Simon **Sehayek**

PH.D. PHYSICS

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Experience

Toronto Dominion Bank
Toronto, Canada

QUANTITATIVE ASSOCIATE – NON-RETAIL MODEL VALIDATION
January – July 2023

- Performed EWST model validation on both Commercial and Wholesale portfolios, while enhancing the capture of economic stress periods by creating and implementing a weighted-least squares method in Python.
- Streamlined EWST programming output by consolidating multiple ad hoc Python codes into a single automated script, significantly improving code execution time from approximately one hour to about ten minutes, and shared the finalized script using git.

QUANTITATIVE ASSOCIATE – SMALL BUSINESS BANKING
July 2023 – Present

- Generated visualizations of loan data using Python and pandas to support a risk-based pricing model, illustrating loan counts and loan loss rates across various risk segments.

McGill University
Montreal, Canada

RESEARCH ASSISTANT (PH.D. AND M.SC.)
2013 – 2021

- Developed a rapid autocorrelation method for quantifying photophysical rates from fluorescence data, achieving results in seconds compared to the time-intensive hours required by conventional single-molecule techniques, with subsequent publication in the high-impact journal ACS Nano.
- Created an autocorrelation method enabling simultaneous measurement of photoblinking and diffusion parameters from fluorescence data, applied it to analyze complex biological cell data, and published the findings in Biophysical Reports.
- Utilized MATLAB to generate synthetic fluorescence microscopy data through programmed simulations, facilitating comprehensive parameter exploration for model validation, and shared simulation codes on GitHub.
- Presented research in 2019 and 2020 at international Biophysical Society (BPS) conference, funded by awards from McGill and BPS.
- Collaborated with various research groups internationally to complete published projects.

Education

McGill University
Montreal, Canada

PH.D. PHYSICS
2015 – 2021
Thesis project: Sifting molecular noise with image correlation methods to measure transport and photophysical dynamics

M.SC. PHYSICS
2013 – 2015
Thesis project: Refinements and extensions of correlation techniques applied to fluorescence microscopy

B.SC. JOINT HONS. MATHEMATICS AND PHYSICS
2010 – 2013
Graduated with first class honors

Publications

1. Mikolajewicz, N.; **Sehayek, S.**; Wiseman, P. W.; Komarova, S. V. Transmission of Mechanical Information by Purinergic Signaling. *Biophys. J.* **116**(10), 2009-2022 (2019).
2. **Sehayek, S.**; Gidi, Y.; Glembockyte, V.; Brandão, H. B.; François, P.; Cosa, G.; Wiseman, P. W. A High-Throughput Image Correlation Method for Rapid Analysis of Fluorophore Photoblinking and Photobleaching Rates. *ACS Nano* **13**(10), 11955–11966 (2019).
3. **Sehayek, S.**; Yi, X.; Weiss, S.; Wiseman, P. W. Rapid Ensemble Measurement of Protein Diffusion and Probe Blinking Dynamics in Cells. *Biophys. Rep.* **1**(2), 100015 (2021).