

Daniel Guimarans

Current Position

Principal Scientist
Amazon
Barcelona, Spain

Additional Information

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Website: dguimarans.net
Specialization: Supply Chain & Transportation Optimization
Languages: English (IELTS 8.5), Spanish, Catalan

PROFESSIONAL SUMMARY

Principal Scientist with 15+ years transforming complex supply chain and logistics challenges into optimized solutions that drive measurable business impact. Proven track record delivering optimization solutions for large-scale freight and transportation networks, logistics systems, port operations, and airline scheduling across government agencies, industry leaders and critical transportation infrastructure. PhD in Computer Science with 40+ peer-reviewed publications, 3 PhD supervisions, and demonstrated success leading projects with documented operational savings exceeding \$300MM.

EDUCATION

Ph.D. in Computer Science, Cum Laude

Universitat Autònoma de Barcelona, Barcelona, Spain 2012
DISSERTATION - Hybrid Algorithms for Solving Routing Problems

M.Sc. in Industrial Computer Science & Advanced Production Techniques

Universitat Autònoma de Barcelona, Barcelona, Spain 2007
DISSERTATION - A Decision Support System for the Emergency Services Coordination Problem in a Road Accident
Sant Jordi Award Winner - Best Information Technology Master Thesis

Bachelor of Science, Physics

Universitat Autònoma de Barcelona, Barcelona, Spain 2005

Minor, Applied Mathematics

Universitat Autònoma de Barcelona, Barcelona, Spain 2004

PROFESSIONAL EXPERIENCE

Amazon

Barcelona, Spain

February 2020 – Present

Principal Scientist

- Lead optimization initiatives for Amazon's global transportation and logistics network delivering operational efficiencies and cost savings exceeding \$100MM annually across multiple business units
- Develop scalable algorithms for end-to-end network optimization supporting millions of daily shipments across global fulfillment operations
- Develop strategic research roadmaps and system architectures enabling new business line expansion while optimizing resource allocation across established middle-mile and last-mile operations
- Design optimization frameworks supporting network efficiency improvements and capacity planning across multiple geographic regions and service tiers
- Previous Role: Senior Research Scientist (February 2020 - April 2022; Luxembourg, Luxembourg)

Monash University
Melbourne, Australia

February 2019 – January 2020
Research Fellow - Optimization & AI

- **Melbourne Metro Optimization:** Delivered congestion-minimization system using large-scale Public Transport Victoria datasets, directly impacting daily commuter experience
- **Digital Twin Development:** Created open-source discrete-event simulation engine for Queensland's coal rail system and ground operations at European airports
- Developed hybrid simulation-optimization techniques for complex stochastic problems across aviation, logistics, and transportation
- Advanced state-of-the-art approaches in stochastic optimization with direct industrial applications

Amsterdam University of Applied Sciences
Amsterdam, Netherlands

October 2015 – January 2019
Senior Researcher - Lecturer

- Led research in aviation operations optimization and disruption management while establishing new academic programs
- **Industry Partnerships:** Delivered optimization solutions for Amsterdam's green taxi fleet in collaboration with Amsterdam City Council and supervised students hosted by KLM and Schiphol Airport
- **Program Leadership:** Developed and launched Aviation Logistics curriculum and Aviation Operations master program, coordinating a team of multi-disciplinary researchers and lecturers
- Taught advanced courses in data analysis, optimization, and operational resilience to 200+ students annually

NICTA (National ICT Australia)
Sydney, Australia

March 2013 – October 2015
Researcher

- **Port Botany Optimization (2013-2014):** Maximized rail capacity at Australia's busiest container port through simulation and scheduling algorithms, collaborating with Sydney Ports Corporation and NSW Ports. Project won Best Industry Project Award and generated significant media coverage
- **Virgin Australia Crew Optimization (2014):** Analyzed and optimized crew productivity and rostering practices for E190 fleet operations
- **Canberra Light Rail Impact Analysis (2015):** Minimized traffic disruption from new light rail system through predictive simulation modeling for ACT Government
- **Fleet Logistics Solutions:** Developed routing optimization systems for multiple commercial clients

Universitat Autònoma de Barcelona
Barcelona, Spain

September 2005 – February 2013
PhD Researcher & Postdoctoral Researcher

- **Postdoctoral Research (2012-2013):** Advanced hybrid optimization methodologies combining constraint programming, metaheuristics, and simulation for transportation applications
- **PhD Research & Teaching (2005-2012):** Pioneered hybrid algorithms for vehicle routing and transportation optimization problems
- **Emergency Services Optimization:** Developed distributed decision support systems for emergency services coordination
- **Software Commercialization:** Created and licensed two optimization platforms (ITSLogisim Optimization Suite and Simulation Suite) to Digital Aeronautics Engineering Services
- Supervised 20+ graduation theses while maintaining active research output

