Curriculum Vitae

Tito Homem-de-Mello

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Education

- Ph.D., Industrial and Systems Engineering, Georgia Institute of Technology (1998)
  Thesis topic: "Simulation-Based Methods for Stochastic Optimization"
- M.S. in Mathematics, Georgia Institute of Technology (1995)
- M.S. in Applied Mathematics, University of São Paulo, Brazil (1992)
  Thesis topic: "A Contribution to the Study of Stability in Flexible Manufacturing Systems"
- B.Sc. in Computer Science (with Honorable Mention), University of São Paulo, Brazil (1987)

Research interests

The core of my research focuses on methodology for decision-making problems under uncertainty and applications of those techniques. On the methodology side, I am interested in the development of risk models that can be used within an integrated framework of optimization and simulation. I have also been studying the incorporation of machine learning techniques into the optimization models to develop a data-driven approach to decision making. On the application side I am currently interested in energy planning problems since many of the topics in those areas fall into the realm of decision-making problems under uncertainty, in particular due to the use of renewable energy sources.

Academic work experience

- Professor, School of Business, Adolfo Ibañez University, since 2011.
- Visiting Associate professor, Department of Mechanical and Industrial Engineering, University of Illinois at Chicago, 2009-2011.
- Associate professor, Department of Industrial Engineering and Management Sciences, North-western University, 2003-2009.
- Assistant professor, Department of Industrial and Systems Engineering, The Ohio State University, 1998-2003.
- Graduate research assistant and teaching assistant, School of Industrial and Systems Engineering, Georgia Institute of Technology, 1997-1998.
- Assistant professor, Department of Computer Science, Institute of Mathematics and Statistics, University of São Paulo, Brazil, 1990-1993.

Other work experience

- Analyst for the Department of Operations Research of Aços Villares S/A (Brazilian steel company), 1988-1990.

Honors/Awards

- Best researcher in Management/Economics area at Adolfo Ibañez University, 2023.
- Invited to be keynote speaker at the International Symposium on Mathematical Programming held in Bordeaux, France, in July 2018.
- Invited to be plenary speaker at the 50th Brazilian Symposium on Operations Research, Rio de Janeiro, Brazil, 2018.
- Invited to be plenary speaker at the OPTIMA Conference in Vina del Mar, Chile, 2017.
- Best Applied Paper prize in Operations Engineering and Analysis, awarded by the journal IIE Transactions, 2013.
- Awarded as one of the top 5 researchers in 2012 among the faculty of the Adolfo Ibañez University.
- Best Paper prize, awarded by the INFORMS Revenue Management and Pricing Section, 2007.
- Meritorious Service Award, awarded by the journal Operations Research, 2005.
- Meritorious Service Award, awarded by the journal Operations Research, 2004.
- Winner of the 1998 George Nicholson Student Paper Competition (organized by INFORMS).
- Outstanding Ph.D. student award, Georgia Institute of Technology, 1998.
- Doctoral scholarship from CNPq (Brazilian government science agency), 1993-1998.

Publications

a) Peer-reviewed journal articles/invited papers/book chapter: (NOTE: (*) indicates journals in the Journal Citation Reports list (WoS); (**) indicates journals in the Scopus list.)

1. "Application-Driven Learning via Joint Prediction and Optimization of Demand and Reserves Requirement" (with J. Dias-Garcia, A. Street and F. Muñoz), *Operations Research** (2024) (published online, DOI https://doi.org/10.1287/opre.2023.0565) **Q2**
2. "Solving Constrained Consumption-Investment Problems by Decomposition Algorithms" (with B. Pagnoncelli, G. Lagos, P. Castañeda, and J. Garcia), *European Journal of Operational Research** (2024) (published online) **Q1**
3. "Synthetic simulation of spatially-correlated streamflows: Weighted-modified Fractional Gaussian Noise" (with C. Chadwick, F. Babonneau and A. Letelier), *Water Resources Research** 60 (2), e2023WR035371 (2024) **Q1**
4. "Uncertainty dynamics in energy planning models: An autoregressive and Markov chain modeling approach" (with E. Guevara and F. Babonneau), *Computers & Industrial Engineering** 191: 110084 (2024) **Q1**
5. "Measuring the impact of climate change on heating and cooling demand for the Chilean energy transition" (with C. Zavala and F. Babonneau), *Journal of Cleaner Production**, 428:139390 (2023) **Q1**
6. "The role of hydrogen for deep decarbonization of energy systems: A Chilean case study" (with F. Ferrada, F. Babonneau, and F. Jalil-Vega), *Energy Policy** 177, 113536 (2023) **Q1**

