Ignacio Erazo, Ph.D.

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Research Gate

Education

- **Georgia Institute of Technology** — Atlanta, USA
  Ph.D. in Operations Research, minor in Machine Learning; GPA: 4.0/4 — *August 2019 - Jan 2024*
  Courses: *Optimization (Linear, Discrete, Nonlinear, Stochastic, Advanced Combinatorial), Stochastic Processes (I, II, Simulation and its Theory), Computational Methods, Constraint Programming, Theoretical Statistics, Machine Learning, Reinforcement Learning Theory.*
- **Georgia Institute of Technology** — Atlanta, USA
  M.Sc. in Operations Research; GPA: 4.0/4 — *August 2019-December 2021*
- **University of Concepcion** — Concepcion, Chile
  B.Sc. in Industrial Civil Engineering; GPA: 6.7/7; rank 1/120 — *March 2014-July 2019*
  Courses: *Traditional Engineering Classes + Optimization and Stats classes + Innovation, Entrepreneurship and Soft Skills classes.*

Experience

- **Amazon Science** — Bellevue, WA
  Research Scientist II — *Jan 2024 - Now*
  - **Large-scale optimization**: Creation, implementation and deployment of large-scale online optimization models for picking in robotic warehouses.
  - **Multi-period optimization algorithms**: Development of new multi-period optimization algorithms for pick prioritization and assignment in robotic warehouses.
  - **Coding and Deployment of Optimization Algorithms**: Implementation of optimization algorithms in production systems, deployment, monitoring of pilot and revisions/collaboration with SDEs.
- **Amazon Science** — Seattle, WA
  Research Scientist Intern — *May 2023 - Aug 2023*
  - **Part of the Amazon Science Fulfillment Technologies Team**: Large-scale online optimization models for picking in robotic warehouses.
- **Amazon** — Edinburgh, Scotland
  Applied Scientist Intern — *Sep 2022 - Dec 2022*
  - **Natural Language Processing — Machine Learning**: Developed topic models to support classification tasks for private data and internal applications.
- **Apple** — Sunnyvale, CA
  Applied Scientist Intern in BPR's Advanced Analytics Team — *May 2022 - Aug 2022*
  - **Inventory Optimization**: Developed an analytical tool based on optimization that helps to reduce inventory levels.
  - **Software Development**: Developed the logic that allows different optimization tools to work simultaneously to reduce transportation costs.
- **Georgia Institute of Techonology** — Atlanta, GA
  Teaching and Research Assistant — *Aug 2019 - Present*
  - **Head TA for Graduate Courses**: ISyE 6644 Simulation (Summer 2020, Fall 2020, Spring 2021), ISyE 6203 Logistics (Spring 2022) for the online and in-campus programs. Thank-a-Teacher recipient in Fall 2020, Spring 2022.
  - **TA in the tutoring center for undergrad Courses**: ISyE 3133 Optimization and ISyE 2027 Probability with Applications.
- **BHP Billiton** — Santiago, Chile
  Intern at the Inventory Optimization Team — *Jan 2019 - Mar 2019*
  - **Process automation**: Developed a new automatized dashboard in Power BI to show results for stakeholders of the supply team (saved 2 days of work a month).
  - **Holding Inventory Improvement**: Proposed and implemented a new inventory classification system leading to inventory savings of +5 Million USD.

Current External Research Projects

- **Last-Mile Delivery to Parcel Lockers**: Joint Work with Prof. Dipayan Banerjee.
- **Routing in Rectangular Warehouses: Linear Programming Relaxation and Algorithms**: Joint Work with Prof. Alejandro Toriello.
- **Subadditive Dispatching Under Capacity Constraints: Analysis of FIFO Policies**: Joint Work with Prof. Alejandro Toriello.
- **Improved Pythagorean Wins and Linear Programming for Strength Coefficient Computation On Sports Competitions**: Only author.

Preprints

- **Submodular Dispatching with Multiple Vehicles**: Joint Work with Prof. Alejandro Toriello. Submitted to *INFORMS Journal of Computing*.
- **Optimizing the Trade-Off Between Batching and Waiting: Subadditive Dispatching**: Joint Work with Prof. Alejandro Toriello. Under minor revisions at *Operations Research*.

Published Journal Papers

- **Cost-Efficient Confidence Intervals for the Difference of Two Bernoulli Distributions' Success Parameters**: *Journal of Simulation*, joint Work with Prof. David Goldsman and Prof. Yajun Mei (2023).
- **Efficient Confidence Intervals for the Difference of Two Bernoulli Distributions' Success Parameters**: *Journal of Simulation*, joint work with Prof. David Goldsman (2021).

Published Peer-reviewed Conference Papers

- **Smart Sports Predictions Via Hybrid Simulation: NBA Case Study**: *Winter Simulation Conference 2023*, only author (2023).
- **A Simulation-Optimization Framework to Improve the Organ Transplantation Offering System**: *Winter Simulation Conference 2022*, joint work with Prof. David Goldsman and Prof. Pinar Keskinocak (2022).
- **A Simulation-Based Approach to Compare Policies and Stakeholders' Behaviors for the Ride-Hailing Assignment Problem**: *Winter Simulation Conference 2021*, joint work with Prof. Rodrigo de la Fuente (2021).
- **Enabling Intelligent Processes in Simulation Utilizing the Tensor Flow Deep Learning Resources**: *Winter Simulation Conference 2018*, joint work with Prof. Rodrigo de la Fuente and Raymond Smith III (2018).

Honors and Awards

- Amazon AWS AI & ML Scholarship Recipient 2023.
- NSF travel award for the Triennial INFORMS TSL Conference 2023.
- Best Applied Student Paper, Winter Simulation Conference 2022.
- Diversity award for a Ph.D. student, Winter Simulation Conference 2022.
- Top 3 Short Research Video at the YinzOR 2021 Conference (Carnegie Mellon University), Submodular Dispatching.
- Stewart Fellowship in Georgia Tech.
- First place in 2019 "University of Concepcion" programming Competition, category "Non Computer Science Major".
- University of Concepcion Prize (Class 2014 Industrial Civil Engineering). This award is given by the university to the most deserving student (if any) of the respective class.
- Best GPA class 2014 of Industrial Civil Engineering in years 2014, 2015, 2016, 2017, 2018, 2019.
- Leader of World Finalist Teams for Simio Simulation Competition (Fall 2016, Spring 2017).
- Highest Recognition "Très Bien" in French Baccalauréat, maximum scores in Mathematics, Physics and Chemistry.

Skills Summary

- **Languages**: Spanish(+++), French(+++), English(+++)//, Python(+++), R(++), Java(++), C++(+).
- **Software**: Gurobi(+++), Xpress(+++), Cplex(++), SIMIO(+++), Sklearn(+++), PyTorch(++), Matplotlib(++).
- **Soft Skills**: Leadership, Time Management, Eager to Learn, Hard-worker, Responsibility.

Volunteer Experience

- **WSC Reviewer** — Remote
  Reviewer for the Winter Simulation Conference Proceedings. — *2023-Present*
- **EJOR Reviewer** — Remote
  Reviewer for the European Journal of Operational Research. — *2022-Present*
- **ISyE's GSAC** — Atlanta, USA
  Part of ISyE's Graduate Student Advisory Council (GSAC). — *21-22, 22-23 Academic Years*
- **CoE GSAC** — Atlanta, USA
  Only ISyE representative in the College of Engineering GSAC. — *21-22, 22-23 Academic Years*