Daniel F. Otero-Leon

Ph.D. Candidate
@ University of Michigan

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Research Interests

- My research interests are generally in operations research and, more specifically, in the area of stochastic models and stochastic dynamic programming with applications to service systems.
- Currently, I analyze longitudinal electronic medical record data and pharmacy claims data to optimize appointment monitoring policies.
- Interested in modelling social dynamics in complex systems to develop policies for diverse populations.

Methodology

Predictive modeling, data-driven optimization, dynamic programming, bandit models, stochastic optimization.

Applications

Medical decision-making, cardiovascular disease, personalized medicine, revenue management, airline applications.

Education

PhD, Industrial and Operations Engineering — Expected 2023
University of Michigan, Ann Arbor, MI
Advisors: Brian Denton, Ph.D. and Mariel Lavieri, Ph.D.
Dissertation Title: Medical Monitoring Policies in the Context of Primary Prevention for Cardiovascular Disease

M.Sc. Industrial Engineering — 6/2012
Universidad de los Andes, Bogota, Colombia
Thesis Title: An Optimum Pricing Policy for a Multiclass Problem in the Airline Industry

B.Sc. Industrial Engineering — 6/2010
Universidad de los Andes, Bogota, Colombia

Research Experience

University of Michigan, Ann Arbor, MI

GSRA, Department of Industrial and Operations Engineering — 8/2018-Current
Research in data-driven models for improving decision-making in the context of cardiovascular disease, with the help of clinical collaborators at the U.S. Department of Veteran Affairs.

Universidad de los Andes, Bogota, Colombia

Research Assistant, Industrial Engineering Department — 8/2012-6/2018
Research in applying stochastic dynamic programming models for pricing and promotion policies in the airline industry.

Undergraduate Research Assistant, Industrial Engineering Department — 1/2010-6/2010
Research in queueing theory for systems with general arrival and service times.

Teaching Experience

University of Michigan, Ann Arbor, MI

Instructor on Record, Department of Industrial and Operations Engineering 8/2021-12/2021
Lecturer for undergraduate courses in Operations Research.

Courses

- IOE 316: Introduction to Markov Processes, University of Michigan. Fall 2021 (93 Students).

Universidad de los Andes, Bogota, Colombia

Instructor, Industrial Engineering Department 8/2012-12/2021
Lecturer of different undergraduate courses in Operations Research, advisory activities for the undergraduate and masters programs, and supported the IE department in educational activities.

Courses

- IIND 2104: Stochastic Modelling, Universidad de los Andes. 2012-20 to 2021-20 (1055 Students).
- IIND 2109: Decision Analysis Tools, Universidad de los Andes. 2014-20 to 2016-20 (255 Students).
- IIND 3107: Marketing Engineering, Universidad de los Andes. 2017-10 to 2018-10 (51 Students).
- IIND 3113: Discrete Event Simulation, Universidad de los Andes. 2015-20 to 2017-20 (274 Students).

The complete list of courses with teaching evaluations can be found in the appendix.

Publications

Peer Reviewed Journal Articles

1. **D. F. Otero-Leon**, M. S. Lavieri, B. T. Denton, J. Sussman, and R. A. Hayward (2022). Monitoring policy in the context of preventive treatment of cardiovascular disease. *Health Care Management Science* (Accepted).
2. **D. F. Otero**, M. Escallon*, C. Lopez+, and R. Akhavan-Tabatabaei (2019). Optimal timing of airline promotions under dilution. *European Journal of Operational Research* **277**(3), 981–995.
3. **D. F. Otero** and R. Akhavan-Tabatabaei (2015). A stochastic dynamic pricing model for the multiclass problems in the airline industry. *European Journal of Operational Research* **242**(1), 188–200.

Conference Proceedings

1. **D. F. Otero-Leon**, W. Li, M. S. Lavieri, B. T. Denton, J. Sussman, and R. A. Hayward (2021). Using longitudinal health records to simulate the impact of national treatment guidelines for cardiovascular disease. *Winter Simulation Conference*.

Working Papers

1. **D. F. Otero-Leon**, M. S. Lavieri, B. T. Denton, J. Sussman, and R. A. Hayward (2022). Prediction of long-term medication adherence and its potential benefits for intervention. *Medical Decision Making* (Target Journal).
2. **D. F. Otero-Leon**, M. S. Lavieri, B. T. Denton, J. Sussman, and R. A. Hayward (2022). Patient prioritization model with limited resources and stochastic compliance. *Working Paper*.

