GUNJAN LAKHLANI

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EXPERIENCE

Bank of Montreal (BMO) August 2021 - Present

Quantitative Researcher - Corporate Treasury

I am a quantitative researcher in the balance sheet management team inside corporate treasury. My work is divided into multiple sectors, I lead model development team that is responsible to migrate the currently used models to Python. I also leverage machine learning techniques to create models that help us classify trades. I lead the research and development arm of the balance sheet management team whereby my role is to work on generating and implementing novel ideas to help the day to day trading activities of our team.

Royal Bank of Canada (RBC) August 2020 - July 2021

Manager – Balance Sheet Risk

- I lead validation projects that measure interest rate risk in the banking book under B-12 OSFI guidlines. This includes developing independent benchmark models in python and producing validation reports. I have built several interest rate models to measure long and short term interest rate risk for the purposes of B-12 IRRBB guidelines.
- Theoretical and working knowledge of machine learning algorithms (regression, classification, decision trees, support vector machines, auto-encoders, PCA).

Royal Bank of Canada May 2019 - July 2020

Data Scientist – Model Risk Management

- I worked on validating machine learning based models in the bank ranging in complexity from regression/classification to more sophisticated models leveraging deep learning techniques. I built benchmark models in python and used version control (git) on a regular basis.
- Lead validator for a resume screening model that used ensemble learning techniques. Validated NLP based models related to the OSFI Large Exposure Framework which used named entity tagging and string similarity algorithms.
- Developed a new validation methodology by successfully adapting and implementing **gen-attack** (an adversarial machine learning technique) for validating machine learning based probability of default (credit risk) models in the bank (based on tabular data sets). Helped write guidelines for validating supervised machine learning models.
- Formed machine learning questionnaires to assess model risk for vendor based machine learning models.
- Expert at writing technical documents for readers of various backgrounds.

University of Toronto August 2014 - November 2018

Doctoral Researcher in Computational Astrophysics

- Developed python packages to analyze large data-sets of simulated galaxies (`fire.northwestern.edu`). The main focus of my thesis was to understand and improve on the existing algorithms implementing star formation in high resolution galaxy simulations.
- Presented on the topic of star formation in galaxy simulations and initiated collaborations at multiple international conferences at Caltech and Johns Hopkins University.
- Lectured and explained advanced physics topics as a teaching assistant for the past four years to students ranging from first to fourth year in their undergraduate studies.

EDUCATION

University of Toronto, Toronto, ON *August 2014 - November 2018*
PhD in Physics, with specialization in computational astrophysics.
Advisor: Prof. Norman Murray
Thesis: The Structure and Dynamics of the Interstellar Medium in the FIRE Simulations

Perimeter Institute for Theoretical Physics, Waterloo, ON *August 2013 - July 2014*
Switched to University of Toronto

Perimeter Institute for Theoretical Physics, Waterloo, ON *August 2012 - June 2013*
Masters of Science in Physics

St. Xavier's College, Mumbai, India *July 2009 - June 2012*
Bachelors of Science in Physics

SKILLS

Computer Languages	Python, C, C++, Java, SQL, Bash
Tools	Git, Microsoft Excel, LaTeX, Microsoft Azure

PUBLICATIONS

- The Structure and Properties of GMCs in the FIRE Simulations (to be submitted to MNRAS)
- Turbulence in the FIRE Simulations (to be submitted to MNRAS)
- What is Neptune's D/H ratio really telling us about its water abundance? (published in MNRAS)
  - *with Mohamad Ali-Dib* *January 2018*
- Line-Intensity Mapping: 2017 Status Report (on ArXiv) *September 2017*
- Possible formation pathways for the low density Neptune-mass planet HAT-P-26b (published in MNRAS)
  - *with Mohamad Ali-Dib* *September 2017*

ACADEMIC ACHIEVEMENTS

University of Toronto Physics Graduate Scholarship *August 2014 - November 2018*
Marie Curie Graduate Student Award *January 2014 - August 2014*
International Doctoral Student Award *September 2013 - August 2014*
Science Graduate Experience Award *September 2013 - August 2014*
Perimeter Scholars International Award *August 2012 - June 2013*