Andrew David WERNER ROSEMBERG

Double Nationality: Brazilian/American
Mail: arosemberg3@gatech.edu
LinkedIn: https://www.linkedin.com/in/andrew-rosemberg-46ba8613b/
Github: https://github.com/andrewrosemberg

EDUCATION

2023–Present **PhD, Machine Learning and Optimization**
ISyE - Georgia Institute of Technology, Georgia, United States
Advisor: Pascal Van Hentenryck
Focus: Decision-making methods under uncertainty, combining Machine Learning and Optimization.

2018 – 2019 **Master's degree in Operations Research**
Electrical Engineering Department, Pontifical Catholic University of Rio de Janeiro, PUC-Rio, Brazil
Advisor: Alexandre Street **| Committee:** Andy Philpott, Arild Helseth, Davi Valladão and Bruno Fanzeres.
Focus: Optimization and Decision Under Uncertainty approaches for quantitative finance; portfolio optimization; dynamic allocation of resources; asset and liability management.
Classes: Convex and Integer programming, decision under uncertainty (covering Online Learning, Robust and Stochastic Optimization), and Probability Theory (covering high dimensional statistics, structured and score-driven models for forecasting, and measure theory).
Thesis: A Framework for Assessing the Impacts of Network Formulations in the Operation of Hydrothermal Power Systems (https://doi.org/10.17771/PUCRio.acad.51577)

2014–2017 **Double Degree, General Engineering, BRAFITEC merit scholarship.**
École Centrale de Marseille, France
Minor Degree: Computer Science and Information systems.
Significant Classes: Artificial Intelligence (supervised and unsupervised learning for regression and classification), Information Theory, Optimal Control, and Continuous Analysis.

2012–2017 **Mechatronics and Control engineering**
Pontifícia Universidade Católica do Rio de Janeiro, PUC-Rio, Brazil
Minor Degree: Software Development.
Significant Classes: Linear Programming, Functional and Object-oriented programming, Data Structures, and Mathematical Programming in Capital markets.

PUBLICATIONS

Nov 11, 2022 **Virtual Transactions in Electricity Markets: An Instrument for a Reliable Energy Transition Towards a Low-Carbon Operation**
54th Brazilian Operational Research Symposium - SBPO proceedings, 2022. Conference Paper.

Jan 02, 2022 **Assessing the Cost of Network Simplifications in Long-Term Hydrothermal Dispatch Planning Models**
IEEE Transactions on Sustainable Energy, 2022 - DOI: 10.1109/TSTE.2021.3106810.

Jul 31, 2020 **HydroPowerModels.jl: A Julia/JuMP Package for Hydrothermal Economic Dispatch Optimization**
JuliaCon Proceedings, 2019 - https://doi.org/10.21105/jcon.00035.

Aug 09, 2018 **Futures Contracts Portfolio Selection via Robust Data-Driven Optimization**
50th Brazilian Operational Research Symposium - SBPO proceedings, 2018. Conference Paper.

Invited Talks

2022 ICCOPT - Methods for Ambiguity Set Estimation in Distributionally Robust Optimization.
2021 EURO2021 - Assessing the choice of ambiguity set for distributionally robust portfolio selection in electricity spot markets (Co-author and session chair).
2020 INFORMS and PES General Meeting - Impact of Network Formulations on Hydrothermal Scheduling.
2019 JuliaCon - HydroPowerModels.jl: A Package for Hydrothermal Economic Dispatch Optimization.

RESEARCH EXPERIENCES

2023–Present **Researcher (Machine Learning and Optimization) at AI4OPT, Atlanta, US**
Research in automated decision-making methods under uncertainty, combining Machine Learning and Optimization. The main emphasis is on the development of interpretable AI for pressing global challenges using tractable models and robust decision frameworks.

2020-2023 **Researcher (Machine Learning and Optimization) at Invenia Labs, Cambridge, UK**
Strategic algorithmic operation in energy markets to support the renewable energy transition.
- Led projects on the implementation of stochastic, robust, and distributionally robust optimization approaches to tackle uncertainty in daily bidding operations, coupling Machine Learning techniques to estimate uncertainty and appropriate optimization methods to find robust decisions.
- Contributed to the construction of a detailed market simulator for counterfactual analysis.

Led work on decomposition techniques for large-scale Integer and continuous optimization problems, proposed methods for estimation of unknown parameters of the grid through Inverse Optimization and other heuristics, and led the data analysis of simulation results accuracy.
- Exploration of exact and surrogate approaches to bi-level optimization (for hyperparameter optimization and strategic bidding). Including integration of Automatic Differentiation and Automatic Dualization of optimization problems to help implement explored approaches.

Experience in MISO, PJM, ERCOT, CAISO, SPP, ISO-NE, and NYISO.

2017-2019 **Research Staff Member at LAMPS PUC-Rio, Rio de Janeiro, Brazil**
(2 years) Research and development of mathematical programming solutions to find power systems transmission usage optimal contracting strategies for one of Brazil's biggest electricity services companies (Energisa Group).
Development of flexible software for Hydrothermal Multistage Economic dispatch in a consulting project for FGV Energia to help assess network and installed capacity changes. (HydroPowerModels Project).

2017 **Intern at Bank BBM, BoCom, Rio de Janeiro, Brazil**
(6 months) Trade-note receivable fraud-risk assessment while in the Data Science team.
Macroeconomic indicators analysis while in the Economic Research team.

2016-2017 **Research Intern at Air Liquide Medical Systems, Air Liquide Group, Paris, France**
(6 months) Modeling of the company's first integrated breathing-support machine simulator to help researchers test new designs and access solutions. Focus on both CPAP and BiPAP breathing programs for the Vendome home ventilator.

2015 **Intern at Northumberland Tyne and Wear NHS Foundation Trust, Newcastle, UK**
(5 weeks) Creation of a digital consumables database for stock control and protocols for logging supply usage. Coverage of over 90% of supply material for the engineering department.

PROJECTS

2018-Present **HydroPowerModels - https://github.com/andrewrosemberg/HydroPowerModels.jl**
Objective: Build an open-source tool for Hydrothermal Multistage Steady-State Power Network Optimization solved by Stochastic Dual Dynamic Programming (SDDP), that is flexible enough for the electrical sector to test new ideas in an agile and high-level way, but at the same time using the state-of-the-art implementations of both the SDDP and the dispatch model formulations.

2015-2016 **GSM Sector ("Groupe Signaux Multidimensionnels") of the Fresnel Institute**
(6 months) **Objective**: Development of classification methods on MATLAB to classify patients suffering from seizures of epilepsy by their EEG signal. 95% Accuracy when ensembling models.

2014 **Mechatronics Laboratory of PUC-RIO and aeromodelling group (AeroDesign AERO-RIO)**
(10 months) **Objective**: Virtual modeling of aircraft parts on SolidWorks; building physical models; studying and programming microcontrollers. Models used in the US East aeromodelling championship.

LANGUAGES

English Full Professional Proficiency.
French Full Professional Proficiency /Level C1 (common European framework of reference for languages) (DALF C1)
Portuguese Native/Mother language
German Level B1 (Common European Framework of Reference for languages) (DSD I)
Programming Julia, Python, C and C++, C#, Java and SQL.