7. “A Simulation Optimization Approach for Appointment Scheduling Problem with Decision-Dependent Uncertainties” (with. Q. Kong and R. Godoy-Barba), *INFORMS Journal on Computing** 34 (5), 2845-2865 (2022) **Q2**
8. “Effective Scenarios in Multistage Distributionally Robust Optimization with a Focus on Total Variation Distance (with H. Rahimian and G. Bayraksan), *SIAM Journal on Optimization** 32 (3), 1698–1727 (2022) **Q1**
9. “Energy planning policies for residential and commercial sectors under ambitious global and local emissions objectives: A Chilean case study” (with F. Ferrada, F. Babonneau, and F. Jalil-Vega), *Journal of Cleaner Production** 350, 131299 (2022) **Q1**
10. “A Framework for Adaptive Open-Pit Mining Planning under Geological Uncertainty” (with T. Lagos, M. Armstrong, G. Lagos and D. Saure), *Optimization and Engineering** 23, 111–146 (2022) **Q2**
11. “A Robust Short-Term Oil Production under a Bow-Tie Uncertainty Set for the Gas Lift Performance Curve” (with A. Ramos, C. Gamboa, D. Valladão, B. K. Pagnoncelli, B. Vieira, T. Gutierrez and A. Teixeira), *SPE Journal** 27 (01), 519–531 (2022) **Q1**
12. “A Data-Driven Approach for a Class of Stochastic Dynamic Optimization Problems” (with T. Silva and D. Valladão), *Computational Optimization and Applications** 80, 687–729 (2021) **Q1**
13. “Decomposition methods for Wasserstein-based data-driven distributionally robust problems” (with C. Gamboa, D. Valladão, and A. Street), *Operations Research Letters** 49 (5), 696–702 (2021) **Q4**
14. “Adaptive Open-pit Mining Planning under Geological Uncertainty” (with M. Armstrong, T. Lagos, X. Emery, G. Lagos and D. Saure), *Resources Policy** 72, 102086 (2021) **Q1**
15. “A Machine Learning and Distributionally Robust Optimization Framework for Strategic Energy Planning under Uncertainty” (with E. Guevara, F. Babonneau and S. Moret), *Applied Energy** 271, 115005 (2020) **Q1**
16. “A Stochastic Optimization Model for Short-Term Production of Offshore Oil Platforms with Satellite Wells Using Gas Lift” (with C. Gamboa, T. Silva, D. Valladão, B. Pagnoncelli, B. Vieira and A. Teixeira), *TOP** 28:549–574 (2020) **Q4**
17. “A Proximal ADMM Algorithm for Two-Stage Stochastic Programming Problems” (with S. Arpon and B. Pagnoncelli), *Annals of Operations Research** 286:559–582 (2020) **Q2**
18. “Controlling Risk and Demand Ambiguity in Newsvendor Models” (with H. Rahimian and G. Bayraksan), *European Journal of Operational Research** 279:854–868 (2019) **Q1**
19. “Designing Coalition-Based Fair and Stable Pricing Mechanisms Under Private Information on Consumers? Reservation Prices” (with H. Le Cadre, B. Pagnoncelli, and O. Beaude), *European Journal of Operational Research** 272:270–291 (2019) **Q1**
20. “Identifying Effective Scenarios in Distributionally Robust Stochastic Programs with Varia- tion Distance” (with H. Rahimian and G. Bayraksan), *Mathematical Programming** , Ser. A 173:393–430 (2019) **Q1**
21. “Scenario Reduction for Stochastic Programs with Conditional Value-at-Risk” (with S. Arpon and B. Pagnoncelli), *Mathematical Programming** 170:327–356 (2018) **Q1**
22. “An Optimal Path Model for the Risk-Averse Traveler” (with L. Zhang), *Transportation Science** 51(2):518–535 (2017) **Q1**
23. “Risk-Aversion in Multistage Stochastic Programming: A Modeling and Algorithmic Perspective” (with B. Pagnoncelli), *European Journal of Operational Research** 249, 188–199 (2016). **Q1**
24. “Learning and Pricing with Models that Do Not Explicitly Incorporate Competition” (with W.L. Cooper and A. Kleywegt), *Operations Research** 63(1), 86–103 (2016). **Q2 (Financial Times list)**

