Rennes, France.
  - *Workshop on Mathematics of Energy Finance and Natural Resource Management*, March, 2013, Santiago, Chile.
  - *Septièmes Journées Franco-Chiliennes d'Optimisation,* December, 2011, Perpignan, France.
- International conferences:
  - *LACIAM 2023*, January 2023, Rio de Janeiro, Brazil.
  - *12th AIMS Conference on Dynamical Systems, Differential Equations and Applications"*, July 2018, Taipei, Taïwan.
  - *Control and Optimization Conference on the occasion of Frédéric Bonnans 60th birthday*, November, 2017, Palaiseau, France.
  - *MCA 2017, Mathematical congress of the Americas*, July, 2017, Montréal, Canada.
  - *20ème congrès mondial de l'IFAC*, July, 2017, Toulouse, France.
  - *28th European Conference on Operational Research*, July, 2016, Poznan, Poland.
  - *15th annual European Control Conference*, June, 2016, Aalborg, Danemark.
  - *WONAPDE 2016*, January, 2016, Concepción, Chile.
  - *Sixteenth International Symposium on Dynamic Games and Applications (ISDG)*, July, 2014. Amsterdam, Netherlands.
  - *SIAM Conference on Optimization*, May, 2014, San Diego, USA.
  - *SADCO Young Research Workshop*, January, 2014, Berlin, Germany.
  - *ICCOPT 2013, The Fourth International Conference on Continuous Optimization*, August, 2013, Lisbon, Portugal.
  - *Workshop: Stochastic Optimization - Models and Algorithms, HIM*, May, 2013, Bonn, Germany.

- *2012 Mathematical Programming Symposium*, August, 2012, Berlin, Germany.
- *Second industrial workshop of SADCO project*, February, 2012, Stuttgart, Germany.
- *III Latin American Workshop on Optimization and Control*, January, 2012, Valparaíso, Chile.
- *The* 15^{th} *AFG conference on Optimization*, September, 2011, Toulouse, France.
- *ICCOPT* 2010*, The international conference on continuous optimization*, July, 2010, Santiago, Chile.
- 14-*th Belgian-French-German Conference on Optimization*, September, 2009, Leuven, Belgium.
- *IFIP Conf. System Modeling and Optimization*. July, 2009, Buenos Aires, Argentina.
- *SMAI* 2009, May 2009, La Colle-sur-Loup, France. *Poster presentation*.
- *Control Applications of Optimization*, May, 2009, Jivaskyla, Finland.

- National conferences:

  - *Workshop ANR MFG*, March, 2018, Tours, France.
  - *Workshop ANR MFG*, March, 2017, Nice, France.
  - *Congrès SMAI 2017*, June, 2017, Ronce-Les-Bains, La Tremblade, France.
  - *PGMO days 2016*, November, 2016, Palaiseau, France.
  - *PGMO days 2015*, October, 2015, Palaiseau, France.
  - *Conference on Optimization and Practices in Industry (COPI)*, October, 2014, Paris, France.
  - *Stochastic Optimization: Theory and applications to energy management*, June, 2014, Limoges, France.
  - *Conference on New Trends in Optimal Control*, June, 2014, Tours, France.
  - *ALEL 2012*, July, 2012, Limoges, France.
  - *Conférence MODE 2012: Mathématiques de l'Optimisation et de la décision*, March, 2012, Dijon, France.
  - *MODE 2010 : Conférence de la SMAI sur l'optimisation et la décision*, March, 2010, Limoges, France.
  - *Sixième Journée Optimeo a l'École Polytechnique*, March, 2010, Palaiseau, France.
  - *GdR* 3273 *Mathématiques de l'Optimisation et Applications*, October, 2009, Porquerolles, France.
  - *Journée de bilan de a chaire Modélisation Mathématique et Simulation Numérique à l'École Polytechnique*, September, 2009, Palaiseau, France.
  - *Conference on Optimization and Practices in Industry*, November, 2008, Paris, France.

- Seminars:

  - *"Analysis and/of PDE Seminar"*, October 2020, Durham University, UK (online).
  - *"Nonlinear Analysis/Differential Equations seminar"*, October 2020, NC State University, USA (online).
  - *Séminaire français d'optimisation*, September 2020, (online), France.
  - *Séminaire à l'Institut de Mathématiques de Bourgogne*, February 2019, Dijon, France.
  - *MAD-STAT at the university Toulouse I, Capitole*, March, 2018, Toulouse, France.
  - *"Applied PDEs Seminar" at the Imperial College*, March, 2018, London, England.
  - *SPOT*, February, 2018, Toulouse, France.
  - *Séminaire Parisien de théorie de jeux*, January, 2018, Paris, France.
  - *SPOC*, January, 2017, Bourgogne, France.
  - *"IMA-PUCV"*, PUCV, August, 2016, Valparaíso, Chile.

- *"Optimization and equillibrium"*, CMM, Universidad de Chile, January, 2016, Santiago, Chile.
- *"Optimization and equillibrium"*, CMM, Universidad de Chile, August, 2015, Santiago, Chile.
- *"KAUST"*: KAUST, June, 2015, Thuwal, Saudi Arabia.
- *"RICAM"*: RICAM, March, 2015, Linz, Austria.
- *"Decision Mathematics Seminar"*, TSE, April, 2014, Toulouse, France.
- *"COMMANDS"*, École Polytechnique, April, 2014, Palaiseau, France.
- *"Optimization and equillibrium"*, CMM, Universidad de Chile, March, 2013, Santiago, Chile.
- *"MODEMIC"*, INRA, January, 2014, Montpellier, France.
- *"EDP"*, Université de Lorraine, November, 2013, Metz, France.
- *"Modellistica Differenziale Numerica"*, La Sapienza, November, 2011, Rome, Italy.
- *Summer school "CIME - Summer School in applied mathematics: HJB equations: approximations, numerical analysis and applications"*, August, 2011, Cetraro, Italy.
- *Summer school on Calculus of Variations and Applications*, CIRM, July, 2011, Marseille, France.
- *"Modellistica Differenziale Numerica" at La Sapienza*, May, 2011, Rome, Italy.
- *"Optimización y equilibrio"*, CMM, Universidad de Chile, March, 2011, Santiago, Chile.
- *Summer school on the optimal control of PDEs*, July, 2010, Cortona, Italy.
- *"Optimización y equilibrio"*, , CMM, Universidad de Chile, August, 2009, Santiago, Chile.
- *"COMMANDS"*, ENSTA, June, 2009, Paris, France.
- *Seminar of Phd students on game theory at Paris VI*, April, 2009, Paris, France.
- *Seminar of Phd students at the École Polytechnique*, March, 2009, Palaiseau, France.

Miscellaneous

Referee: Mathematical Reviews, SIAM Journal on Optimization, SIAM Journal on Control and Optimization, SIAM Journal on Numerical Analysis, Mathematical Programming, Mathematics of Operation Research, Discrete and Continuous Dynamical Systems, Networks and Heterogeneous Media, Optimization Methods and Software, Journal of Optimization Theory and Applications, Journal of Global Optimization, Journal of Dynamics Games and Applications, Automatica, IEEE TAC, Numerical Functional Analysis and Optimization, Numerical Algebra, Control and Optimization.

- *Languages:* Spanish (mother tongue), English (advanced), French (advanced), Italian (advanced).
- *Computer Skills:* Matlab, Python, Scilab, LaTeX, and Java.

Last updated: October 13, 2023