JORGE A. ACUÑA

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RESEARCH INTEREST

Apply Operations Research and Analytics to Increase Efficiency and Equity in Health Systems: Defining, formulating, and solving models representing human-system interactions in health systems through Game Theory, Multi-Objective Optimization, Stochastic Programming, and Data Science methods. I am currently working to establish a Health Systems Engineering Research Lab at UAI that promotes end-to-end science, from idea conception to implementation.

EDUCATION

Universidad Adolfo Ibáñez, Santiago, Chile. *August 2023 - July 2024*
Diploma in Higher Education.

University of South Florida, Tampa, FL, USA. *August 2016 - July 2021*
Ph.D., Industrial Engineering. Advisor: Dr. Jose L. Zayas-Castro. GPA: 3.84
Department of Industrial and Management Systems Engineering.

University of South Florida, Tampa, FL, USA. *August 2016 - May 2018*
M.Sc., Industrial Engineering. Advisor: Dr. Jose L. Zayas-Castro. GPA: 3.73
Department of Industrial and Management Systems Engineering.

Alpen-Adria-Universitat, Klagenfurt, Austria *August 2013 - March 2014*
Engineering in Applied Informatics (Scholarship to study abroad). Total Credits: 28

Universidad de La Frontera, Temuco, Chile *March 2010 - August 2015*
B.S. & Professional Degree, Civil Industrial Engineering with a Minor in Mechanics. Grade: 6.4 out of 7.0

ACADEMIC APPOINTMENTS

- **Faculty of Engineering and Sciences, Universidad Adolfo Ibáñez** Viña del Mar, Chile
  Assistant Professor in Operations Research - HSE Lab Director *August 2023 - Present*
- **College of Engineering, IMSE, University of South Florida** Tampa, FL
  Assistant Professor of Courtesy *December 2023 - Present*
- **College of Engineering, IMSE, University of South Florida** Tampa, FL
  Postdoctoral Scholar *August 2021 - August 2023*
- **College of Engineering, IMSE, University of South Florida** Tampa, FL
  Adjunct Faculty *May 2022 - August 2023*
- **College of Engineering, IMSE, University of South Florida** Tampa, FL
  Instructor *May 2021 - August 2021*
- **College of Engineering, IMSE, University of South Florida** Tampa, FL
  Research Assistant *August 2016 - July 2021*

PUBLICATIONS

- **Jorge A. Acuna**, Daniela Cantarino, Rodrigo Martinez, Jose L. Zayas-Castro (**2024**). A Two-Stage Stochastic Game Model for Elective Surgical Capacity Planning and Investment. Socio-Economic Planning Sciences. https://doi.org/10.1016/j.seps.2023.101786
- Mariana Arriz-Jorquiera, **Jorge A. Acuna**, Marian Rodriguez-Carbo, Jose L. Zayas-Castro (**2024**). Hospital Food Management: A Multi-objective Approach to Reduce Waste and Costs. Waste Management. https://doi.org/10.1016/j.wasman.2023.12.010
- Nancy Diaz-Elsayed, **Jorge A. Acuna**, Wainella Isaacs, Bernard Batson, Tramaine Polk, Jose L. Zayas-Castro (**2023**). Building Inclusive Excellence in STEM: A 15-year Analysis and Lessons Learned of the Alfred P. Sloan Foundation Minority Ph.D. Program at the University of South Florida. Frontiers in Education. https://doi.org/10.3389/feduc.2023.1192853
- **Jorge A. Acuna**, Felipe A. Feijoo, Jose L. Zayas-Castro (**2022**). A Bilevel-Nash-in-Nash Model for Hospital Mergers: A Key to Affordable Care. Socio-Economic Planning Sciences. https://doi.org/10.1016/j.seps.2022.101334
- **Jorge A. Acuna**, Jose L. Zayas-Castro, Felipe A. Feijoo, Sriram Sankaranarayanan, Rodrigo Martinez, Diego A. Martinez (**2022**). The Waiting Game: How Cooperation between Public and Private Hospitals Can Help Reduce Waiting Lists. Health Care Management Science. https://doi.org/10.1007/s10729-021-09577-x
- **Jorge A. Acuna**, Jose L. Zayas-Castro, Hadi Charkhgard (**2020**). Ambulance Allocation Optimization Model for the Overcrowding Problem in US Emergency Departments: A Case Study in Florida. Socio-Economic Planning Sciences. https://doi.org/10.1016/j.seps.2019.100747

