Nicolás Hernández Santibáñez

Contact Information

Center for Mathematical Modeling
Universidad de Chile
Beauchef 851, Edificio Norte - Piso 7
Santiago - Chile

+(56) 2 2978 4870
nhernandez@dim.uchile.cl

Research Interests

Contract Theory, Stochastic Control, Financial Mathematics, Optimization, Game Theory.

Webpage

https://sites.google.com/site/nicohernandezsantibanez

Employment & Education

FONDECYT Postdoctoral fellow at CMM - Universidad de Chile.
- Funding: Postdoctoral Scholarship provided by ANID, 2020-2023.
- Started in April 2020.

Postdoctoral Assistant Professor, Mathematics - University of Michigan.
- September 2017-December 2019.

PhD cotutelle, Université Paris-Dauphine & Universidad de Chile.
- Programs: Doctorado en Ciencias de la Ingeniería, mención en modelamiento matemático & Doctorat en Mathématiques appliquées, spécialité en sciencies économiques.
- Title: Contributions to the Principal-Agent theory and applications in economics.
- Advisors: Alejandro Jofré (Chile) & Dylan Possamaï (France).
- Funding: National PhD Scholarship provided by CONICYT, 2013-2016.
- July 2017.

Mathematical Engineer (Master Equivalent), Universidad de Chile.
- Title: Variational Analysis methods in mechanism design problems.
- Advisor: Nicolás Figueroa.
- July 2012.

Bachelor in Engineering Sciences, Universidad de Chile.
- November 2011.

Professional Experience

March 2011 – March 2013: Project Engineer at Centro de Investigación JRI S.A., Santiago, Chile.

Publications

[1] N. Hernández, T. Mastrolia. Contract theory in a VUCA world, 2019. SIAM Journal on Control and Optimization, 57(4), 3072-3100.

[2] N. Hernández, D. Possamaï, C. Zhou. Bank monitoring incentives under moral hazard and adverse selection, 2019. Journal of Optimization Theory and Applications, 184(3), 988-1035.

[3] C. Alasseur, I. Ekeland, R. Élie, N. Hernández, D. Possamaï. An adverse selection approach to power tarification, 2020. SIAM Journal on Control and Optimization, 58(2), 686-713.

[4] S. Bensalem, N. Hernández, N. Kazi-Tani. Prevention efforts, insurance demand and price incentives under coherent risk measures. hal-01983433, 2019. Accepted in the Journal Insurance: Mathematics and Economics.

Working papers

[5] E. Bayraktar, J. Cvitanić, N. Hernández. Optimal Contracting with Poisson Breakthroughs and Failures. In preparation.

[6] R. Élie, N. Hernández, V. Young. Moral Hazard and Adverse Selection in Continuous–Time Insurance problems. In preparation.

[7] A. Jofré, N. Hernández, D. Possamaï. A pollution regulation model for electricity producers. In preparation.

Teaching Experience

Instructor

Fall	2020	Differential Calculus and Advanced Ordinary Differential Equations, Universidad de Chile.
Fall	2019	Discrete State Stochastic Processes (2), University of Michigan.
Winter	2019	Mathematics of Finance (2), University of Michigan.
Fall	2018	Mathematics of Finance, University of Michigan.
Winter	2018	Mathematics of Finance (2), University of Michigan.
Fall	2017	Mathematics of Finance, University of Michigan.
Fall	2017	Calculus, Universidad de Chile.
Fall	2017	Optimization, Universidad de Chile.
Spring	2016	Optimization, Universidad de Chile.

Teaching Assistant

Fall	2015	Optimization, Universidad de Chile.
Fall	2014	Optimization, Universidad de Chile.
Fall	2013	Optimization, Universidad de Chile.
Fall	2013	Multivariate Calculus, Universidad de Chile.
Fall	2012	Algebra, Universidad de los Andes.
Summer	2012	Numerical Calculus, Universidad de los Andes.
Spring	2011	Numerical Calculus, Universidad de los Andes.
Spring	2011	Geometry, Universidad de los Andes.
Fall	2011	Applied Mathematics, Universidad de los Andes.
Fall	2011	Calculus II, Universidad de los Andes.
Spring	2010	Linear Algebra, Universidad de los Andes.
Spring	2010	Calculus I, Universidad de los Andes.
Fall	2010	Linear Algebra, Universidad de los Andes.
Fall	2010	Linear Programming, Universidad de los Andes.
Fall	2010	Ordinary Differential Equations, Universidad de Chile.
Spring	2009	Optimization, Universidad de Chile.
Spring	2009	Ordinary Differential Equations, Universidad de Chile.
Fall	2009	Optimization, Universidad de Chile.

Mentoring

Research opportunites

2017-2019	Mengyao Huang (master). Numerical methods for Principal-Agent problems.
2018	Mark Hwang (undergraduate). Introduction to Stochastic Control.

Research Experience for Undergraduates (REU program)

2019	Xinjie Sun and Zhenxi Wu. Submitted application to the program and received funding for the students' summer research under the title "Dynamic programming approach to discrete-time Principal-Agent problems".

Presentations in Conferences

Oct 2019	INFORMS Annual Meeting, Seattle, Washington.
Jun 2019	SIAM Conference on Financial Mathematics & Engineering (FM19), Toronto, Canada.
Oct 2018	International Conference on Control, Games and Stochastic Analysis, Hammamet, Tunisia.
Aug 2018	11th European Summer School in Financial Mathematics, École Polytechnique, Palaiseau, France.
Mar 2018	Workshop on Stochastic Analysis applied to economics, finance and insurance, Santiago, Chile.
Oct 2017	International Conference on Stochastic Analysis and Applications, Hammamet, Tunisia.
Mar 2017	Workshop on Variational and Stochastic Analysis, Santiago, Chile.
Jun 2016	3rd Young Researchers Meeting in Probability, Numerics and Finance, Le Mans, France.
Jan 2016	Two-day workshop on Optimization and equilibrium in financial and energy markets, Santiago, Chile.

Presentations in Seminars

Nov 2019	Financial Mathematics, University of Michigan, Ann Arbor, Michigan.
May 2018	Séminaire du laboratoire SAF, Université Claude Bernard Lyon 1, Lyon, France.
Apr 2018	Financial Mathematics, University of Michigan, Ann Arbor, Michigan.
Oct 2017	Financial Mathematics, University of Michigan, Ann Arbor, Michigan.
Sep 2017	Capsule Research Talks, University of Michigan, Ann Arbor, Michigan.
Aug 2017	Seminario de Optimización y Equilibrio, Universidad de Chile, Santiago, Chile.
Feb 2017	GT Modèles stochastiques en finance, École Polytechnique, Palaiseau, France.
Jun 2016	Séminaire des jeunes chercheurs du Ceremade, Université Paris-Dauphine, Paris, France.
May 2016	Séminaire á l'Université Claude Bernard Lyon 1, Lyon, France.

Orginazing Committee

Mar 2017	Workshop on Variational and Stochastic Analysis, Santiago, Chile.
Jan 2017	School on Equilibria in Games: existence, selection and dynamics, Santiago, Chile.

Peer Review Services SIAM Journal on Control and Optimization, Applied Mathematics and Optimization, Electronic Journal on Probability and Journal of Optimization Theory and Applications.

Distinctions Student's honor list, Universidad de Chile, Santiago, Chile.
(2005), (2006), (2007), (2009), (2010).