Jônatas Augusto Manzolli

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BIOGRAPHY

Postdoctoral researcher and electrical engineer working at the intersection of electric mobility, transportation systems, optimization, artificial intelligence, and energy-system integration. My research focuses on electric bus fleet planning and operations, smart charging, V2G/grid services, battery degradation, agent-based simulation, robust and hierarchical optimization, and multi-criteria decision analysis for transport policy and the energy transition.

RESEARCH INTERESTS AND EXPERTISE

Electric mobility and fleet electrification: electric bus planning and operations; EV adoption; charging infrastructure; fleet electrification strategy.

Optimization and decision support: robust, bi-level, hierarchical, and multi-objective optimization; MCDA; SMAA; PROMETHEE; policy-oriented transport planning.

Transport-energy integration: V2G; smart charging; energy markets; tariff design; distributed energy resources; grid-aware fleet operation.

AI, simulation, and digital twins: agent-based simulation; machine learning for energy consumption and battery degradation; data-driven decision-support platforms.

EDUCATION

Sept. 2020 – Feb. 2025
Coimbra, Portugal

Ph.D. in Sustainable Energy Systems
University of Coimbra

Thesis: *Adaptive Energy Management Strategies for Electric Bus Fleets: A Hybrid Approach with Artificial Intelligence and Optimisation Methods.* Summa cum laude.

Sept. 2018 – Mar. 2020
Coimbra, Portugal

M.Sc. in Energy for Sustainability
University of Coimbra

Dissertation: *Decision Support for Planning a Bus Rapid Transit Charging Infrastructure.*

Mar. 2015 – Mar. 2016
Munich, Germany

Exchange Program in Electrical Engineering
Technical University of Munich

Mar. 2011 – Mar. 2017
Campinas, Brazil

B.Sc. in Electrical Engineering
University of Campinas

Best undergraduate final project award.

ACADEMIC AND PROFESSIONAL APPOINTMENTS

Research Activities

May 2025 – present
Montreal, Canada

Postdoctoral Researcher
McGill University, IMaTS Lab

Research on electric mobility, fleet electrification, AI-enabled transport-energy systems, optimization, and battery degradation.

June 2019 – present
Coimbra, Portugal

Affiliated Researcher; Researcher and Optimization Specialist
INESC Coimbra / University of Coimbra

Developed optimization, simulation, and decision-support frameworks for electric bus fleets, charging infrastructure, V2G, energy-market participation, and uncertainty-aware operations.

Oct. 2022 – Mar. 2023
Sherbrooke, Canada

Visiting Researcher
University of Sherbrooke

Developed semi-empirical battery-aging models for electric buses under temperature and operating-condition variability.

Aug. 2020 – Oct. 2020
Lisbon, Portugal

Student Researcher, C-Tech Project
NOVA Cidade – Urban Analytics Lab

Developed an MCDA framework to map street-level walkability in Lisbon, integrating operations research with urban analytics.

Industry Experience

Sept. 2015 – Mar. 2016
Munich, Germany

Intern
IAV GmbH

Worked on BMW engine design projects, embedded monitoring systems, component modeling, simulation, and data visualization.

RESEARCH FUNDING AND FELLOWSHIPS

2026 **TechAccellR – Engine McGill**
Commercialization funding. Funding: EUR 12,000.

2026 **Lab2Market Launch Fall Cohort**
Commercialization funding. Funding: EUR 6,800.

2025 **SYLFF Research Grant**
Research grant. Funding: EUR 13,800.

2025 **Lab2Market Validate Summer Cohort**
Commercialization funding. Funding: EUR 6,800.

2023 **Tokyo Foundation SYLFF Research Grant**
Research grant. Funding: EUR 2,700.

2022 **GISU International Urban Entrepreneurship, Padova, Italy**
Entrepreneurship prize. Funding: EUR 10,000.

2021 **Foundation for Science and Technology (FCT), National PhD Research Fellowship**
Doctoral fellowship. Funding: EUR 68,000.

2020 **Sasakawa Young Leaders Fellowship Fund (SYLFF) Fellowship Program**
Fellowship. Funding: EUR 10,200.