Under Review

- Daniela Cantarino, **Jorge A. Acuna**, Mckenzi Heide, Monica Stevens, Jose L. Zayas-Castro. A Multi-Objective Chance-Constrained Allocation Model for the Kidney Shortage in the US. Computers & Industrial Engineering (*first revision*).
- Maryam Jafaripakzad, **Jorge A. Acuna**, Jose L. Zayas-Castro. A Prediction Framework for ICU Admission and Hospital Length of Stay (LOS) using Learning Algorithms. Computer Methods and Programs in Biomedicine (*first revision*).
- Kevin Palomino, **Jorge A. Acuna**, Carmen Berdugo, Jose L. Zayas-Castro. A Bi-objective Location-Allocation Model of Interventions in High Drug Consumption Areas Incorporating X Topic Modeling. Health Care Management Science (*first revision*).

In Preparation

- **Jorge A. Acuna**, Daniela Cantarino, Michael Lozano Jr., Jose L. Zayas-Castro. A Multi-Stage Stochastic Progressive Hedging Approach for Ambulance Allocation to on and off Campus Emergency Departments. (Working title). Target Journal: Omega. (*to be submitted on December 2024*)
- Mariana Arriz-Jorquiera, **Jorge A. Acuna**, Jose L. Zayas-Castro. A Stochastic Approach for Minimizing Food Waste and Cost in Hospitals. (Working title). Target Journal: Waste Management. (*to be submitted on November 2024*)
- Daniela Cantarino, **Jorge A. Acuna**, Jose L. Zayas-Castro. A Two-Stage Stochastic Deceased-Donor Organ Allocation Model for Kidney Transplants. (Working title). Target Journal: Omega. (*to be submitted on December 2024*)
- Kevin Palomino, **Jorge A. Acuna**, Maryam Jafaripakzad, Carmen Berdugo, Jose L. Zayas-Castro. Identifying Patterns of Psychoactive Substances Consumption for High Dimensional Datasets through Deep

Learning Algorithms: A Comparison of Clustering Methods based on Experiment Designs (Working title). Target Journal: BMC Bioinformatics.

- **Jorge A. Acuna**, Hung Nguyen, Jose L. Zayas-Castro. Design and Optimization of Admission Policies with Dynamic Capacity to Avoid Hospital Congestion (Working title). Target Journal: European Journal of Operational Research.
- Maryam Jafaripakzad, **Jorge A. Acuna**, Ankit Shah, Joel Fernandez, Jose L. Zayas-Castro. A Two-Step Framework to Improve Monitoring Process of Heart Failure Patients Using Artificial Intelligence Algorithms. (Working title). Target Journal: Artificial Intelligence in Medicine.

