Giorgio Costa

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ACADEMIC APPOINTMENTS

2021 – Present **Postdoctoral Research Fellow**
Department of Mechanical and Industrial Engineering, University of Toronto

EDUCATION

2015 – 2020 **Ph.D. in Industrial Engineering and Operations Research**, *University of Toronto*
Advisor: Professor Roy H. Kwon
Thesis: Advances in risk parity portfolio optimization

2007 – 2012 **B.Eng. (Hons.) in Mechanical Engineering**, *McGill University*
Minor in Economics
Advisor: Professor Michael P. Paidoussis
Thesis: Stability of pipes subjected to fluid flow induced vibration with flexible boundary conditions in discharge

RESEARCH INTERESTS

- Convex optimization
- Robust and distributionally robust optimization
- Integrated learning and optimization
- Distributed algorithms for optimization
- Asset allocation and portfolio optimization
- Risk attribution and risk diversification

RESEARCH

Peer-Reviewed Journal Publications

1. **Costa, G.** and Kwon, R. H. (2020). A robust framework for risk parity portfolios. *Journal of Asset Management*, 21, 447–466.
2. **Costa, G.** and Kwon, R. H. (2020). Generalized risk parity portfolio optimization: an ADMM approach. *Journal of Global Optimization*, 78, 207–238.
3. **Costa, G.** and Kwon, R. H. (2020). A regime-switching factor model for mean–variance optimization. *Journal of Risk*, 22(4), 31–59.
4. **Costa, G.** and Kwon, R. H. (2019). Risk parity portfolio optimization under a Markov regime-switching framework. *Quantitative Finance*, 19(3), 453–471.
5. Wu, D., Kwon, R. H., and **Costa, G.** (2017). A constrained cluster-based approach for tracking the S&P 500 index. *International Journal of Production Economics*, 193, 222–243.
6. Kheiri, M., Paidoussis, M. P., **Costa, G.**, and Amabili, M. (2014). Dynamics of a pipe conveying fluid flexibly restrained at the ends. *Journal of Fluids and Structures*, 49, 360–385.

Manuscript Preprints

7. **Costa, G.** and Kwon, R. H. (2020). Data-driven distributionally robust risk parity portfolio optimization. Manuscript submitted for publication.

Conference Proceedings

8. Kheiri, M., Paidoussis, M. P., and **Costa, G.** (2014). Dynamics of a Pipe Conveying Fluid Flexibly Supported at the Ends. *Proceedings of the ASME 2014 Pressure Vessels and Piping Conference. Volume 4: Fluid-Structure Interaction*. Anaheim, California, USA. July 2024, 2014.

Presentations

9. **Costa, G**. (November 2020). *Data-driven distributionally robust risk parity portfolio optimization*. INFORMS Annual Meeting. Virtual.
10. **Costa, G**. (November 2019). *Generalized Risk Parity Portfolio Optimization: An ADMM Approach*. CASCON x EVOKE, IBM annual academic and research conference. Markham, ON.
11. **Costa, G**. (November 2018). *A Regime-Switching Framework for Portfolio Optimization*. Fourth Industrial-Academic Workshop on Optimization and Artificial Intelligence in Finance at The Fields Institute. Toronto, ON.
12. **Costa, G**. (January 2018). *Hidden Markov Model for Risk Parity Optimization*. Master of Mathematical Finance Symposium 2018. Blue Mountain, ON.

AWARDS AND RESEARCH GRANTS

2021 – 2023	NSERC Postdoctoral Fellowship, $90,000
Fall 2020	Ontario Graduate Scholarship, $5,000
Fall 2019	ECE Department Excellence in teaching award
2016 – 2020	MIE Graduate Fellowship, $48,000
2019 – 2020	Ontario Graduate Scholarship, $15,000
2018 – 2019	Ontario Graduate Scholarship, $15,000
2017 – 2018	Mitacs Accelerate Research Grant, $30,000
2017 – 2018	QEII Graduate Scholarship in Science and Technology, $15,000
2016 – 2017	Mitacs Accelerate Research Grant, $30,000

TEACHING EXPERIENCE

Course Instructor (Lecturer)

2018 – 2021	MIE377: Financial Optimization Models	3rd-year course	Instructor rating: 4.7 / 5.0
2020	MIE236: Probability	2nd-year course	Instructor rating: 4.2 / 5.0
2019	ECE302: Probability and Applications	3rd-year course	Instructor rating: 4.0 / 5.0
2018	MIE375: Financial Engineering	3rd-year course	Instructor rating: 4.5 / 5.0

Teaching Assistant

2019 – 2020	MIE479: Capstone Design Project	4th-year course
2017 – 2020	MMF1921: Operations Research	Graduate course
2017 – 2020	MMF2000: Risk Management	Graduate course
2016	MIE1621: Non-Linear Optimization	Graduate course

ACADEMIC SERVICE AND SUPERVISION

Academic Service

2020 – Present	Journal of Asset Management	Referee
2020 – Present	Journal of Risk and Financial Management	Referee
2017 – Present	The Engineering Economist Journal	Referee

Student Supervision

2019 – 2020 Yu Zhang (Undergraduate Student)
Thesis: Financial fundamental factors: A comparative and data-driven approach.

2019 – 2020 Yang Yang (Undergraduate Student)
Thesis: A quantitative approach to build a predictive model of PE ratio for stocks using linear regression with log transformations.

PROFESSIONAL EXPERIENCE

Toronto–Dominion Bank, Toronto, ON

2017 – 2018 **Senior Risk Analyst**, TD Wealth – Credit and Market Risk
Developed a novel equity risk model that measures the propensity of a stock to suffer from price shocks. This model applies machine learning principles while retaining interpretability. The development included feature selection and engineering, predictive model design, backtesting, and documentation. The model was successfully validated through the TD validation process.

2016 – 2017 **Research Associate**, TD Securities – Capital Markets Risk Management
Developed a model to simulate reasonable interest rate shocks in a near-zero and negative interest rates environment. This produced more realistic Monte Carlo simulations when computing the 10-day Value-at-Risk of the Bank's portfolios. My responsibilities included research, model development, coding and implementation, and backtesting.

Wood plc, Oakville, ON

2012 – 2015 **Mechanical Engineer-in-Training**
Performed computational fluid-flow simulations and stress analysis of piping systems. Prepared other engineering calculations and technical drawings. Performed project management duties on-site in Buchanan, Liberia.

PROFESSIONAL AFFILIATIONS

2019 – Present Student Member, Institute for Operations Research and Management Sciences (INFORMS)

2018 – Present Student Member, Canadian Operations Research Society (CORS)

2012 – Present Engineer-in-Training, Professional Engineers Ontario (PEO)

PROGRAMMING AND SOFTWARE

Programming	Julia, Python, R, HTML5/CSS3, LaTeX
Software	MATLAB, MS Office Suite
Optimization tools	Gurobi, Mosek, Ipopt, CPLEX, SCS, JuMP, CVXPY
Cloud Computing	MS Azure, Docker