CORE COMPETENCIES

Supply Chain & Logistics Optimization: Transportation Network Design, Fleet Routing & Scheduling, End-to-end Supply Chain Optimization, Inventory Optimization, Aviation Operations

Advanced Analytics & AI: Simulation-Optimization, Constraint Programming, Stochastic Modeling, Digital Twins, Metaheuristics, Large-Scale Data Analysis

Technical Expertise: Java, R, Constraint Programming, Mixed Integer Programming, Algorithmic Design, Cloud Platforms (AWS), Simulation Tools

Leadership & Collaboration: Cross-Functional Team Leadership, Industry Partnerships, Project Management, Academic Program Development, PhD Supervision

Communication & Outreach: Keynote Speaker, Conference Organizer, Media Engagement

Industry Applications: Logistics, Network Optimization, Supply Chains, Ground Transportation, Urban Transportation, Aviation Logistics, Ground Handling Operations, Disruption Management

SELECTED INDUSTRY-SPONSORED PROJECTS

- **Peak-hour Passenger Shifting (2019)** - Monash University & Public Transport Victoria — Congestion reduction system for Melbourne's rail network affecting 500K+ daily commuters
- **Green Taxi Fleet Optimization (2018)** - Amsterdam University & Amsterdam City Council — Data analysis and simulation optimization of taxi charging ranks for sustainable urban transportation
- **Light Rail Traffic Impact (2015)** - NICTA & ACT Government — Minimization of traffic disruption for Canberra's new light rail system
- **Virgin Australia Crew Optimization (2014)** - NICTA & Virgin Australia — Productivity analysis and rostering optimization for E190 fleet operations
- **Port Botany Rail Optimization (2013-2014)** - NICTA & NSW Ports — Container freight train operations simulation and capacity maximization — Impact: \$AUD 210MM+

SOFTWARE LICENSES & INTELLECTUAL PROPERTY

ITSLogisim Optimization Suite 1.0 (2010) - Licensed to Digital Aeronautics Engineering Services
ITSLogisim Simulation Suite 1.0 (2010) - Licensed to Digital Aeronautics Engineering Services
Optimization platforms for solving vehicle routing problems and distributed simulation systems

KEY ACHIEVEMENTS & RECOGNITION

- **Best Industry Project Award** (NICTA 2014) - Port Botany Capacity Assessment
- **Sant Jordi Award** (2008) - Best Information Technology Master Thesis, Catalan Government
- **Media Recognition** - Featured in Sydney Morning Herald, The Australian, Lloyd's List for ground-breaking port optimization work
- **40+ Peer-Reviewed Publications** in top Operations Research and Transportation journals and international conferences
- **Software Licensing** - Two commercial optimization platforms successfully licensed to industry
- **PhD Supervision** - 3 successful PhD graduates in optimization and logistics (Edinburgh, Open University of Catalonia, Universitat Autònoma de Barcelona)
- **International Recognition** - Keynote and invites presentations at major conferences across 3 continents

SELECTED INDUSTRY-RELEVANT PUBLICATIONS

- “Constraint-based Robust Planning and Scheduling of Airport Apron Operations through Simheuristics,” *Annals of Operations Research*, 2023
- “A Stochastic Approach for Planning Airport Ground Support Resources,” *International Transactions in Operational Research*, 2022
- “A Simheuristic Algorithm for the Capacitated Location Routing Problem with Stochastic Demands,” *Journal of Simulation*, 2021
- “A Bi-objective Approach for Scheduling Ground Handling Vehicles in Airports,” *Computers & Operations Research*, 2016
- “Rich Vehicle Routing Problem: Survey,” *ACM Computing Surveys*, 2014 - Highly cited foundational work

Note: Complete list of 40+ peer-reviewed publications available at dguimarans.net

PROFESSIONAL ACTIVITIES

Editorial & Review Activities: Journal Reviewer for European Journal of Operations Research, Computers & Operations Research, Annals of Operations Research

Conference Activities: Program Committee Member for IJCAI, ICAPS, EURO, Winter Simulation Conference

Industry Partnerships: Government Agencies (Public Transport Victoria, ACT Government, NSW Ports, Amsterdam City Council), Airlines (Virgin Australia, KLM), Technology (Amazon), Ports & Infrastructure (Port Botany, European airports)