* Undergraduate advised student
+ Graduate advised student

Presentations

Invited Talks and Seminars

1. **D. F. Otero-Leon** (2022). Dynamic medical decision-making to define monitoring policies for cardiovascular disease prevention. *CHEPS Seminar*, University of Michigan, Ann Arbor, MI.
2. **D. F. Otero-Leon** (2022). Dynamic medical decision-making to define monitoring policies for cardiovascular disease prevention. *Building Future Faculty Program*, North Carolina State University, Raleigh, NC.
3. **D. F. Otero-Leon** (2020). Stochastic Dynamic Programming: Applications in the Airline Industry and Healthcare Sector. *The Group for Applied Mathematical Modeling and Analytics seminar*, University of Buffalo, Buffalo, NY.
4. **D. F. Otero-Leon** (2018). Workshop: Introduction to Revenue Management. *Analytics Forum*, Universidad de los Andes, Bogota, Colombia
5. **D. F. Otero-Leon** (2013). An optimum pricing policy for a multiclass problem in the airline industry. *Mathematics Department Seminar*, Universidad Nacional, Bogota, Colombia

Conference Presentations

1. **D. F. Otero-Leon**, M. S. Lavieri, and B. T. Denton (2022). Prediction of Long-Term Medication Adherence and Its Potential Benefits for Intervention. *INFORMS Annual Meeting*, Indianapolis, IN
2. **D. F. Otero-Leon**, M. S. Lavieri, and B. T. Denton (2021). Patient Prioritization Model With Limited Resources And Stochastic Compliance. *INFORMS Annual Meeting*, Anaheim, CA
3. **D. F. Otero-Leon**, M. S. Lavieri, and B. T. Denton (2021). Using Longitudinal Health Records to Simulate the Impact of National Treatment Guidelines for Cardiovascular Disease. *INFORMS Healthcare*, Virtual
4. **D. F. Otero-Leon**, M. S. Lavieri, and B. T. Denton (2020). Dynamic Updating For Prediction Models For Medication Adherence. *INFORMS Annual Meeting*, Virtual
5. **D. F. Otero-Leon**, M. S. Lavieri, and B. T. Denton (2019). Cholesterol Follow-up Policy in the Context of Preventive Treatment of Cardiovascular Disease. *INFORMS Annual Meeting*, Seattle, WA
6. **D. F. Otero-Leon**, M. S. Lavieri, B. T. Denton, A. Gavica, J. Sussman, and R. A. Hayward (2019). Cholesterol Follow-up Policy in the Context of Preventive Treatment of Cardiovascular Disease. *INFORMS Healthcare*, Boston, MA
7. C. Quiroga, **D. F. Otero-Leon**, and A. Medaglia (2017). A Stochastic Optimization Model for Fleet Assignment under Uncertainty Conditions. *INFORMS Annual Meeting*, Houston,TX
8. **D. F. Otero-Leon**, M. Escallon, C. Lopez, and R. Akhavan-Tabatabaei (2016). A Pricing Model To Optimize The Promotions Period In Airlines. *INFORMS Annual Meeting*, Nashville, TN
9. **D. F. Otero-Leon** and R. Akhavan-Tabatabaei (2013). A Pricing Model To Optimize The Promotions Period In Airlines. *INFORMS Annual Meeting*, Minneapolis, MN
10. **D. F. Otero-Leon** and R. Akhavan-Tabatabaei (2012). An optimum pricing policy for a multiclass problem in the airline industry. *INFORMS Annual Meeting*, Phoenix, AZ
11. **D. F. Otero-Leon** and R. Akhavan-Tabatabaei (2012). An optimum pricing policy for a multiclass problem in the airline industry. *IX Congreso Latinoamericano IIE*, Bogota, Colombia
12. **D. F. Otero-Leon** and R. Akhavan-Tabatabaei (2010). Role of higher moments in the accuracy of G/G/m approximations. *INFORMS Annual Meeting*, Austin, TX
13. **D. F. Otero-Leon** and R. Akhavan-Tabatabaei (2010). Role of Higher Moments of Arrival and Service Time in G/G/m Approximations. *ALIO-INFORMS*, Buenos Aires, Argentina

Poster Presentations

1. **D. F. Otero-Leon**, M. S. Lavieri, and B. T. Denton (2021). Understanding the role of race and gender in the design of cholesterol monitoring guidelines. *Minority Issues Forum - INFORMS Annual Meeting*, Anaheim, CA
2. **D. F. Otero-Leon**, M. S. Lavieri, and B. T. Denton (2020). Effects of follow-up policies on statin adherence. *Michigan Student Symposium for Interdisciplinary Statistical Sciences*, Ann Arbor, MI
3. I. Mura, K. D. Angulo, M. F. Cortes, **D. F. Otero-Leon**, and R. Akhavan-Tabatabaei (2017). Supporting the Definition and Analysis of Cervical Cancer Public Health Policies. *INFORMS Annual Meeting*, Houston, TX