2014 **Science without Borders Scholarship, DAAD/CAPES**
International scholarship. Funding: EUR 20,400.

Total funding and fellowships
EUR 150,700.

AWARDS

2025 **Best Paper Award**
Transportation Research Board Annual Meeting, Standing Committee on Critical Infrastructure Protection.

2017 **Undergraduate distinction**
Best undergraduate final project award, University of Campinas.

PUBLICATIONS

Peer-reviewed articles

1. **J. A. Manzolli**, A. V. D'Apice, P. K. Pandey, F. Ciari, and L. Miranda-Moreno. Planning resilient electric bus operations in cold regions: An agent-based simulation-optimization framework. *Applied Energy*, 413, 127735, 2026. 10.1016/j.apenergy.2026.127735.

2. **J. A. Manzolli**, J. Yu, A. V. D'Apice, and L. Miranda-Moreno. Balancing energy resilience and mobility: A multi-objective strategy for deploying shared autonomous electric vehicles during power outages. *npj Sustainable Mobility and Transport*, 3(1), article 13, 2026. 10.1038/s44333-026-00081-9.
3. D. Deda, **J. A. Manzolli**, M. J. Quina, and H. Gervasio. The Road to 2030: Combining Life Cycle Assessment and Multi-Criteria Decision Analysis to Evaluate Commuting Alternatives in a University Context. *Sustainability*, 17(13), 5839, 2025. 10.3390/su17135839.
4. **J. A. Manzolli**, J. Yu, and L. Miranda-Moreno. Synthetic multi-criteria decision analysis (S-MCDA): A new framework for participatory transportation planning. *Transportation Research Interdisciplinary Perspectives*, 31, 101463, 2025. 10.1016/j.trip.2025.101463.
5. **J. A. Manzolli**, P. Messier, J. P. Trovao, and C. H. Antunes. Decision-making in bus-transit systems: A comprehensive approach based on stochastic multi-criteria acceptability analysis. *Sustainable Futures*, 9, 100653, 2025. 10.1016/j.sftr.2025.100653.
6. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. Electric bus fleet charging management: A robust optimisation framework addressing battery ageing, time-of-use tariffs, and energy consumption uncertainty. *Applied Energy*, 381, 125137, 2025. 10.1016/j.apenergy.2024.125137.
7. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. Aggregator-supported strategy for electric bus fleet charging: A hierarchical optimisation approach. *Energy*, 306, 132497, 2024. 10.1016/j.energy.2024.132497.
8. I. Cavalcante, J. Junior, **J. A. Manzolli**, L. Almeida, M. Pungo, C. P. Guzman, and H. Morais. Electric Vehicles Charging Using Photovoltaic Energy Surplus: A Framework Based on Blockchain. *Energies*, 16(6), 2694, 2023. 10.3390/en16062694.
9. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. Electric bus coordinated charging strategy considering V2G and battery degradation. *Energy*, 254, 124252, 2022. 10.1016/j.energy.2022.124252.
10. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. A review of electric bus vehicles research topics – Methods and trends. *Renewable and Sustainable Energy Reviews*, 159, 112211, 2022. 10.1016/j.rser.2022.112211.
11. **J. A. Manzolli**, A. Oliveira, and M. de Castro Neto. Evaluating Walkability through a Multi-Criteria Decision Analysis Approach: A Lisbon Case Study. *Sustainability*, 13(3), 1450, 2021. 10.3390/su13031450.
12. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. Scenario-Based Multi-criteria decision analysis for rapid transit systems implementation in an urban context. *eTransportation*, 7, 100101, 2021. 10.1016/j.etran.2020.100101.

