

CONTACT INFORMATION	Larkin Liu Arcisstraße 21, 80333 Munich, DE	larkin.liu@tum.de https://larkz.github.io
CITIZENSHIP	Canadian	
RESEARCH INTERESTS	Operations Research, Monte Carlo Methods, Reinforcement Learning	
CURRENT POSTING	Technical University of Munich Doctoral Candidate TUM School of Management	Munich, Bavaria, Germany
	<ul style="list-style-type: none"> • Working Thesis: <i>Reinforcement Learning and Monte Carlo Optimization Algorithms for Supply Chain Economics</i> • Advisor: Prof. Dr. Stefan Minner 	
EDUCATION	University of Toronto Master of Applied Science, Industrial Engineering Focus in Operations Research	Toronto, Ontario, Canada 2015 - 2017
	<ul style="list-style-type: none"> • Thesis: Comparative Study between Statistical Fraud Detection Methods for eCommerce • Advisor: Prof. Dr. Viliam Makis • Committee: Viliam Makis, Chi-Guhn Lee, Vahid Sarhangian 	
	University of Toronto Bachelor of Applied Science, Mechanical Engineering Minor in Robotics and Mechatronics	Toronto, Ontario, Canada 2010 - 2015
	<ul style="list-style-type: none"> • Graduated with Honours (cum laude) • Extra Credits in Physics & Computer Science 	
CONFERENCE PROCEEDINGS	[C1] L. Liu, R. Downe, and J. Reid. Multi-Armed Bandit Strategies for Non-Stationary Reward Distributions and Delayed Feedback Processes. <i>In Canadian Operational Research Society 61st Annual Conference (CORS)</i> . arXiv:1902.08593v1 . 2019.	
JOURNAL PUBLICATIONS	[J1] L. Liu, J. Luo. <i>mctreesearch4j</i> : A Monte Carlo Tree Search Implementation for the JVM. <i>Journal of Open Source Software</i> . doi:10.21105/joss.03804 . 2022	
MANUSCRIPTS	[M1] L. Liu. Approximate Nash Equilibrium Learning for n-Player Markov Games in Dynamic Pricing. <i>Manuscript available</i> . arXiv:2207.06492 . 2022	
	[M2] L. Liu. Algorithm for Two-Phase Facility Planning via Balanced Clustering and Integer Programming. <i>Manuscript available</i> . arXiv:1902.08593v1 . 2020	
	[M3] L. Liu, J. Reid, Y.C. Lin. Improving the Performance of the LSTM and HMM Model via Hybridization. <i>Manuscript available</i> . arXiv:1907.04670 . 2019	
PAPERS IN PROGRESS	[R1] L. Liu, S. Minner. Dual-Sourcing under Inventory Disruption Risk via Dynamic Programming with Monte Carlo Value Approximation <i>In progress</i> . 2022	

INVITED TALKS

- [P1] Applications of Data Science in the Logistics Domain. *PhD Seminar at Munich Data Science Institute*. Online Event. 01.06.2022. (~15 Attendees)
- [P2] An Extensible and Modular Design and Implementation of Monte Carlo Tree Search for the JVM. *Invited Speaker at Boston Computation Club*. Online Event. 25.10.2021. (~5 Attendees)
- [P3] Deploying Deep Learning Models at Scale on GPU-enabled Clusters. *Invited at Speaker Databricks-Zalando Community Event*. Online Event. 04.06.2021. (~80 Attendees)
- [P4] Recurrent Neural Networks for Quasi AB Testing. *Invited Speaker at Data Science Days Zalando*. Online Event. 01.06.2021. (~400 Attendees)
- [P5] Multi-Armed Bandit Strategies for Non-Stationary Reward Distributions and Delayed Feedback Processes. *Invited Speaker at AISC*. Toronto ON Canada. 2019. (~30 Attendees)
- [P6] Application of Machine Learning in Advertising Technology at StackAdapt. *Guest Lecturer at the University of Toronto School*. Toronto ON Canada. 2018. (~20 Attendees)
- [P7] How Data Science is Revolutionizing Digital Advertising *Invited interview at StackAdapt*. Toronto ON Canada. 03.09.2017. (Media Publication)
- [P8] What is Artificial Intelligence? *Invited Guest on Interview with Najeeb Khan*. Toronto ON Canada. 15.03.2017. (Media Publication)

TECHNICAL REPORTS

- [T1] L. Liu, J. Luo, An Extensible and Modular Design and Implementation of Monte Carlo Tree Search for the JVM. *Text available*. [arXiv:2108.10061](https://arxiv.org/abs/2108.10061). 2021
- [T2] Early Gearbox Fault Detection via Auto-Regressive Models in the Time Domain constructed from Vibrational Data. [Summer Research Fellowship Program](#). University of Toronto. 2012
- [T3] Automated Measurement of Contact Angles for Sessile Droplets using MATLAB Image analysis Library. [Summer Research Assistant](#). University of Toronto 2011

ARTICLES

- [A1] L. Liu. Data Science Do's and Don'ts. *Online Article*. [LinkedIn](#). 2016

TEACHING

Co-Instructor - Stochastic Modeling and Optimization (WI000977) Winter 2022/2021
Technical University of Munich

- Deliver course materials, graded exams, prepare lectures, and provide student support.

Co-Instructor - Data Science for Logistics (WIB22964SE) Summer 2022
Technical University of Munich

- Prepare datasets, graded presentations and reports, and provide student support.

Mentor January 2019 - September 2020
SharpestMinds

- Prepared tutorials and lessons in mathematics, statistics, computer science and machine learning for students who wish to work in the industry based out of Canada and the USA.

