

Amine Mohamed Aboussalah

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EDUCATION

University of Toronto , Toronto, Canada	2017-present
<ul style="list-style-type: none">Ph.D. in Operations Research & Artificial Intelligence, GPA: 4.0/4.0Thesis: 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
<ul style="list-style-type: none">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
<ul style="list-style-type: none">Postgraduate Diploma, Innovation Management in Aviation & Aerospace, GPA: 4.0/4.0Thesis: 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
<ul style="list-style-type: none">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
<ul style="list-style-type: none">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
<ul style="list-style-type: none">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
<ul style="list-style-type: none">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
<ul style="list-style-type: none">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
<ul style="list-style-type: none">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
<ul style="list-style-type: none">Research assistant – Modeling thin film growth and evaluating the emissivity of thermochromic materials.	

ENTREPRENEURIAL EXPERIENCE

Cofounder of DeepAlpha Inc. , Toronto, Canada	4/2020-present
<ul style="list-style-type: none">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
<ul style="list-style-type: none">Political Risk Consultancy leveraging AI and Quantum Computing to forecast protest-related risk.	
Cofounder of YopiCar , Rabat, Morocco	9/2014-12/2015
<ul style="list-style-type: none">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
<ul style="list-style-type: none">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
<ul style="list-style-type: none">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. Akrouf. 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.