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Undergraduate Studies:

Bachelor of Sciences in Fisheries Science, Professional Degree of Aquaculture Engineering,
Pontificia Universidad Católica de Valparaíso, 2010

Graduate Studies:

University of California, Santa Barbara, 2014 to present

Ph.D. Candidate in Economics

Dissertation Title: “*Economic Institutions and Natural Resources*”

Expected Completion Date: June 2018

References:

Professor Christopher Costello
4410 Bren Hall, UCSB
805-893-5802, costello@bren.ucsb.edu

Professor Olivier Deschenes
2127 North Hall, UCSB
805-893-5617, olivier@econ.ucsb.edu

Professor Kyle Meng
4416 Bren Hall, UCSB
805-893-5055, kmeng@bren.ucsb.edu

Professor Javier Birchenall
2127 North Hall, UCSB
805-893-5275, javier.birchenall@ucsb.edu

Teaching and Research Fields:

Primary fields: Environmental and Resource Economics, Applied Econometrics, Applied Theory

Secondary fields: Game Theory, Political Economy, Microeconomics, Macroeconomics

Teaching Experience:

2017, Spring Economics of Environmental Management, UC Santa Barbara, teaching assistant
for Professor Christopher Costello

2017, Winter Economics of Fisheries Management, UC Santa Barbara, instructor

2016, Fall Intermediate Macroeconomic Theory, UC Santa Barbara, teaching assistant for
Professor Javier Birchenall

2010-2011, Operations Research, Pontificia Universidad Católica de Valparaíso, instructor
Spring

2010-2011, Production and Operations Management, Pontificia Universidad Católica de
Summer Valparaíso, instructor

Teaching Experience (Continued):

2007-2009, Spring Operations Research, Pontificia Universidad Católica de Valparaíso, teaching assistant for Professor René Cerda

Research Experience and Other Employment:

Oct 2013 to date UC Santa Barbara, Sustainable Fisheries Group, Project Researcher

Mar 2010 to Aug 2016 Pontificia Universidad Católica de Valparaíso, Faculty of Natural Resources, Assistant Instructor and Researcher

Nov 2012 to Aug 2013 UC Santa Barbara, Bren School, Graduate Research Assistant

Jul 2007 to Dec 2009 Pontificia Universidad Católica de Valparaíso, Faculty of Natural Resources, Research Assistant

Honors, Scholarships, and Fellowships:

2017 White Family Graduate Fellowship for Outstanding Academic Achievement, UC Santa Barbara

2017 Lindau Nobel Laureate Meetings Fellowship, Lindau Nobel Laureate Foundation

2017 Honorable Mention, Best Student Paper Contest, North American Association of Fisheries Economists

2017 Ronald Coase Workshop Fellowship, Ronald Coase Institute

2016 Graduate Student Fellowship, Property and Environment Research Centre

2016 H. William Kuni Bren Fellowship, Bren School, UC Santa Barbara

2014 Becas Chile for Ph.D. studies, Chilean Government

2011 Latin American Fisheries Fellowship, Bren School, UC Santa Barbara

2011 Becas Chile for Master studies, Chilean Government

2010 Best Graduate of the Aquaculture Engineering Program, Pontificia Universidad Católica de Valparaíso

2010 APROPECH Best Thesis of the Aquaculture Engineering Program, Pontificia Universidad Católica de Valparaíso

2010 Best Academic Performance of the Bachelor in Fisheries Science Program, Pontificia Universidad Católica de Valparaíso

Publications:

Molina, R., Cerda, R., González, E., & Hurtado, F., 2012. Simulation model of the scallop (*Argopecten purpuratus*) farming in northern Chile: some applications in the decision making process. *Latin American Journal of Aquatic Resources*, 40(3): 679-693.

Book Chapters:

Norambuena, R., González, E., **Molina, R.** & Gomez, A. 2017. Impacts of Climate Change on Marine Fisheries and Aquaculture in Chile (Chapter 10 - Aquaculture). In: Phillips, B. & Pérez, M. (eds) *The Impacts of Climate Change on Fisheries and Aquaculture*. John Wiley & Sons, Inc., Hoboken, NJ, USA.

González, E., Norambuena, R., **Molina, R.** & Thomas, F. 2013. Evaluación de Potenciales Impactos y Reducción de la Vulnerabilidad de la Acuicultura al Cambio Climático en Chile [Potential Impacts and Reduction of the Aquaculture Vulnerability to Climate Change in Chile]. In: *Cambio climático, pesca y acuicultura en América Latina: Potenciales impactos y desafíos para la adaptación*. Taller FAO/Centro de investigación Oceanográfica en el Pacífico Sur Oriental (COPAS), Universidad de Concepción, Concepción, Chile. FAO Actas de Pesca y Acuicultura. No. 29. Roma, FAO, 275-335p.