Conference Proceedings and Presentations

- **Jorge A. Acuna**. "A Multi-Stage Stochastic Programming Model for Ambulance Allocation to Emergency Departments." In IFORS conference, Santiago, Chile, 2023.
- Daniela Cantarino, **Jorge A. Acuna**, Jose L. Zayas-Castro. "A Two-Stage Stochastic Deceased-Donor Organ Allocation Model for Kidney Transplants." In INFORMS Annual Meeting, Phoenix, AZ, 2023.
- Mariana Arriz-Jorquiera, **Jorge A. Acuna**, Jose L. Zayas-Castro. "A Stochastic Approach for Minimizing Food Waste and Cost in Hospitals." In INFORMS Annual Meeting, Phoenix, AZ, 2023.
- Maryam Jafaripakzad, **Jorge A. Acuna**, Jose L. Zayas-Castro. "Admission Classification and Length of Stay Forecasting: Methodological Exploration and Feature Engineering in Healthcare Analytics." In INFORMS Annual Meeting, Phoenix, AZ, 2023.
- Mariana Arriz-Jorquiera, **Jorge A. Acuna**, Jose L. Zayas-Castro. "Hospital Food Waste and Nutritional Intake: A Bi-objective Model to Minimize Waste and Cost." In IFORS conference, Santiago, Chile, 2023.
- **Jorge A. Acuna**. "A Multi-stage Stochastic Game Investment Model for the Waiting List Crisis in Health Systems: A Chilean Case Study." In INFORMS Annual Meeting, Indianapolis, IN, 2022.
- Daniela Cantarino, **Jorge A. Acuna**, Jose L. Zayas-Castro. "A Stochastic Model for the Organ Shortage Crisis in Kidney Patients: a National Framework." In INFORMS Annual Meeting, Indianapolis, IN, 2022.
- **Jorge A. Acuna**. "EHR-Based Data Registries: From Data to Public Health Action." In Johns Hopkins School of Medicine, Virtual, 2022.
- **Jorge A. Acuna**. "Analysis and Modeling of Strategic Interactions in Health Systems to Improve Patient Care Access." In Pontificia Universidad Católica de Valparaíso, Chile, 2021.
- **Jorge A. Acuna**. "Prediction Of Inpatient Disaggregate Length Of Stay For Heterogeneous Demand Using Machine Learning Algorithms And Survival Analysis." In INFORMS Annual Meeting, Anaheim, CA, 2021.
- **Jorge A. Acuna**. "Mergers and Competition in Healthcare Markets: A Key to Affordable Care." In INFORMS Healthcare, Virtual, 2021.
- **Jorge A. Acuna**. "The Health Systems Waiting Problem – Strategic Modeling To Improve Patient Access." Universidad Autónoma del Caribe, Barranquilla, Colombia, 2021.
- **Jorge A. Acuna**, Jose L. Zayas-Castro. "A Strategic Gaming Model for Health Price Negotiations Markets: Policies to Encourage Competition." In INFORMS Annual Meeting, Virtual, 2020.
- **Jorge A. Acuna**, Jose L. Zayas-Castro, Felipe A. Feijoo, Sriram Sankaranarayanan, Diego A. Martinez. "The Waiting Game - How Public And Private Hospitals Should Work Together To Reduce Waiting Lists." In INFORMS Annual Meeting, Seattle, WA, 2019.
- **Jorge A. Acuna**, Hung Nguyen, Jose L. Zayas-Castro. "Optimization of Admission Policies with Dynamic Capacity in Inpatient Ward Units." In INFORMS Annual Meeting, Seattle, WA, 2019.

- **Jorge A. Acuna**, Jose L. Zayas-Castro, Felipe A. Feijoo, Sriram Sankaranarayanan, Diego A. Martinez. "The Public Healthcare, the Private Healthcare, and the Waiting Game: Evidence from Strategic Gaming Models of Two-tier Health Systems." In INFORMS Healthcare at MIT, Cambridge, MA, 2019.
- **Jorge A. Acuna**, Jose L. Zayas-Castro. "A Strategic Modeling for the Allocation of Ambulance Request to Emergency Departments in the United States System." In INFORMS Annual Meeting, Phoenix, AZ, 2018.
- **Jorge A. Acuna**, Martha Ramirez Valdivia. "Study of the relationship between Quality Management and Data Envelopment Analysis." In XI Chilean conference of operational research OPTIMA, Antofagasta, Chile, 2015.

