Emilio Jesús MOLINA OLIVARES
PhD. in applied mathematics
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ℹ born on 21 November, 1991, Santiago de Chile

I am a postdoctoral researcher in Creatis, CNRS. My main interest as mathematician is the modeling and application of optimization and optimal control techniques to real world problems.

Research interest	Optimal control; nonlinear optimization; ordinary and partial differential equation models; model predictive control (MPC); problems applied to epidemiology, biology, privacy, magnetic resonance imaging (MRI).

🎓 EDUCATION

2022	Phd in Applied Mathematics, Sorbonne Université (Laboratoire Jacques-Louis Lions) and Universidad de Chile
2016	Master in Engineering Sciences mention Applied Mathematics, Universidad de Chile
2016	Mathematical Civil Engineering, Universidad de Chile

💼 PROFESSIONAL EXPERIENCE

Today October 2023	Research postdoctal, CREATIS, CNRS, Lyon main subject : Low Energy Optimal Radiofrequency Pulses for MRI › Pulse optimization in magnetic resonance imaging using optimal control techniques..
Today October 2022	Postdoctal researcher, GIPSA-LAB, UNIVERSITÉ GRENOBLE-ALPES, Grenoble Main subject : Protecting privacy in mobile apps using predictive control and machine learning techniques › State of the art in location privacy and study of the control and machine learning techniques applied to the problem. Modelling using model predictive control and optimal control techniques.
September 2022 March 2018	PhD in Applied Mathematics, SORBONNE UNIVERSITÉ, Paris In co-direction with Universidad de Chile, Santiago Subject : Optimal control techniques applied to natural systems management. › Solving the Open Pit Mine Problem in the continuous framework. › Peak minimization of infected individuals in epidemiology compartmental models. › Evaluation of the vaccine program in Chile.
September 2018 January 2017	Project engineer, CENTER FOR MATHEMATICAL MODELING (CMM), Chile Work in optimization and natural resources area › Find velocity curves for trains minimizing energy consumption. › Ship scheduling in Chilean ports. › Crew scheduling for FCAB, railway company which transports mineral in the north of Chile.
January 2015	Engineering Internship, DELPHOS LAB, AMTC, Chile › Subject : Ramps in open pit mine.

🏛 TEACHING EXPERIENCE

July 2022 March 2021	University teacher, FACULTAD DE CIENCIAS FÍSICAS Y MATEMÁTICAS, UNIVERSIDAD DE CHILE, Chile Subject : Optimization › Plenary class 3 h weekly, 15 weeks each semester. › Make tests. › Undergraduate level. Number of students : over 30.

December 2018 August 2017	University teacher, Universidad Nacional Andrés Bello, Chile Subjects : Linear Algebra and Numerical Calculus › Plenary class 4.5 h weekly, 15 weeks each semester. › Make tests. › Undergraduate level. Number of students : over 50.
December 2019 August 2012	Teacher assistant, Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile, Chile Several subjects, some of them : Optimal Control, Theory and Laboratory ; Mixed Integer Programming, Theory and Laboratory ; Nonlinear Optimization ; Calculus. › Weekly review and exercise classes, complementary to the plenary classes, 1.5 h weekly, 15 weeks each semester. › Undergraduate level, number of students : over 100. › Master level, number of students : over 20.
2015- Sporadic	Pedagogical Tools Maker, Center for Mathematical Modelling, Chile Develop pedagogical tools of B-Learning courses. Projects for the chilean Ministry of Education. UNESCO-Hamdan bin Rashid Al-Maktoum prize winners 2017-2018 for the project Suma y Sigue.

🧪 PUBLICATIONS

Optimal synthesis for a class of L^∞ optimal control problems in the plane with L^1 constraint on the input 2023
Molina, E., Rapaport, A.
🔗 submitted

React to the Worst : Efficient and proactive protection of location privacy 2023
Molina, E.,, Fiacchini, M., Cerf, S., Robu, B.
🔗 IEEE Control Systems Letters

Optimal privacy protection of mobility data : a predictive approach 2023
Molina, E., Fiacchini, M., Cerf, S., Robu, B.
🔗 IFAC World Congress

Optimal control approaches for Open Pit planning 2022
Molina, E., Martinon, P., Ramírez, H.
🔗 Optimization and Engineering

Equivalent Formulations of Optimal Control Problems with Maximum Cost and Applications 2022
Molina, E., Rapaport, A., Ramírez, H.
🔗 Journal of Optimization Theory and Applications

