Amine Mohamed Aboussalah

amine.aboussalah@mail.utoronto.ca | (647) 509-7002 | Citizenship: US-Morocco, Canada Permanent Resident

EDUCATION

University of Toronto, Toronto, Canada 2019-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. Forced to stop due to family reasons.
- 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 787 "Dreamliner" be explained by Boeing's innovative supply chain strategy?

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

- Dual Bachelor and Master Degree 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 1/2019-9/2020

- 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 oncology.

French Alternative Energies and Atomic Energy Commision (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 3/2020-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 Inc., Toronto, Canada 09/2019-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

- MIE567H1 – Dynamic and Distributed Decision Making. Teaching, lab, grading, office hours.
- MIE367H1 – Cases in Operations Research. Lab, grading, office hours.

Volunteer High School Tutor, SUPAERO Diversity Program, Toulouse, France

- Physics I - Motion, Mechanics, Electricity and Magnetism (6 hours a week for 2012-2013 school year).

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.
- The study of Dark Energy models to explain the acceleration of the expansion of the Universe.
- Development of a space launcher design to transfer satellites in orbit.
- The study of a star tracker in order to justify its functional role in a complex system such as satellite platforms.

Polytechnique Montréal, Montréal, Canada

- Conception of a conductance measurement system using Mechanically Controlled Break junctions.
- Conception of an electrodynamic thruster to levitate a weight and to propel a vehicle.

SCHOLARSHIPS & AWARDS

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

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, 2019 & 2020)
- 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.**, Ananth, R., M. Akrout Attacking the COVID-19 Pandemic Spread with Reinforcement Learning. (working paper).
- **Aboussalah, A.M.** Symmetry Augmentation Using Direct Sum for Time Series Reinforcement Learning. Available at SSRN (In preparation for INFORMS – Mathematics of Operations Research).
- **Aboussalah, A.M.** 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.**, El Mesbahi, Y., Zhang, D. Building Financial Baskets with Quantum Computing. Submitted to Chaos, Solitons and Fractals (currently under review).
- **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. Mon. Not. R. Astron. Soc. 1-6, ISSN: 1365-2966 (2015).

SEMINARS AND ORAL 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).
- 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 (2019).
- Optimization-based approach for visualizing 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 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).

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.