Awards and Honors

Universidad de los Andes Business Ideas Contest - Second Place	2010
Latin-American simulation contest with FLEXSIM - Third Place	2009
Univerisdad de los Andes ICTs Innovation Contest - First Place	2008

Grants and Funding

Building Future Faculty, North Carolina State University, Raleigh, NC 2022
Amount Awarded: Cost of travel to workshop

Rackham Travel Grant 2021
Amount Awarded: $800

Rackham Travel Grant 2019
Amount Awarded: $800

INFORMS Student Leadership Conference 2019
Amount Awarded: $200

Advisory Activities

Masters Research Supervision

Stochastic Dynamic Programming

1. D. López (2017). A stochastic dynamic pricing model for massive consumption products. *Universidad de los Andes*, Bogota, Colombia. Co–Advised with Ivan Mura
2. C. López (2015). Pricing model to optimize the promotions period in airlines. *Universidad de los Andes*, Bogota, Colombia. Co–Advised with Raha Akhavan–Tabatabaei

Stochastic Optimization

1. S. Cardenas (2017). Optimización de políticas de promociones multiproducto con canibalización. *Universidad de los Andes*, Bogota, Colombia. Co–Advised with Andrés Medaglia
2. C. Quiroga (2017). A stochastic optimization model for aircraft scheduling under uncertainty during operational times. *Universidad de los Andes*, Bogota, Colombia. Co–Advised with Andrés Medaglia

Machine Learning

1. D. Alzate and J. Cerero (2017). Análisis del poder predictivo de variables sociodemográficas para clasificar resultados de citología cervicouterina en población colombiana. *Universidad de los Andes*, Bogota, Colombia. Co–Advised with Ivan Mura
2. J. C. Varayoud and J. E. Perez (2017). Modelo de tratamiento persuasivo para el pago de parafiscales en Colombia- UGPP. *Universidad de los Andes*, Bogota, Colombia. Co–Advised with Gonzalo Torres

Undergraduate Research Supervision

Optimization

1. P. Rojas (2018). Programación Óptima de Cartelera que maximice la asistencia de Procinal en el Multiplex Álamos, en Bogotá. *Universidad de los Andes*, Bogota, Colombia
2. D. A. Jimenez (2016). Metodología de implementación revenue management para el sector hotelero. *Universidad de los Andes*, Bogota, Colombia
3. A. Cardona (2015). Política óptima para la oferta de tiquetes en la industria deportiva. *Universidad de los Andes*, Bogota, Colombia
4. A. España (2015). Modeling capacity allocation. A revenue management approach for Innomed S.A. *Universidad de los Andes*, Bogota, Colombia
5. V. Urrea (2015). Asignación de sillas para una empresa de transporte terrestre de pasajeros del eje cafetero. *Universidad de los Andes*, Bogota, Colombia
6. J. E. Valenzuela (2014). Hotel room optimal pricing strategy based on the bid price curve. *Universidad de los Andes*, Bogota, Colombia
7. A. F. Montoya (2013). Optimal customer's class segmentation for the rooms in a hotel. Blue Doors Hotels case study. *Universidad de los Andes*, Bogota, Colombia

Probability and Statistics

1. M. A. Caicedo (2018). Herramienta de apoyo a la decisión para el análisis de las fluctuaciones de la participación de mercado. *Universidad de los Andes*, Bogota, Colombia
2. J. Uribe (2018). Aplicación del modelo de Bass con modificaciones por estacionalidad, efectos de marketing y recompra para pronósticos de ventas de productos nuevos. *Universidad de los Andes*, Bogota, Colombia
3. L. Castiblanco and P. Ruiz (2017). Estimación de las probabilidades de restricción de operación en aeropuertos de Colombia por condiciones meteorológicas. *Universidad de los Andes*, Bogota, Colombia
4. D. Vargas (2017). Aproximación numérica al fenómeno de canibalismo de marca. *Universidad de los Andes*, Bogota, Colombia
5. J. F. Pieschacón (2016). Implementación de revenue management y pronósticos de demanda para productos de consumo masivo. *Universidad de los Andes*, Bogota, Colombia
6. M. Escallon (2015). Input data distribution estimations for a pricing model to optimize the duration of promotion periods for airlines. *Universidad de los Andes*, Bogota, Colombia
7. J. J. Pineda (2015). Cálculo de la tasa óptima de overbooking para hoteles. *Universidad de los Andes*, Bogota, Colombia
8. J. D. Daza (2013). Continental hotel demand recapture estimation. *Universidad de los Andes*, Bogota, Colombia
9. J. F. Imbett (2013). On the price elasticity of demand in hotel revenue management: A case study in the Colombian hotel sector. *Universidad de los Andes*, Bogota, Colombia

