Abderrahmane Abbou

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Interested in the development of new models and algorithms for decision making under uncertainty

EDUCATION

University of Toronto, Toronto, ON, Canada

- PhD - Industrial Engineering — 2015 – 2020
  - Area: Operations Research
  - Thesis: Maintenance Optimization of Partially Observable Complex Systems
  - Adviser: Prof. Viliam Makis
- MEng - Industrial Engineering — 2014 – 2015
  - Area: Operations Research
  - Thesis: Multi-Echelon Spare Parts Inventory Control
  - Adviser: Prof. Viliam Makis

Concordia University, Montreal, QC, Canada

- BEng - Industrial Engineering (with distinction) — 2008 – 2013

TECHNICAL EXPERTISE

Mathematical Models

- *Optimization*: mathematical programming, approximate dynamic programming, heuristic search
- *Probability*: Markov renewal theory, diffusion processes, stochastic simulation
- *Statistics*: hidden Markov models, Bayesian inference, maximum likelihood estimation

Computational Tools

- *Programming Languages*: C++, Python, R
- *Software Packages*: Arena, CPLEX, GAMS, Minitab, SQL, VBA

RESEARCH INTERESTS

Dynamic Resource Allocation

- *Methodologies*: restless bandits, index policies, linear programming relaxation, Lagrange duality
- *Applications*: inventory routing, maintenance planning, multitasking

Statistical Process Control

- *Methodologies*: optimal stopping, Bayesian control charts, expectation-maximization algorithm
- *Applications*: quality control, condition-based maintenance, intrusion detection

Wiener Disorder Detection

- *Methodologies*: stochastic differential equations, first-passage time statistics, threshold-based policies
- *Applications*: risk management, quantitative finance

JOURNAL PUBLICATIONS

[1] A. Abbou, and V. Makis, "Event-triggered Bayesian control chart," *Working Paper*, 2021

[2] A. Abbou, and V. Makis, "Group maintenance: A restless bandits approach," *INFORMS Journal on Computing*, vol. 31, no. 4, pp. 719–731, 2019

CONFERENCE PROCEEDINGS

[1] A. Abbou and V. Makis "Bayesian process control using sensor signals and multivariate sample data," accepted at *Proceedings of the 2020 IISE Annual Conference*, Virtual, Nov 2020

[2] A. Abbou, V. Makis, L. Paganin, N. Farooqi and S. Delesalle, "Opportunistic maintenance policy for a bus engine cooling system," in *Proceedings of the 2019 IISE Annual Conference*, Orlando, FL, USA, May 2019

[3] A. Abbou, V. Makis and N. Salari, "Real time control of partially observable deteriorating processes," in *Proceedings of the 2018 IISE Annual Conference*, Orlando, FL, USA, May 2018

[4] A. Abbou, V. Makis and N. Salari, "An index policy for scheduling group maintenance services," in *Proceedings of the 2017 IISE Annual Conference*, Pittsburgh, PA, USA, May 2017

[5] A. Abbou and V. Makis, "Average cost and availability evaluation for a machine repair problem with spares," in *Proceedings of the 2016 IISE Annual Conference*, Anaheim, CA, USA, May 2016

PRESENTATIONS

[1] A. Abbou and A. Aboussalah, "Trend-following strategy under unobservable regime-switching: A simple computation of optimal trading thresholds," in *CIBC Seminar Series*, Toronto, ON, Canada, Jul 2020

[2] A. Abbou and A. Aboussalah, "Wiener switching disorder problem: A simple computation of detection thresholds under the average cost criterion," in *CIBC Seminar Series*, Toronto, ON, Canada, Jun 2020

[3] N. Farooqi, A. Abbou and V. Makis, "Opportunistic maintenance modeling for urban transit buses," in *Annual MIE Graduate Research Symposium*, Toronto, ON, Canada, Jun 2018

[4] N. Farooqi, A. Abbou and V. Makis, "Complex multi-unit system failure analysis and predictive reliability modeling for urban transit buses," in *CNAM Student Research Symposium*, Windsor, ON, Canada, May 2018