Research Papers:

Why Natural Disasters are a Disaster in Common Property Resources (Job Market Paper)

Developing countries tend to suffer the most from natural disasters, but the mechanisms underlying this outcome are poorly understood. I postulate that the lack of strong and well defined property rights for renewable resources is a key factor increasing the impacts of disasters. Using a theoretical model for renewable resource extraction with irreversible investment, I show that common property regimes incentivize users to invest in ways that exacerbate both immediate losses from disasters and increase the cost of recovery after they hit. I test these predictions by examining investment patterns across institutional regimes in Chilean small scale fisheries before and after a tsunami in 2010. The results indicate causal links between more common regimes and excessive investment increasing the cost of the tsunami. This paper contributes to the ongoing work on the economic impact of natural disasters and provides an argument for how institutional regimes can be used as mitigation strategies.

Transboundary Marine Protected Areas (with Costello, C.)

Countries exploiting transboundary fisheries face strong incentives for over-exploitation. This basic economic insight has been validated empirically; transboundary fisheries tend to be in worse condition than fisheries in single nations. Thus, transboundary fisheries pose a significant, and globally ubiquitous, management challenge. Attempts to solve this challenge through cross-country cooperation have been largely unsuccessful because defection is often more attractive than adhering to cooperative agreements. We explore the economics of an alternative solution, a transboundary marine protected area (TMPA), and derive the conditions under which it can improve profits and stock biomass, even in the presence of individually-rational non-cooperation across countries. We find that well-designed TMPAs have the potential to overcome non-cooperation across countries; this result is strengthened when stocks have relatively low growth rates. A well-designed TMPA can earn higher profits for both countries, increase stocks in both countries, and reproduce the fully cooperative outcome.

Global opportunities for mariculture development to promote human nutrition (with Halpern, B., Liu, O., and Wilson, M.) (Submitted)

An estimated two billion people worldwide suffer from micronutrient malnutrition, and almost one billion are calorie deficient. With human population expected to approach 10 billion by the middle of the century, providing adequate nutrition is a primary global challenge. Seafood is one of the most important sources of both protein and micronutrients for millions of people around the world, and yet production from wild capture fisheries has stagnated. In contrast, aquaculture is the world's fastest-growing food production sector and now provides over half of all seafood consumed globally. Mariculture, or the farming of brackish or marine species, accounts for roughly one-third of all aquaculture production and has received increasing attention as a potential supplement for wild-caught marine fisheries. Given current nutrition levels, seafood dependence, and economic landscapes, how

and where can we prioritize future mariculture developments to have the greatest benefit for global nutrition? This study addresses this question by analyzing global patterns in seafood reliance, malnutrition levels, and economic opportunity; where they overlap indicates where mariculture has the greatest potential to improve human nutrition. We found that island nations in Southeast Asia and the Caribbean are consistently identified as high-opportunity countries. An in-depth case study analysis corroborates global analysis results and highlights key challenges to ameliorating malnutrition through mariculture development, including policy infrastructure, government stability, and local consumption of farmed fish.

Palacios-Abrantes, J., Herrera-Correal, J., Rodriguez, S., Brunkow, J., & **Molina, R.** Evaluating the Bio-Economic performance of a Callo de hacha (*Atrina Maura*, *Atrina tuberculosa* & *Pinna rugosa*) fishery restoration plan of La Paz Cove, Mexico (Submitted)

Small Scale fisheries are large contributors to regional economies and livelihoods in coastal communities in Latin America. Mexico is one of the main seafood producers of this region. Nevertheless, overfishing and poor management strategies have led to the collapse of many of its fisheries. The callo de hacha scallop fishery of La Paz, Baja California Sur, Mexico, is an example of the overfished fisheries. In 2009, the Mexican government closed the fishery in La Paz Cove, due to unsustainable levels. The present study evaluated the recovery efforts in the Cove, and the dynamics between an NGO and a fishing community working towards the restoration of this pen-shell's fishery. After four years of closure and active monitoring of the recovering process, the callo de hacha population has increased, when compared to the 2011 estimate. For scenarios of uncertainty are presented. For all of them, the fishery if harvested now, would be profitable. Moreover, the involvement of the NGO and the fishing community created social capital, which was essential for the restoration process. Having an actively involved community, helped raise funds for the fishing closure, and helped fishers comply with Mexican legislation, and foster community building and self-organization.

Ongoing Projects:

The provision of a public good through the establishment of property rights in marine environments

Strategic responses and the effectiveness of treaties for international common property resources

The relationship between environmental variability, risk preferences and institutional regimes for the extraction of renewable resources