An optimal feedback control that minimizes the epidemic peak in the SIR model under a budget constraint 2022
Molina, E., Rapaport, A.
🔗 Automatica

Optimality conditions for the continuous model of the final open pit problem 2019
Amaya, J., Hermosilla, C., Molina, E.
🔗 Optimization Letters

Optimization model for rostering and crew assignment for train transportation 2019
Amaya, J., Molina, E., Morales, N., Uribe, P.
🔗 Conference : Application of Computers and Operation Research in the Minery Industry (APCOM)

Analytical Properties of the Feasible and Optimal Profiles in the Binary Programming Formulation of Open Pit 2017
Amaya, J., Molina, E.
🔗 Conference : Application of Computers and Operation Research in the Minery Industry (APCOM)

CHARACTERIZING THE OPTIMAL PROFILE OF THE OPEN PIT PROBLEM IN THE CONTINUOUS FRAMEWORK 2017
Amaya, J., **Molina, E.**
Conference : Application of Computers and Operation Research in the Minery Industry (APCOM)

🖥 SCIENTIFIC PRESENTATIONS

IFAC WORLD CONFERECE 2023 JULLIET 2023
Yokohama, Japan
Speaker

SÉMINAIRE DU GROUPE PAD GIPSA LAB MARS 2023
Grenoble, France
Speaker

SÉMINAIRE DE MATHEMTIQUES UNIVERSITÉ D'AVIGNON NOVEMBRE 2023
Avignon, France
Speaker

PGMO DAYS NOVEMBRE. 2023
Palaiseau, France
Speaker

EURO CONFERENCE ON OPERATION RESEARCH JULLIET 2022
Espoo, Finland
Speaker

9ÈMES JOURNÉES FRANCO-CHILIENNES D'OPTIMISATION JUIN 2022
Perpignan, France
Speaker

WORKSHOP ON OPTIMAL CONTROL THEORY JUIN 2022
Rouen, France
Speaker

SEMINAIRE DES DOCTORANTES UNIVERSIDAD DE CHILE CMM JUIN 2022
Santiago, Chile
Speaker

GROUPE DE TRAVAIL DES THÉSARD(E)S DU LJLL MARS 2022
Paris, France
Speaker

MATHEMATICAL CONGRESS OF THE AMERICAS MCA JULLIET 2021
Online
Speaker

WORKSHOP STIC AMSUD – NEMBICA MAI 2021
Frejus, France
Speaker

ATENEO ALMA JOVEN JANVIER 2021
online
Speaker

SEMINARE EQUIPE INRIA CAGE MAI 2020
online
Speaker

EURO CONFERENCE ON OPERATION RESEARCH JULLIET 2019
Dublin, Irlande
Speaker

ENCUENTRO ANUAL SOCIEDAD DE MATEMATICA DE CHILE NOVEMBRE 2018
Santiago, Chile
Speaker

ENCUENTRO LATINOAMERICA DE ESTUDIANES EN MODELAMIENDO, INGENIERÍA Y CIENCIAS OCTOBRE 2018
Santiago, Chile
Poster session

EURO CONFERENCE ON OPERATION RESEARCH JULLIET 2018
Valence, Espagne
Speaker

Golden, USA
Speaker

☰ COMPETENCES

Optimization software and solvers	Ampl, Gurobi, Cplex, Ipopt, Casadi, Bocop
Programming	Matlab, Python (numpy, scipy, pandas, scikit-learn,matplotlib), R

🌐 LANGUAGES

Spanish	⬤ ⬤ ⬤ ⬤ ⬤
French	⬤ ⬤ ⬤ ⬤ ○
English	⬤ ⬤ ⬤ ○ ○

➕ STRENGTHS

> Independent
> Proactive
> Enthusiastic

❝ REFERENCES

Héctor Ramírez
Full profesor
Departamento de Ingeniería Matemática, Universidad de Chile
Director of Center for Mathematical Modeling (CMM)
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Alain Rapaport
Senior researcher Univ. Montpellier, INRAE, Institut Agro
Laboratory : Mathematics, Informatics and Statistics applied to Environment and Agronomy (MISTEA)
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Pierre Martinon
Researcher INRIA
Team : Control and Geometry (CAGE)
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Mirko Fiacchini
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Gipsa-lab, Université Grenoble Alpes
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