Simulation

1. A. F. Otero (2017). Simulación del turnaround para el aeropuerto El Dorado de Bogotá. *Universidad de los Andes*, Bogota, Colombia
2. M. F. Cortés (2017). Modelo epidemiológico para la evaluación de políticas de detección temprana del cáncer de cuello uterino en Colombia. *Universidad de los Andes*, Bogota, Colombia
3. A. Ardila (2017). Ampliación del modelo compartimentado de simulación para la evaluación de políticas de vacunación contra vph en Colombia. *Universidad de los Andes*, Bogota, Colombia
4. C. Avellaneda (2015). Simulación de eventos discretos aplicada a una explotación. Explotación productora de leche Alameda Farm. *Universidad de los Andes*, Bogota, Colombia

Professional Development

Building Future Faculty, North Carolina State University, Raleigh, NC	2022
PhD Colloquium Winter Simulation Conference, Phoenix, AZ	2021
PhD Colloquium INFORMS Annual Meeting, Anaheim, CA	2021
NextProf Engineering, University of Michigan, Ann Arbor, MI	2020
INFORMS Student Leadership Conference, Baltimore, MD	2019

Industry Experience

ImecTech SAS, Bogota, Colombia
Revenue Management Consultant 1/2015-5/2017

Yield Optimization Intelligence, Bogota, Colombia
Entrepreneur 1/2014-12/2014

Avianca, Bogota, Colombia
Market Analysis Specialist 1/2011-6/2012

Service Activities

Journal Refereeing

Operations Research, Industrial Engineering, and Management Science Journals

- Journal of Intelligent Transportation Systems: Technology, Planning, and Operations

Service to the Profession

Institute for Operations Research and the Management Sciences (INFORMS)

Session Chair, *Health Application Society Session,* INFORMS Annual Meeting	2022
Session Chair, *Introductory Tutorial Session,* Winter Simulation Conference	2021
Session Chair, *Health Application Society Session,* INFORMS Annual Meeting	2021
Session Chair, *Health Application Society Session,* INFORMS Annual Meeting	2020
Session Chair, *Aviation Applications Session,* INFORMS Annual Meeting	2017

Service to the University

INFORMS Student Chapter, University of Michigan

President* **	2021
Vice President and Treasurer*	2020
Social Chair*	2019

IISE Student Chapter, Universidad de los Andes

Faculty Co-Advisor	2017-2018

*Received INFORMS Student Chapter Award at *Summa Cum Laude* level

**Received the University of Michigan North Campus Dean's 2021 MLK Spirit Awards

Appendix

Teaching Evaluations

Course	Position	Semester	Instructor Rating	College-wide Average	Response
IOE 316	Instructor	Fall 2021	4.5/5.0	4.6	81/93
IIND 2104	Instructor	2021-20	4.7/5.0	4.6	22/23
IIND 2104	Instructor	2018-10	4.4/5.0	4.3	103/109
IIND 3107	Instructor	2018-10	4.7/5.0	4.3	21/22
IIND 2104	Instructor	2017-20	4.4/5.0	4.3	108/114
IIND 3113	Instructor	2017-20	4.4/5.0	4.3	61/68
IIND 2104	Instructor	2017-10	3.7/4.0*	NA	113/116
IIND 3107	Instructor	2017-10	3.6/4.0*	NA	29/29
IIND 3113	Instructor	2017-10	3.7/4.0*	NA	63/65
IIND 2104	Instructor	2016-20	3.8/4.0	NA	57/59
IIND 2109	Instructor	2016-20	3.6/4.0	NA	49/49
IIND 3113	Instructor	2016-20	3.6/4.0	NA	49/51
IIND 2104	Instructor	2016-10	3.8/4.0	NA	61/63
IIND 2109	Instructor	2016-10	3.7/4.0	NA	37/37
IIND 3113	Instructor	2016-10	3.9/4.0	NA	41/44
IIND 2104	Instructor	2015-20	3.6/4.0	NA	93/97
IIND 3113	Instructor	2015-20	3.8/4.0	NA	43/46
IIND 2109	Instructor	2015-10	3.7/4.0	NA	82/87
IIND 2104	Instructor	2014-20	3.8/4.0	NA	56/58
IIND 2109	Instructor	2014-20	3.7/4.0	NA	81/82
IIND 2104	Instructor	2014-10	3.7/4.0	NA	94/99
IIND 2104	Instructor	2013-20	3.7/4.0	NA	93/115
IIND 2104	Instructor	2013-10	3.6/4.0	NA	76/106
IIND 2104	Instructor	2012-20	3.6/4.0	NA	44/96

*For the second semester of 2017, Universidad de los Andes changed their evaluation system.