Book chapters

1. R. D. de Castro, **J. A. Manzolli**, N. C. Figueiredo, and P. P. da Silva. Renewable Power Purchase Agreements: An Instrument for Corporate Decarbonization. In *Wiring the Future: Financial Strategies, Challenges, and Opportunities in the Sustainable Energy Transition*, Springer Nature Switzerland, 2026. 10.1007/978-3-032-14717-2_2.
2. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. Forecasting of Vehicle Electrification in Modern Power Grids. In *Vehicle Electrification in Modern Power Grids*, Elsevier, 2024. 10.1016/B978-0-443-13969-7.00003-5.
3. D. Deda, **J. A. Manzolli**, J. A. Santos, W. V. D. S. Correia, P. M. A. R. Carvalho, F. B. Carvalho, M. B. Carvalho, et al. Transicao e Pobreza Energetica. In *Desafios Societais e a Investigacao em Direito*, 2023. 10.47907/DesafiosSocietais6/2024.

Conference papers, posters, and proceedings

1. R. D. de Castro, **J. A. Manzolli**, J. P. Trovao, C. H. Antunes, N. C. Figueiredo, and P. P. da Silva. Strategic Energy Procurement for EV Fleets: A Comparative Study. 21st International Conference on the European Energy Market, 2025. 10.1109/EEM64765.2025.11050169.
2. **J. A. Manzolli**, W. Do, C. H. Antunes, J. P. Trovao, and L. Miranda-Moreno. An Agent-based Optimization Framework for Smart Electric Bus Charging with Operational Strategies. Transportation Research Board Annual Meeting, Washington, DC, 2025. 10.13140/RG.2.2.17321.30568.
3. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. "An Integrated Optimization-MCDA Framework for Efficient Electric Bus System Planning," conference paper, 2024.
4. C. Hernandez, **J. A. Manzolli**, T. R. Simoes, D. J. Redol, D. C. Rodrigues, and D. F. Freire. The Influence of a Rooftop Photovoltaic System on the Electricity Consumption of a Plastic Moulding Plant: A Carbon Footprint Assessment. IEEE MELECON, 2024. 10.1109/MELECON56669.2024.10608704.
5. J. Almeida, **J. A. Manzolli**, J. Soares, J. P. Trovao, F. Lezama, and C. H. Antunes. "Addressing Complexities in Electric Bus Fleet Charging: A Metaheuristic Approach," ELECTRIMACS 2024.
6. **J. A. Manzolli**, W. Do, L. Miranda-Moreno, J. P. Trovao, and C. H. Antunes. Optimising Electric Bus Fleet Charging Using a Simulation-Based Energy Consumption Model. IEEE VPPC, 2023. 10.1109/VPPC60535.2023.10403253.
7. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. Optimising Electric Bus Charging: Dynamic Tariffs in a Bi-Level Framework Considering Weather Conditions and Energy Storage. 21st IMACS World Congress, 2023. 10.13140/RG.2.2.20170.13769.
8. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. Optimisation of an Electric Bus Charging Strategy Considering a Semi-Empirical Battery Degradation Model and Weather Conditions. ICCAIS, 2022. 10.1109/ICCAIS56082.2022.9990180.
9. **J. A. Manzolli**, J. P. Trovao, and C. H. Antunes. Electric Bus Smart Charging under a Bi-Level Optimisation Model to Set Dynamic Tariffs. IECON, 2022. 10.1109/IECON49645.2022.9969101.

SELECTED PRESENTATIONS, TUTORIALS, AND SEMINARS

May 2026 **Electric Mobility and Integrated Optimization for Energy and Transport Systems**
Seminar, McGill University, Montreal, Canada.

Apr. 2026 **Planning Resilient Electric Bus Operations**
Invited webinar, PANAMSTR Webinar 3.03: Optimization of Electric Vehicles, online.

Oct. 2025 **Scenario-Driven Optimization for Quebec's Electric Bus Fleets under Climate and Operational Variability**
Presentation and co-organized workshop, McGill University.

Oct. 2025 **A Comprehensive Framework for Evaluating Different Transit Systems**
Congreso de Transporte y Logistica MexCan, Mexico City, Mexico.

Sept. 2025 **Spatiotemporal Dynamics of Electric Vehicle Adoption in Quebec**
International Symposium on Transportation Data & Modelling, HEC Montreal.

Sept. 2025 **Nextdriv Platform Development and Electric Fleet Decision Support**
McGill Engine Startup Interns / Annual Engine Internship Showcase.