Teaching Assistant - Reliability Engineering (MIE364) Winter 2017
University of Toronto

- Provided exam and assignment grading in addition to student support.

Teaching Assistant - Introduction to Computer Programming (APS104) Fall 2016
University of Toronto

- Provided laboratory and tutorial instruction.

STUDENTS ADVISED	2022	M. Rueda, Master Candidate	Technical University of Munich
		Advanced Seminar Project: <i>Data-Driven Marketing Strategy for Bike Sharing System</i>	
	2022	H. Mohamed, Master Candidate	University of Strathclyde
		Master Thesis: <i>Designing a Dynamic Game-playing AI</i>	
	2020	P. Damiba, Data Science Fellow	SharpestMinds
		Industry Project: <i>Predicting Click-Through Rate for Online Advertising</i>	
INDUSTRY EXPERIENCE	2020	G. Swarg, Data Science Fellow	SharpestMinds
		Industry Project: <i>Optimizing Consumer Purchasing Behaviour for Grocery eCommerce</i>	
	2019	S. Badavanahalli, Data Science Fellow	SharpestMinds
		Industry Project: <i>Analyzing Response Times for the San Francisco Fire Department</i>	
		Zalando SE	Berlin, Germany
		Applied Scientist	January 2020 - October 2021
		<ul style="list-style-type: none"> Worked extensively on the development of new deep learning architectures for causal inference, deployed at scale on SLURM and Databricks GPU- Enabled clusters with upstream Apache Spark based infrastructure fully integrated into company standard CI/CD processes. 	
		Loblaw Companies Ltd.	Toronto, Ontario, Canada
		Data Scientist	August 2018 - January 2020
		<ul style="list-style-type: none"> Research and development on mixed integer programming algorithms for optimal path planning in the fulfillment pick-up mobile application, as well as designing bandit algorithms to test and deploy various strategies for store inventory allocation optimizing for profit and minimizing surplus. 	
		StackAdapt Inc.	Toronto, Ontario, Canada
		Data Scientist	October 2016 - August 2018
		<ul style="list-style-type: none"> Lead a team of 3 software engineering interns, and 2 software engineers reporting directly to the CTO for StackAdapt's first machine learning driven real time bidding auction optimization system. 	
		Paytm Labs	Toronto, Ontario, Canada
		Visiting Scientist	June 2015 - September 2016
		<ul style="list-style-type: none"> Built experimental prototypes for fraud detection classification using traditional machine learning techniques, such as Logistic Regression, Random Forest, as well stochastic modelling techniques, such as Hidden Markov Models. 	
		RBC Capital Markets	Toronto, Ontario, Canada
		Research Student	June 2014 - April 2015
		<ul style="list-style-type: none"> Applied multivariate Box-Jenkins Modelling on financial securities trading data to value of potential portfolio assets via robust forecasting metrics. 	
		Advanced Micro Devices Inc.	Toronto, Ontario, Canada
		Reliability Engineering Intern	May 2013 - May 2014
		<ul style="list-style-type: none"> Performed quality and reliability testing of discrete GPU's under computational load in order to characterize the statistical reliability of hardware. 	

GRANTS & AWARDS	2021	Dynamic Pricing Competition First Place	500 EUR
	2015	Mitacs Accelerate Industry Government Joint Research Grant	C\$30,000
	2013	Wallace G Chalmers Engineering Design Award	C\$860
	2012	University of Toronto Faculty of Applied Science Engineering Research Fellowship	C\$3000
	2012	Cancer Care Ontario IDEA Challenge Development Grant	C\$1000
	2010	Magna Family Scholarship	C\$10,000
REVIEWER	2022	Referee	International Journal of Production Economics
PUBLIC SERVICE	2022	Coach	MDSI GreenHack IT
	2022	Organizer	MDSI Workshop on Stochastic Modelling and MCTS
	2022	Admissions Interviewer	TUM School of Management
	2022	Volunteer	MSOM Annual Conference
	2019	Session Chair	CORS Annual Conference - Business Analytics Section
RECOGNITION	2022	Acceptance	EURO StochMod PhD School
	2015	Academic Rank of 2/202 Students	University of Toronto
	2009	Scored Top 1% in	Sir Isaac Newton Physics Contest
PROFESSIONAL MEMBERSHIP	2022-	<i>President</i>	TU Munich Canadian Students Association (TUMCSA)
	2022-	<i>Member</i>	Munich Data Science Institute (MDSI)
	2022-	<i>Member</i>	Institute of Electrical and Electronics Engineers (IEEE)
	2015-	<i>Member</i>	Canadian Operational Research Society (CORS)
	2015-2017	<i>President</i>	University of Toronto Data Science Group (UTDSG)
	2015-2017	<i>Member</i>	University of Toronto Operations Research Group (UTORG)
	2012-2017	<i>Member</i>	University of Toronto Robotics Association (UTRA)
LANGUAGES	English (Native), Chinese (Native), German (B1)		
TECHNICAL SKILLS	Programming Languages (Advanced Proficiency):		Python, Scala, Kotlin
	Programming Languages (Intermediate Proficiency):		C, Java, Shell, R
	Distributed Computing Frameworks:		Apache Spark, Hadoop
	High Performance Computing Frameworks:		SLURM, Docker
	Operating Systems:		Windows, Linux, MacOS
OTHER ACTIVITIES	2022-	Violinist	Epsilon Chamber Music Ensemble
	2022-	Administrator (TUM)	Wharton Data Research Data Services
	2012-	IT Consultant	Freelance