GRANTS AND FUNDING

- **Faculty of Engineering and Sciences UAI** *October 2024*
  Ambassadors Program **$1.000 USD**.
- **Faculty of Engineering and Sciences UAI** *June 2024*
  Principal Investigator: Thesis Support Program for Technology Maturation **$2.500 USD**
- **Faculty of Engineering and Sciences UAI** *August 2023*
  Principal Investigator: Start Up Package **$4.5M CLP - $5.000 USD**
- **College of Engineering USF** *Fall 2021 - Spring 2023*
  Principal Investigator: PostDoctoral Fellowship IMSE Department **$140,000 USD**
- **Office of Graduate Studies USF** *Summer 2021*
  Principal Investigator: "Analysis and Modeling of Strategic Interactions in Health Systems to Improve Patient Care Access" **$8,000 USD + Tuition + Fees + Health Insurance**
- **Alfred P. Sloan Foundation** *Summer 2020 - Summer 2023*
  Research Assistant: "University Center of Exemplary Mentoring (UCEM)" **$630,000 USD**
- **Hillsborough County Tax Collector's Office** *Spring 2018 - Spring 2019*
  Research Assistant: "Office Process Improvement" **$25,772 USD**
- **Alfred P. Sloan Foundation** *Summer 2017 - Summer 2020*
  Research Assistant: "University Center of Exemplary Mentoring (UCEM)" **$630,000 USD**

RESEARCH EXPERIENCE

University of South Florida (USF), Tampa, FL, USA. *Fall 2021 - Present*
Postdoctoral Scholar - College of Engineering.

- Generate decision-making systems based on optimization techniques and neural networks to establish the first comprehensive cancer center at Tampa General Hospital.
- Mentor three doctoral students in industrial engineering, work in peer-reviewed publications, submit proposals to national agencies, and lead multidisciplinary teams in different research projects.

University Center of Exemplary Mentoring, Tampa, FL, USA. *Summer 2017 - Summer 2021*
Research Assistant - USF collaboration Alfred P. Sloan Foundation.

- Assist in writing grant proposals and reports on projects that support increased participation of under-represented students in STEM.
- Coordinate recruitment, retention, and professional development activities for students (graduate and undergraduate) and faculty.

Hillsborough County Tax Collector, Brandon, FL, USA. *Spring 2018 - Spring 2019*
Research Assistant - USF.

- Forecast services demand per hour, day, and month using ARIMA and machine learning algorithms.
- Implement agent based simulation using ARENA to optimize scheduling and staffing.

University of South Florida (USF), Tampa, FL, USA. *Spring 2017*
Research Assistant - College of Engineering.

- Design the methodology and define the steps to build the best distance education source for producing highly effective college of engineering graduates.

Universidad de La Frontera, Temuco, Araucania, Chile *Spring - Summer 2013*
Undergraduate Research Assistant - Department of Mechanical Engineering.

- Optimize the combustion chamber's design of boilers to reduce pollution in the Araucania region.

TEACHING EXPERIENCE

Universidad Adolfo Ibáñez Viña del Mar, Chile

Assistant Professor	- Optimizacion (First Semester 2024 - Present).
	- Process and Service Design (First Semester 2024).
	- Capstone Project (Second Semester 2023).

University of South Florida Tampa, FL, USA

Adjunct Faculty	- Probability & Statistics for Engineers (Summer 2022 & 2023).
	- Healthcare Systems Management and Modeling (IS) (Spring 2022).
	- Linear Programming and Optimization in Healthcare (Fall 2021 - Present).
Instructor	- Introduction to Linear Systems (Summer 2020).
Teaching Assistant	- Senior Design Project II (Spring 2017).

Universidad de La Frontera Temuco, Chile

Online Visiting Professor	- Data Analytics - Graduate level (Fall 2021).
Teaching Assistant	- Department of Mechanical Engineering (Fall 2012 - Summer 2013).

PROFESSIONAL EXPERIENCE

University of South Florida (USF), Tampa, FL, USA. *Fall 2016 - Spring 2021*
Research Assistant - College of Engineering.

Universidad de La Frontera, Temuco, Chile. *August 2015 - August 2016*
Project Engineer - Vice-Rector's Office of Research and Graduate Studies.

Universidad de La Frontera, Temuco, Chile *March 2015 - August 2015*
Project Engineer - National and International Mobility Office.

Intergas, Los Angeles, Chile *January 2015 - March 2015*
Project Engineer Intern - Natural gas company.