[5] A. Abbou and V. Makis, "An index policy for group maintenance scheduling," in *Annual MIE Graduate Research Symposium*, Toronto, ON, Canada, May 2017

[6] A. Abbou and V. Makis, "Vehicle routing in finite source queueing networks," in *Annual MIE Graduate Research Symposium*, Toronto, ON, Canada, Jun 2016

ACADEMIC RESEARCH

Postdoctoral Researcher at University of Delaware 2021 – 2022

- Department: Civil & Environmental Engineering
- Project: Earthquake Risk Management of Critical Infrastructure
- Supervisors: Prof. Rachel Davidson

Research Assistant at University of Toronto 2015 – 2019

- Department: Mechanical & Industrial Engineering
- Project: Maintenance Modelling & Optimization
- Supervisors: Prof. Viliam Makis

Research Assistant at Concordia University 2013 – 2014

- Department: Mechanical, Industrial & Aerospace Engineering
- Project: Preventive Healthcare Facility Network Design under Congestion
- Supervisors: Prof. Onur Kuzgunkaya, Prof. Navneet Vidyarthi

INDUSTRY RESEARCH

Risk Modelling Researcher at CIBC 2020 – 2020

- Department: Capital Markets Risk Management
- Project: Capitalization of Non-Modellable Risk Factors
- Supervisors: Dr. Hany Farag, Dr. Mahdi Ramezani, Dr. François Ouegnin

MITACS Internship at WSP 2018 – 2019

- Department: Global Advisory
- Project: Reliability Study for Urban Transit Buses
- Supervisors: Prof. Viliam Makis, Mr. Jeffrey Seider

Capstone Design Project at Remco 2012 – 2013

- Department: Warehousing
- Project: Optimization of Pick-and-Pack Operations

- Supervisor: Prof. Masoumeh Kazemi-Zanjani, Ms. Jody Cohen

TEACHING EXPERIENCE

Teaching Assistant at University of Toronto 2015 – 2020

- APS1040: Quality Control for Engineering Management (Graduate)
- MIE236: Probability (Undergraduate)
- MIE364: Methods of Quality Control and Improvement (Undergraduate)
- MIE1727: Statistical Methods in Quality Assurance (Graduate)

AWARDS & SCHOLARSHIPS

University of Toronto

- MITACS Accelerate 2018 – 2019
- Department of Mechanical & Industrial Engineering Fellowship 2015 – 2019

Concordia University

- Dean's List 2012 – 2013

REFERENCES

- **Viliam Makis**, Professor Emeritus - *Operations Research*
  Mechanical & Industrial Engineering, University of Toronto
  5 King's College Road, Toronto, ON, Canada M5S 3G8
  makis@mie.utoronto.ca • +1 (416) 978-4184
- **Daniel Frances**, Professor - *Operations Research*
  Mechanical & Industrial Engineering, University of Toronto
  5 King's College Road, Toronto, ON, Canada M5S 3G8
  frances@mie.utoronto.ca • +1 (416) 946-7435
- **Navneet Vidyarthi**, Assistant Professor - *Supply Chain and Business Technology Management*
  John Molson School of Business, Concordia University
  1450 Guy St, Montreal, QC, Canada H3H 1J5
  n.vidyarthi@concordia.ca • +1 (514) 848-2424 ext. 2990
- **Mahdi Ramezani**, Director of Modelling & Methodology - *Quantitative Risk*
  Capital Markets Risk Management, CIBC
  161 Bay St, Toronto, ON, Canada M5J 1C4
  mahdi.ramezani@cibc.com • +1 (416) 585-1568
- **François Ouegnin**, Senior Quantitative Analyst - *Quantitative Risk*
  Capital Markets Risk Management, CIBC
  161 Bay St, Toronto, ON, Canada M5J 1C4
  francoisa.ouegnin@cibc.com • +1 (416) 313-1131

PERSONAL

- **Citizenship:** Canadian-Moroccan
- **Languages:** Arabic, English, French
- **Interests:** Sports (Basketball, Soccer), Movies (Drama, Science)