**Amine Mohamed Aboussalah**

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https://amineaboussalah.github.io/

**EDUCATION**

**University of Toronto,** Toronto, Canada 2017-present

* Ph.D. in Operations Research & Artificial Intelligence, GPA: 4.0/4.0
* Thesis: High-dimensional continuous reinforcement learning for finance.
* Improve reinforcement learning by exploiting topological properties (symmetries) of dynamical systems and time series.

**Polytechnique Montréal,** Montreal, Canada 2016-2017

* Started M.S. in Applied Mathematics & Data Science, GPA: 3.91/4.0. Transferred to Ph.D. program at University of Toronto.
* Canada Excellence Research Chair in Data Science for Real-Time Decision Making.

**HEC Paris,** Paris, France 2013

* Postgraduate Diploma, Innovation Management in Aviation & Aerospace, GPA: 4.0/4.0
* Thesis: Can the problems faced by the Boeing 787 “Dreamliner” be explained by Boeing’s innovative supply chain strategy?

**ISAE-SUPAERO,** Toulouse, France and **Polytechnique Montréal,** Montreal, Canada 2008-2013

* Integrated Bachelor and Master in Engineering Physics, Aerospace Engineering, Astrophysics and Applied Mathematics.
* Thesis: Revealing the nature of a new black hole “Swift J1745-26” in outburst.
* Mention d’Excellence.

**RESEARCH EXPERIENCE**

**Fujitsu Co-Creation Research Laboratory at the University of Toronto***,* Toronto, Canada 8/2019-9/2020

* Research assistant – Solving complex optimization problems using quantum-inspired computing.

**Canada Excellence Research Chair in Data Science for Real-Time Decision Making**, Montreal, Canada 1/2016-8/2017

* Research assistant – Development of RNNs for estimation and prediction of time series with missing data.

**Cancer University Institute of Toulouse Oncopole***,* Toulouse, France 9/2014-8/2015

* Research assistant – Algorithm development for automatic organ delineation in adaptive radiation therapy.

**French Alternative Energies and Atomic Energy Commission (CEA-Saclay)***,* Paris, France 6/2013-12/2013

* Research assistant – Photometric and Spectroscopic analysis of a black hole candidate in outburst (Swift J1745-26).

**Thin Film Physics and Technology Research Group (GCM)***,* Montreal, Canada 4/2011-8/2011

* Research assistant – Study of the transport of electric charges and spin dynamics in materials and magneto-devices.

**Canadian Space Agency (CSA)***,* Montreal, Canada 4/2010-8/2010

* Research assistant – Modeling thin film growth and evaluating the emissivity of thermochromic materials.

**ENTREPRENEURIAL EXPERIENCE**

**Cofounder of DeepAlpha Inc.***,* Toronto, Canada 4/2020-present

* Quantitative research firm applying scientific techniques, AI, and Quantum Computing to find patterns in large, noisy real-world financial data sets. Currently in R&D phase.

**Cofounder of Maidan Analytics Ltd.**, Toronto, Canada 12/2019-present

* Political Risk Consultancy leveraging AI and Quantum Computing to forecast protest-related risk.

**Cofounder of YopiCar***,* Rabat, Morocco 9/2014-12/2015

* Carpooling start-up to address the problematic isolation of regions that are poorly served by public transportation.
* 17,000+ subscribers when I left.

**TEACHING EXPERIENCE**

**Teaching Assistant**, University of Toronto, Toronto, Canada 9/2018-present

* MIE567H1 – Dynamic and Distributed Decision Making (4 semesters). Teaching, lab, grading, office hours.
* MIE367H1 – Cases in Operations Research (2 semesters). Lab, grading, office hours.
* MIE364H1 – Quality Control and Improvement (2 semesters). Teaching, lab, grading, office hours.

**Volunteer High School Tutor**, SUPAERO Diversity Program, Toulouse, France 9/2012-12/2014

* Physics I – Motion, Mechanics, Electricity and Magnetism (6 hours a week).