25. “Chance-Constrained Problems and Rare Events: An Importance Sampling Approach” (with J. Barrera, E. Moreno, B. Pagnoncelli and G. Canessa), *Mathematical Programming*[*], Volume 157 (1), 153–189 (2016). **Q1**
26. “Finding Efficient and Environmentally Friendly Paths for Risk-Averse Freight Carriers” (with Q. Li, Y. Nie, S. Vallamsundar and J. Lin), *Networks and Spatial Economics*[*], Volume 16 (1), 255–275 (2016). **Q1**
27. “Stochastic Constraints and Variance Reduction Techniques” (with G. Bayraksan), in Handbook of Simulation Optimization, Michael Fu (ed.), Springer, 2015.
28. “Monte Carlo Sampling-Based Methods for Stochastic Optimization” (with G. Bayraksan), *Surveys in Operations Research and Management Science*[**], Vol. 19, 56–85 (2014).
29. “Stochastically Weighted Stochastic Dominance Concepts with an Applications in Capital Budgeting ” (with J. Hu and S. Mehrotra), *European Journal of Operational Research*[*], Vol. 232, 572–583 (2014). **Q1**
30. “Optimal Path Problems with Second-Order Stochastic Dominance Constraints” (with Y. Nie and X. Wu), *Networks and Spatial Economics*[*], Vol. 12, 561–587 (2012).
31. “Dynamic Fleet Scheduling with Uncertain Demand and Customer Flexibility” (with J. Turner, S. Lee, M. Daskin and K. Smilowitz), *Computational Management Science*[**], Vol. 9, 459–481 (2012).
32. “Newsvendor-Type Models with Decision-Dependent Uncertainty” (with S. Lee and A. Kleywegt), *Mathematical Methods of Operations Research*[*], Vol. 76, 186–212 (2012).
33. “Improving Fleet Utilization for Carriers by Interval Scheduling” (with S. Lee, J. Turner, M. Daskin and K. Smilowitz), European Journal of Operational Research[*], Vol. 218, 261–269 (2012).
34. “Some Large Deviations Results for Latin Hypercube Sampling” (with S. Drew), *Methodology and Computing in Applied Probability*[*], Vol. 14, 203–232 (2012).
35. “Sample Average Approximation for Stochastic Dominance Constrained Programs” (with J. Hu and S. Mehrotra), *Mathematical Programming*[*] Ser. A 133:171-201 (2012).
36. “Risk Adjusted Budget Allocation Models with Application in Homeland Security” (with J. Hu and S. Mehrotra), *IIE Transactions*[*], 43:819839 (2011).
37. “Sampling Strategies and Stopping Criteria for Stochastic Dual Dynamic Programming: A Case Study in Long-Term Hydrothermal Scheduling” (with V.L. de Matos and E.C. Finardi), *Energy Systems*, Vol. 2, 1-31 (2011).
38. “Supply Chain Broker Operations: A Network Perspective” (with M. Huang, K. Smilowitz and W. Driegert), *Transportation Research Record*[*], Issue 2224, 1–7 (2011).
39. “Mathematical Programming Models for Revenue Management under Customer Choice” (with L. Chen), *European Journal of Operational Research*[*], Vol. 203, 294-305 (2010).
40. “Re-Solving Stochastic Programming Models for Airline Revenue Management” (with L. Chen), *Annals of Operations Research*[*], Vol. 177, No. 1, 91-114 (2010).
41. “A Cutting Surface Method for Uncertain Linear Programs with Polyhedral Stochastic Dominance Constraints” (with S. Mehrotra), *SIAM Journal on Optimization*[*], Vol. 20, No. 3, 1250-1273 (2009).
42. “On Rates of Convergence for Stochastic Optimization Problems Under Non-I.I.D. Sampling”, *SIAM Journal on Optimization*[*], Vol. 19, No. 2, 524-551 (2008).
43. “Some Decomposition Methods for Revenue Management” (with W.L. Cooper), *Transportation Science*[*], Vol. 41, No. 3, 332-353 (2007).
44. “A Study on the Cross-Entropy Method for Rare Event Probability Estimation”, *INFORMS Journal on Computing*[*], Vol. 19, No. 3, 381-394 (2007).

