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 2022
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

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

Employment

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

Instructor, Industrial Engineering Department — 8/2012-6/2018
Lecturer of different undergraduate courses in Operations Research, advisory activities for the undergraduate and masters programs, and supported the IE department in educational activities.

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.

Publications

Journal Articles

1. **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.
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

Working Papers

1. **D. F. Otero-Leon**, M. S. Lavieri, B. T. Denton, J. Sussman, and R. A. Hayward (2020). Monitoring policy in the context of preventive treatment of cardiovascular disease. *Healthcare Management Science* (Target Journal)
2. **D. F. Otero-Leon**, M. S. Lavieri, B. T. Denton, J. Sussman, and R. A. Hayward (2020). Dynamic Updating For Prediction Models For Medication Adherence. *Medical Decision Making* (Target Journal)

Presentations

Invited Talks and Seminars

1. "Stochastic Dynamic Programming: Applications in the Airline Industry and Healthcare Sector."
   - ➤ The Group for Applied Mathematical Modeling and Analytics seminar, University of Buffalo, March 2020
2. "Workshop: Introduction to Revenue Management"
   - ➤ Analytics Forum, Universidad de los Andes, Bogota, Colombia, March 2018
3. "An optimum pricing policy for a multiclass problem in the airline industry"
   - ➤ Mathematics department seminar, Universidad Nacional, September 2013

Conference Presentations

1. **D. F. Otero-Leon**, M. S. Lavieri, and B. T. Denton (2020). Dynamic Updating For Prediction Models For Medication Adherence. *INFORMS Annual Meeting*, Virtual
2. **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
3. **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
4. 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
5. **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
6. **D. F. Otero-Leon** and R. Akhavan-Tabatabaei (2013). A Pricing Model To Optimize The Promotions Period In Airlines. *INFORMS Annual Meeting*, Minneapolis, MN
7. **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
8. **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
9. **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
10. **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 (2020). Effects of follow-up policies on statin adherence. *Michigan Student Symposium for Interdisciplinary Statistical Sciences*, Ann Arbor, MI
2. 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

Rackham Travel Grant — Fall 2019
Amount Awarded: $800

INFORMS Student Leadership Conference — 2019
Amount Awarded: $200

Teaching Experience

University Teaching

I have teaching experience with the following courses at the University level:

- IIND 2104: Stochastic Modelling, Universidad de los Andes
- IIND 2109: Decision Analysis Tools, Universidad de los Andes
- IIND 3107: Marketing Engineering, Universidad de los Andes
- IIND 3113: Discrete Event Simulation, Universidad de los Andes
- ISIS 1204: Algorithms and Object-Oriented Programming I, Universidad de los Andes

Course	Position	Semester	Instructor Rating	College-wide Average	Response
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	3.65/4.0*	NA	113/116
IIND 3107	Instructor	2017-10	3.58/4.0*	NA	29/29
IIND 3113	Instructor	2017-10	3.66/4.0*	NA	63/65
IIND 2104	Instructor	2016-20	3.77/4.0	NA	57/59
IIND 2109	Instructor	2016-20	3.61/4.0	NA	49/49
IIND 3113	Instructor	2016-20	3.59/4.0	NA	49/51
IIND 2104	Instructor	2016-10	3.77/4.0	NA	61/63
IIND 2109	Instructor	2016-10	3.72/4.0	NA	37/37
IIND 3113	Instructor	2016-10	3.89/4.0	NA	41/44
IIND 2104	Instructor	2015-20	3.58/4.0	NA	93/97
IIND 3113	Instructor	2015-20	3.78/4.0	NA	43/46
IIND 2109	Instructor	2015-10	3.69/4.0	NA	82/87
IIND 2104	Instructor	2014-20	3.82/4.0	NA	56/58
IIND 2109	Instructor	2014-20	3.72/4.0	NA	81/82
IIND 2104	Instructor	2014-10	3.66/4.0	NA	94/99
IIND 2104	Instructor	2013-20	3.74/4.0	NA	93/115
IIND 2104	Instructor	2013-10	3.62/4.0	NA	76/106
IIND 2104	Instructor	2012-20	3.60/4.0	NA	44/96
IIND 2104	TA	2010-20	NA	NA	NA
IIND 2104	UTA	2010-10	NA	NA	NA
IIND 2104	UTA	2009-20	NA	NA	NA
IIND 2104	UTA	2009-10	NA	NA	NA
IIND 2104	Grader	2008-20	NA	NA	NA
ISIS 1204	UTA	2007-20	NA	NA	NA
ISIS 1204	UTA	2007-10	NA	NA	NA
ISIS 1204	UTA	2006-20	NA	NA	NA

TA: Teaching Assitant, UTA: Undergraduate Teaching Assistant
*For the second semester of 2017, Universidad de los Andes changed their evaluation system.

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

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 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