**TECHNICAL & LANGUAGE SKILLS**

* Programming languages: Python, Matlab, C, TeX, and Java.
* Routine use of Windows, Mac OS and Linux.
* Languages: Native in English, French, and Arabic; Familiar with Spanish and Italian.

**PROJECTS**

**ISAE-SUPAERO**, Toulouse, France

* Simulation of the temperature field in a seismometer for the InSight Mission, NASA Discovery Program Mission (2013).
* The study of Dark Energy models to explain the acceleration of the expansion of the Universe (2012).
* Development of a space launcher design to transfer satellites in orbit (2012).
* The study of a star tracker in order to justify its functional role in a complex system such as satellite platforms (2012).

**Polytechnique Montréal**, Montréal, Canada

* Conception of a conductance measurement system using Mechanically Controlled Break junctions (2010).
* Conception of an electrodynamic thruster to levitate a weight and to propel a vehicle (2009).

**SCHOLARSHIPS & AWARDS**

* NSERC Canada Graduate Scholarship – Michael Smith Foreign Study Supplements (CGS-MSFSS) – $6,000 (2021).
* Alexander Graham Bell Canada Graduate Fellowship (CGS D) – Ranked 7th Nationwide – $70,000 (2019-2021).
* Fonds de Recherche du Québec – Nature et Technologies (FRQNT) – $42,000 (2017-2019).
* Barbara and Frank Milligan Graduate Fellowship – $5,460 (2017).
* CAE-R. Fraser Elliott Scholarship – $2,000 (2017).
* Polytechnique Montréal Graduate Scholarship Award – $20,000 (2016).
* Award of Excellence of the Director General of Polytechnique Montréal (2014).
* International Profile Award of Polytechnique Montréal (2014).
* Pegasus Award in Engineering (2014).
* Selected for the Québec Lieutenant Governor’s Medal (2013).
* Exchange Student Mobility Scholarship – $10,000 (2011-2013).
* Roasters Foundation Distinction Scholarship – $2,500 (2011).
* Unit Participation and Initiation Research Scholarship – $1,500 (2011).
* Arthur Yelon and John Brebner Low Award – $4,800 (2011).
* Québec Advanced Materials Group Award (RQMP) – $5,000 (2010).
* Distinction scholarship (Ministry of Higher Education Morocco-Canada cooperation program) – $28,000 (2008-2011).

**SPORTS AWARDS**

* Champion of GECOS Soccer Tournament, MIE Team (gold medal - Toronto, 2019)
* Vice champion of Intramurals Athletics League, 1st Division Soccer SGS Team (Toronto, 2018 & 2019)
* French Football Federation (FFF) License Futsal Player (2011).
* Best soccer player (“Artist Prize” - CEPSUM soccer tournament - Montreal, 2010).
* Top scorer player (CEPSUM soccer tournament - Montreal, 2009).
* Champion and vice champion of Morocco in Taekwondo under 16 (gold medal in 2001 and silver medal in 2002).