45. "Models of the Spiral-Down Effect in Revenue Management" (with W.L. Cooper and A. Kleywegt), *Operations Research**, Vol. 54, No. 5, 968-987 (2006).
46. "Modeling Revenue Yield of Reservation Systems That Use Nested Capacity Protection Strategies" (with L. Haerian and C. Mount-Campbell), *International Journal of Production Economics** 104, 340-353 (2006).
47. "Quasi-Monte Carlo Strategies For Stochastic Optimization" (with S. Drew), Proceedings of the 2006 Winter Simulation Conference, L.F. Perrone, F.P. Wieland, J. Liu, B.G. Lawson, D.M. Nicol and R.M. Fujimoto (eds.), 774-782, IEEE Press (2006).
48. "Solving the Vehicle Routing Problem with Stochastic Demands using the Cross Entropy Method" (with K. Chepuri), *Annals of Operations Research** 134, 153-181 (2005).
49. "Some Large Deviations Results for Latin Hypercube Sampling" (with S. Drew), Proceedings of the 2005 Winter Simulation Conference, M.E. Kuhl, N.M. Steiger, F.B. Armstrong, and J.A. Joines (eds.), 673-681, IEEE Press (2005).
50. "Variable-Sample Methods for Stochastic Optimization", *ACM Transactions on Modeling and Computer Simulation**, Vol. 13, No. 2, 108-133 (2003).
51. "Conditioning of Convex Piecewise Linear Stochastic Programs" (with A. Shapiro and J. Kim), *Mathematical Programming**, Vol. 94, No. 1, 1-19 (2002).
52. "Rare Event Probability Estimation Using Cross-Entropy" (with R.Y. Rubinstein), Proceedings of the 2002 Winter Simulation Conference, E. Yu¨cesan, C.-H. Chen, J. L. Snowdon, and J. M. Charnes (eds.), 310-319, IEEE Press (2002).
53. "The Sample Average Approximation Method for Stochastic Discrete Optimization" (with A. Kleywegt and A. Shapiro), *SIAM Journal on Optimization**, Vol. 12, No. 2, 479-502 (2002).
54. "Estimation of Derivatives of Nonsmooth Performance Measures in Regenerative Systems", *Mathematics of Operations Research**, Vol. 26, No. 4, 741-768 (2001).
55. "On the Rate of Convergence of Monte Carlo Approximations of Stochastic Programs" (with A. Shapiro), *SIAM Journal on Optimization**, Vol. 11, No. 1, 70-86 (2000).
56. "Monte Carlo Methods for Discrete Stochastic Optimization", book chapter in Stochastic Optimization: Algorithms and Applications (S. Uryasev and P.M. Pardalos, eds.), 95-117, Kluwer Academic Publishers (2000).
57. "Finding Optimal Material Release Times Using Simulation Based Optimization" (with A. Shapiro and M. Spearman), *Management Science** Vol. 45, No. 1, 86-102 (1999).
58. "A Simulation-Based Approach to Stochastic Programming with Recourse"(with A. Shapiro), *Mathematical Programming**, Vol. 81, No. 3, 301-325 (1998).
59. "Instability of Manufacturing Systems with Decreasing Service Times" (with C. Humes Jr.), *Pesquisa Operacional* (ed. by Operations Research Brazilian Society), Vol. 11, No. 2, 17-27 (1991).

