

Giorgio Costa

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EDUCATION

- Sep 2015 – Present **Ph. D. Candidate in Operations Research**, University of Toronto
Advisor: Professor Roy H. Kwon
Thesis: Advances in risk parity portfolio optimization
- Sep 2007 – May 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 optimization
- Unsupervised Learning
- Distributed algorithms for non-convex problems
- Quantitative Finance
- Financial risk management

PUBLICATIONS AND PRESENTATIONS

Journal Publications

- **Costa, G.** and Kwon, R. H. (in press). [A regime-switching factor model for mean–variance optimization](#). *Journal of Risk*.
- **Costa, G.** and Kwon, R. H. (2019). [Risk parity portfolio optimization under a Markov regime-switching framework](#). *Quantitative Finance*, 19(3), 453-471.
- 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.
- 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

- **Costa, G.** and Kwon, R. H. (2019). [Generalized risk parity portfolio optimization: an ADMM approach](#). Manuscript submitted for publication to the Journal of Global Optimization.
- **Costa, G.** and Kwon, R. H. (2018). [A robust framework for risk parity portfolios](#). Manuscript submitted for publication to Annals of Operations Research.

Conference Proceedings

- 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

- **Costa, G.** (November 2019). [Generalized Risk Parity Portfolio Optimization: An ADMM Approach](#). CASCON x EVOKE, IBM annual academic and research conference. Markham, ON.
- **Costa, G.** (May 2019). [Generalized Risk Parity Portfolio Optimization: An ADMM Approach](#). CORS Annual Conference. Saskatoon, SK.
- **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.
- **Costa, G.** (November 2018). [A Regime-Switching Framework for Portfolio Optimization](#). University of Toronto Operations Research Group. Toronto, ON.
- **Costa, G.** (January 2018). [Hidden Markov Model for Risk Parity Optimization](#). Master of Mathematical Finance Symposium 2018. Blue Mountain, ON.

HONOURS AND AWARDS

Sep 2019 – Aug 2020	Ontario Graduate Scholarship , Scholarship
Sep 2016 – Aug 2020	Department of Mechanical and Industrial Engineering , Fellowship
Sep 2018 – Aug 2019	Ontario Graduate Scholarship , Scholarship
Sep 2017 – Aug 2018	Queen Elizabeth II Graduate Scholarship in Science and Technology , Scholarship
Sep 2016 – Aug 2018	Mitacs Accelerate , Research grant
Sep 2010 – Apr 2012	MEES (Quebec) International Fee Exemption , Scholarship

TEACHING AND MENTORSHIP

Course Instructor (Lecturer)

	<i>Department of Electrical and Computer Engineering, University of Toronto</i>
Fall 2019	ECE302 – Probability and Applications <ul style="list-style-type: none">• Third-year undergraduate course• Enrolment: 100 students• Prepared and delivered lectures. Designed new coursework. Managed a team of six teaching assistants.
	<i>Division of Engineering Science, University of Toronto</i>
Spring 2019, 2018	MIE377 – Financial Optimization Models <ul style="list-style-type: none">• Third-year undergraduate course• Enrolment: 30 students• Instructor rating: 4.6 / 5.0• Prepared and delivered lectures. Updated the course curriculum. Redesigned the coursework to emphasize practical applications with real financial data. Managed a team of two teaching assistants. Successfully underwent the Canadian Engineering Accreditation Board skills assessment process during the Spring 2018 term.
Fall 2018	MIE375 – Financial Engineering <ul style="list-style-type: none">• Third-year undergraduate course• Enrolment: 30 students• Instructor rating: 4.5 / 5.0• Prepared and delivered lectures. Updated the course curriculum. Managed the teaching assistant to ensure proper alignment between lectures and tutorials.

Teaching Assistant

	<i>Division of Engineering Science, University of Toronto</i>
Fall 2019	MIE479 – Capstone Design Project <ul style="list-style-type: none">• Fourth-year undergraduate course• Enrolment: 30 students
	<i>Master of Mathematical Finance Program, University of Toronto</i>
Fall 2017 – 2019	MMF2000 – Risk Management <ul style="list-style-type: none">• Graduate course• Enrolment: 30 students
Summer 2017 – 2019	MMF1921 – Operations Research <ul style="list-style-type: none">• Graduate course• Enrolment: 30 students
	<i>Department of Mechanical and Industrial Engineering, University of Toronto</i>
Fall 2016	MIE1621 – Non-Linear Optimization <ul style="list-style-type: none">• Graduate course• Enrolment: 45 students

Student Supervision

Sep 2019 – Apr 2020	Yu Zhang (undergraduate student, co-supervised with Prof. Roy Kwon) Thesis: Dimensionality reduction of fundamental financial features for portfolio optimization
Sep 2019 – Apr 2020	Yang Yang (undergraduate student, co-supervised with Prof. Roy Kwon) Thesis: Improving mean–variance optimization through the DCF method

Volunteer Tutor

Sep 2015 – Jun 2017	<i>Pathways to Education, Regent Park</i> Mathematics and physics tutor in a priority-neighborhood in Toronto
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ACADEMIC SERVICE AND DEVELOPMENT

Academic Service

Sep 2017 – Present	<i>The Engineering Economist Journal</i> Journal paper reviewer in mathematical optimization and applications
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Academic Development

Fall 2019	<i>Prospective Professors-in-Training Program</i> The program introduces candidates to the rigours of teaching and learning within the context of engineering education. Additionally, it prepares candidates to hold an academic position by discussing the responsibilities of teaching, research, and administration.
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PROFESSIONAL EXPERIENCE

Toronto–Dominion Bank, Toronto, ON

Oct 2017 – Sep 2018/	<i>Senior Risk Analyst, TD Wealth – Credit and Market Risk</i>
Oct 2016 – Mar 2017	Received a Mitacs Accelerate research grant to develop a novel equity risk model to measure the propensity of stocks to suffer from price shocks. This model applies machine learning principles while retaining interpretability, and leverages large financial data sets. After preparing all pertinent documentation, the model successfully underwent the TD validation process. Other responsibilities included quantitative research and statistical analysis of large financial data sets.
Apr 2017 – Sep 2017	<i>Research Associate, TD Securities – Capital Markets Risk Management</i> A second project involved modelling of interest rate shocks under a negative rate environment. This model is to be used within the Monte Carlo simulation framework to measure the Value-at-Risk of the bank's portfolios.

Wood plc, Oakville, ON

Sep 2014 – Aug 2015	<i>Project Engineer-in-Training</i> Project: Rainy River Coordinated the preparation of deliverables between the engineering, scheduling, and cost control departments. Evaluated equipment tender bids and provided technical recommendations.
Mar 2014 – Aug 2014	<i>Field Engineer, On-site at Buchanan, Liberia</i> Project: Liberia Western Range Iron Ore – Phase II Performed project management duties for a large-scale construction project. Supervised construction and scheduling of project activities. Coordinated between the engineering and construction management teams.
Jul 2012 – Feb 2014	<i>Mechanical Engineer-in-Training</i> Projects: Liberia Western Range Iron Ore – Phase II, Belle Plaine, Copper Cliff Prepared and checked engineering calculations and technical drawings. Prepared computational fluid-flow models and stress analysis of piping systems.

PROFESSIONAL AFFILIATIONS

Apr 2019 – Present	Student Member, Institute for Operations Research and the Management Sciences (INFORMS)
Nov 2018 – Present	Student Member, Canadian Operations Research Society (CORS)
Aug 2012 – Present	Engineer-in-Training, Professional Engineers Ontario (PEO)