AWARDS AND HONORS

2021 - College of Engineering, USF, PostDoctoral Fellowship.
2021 - University of South Florida, Dissertation Completion Fellowship.
2019 - Finalist, poster competition, INFORMS annual meeting 2019 (Seattle).
2015 - Universidad de La Frontera Award, the student with the best grades and performance within academia.

2014 - First Place, Class Ranking Bachelor's Program.
2013 - Scholarship Alpen Adria Universitat Klagenfurt, Austria.

STUDENT MENTORSHIP

- Bárbara Guichaquelen Levinanco, Master in Engineering Sciences (MCI). UAI, Fall 2024 - Present
- Sofia Zúñiga Ayala, Master in Engineering Sciences (MCI). UAI, Spring 2024 - Present
- Enzo Escuti Moreno, Master in Operations Research (MIIIO). UAI, Fall 2023 - Present
- Daniela Cantarino, Ph.D. Student in Industrial Engineering, USF, Fall 2021 - Present
- Mariana Arriz, Ph.D. Student in Industrial Engineering, USF, Fall 2021 - Present
- Maryam Jafaripakzad, Ph.D. Student in Industrial Engineering, USF, Spring 2021 - Present

JOURNAL REFEREEING

- Expert Systems with Applications.
- Health Care Management Science.
- Socio-Economic Planning Sciences.
- Kybernetes.
- Computers and Industrial Engineering.
- Operations Research for Health Care.
- IISE Transactions on Healthcare Systems Engineering.
- Transportation Research Record.

RELEVANT COURSEWORK

Optimization: Linear Programming & Network Optimization (Fall 2016), Integer Programming (Fall 2017), Multi-Objective Optimization (Spring 2018), Nonlinear optimization & Game Theory (Spring 2018), Revenue Management & Pricing (Spring 2019), Markov Decision Processes (Spring 2019).

Analytics: Statistics Methods I (Fall 2016), Advanced Analytics I (Spring 2017), Design of Experiments (Fall 2017), Deep Learning (Spring 2018), Reliability Data Analysis (Fall 2018), Engineering Analytics (Fall 2018), Bayesian Data Analysis (Fall 2019).

COMPUTER AND OTHER SKILLS

Methodology: Multi-objective optimization, Game Theory, Bi-level optimization, Sequential optimization, Stochastic dynamic programming, Machine Learning, Deep Learning, Mixed-integer programming, Revenue management.

Programming and Software: JULIA (Advanced, 7 years. Libraries: Gurobi, CPLEX, SCIP), R (Advanced, 7 years. Libraries: dplyr, ggplot2, caret, ROCR, glm, gbm, survival, neuralnet), SAS (Intermediate, 3 years), Python (Intermediate, 3 years. Libraries: Keras, Tensorflow, Gurobipy, Cplex docplex), LaTex (Advanced, 7 years), ArcGIS (Basic, 1 year).

Communication: Experienced in writing analytical reports and research publications, presenting to interdisciplinary audiences, teaching graduate/undergraduate courses, fluent in English, Spanish, and Italian.

EXTRACURRICULAR ACTIVITIES AND ASSOCIATIONS

- **Vice-President**, INFORMS USF Student Chapter: The chapter was recognized for its activities and mission on a Summa-cum Laude level at INFORMS Annual Meeting in Anaheim, California. (2020-2021).
- **Member**, Health Application Society (HAS), (2018-Present).

- **Member**, The Institute for Operations Research and the Management Sciences (INFORMS), (2018-Present).
- **Public relationship & Webmaster**, INFORMS USF Student Chapter: The chapter was recognized for its activities and mission on a Magna-cum Laude level at INFORMS Annual Meeting in Phoenix, Arizona. (2017-2018)
- **Expositor**, Engineering Expo at USF (2016-2021).
- **Instructor R programming/Volunteer**, Boot Camp INFORMS Student Chapter at USF (2016-Present).
- **Director**, Workshop "Una mirada hacia el futuro" Ruta Industrial, Universidad de La Frontera (2014).
- **Vice-President/Founding member**, Ruta Industrial, Universidad de La Frontera (2012-2013).
- **President**, Electoral Court of Industrial Engineering Students, Universidad de La Frontera (2010).