b) Submitted publications under review:

1. "Forecasting Outside the Box: Application-Driven Optimal Pointwise Forecasts for Stochastic Optimization" (with J. Valencia, F. Lagos and G. Lagos)
2. "Integrated Long-Term Energy Planning with Vehicle-to-Grid for Decarbonization of the Chilean Energy System" (with F. Ferrada, F. Babonneau, and F. Jalil-Vega)

Research Grants (as Principal Investigator)

- Project: “Integrating predictive and prescriptive analytics for stochastic optimization”
  Role: Principal Investigator
  Funding source: FONDECYT-Chile
  Date: March, 2022 until February 2026.

- Project: “Adapting to the uncertainties and risks of climate change: Advanced methods and models for energy systems and markets”
  Role: Director and Principal Investigator
  Funding source: Programa de Investigación Asociativa (PIA), ANID, Chile
  Date: January, 2020, through June, 2023.

- Project: “GEMA: Improving energy management in micro grids with storage via stochastic optimization and machine learning”
  Role: Vice-Director and Principal Investigator
  Project Director: Rodrigo Carrasco (UAI)
  Funding source: FONDEF- Chile
  Date: January, 2020, through December, 2021.

- Project: “Distributionally Robust Models for Multi-Stage Stochastic Optimization Problems”
  Funding source: FONDECYT-Chile
  Role: Principal Investigator
  Date: March, 2017 until February 2022.

- Project: “Stochastic optimization models for oil production”
  Role: Principal Investigator
  Funding source: Petrobras, Brazil
  Date: August, 2018, until February, 2021.

- Project: “Large-scale optimization under uncertainty: challenges in strategic mine planning, an interdisciplinary approach”
  Role: Principal Investigator
  Project Director: Marcos Goycoolea (UAI)
  Funding source: Programa de Investigación Asociativa (PIA), Conicyt, Chile
  Date: January, 2016, through December, 2018.

- Project: “Models and Strategies for Multi-Stage Stochastic Programs with Risk Control”
  Role: Principal Investigator
  Co-PI: Bernardo Pagnoncelli (UAI)
  Funding source: FONDECYT-Chile
  Date: March, 2012 until February 2016.

- Project: “Freight Routing for Efficient, Sustainable and Reliable Travel”
  Role: Principal Investigator
  Funding source: The University of Wisconsin-Madison
  Date: September, 2010 through August, 2012.

- Project: “Optimization Algorithms for Problems with Stochastic Dominance Constraints”
  Co-PI: Sanjay Mehrotra (Northwestern)
  Role: Principal Investigator
  Funding source: National Science Foundation
  Date: September, 2007, through August, 2010.

- Project: “Model Accuracy and Learning in Revenue Management and Dynamic Pricing”
  Role: Principal Investigator
  Co-PIs: William Cooper (University of Minnesota) and Anton Kleywegt (Georgia Tech)
  Funding source: National Science Foundation
  Date: June, 2007, through June, 2010.

- Project: “Improved Operations at Coyote Logistics: Solving the Network”
  Role: Principal Investigator
  Co-PI: Karen Smilowitz (Northwestern)
  Funding source: Coyote Logistics, LLC
  Date: March, 2008, through February, 2009.

- Project: “Yield Management Opportunities at Carry Transit”
  Role: Principal Investigator
  Co-PIs: Mark Daskin and Karen Smilowitz (Northwestern)
  Funding source: Superior Bulk Logistics, Inc.
  Date: January, 2007, through December, 2008.

- Project: “Yield Management Opportunities at Carry Transit”
  Role: Principal Investigator
  Co-PIs: Mark Daskin and Karen Smilowitz (Northwestern)
  Funding source: Seed Grant award, provided by the Transportation Center at Northwestern
  Date: June, 2007, through September, 2007.

- Project: “Stochastic Optimization for Revenue Management” Co-PI: William Cooper (University of Minnesota)
  Role: Principal Investigator
  Funding source: National Science Foundation
  Date: October, 2001, through September, 2005.