**PUBLICATIONS**

* **Aboussalah, A.M.**, Lee, C-G. Symmetry Augmentation Using Direct Sum for Time Series Reinforcement Learning. Available at SSRN (In preparation for INFORMS – Mathematics of Operations Research).
* **Aboussalah, A.M.**, Lee, C-G. Reinforcement Learning with Symmetry Augmentation for Portfolio Management. Available at SSRN (In preparation for Quantitative Finance).
* **Aboussalah, A.M.**, Xu, Z., Lee, C-G. What is the Value of Cross-Sectional Approach to Deep Reinforcement Learning? Available at SSRN (In preparation for Quantitative Finance).
* **Aboussalah, A.M.**, Ananth, R. , M. Akrout. Attacking the COVID-19 Pandemic Spread with Reinforcement Learning (working paper).
* **Aboussalah, A.M.**, El Mesbahi, Y., Zhang, D. Building Financial Baskets with Quantum Computing. Submitted to Physica A: Statistical Mechanics and its Applications (2020).
* **Aboussalah, A.M.**, Orban, D. An Optimal Control Based Approach for Simulating Black Holes. Submitted to Journal of Physics: Conference Series (JPCS) (2020).
* **Aboussalah, A.M.**, Lee, C-G. Continuous Control Deep Dynamic Recurrent Reinforcement Learning for Portfolio Optimization. Expert Systems With Applications (ESWA-112891) (2020).
* Taib, B., **Aboussalah, A.M.**, Moniruzzaman, M., Chen, S., Haughey, N.J., Kim, S.F., Ahima, R. S. Lipid Accumulation and Oxidation in Glioblastoma Multiforme. Scientific Reports - Nature, volume 9, Article number: 19593 (2019).
* **Aboussalah, A.M.**, Neal, C. Forecasting Local Warming: Missing Data Generation and Future Temperature Prediction. Cahiers du Gerad. G-2016-76, ISSN: 0711-2440 (2016).
* Lopez-Oramas, A., Chaty, S., Coleiro, A., **Aboussalah, A.M.** Infrared and Optical Observations of the Black Hole X-Ray Transient Swift J1745-26. Submitted to Mon. Not. R. Astron. Soc. 1-6, ISSN: 1365-2966 (2015).

**SEMINARS AND PRESENTATIONS**

* Symmetry-Augmented Representation for Time Series. COSMO – Stochastic Mine Planning Laboratory, McGill University, Canada (2020).
* High-Dimensional Reinforcement Learning for Finance. Canadian Imperial Bank of Commerce (CIBC Capital Markets), Toronto, Canada (2020).
* High-Dimensional State Space Representation for Portfolio Management, The Canadian Operational Research Society (CORS) Annual Conference, Toronto (2020) (Moved to 2021 due to COVID19).
* Deep Reinforcement Learning and Quantum Annealing for Risk Management in Financial Portfolio Optimization, The Canadian Operational Research Society (CORS) Annual Conference, Toronto (2020) (Moved to 2021 due to COVID19).
* Continuous Control with Deep Dynamic Recurrent Reinforcement Learning for Portfolio Optimization, 4th Industrial-Academic Workshop on Optimization and Artificial Intelligence in Finance, The Fields Institute, Toronto (2018).
* Optimization-Based Approach for Simulating Interstellar’s Wormhole. Institute for Data Valorization (IVADO), Montreal, Canada (2017).
* Forecasting Local Warming: Missing Data Generation and Future Temperature Prediction. CERC-Data Science, Montreal, Canada (2016).
* Can the Problems Faced by the Boeing 787 be Explained by Boeing’s Innovative Supply Chain Strategy? HEC Paris, France (2013).

**POPULAR-SCIENCE ARTICLES**

* Aboussalah, A.M., A la découverte d’un génie oublié. Les Cahiers de l’Imaginaire (2016).

**BROADCAST INTERVIEWS**

* Qu’est-ce qu’un Data Scientist? Kezakoo (2020) (in preparation).
* The problems of education in the 21st century. CreativeLab: The New School of Creativity (2016).
* YopiCar première plateforme de covoiturage au Maroc. Radio Maroc MedinaFM (2016).

**STUDENT SUPERVISION**

* Zixuan Wang, Constrained Deep Recurrent Reinforcement Learning for Portfolio Optimization. Master of Engineering at University of Toronto (2017).
* Vincent Xu, Quantum Reinforcement Learning, visiting student from Fudan University (2019).

**MENTORING ACTIVITIES**

* Student mentor at HEC Montréal. Number of Mentorees: 1 (2017).
* Student mentor at Polytechnique Montréal. Number of Mentorees: 3 (2016, 2017).

**EXTRA-CURRICULAR ACTIVITIES**

* Outreach Activities: It’s All About Math (IAAM) at the University of Toronto.
* Associations & Clubs: Astronomy SUPAERO Club, Futsal Club ISAE.
* Sports: Soccer, Basketball, Volleyball, Taekwondo, Fencing, Boxing, Archery.
* Interests: Travel, Teaching, Reading scientific reviews, Popular-science.