Oct. 2024 **Optimizing Charging Strategies for Electric Bus Fleets**
Tutorial, IEEE Vehicle Power and Propulsion Conference, Washington, DC.

May 2024 **Agent-Based Optimization for Electric Bus Transit Charging and Operation Strategies**
Seminar, Advances in Transit and Shared Mobility, McGill University.

May 2024 **Science Mapping Tools for Data Visualization and Literature Review**
Workshop, INESC Coimbra.

Dec. 2023 **Artificial Intelligence Tools for Transportation**
Seminar, University of Sherbrooke.

Sept. 2023 **Sustainable Transportation and Electric Vehicles**
Seminar, Polytechnic University of Coimbra.

Sept. 2023 **A Journey to the Future: Urban (R)evolution with Electric Bus Intelligence**
Seminar, McGill University.

Sept. 2023 **Energy Transition: Decarbonization in the Fuel Sector**
Round table, Greenfest, NOVA University, Lisbon.

June 2023 **The Path to a Net-Zero University: Coimbra as a Case Study**
Seminar, EU Sustainable Energy Week, Coimbra.

May 2023 **The Future of Transportation**
Talk, Pint of Science Portugal.

Apr. 2022 **Circular Ideas: How to Start a Sustainable Business?**
Workshop, Casa do Impacto, Lisbon.

REVIEWER SERVICES

Ad Hoc Reviewer – Journals
Applied Energy • Energy • eTransportation • Renewable and Sustainable Energy Reviews • Sustainable Futures • Transportation Research Interdisciplinary Perspectives.

Ad Hoc Reviewer – Conferences
Transportation Research Board Annual Meeting • IEEE Vehicle Power and Propulsion Conference • IEEE International Conference on Communications, Control, and Automation.

ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER

Spin-offs

2025 – present **Nextdriv**
Founder / research commercialization initiative developing digital decision-support tools for electric fleet planning, operations, charging infrastructure, battery degradation, and energy-system analysis.

2021 – 2023 **ReneWaste**
Co-founder of a digital platform designed to increase urban recycling by connecting waste-management companies and businesses.

Training

2025 **Lab2Market Validate**
Research commercialization and stakeholder discovery, Canada.

2024 **Engine Innovation to Impact**
McGill University, Montreal, Canada.

2022 **European Innovation Academy**
Porto, Portugal.

2022 **International Entrepreneurial Week**
EC2U Alliance, Pavia, Italy.

2022 **Explorer Program**
Santander X, Madrid, Spain.

2022 **Triggers**
Casa do Impacto, Lisbon, Portugal.

2019 **International Workshop on Innovating**
MIT, Boston, USA.

Competitions

2021 **Altice Innovation Award**
Second place, Lisbon, Portugal; innovation prize connected to sustainable technology and entrepreneurship.

2021 **CityHack Hackathon**
First place for ReneWaste, a digital platform connecting waste-management companies and businesses.

2021 **Shift APPENS Hackathon**
First place for ReneWaste.

2020 **Microsoft Building the Future Hackathon**
Second place for Blockcharging.

2020 **Oeiras Valley Competition**
Top 10 for a fast-charging allocation strategy.

2020 **EDP University Challenge**
Top 10 for Go! Charging!

NEWS, MEDIA COVERAGE, AND PUBLIC OUTREACH

Interviews and opinion pieces

2023 **RTP**
"90 Segundos de Ciência" research interview.

2023 **Sylff Association**
"Powering Up: How Electric Buses are Paving the Way for a Greener Tomorrow."

2023 **BRAS Center**
"Beyond a Car-Centric World."

2022 **Ambiente Magazine**
"Electric Mobility: Myths and the Importance of Demystifying Concepts."

2021 **Publico**
"Sustainable World: Coimbra Students Promote Webinar Week."

News articles

2025 **Forbes**
"Why Smart Charging Is Key To Successful Electric Bus Fleet Operations."

2022 **INESC Coimbra**
"INESC Coimbra Researcher Wins 2nd Place at the Hackathon Building the Future."

2022 **Noticias UC**
"UC Scientists Develop Intelligent Charging Model for Electric Bus Fleets."

2022 **Observador**
"University of Coimbra Develops Intelligent Charging Model for Electric Buses."