- Project: “Periodic Transportation Scheduling under Uncertainty”
  Role: Principal Investigator
  Funding source: Seed Grant award, provided by The Ohio State University
  Date: January, 1999, through December, 1999.

Research Grants (as Associate Investigator)

- Project: “Mathematical Modeling for Industrial and Management Science Applications” Funding source: Anillo proyect, Conicyt, Chile
  Date: August, 2011, through December, 2012.

- Project: “Centralized versus Decentralized Energy Management in a Stochastic Setting” Funding source: Electricit de France
  Date: June, 2014, through May, 2015.

Recent Teaching

Courses taught at Adolfo Ibañez University :

- Simulation (Masters/PhD course), taught once a year since 2020
- Quantitative Analysis, taught twice a year since 2012 (Executive MBA course).
- Business Analytics, taught once a year 2014-2018 (Executive MBA course in Peru).
- Foundations of Operations Management, 2nd semester 2011, 1st semester 2012, 2nd semester 2012, 2nd semester 2013 (core undergraduate course).
- Stochastic Optimization, 2016 (PhD course)
- Operations Laboratory, 1st quarter 2014 (core graduate course).

PhD Students

1. César Cerda (Universidad Adolfo Ibañez), expected graduation in 2027.
2. Esnil Guevara (Universidad Adolfo Ibañez), graduated in 2022. Co-advised with Frederic Babonneau (KEDGE School of Business, France).
3. Sebastian Arpón (Universidad Adolfo Ibañez), graduated in 2018. Co-advised with Bernardo Pagnoncelli (Universidad Adolfo Ibañez).
4. Jian Hu (Northwestern University), graduated in 2011. Co-advised with Sanjay Mehrotra (Northwestern.
5. Shane Drew (Northwestern University), graduated in 2007.
6. Lijian Chen (Ohio State University), graduated in 2006

Masters Students with Thesis

1. Pablo Flores (Universidad Adolfo Ibañez), graduated in 2024. Co-advised with Frederic Babonneau (KEDGE School of Business, France).
2. Nicolás Allendes (Universidad Adolfo Ibañez), graduated in 2023. Co-advised with Francisca Jalil-Vega (University College London, UK,).
3. Constanza Zavala (Universidad Adolfo Ibañez), graduated in 2023. Co-advised with Frederic Babonneau (KEDGE School of Business, France).
4. Arturo Fuentes (Universidad Adolfo Ibañez), graduated in 2022. Co-advised with Frederic Babonneau (KEDGE School of Business, France).
5. Agustin Letelier (Universidad Adolfo Ibañez), graduated in 2021. Co-advised with Frederic Babonneau (KEDGE School of Business, France).
6. Francisco Ferrada (Universidad Adolfo Ibañez), graduated in 2021. Co-advised with Frederic Babonneau (KEDGE School of Business, France) and Francisca Jalil-Vega (University College London).
7. Javier Garcia (Universidad Adolfo Ibañez), graduated in 2016. Co-advised with Bernardo Pagnoncelli and Pablo Castañeda (Universidad Adolfo Ibañez).

8. Rodrigo Godoy Barba (Universidad Adolfo Ibañez), graduated in 2016. Co-advised with Qingxia Kong (Universidad Adolfo Ibañez).
9. Alexander Nikolaev (Ohio State), graduated in 2003.
10. Krishna Chepuri (Ohio State), graduated in 2003.

Professional activities

Service to Adolfo Ibañez University:

- Co-Director of the Ph.D. Program in Industrial Engineering and Operations Research (since 2015)
- Member of Program Committee of the Masters in Industrial Engineering and Operations Research (since 2018)
- Member of the Promotion Committee of the School of Business (since 2016)
- Member of Research Committee of the School of Business (since 2013)
- Member of Program Committee of the Masters in Business Analytics (2020-2022)
- Member of the Promotion Committee of the University (2016-2018)

Editorial appointments:

- Editorial Board of Computational Optimization and Applications (since 2006).
- Guest Editor for special issue of Mathematical Programming (2017).
- Associate Editor, ACM Transactions on Modeling and Computer Simulation (2004-2015).
- Associate Editor, Operations Research (2006-2011).