2022 **Diario de Noticias**
"University of Coimbra's Intelligent Charging Model for Electric Buses."

2022 **RTP**
"University of Coimbra's Intelligent Charging Model for Electric Buses."

2022 **Publico**
"University of Coimbra's Intelligent Charging Model for Electric Buses."

2022 **Portugal Resident**
"Coimbra Scientists Develop Intelligent Charging Model for Electric Buses."

2022 **FCTUC**
"UC Scientists Develop Intelligent Charging Model for Electric Bus Fleets."

2022 **Revista Sustentavel**
"Portuguese Develop Intelligent Charging Model that Reduces Costs and Increases Battery Life."

2022 **Ambiente Magazine**
"UC Scientists Create Intelligent Charging Model for Electric Bus Fleets."

2022 **Noticias de Coimbra**
"UC Develops Intelligent Charging Model for Electric Buses."

RESEARCH SOFTWARE AND TOOLS

Electric Vehicle Routing with Time Windows
AMPL/CPLEX implementation for electric vehicle routing with time windows, supporting optimization experiments for electric mobility and logistics.

Smart Electric Bus Charging Optimization Platform
Optimization platform for smart charging of electric bus fleets, including mathematical-programming workflows for operational scheduling and energy-cost analysis.

Battery Degradation Modeling Toolkit
MATLAB implementation of a semi-empirical battery degradation model for electric-vehicle and electric-bus battery performance analysis.

Electric Bus Optimization Tutorial Toolkit
Tutorial repository developed for IEEE VPPC 2024, with notebooks and examples for electric bus charging optimization and related transport-energy methods.

EV Charging and Grid Simulation Framework
Code for evaluating electric vehicle adoption through grid simulation and charging optimization, linking transport electrification scenarios with power-system impacts.

SKILLS

Programming
Python, MATLAB, C, HTML, CSS.

Optimization tools
Pyomo, PyRo, Gurobi, CPLEX, GAMS, SciPy, NEOS Server, JSMAA, metaheuristic implementations.

Data analysis
NumPy, Pandas, Matplotlib, statistical analysis, data cleaning, visualization, and reproducible workflows.

Science mapping
VOSviewer, Bibliometrix, systematic literature review workflows.

Design and front end
Figma, Streamlit, HTML, CSS, basic web prototyping.

Languages
Portuguese (native), English (fluent), German (advanced), Spanish (intermediate), Italian (basic).

PROFESSIONAL AFFILIATIONS

IEEE
IEEE Member • IEEE Young Professionals • IEEE Vehicular Technology Society • IEEE Power & Energy Society.

SELECTED CERTIFICATES

Entrepreneurship

June 2019 **Entrepreneurship and Innovation, MIT**
Competencies: entrepreneurship, innovation, communication, leadership.

May 2022 **Entrepreneurism and Social Impact, Santander X**
Competencies: entrepreneurship, innovation, communication, leadership.

Programming and AI

Apr. 2020 **Python Programming, University of Michigan**
Competencies: Python and programming.

May 2020 **Machine Learning, Stanford University**
Competencies: programming, MATLAB, machine learning.

June 2020 **SPSS Advanced Course, APEU-FEUC / University of Coimbra**
Competencies: statistics and mathematics.

Feb. 2022 **Neural Networks and Deep Learning, DeepLearning.AI**
Competencies: Python, programming, machine learning.

Dec. 2022 **HTML and CSS in Web Projects, Alura**
Competencies: CSS and HTML.

May 2024 **Energy Data Analytics, University of Texas at Austin**
Competencies: Python, programming, data visualization.

Science communication

Nov. 2020 **Public Speaking, Board of European Students of Technology (BEST)**
Certificate in science communication and public speaking.

June 2021 **Writing in the Sciences, Stanford University**
Competencies: scientific writing.

Mar. 2022 **Science Communication and Media Training, Institute for Interdisciplinary Research, University of Coimbra**
Certificate in science communication and media engagement.

Jan. 2024 **Creating Successful Research Posters, Springer Nature**
Competencies: research, scientific communication, scientific posters.