

EDUCATION

Queen's University

Masters of Science, Astrophysics

Kingston, ON

Sept 2020 - Aug 2022

University of Toronto

Honours Bachelor of Science, Physics

Toronto, ON

2014 - 2020

TECHNICAL SKILLS

- o **Languages:** Python, C++ (currently learning)
- o **Tech Stack:** AWS (S3, DynamoDB, Lambda), Databricks, Docker, Git
- o **ML Libraries:** PyTorch, Sklearn, Scipy, Numpy, Pandas, Ray-Tune, MLFlow, Holoview, Composer
- o **MLOps Tools:** poetry (package manager), Github Actions (CI/CD), mypy, pydantic, ruff

PUBLICATIONS

1. **Jinsoo Park.** *"Calibrating The Davis-Chandrasekhar Fermi Method on Molecular Cloud Simulations"*. 2022. Queen's University.
2. Che-Yu Chen, Zhi-Yun Li, Richard I. Klein, Pak Shing Li, **Jinsoo Park**, Laura M. Fissel, Renato R. Mazzei, Michael C.-Y. Chen. *"The Davis-Chandrasekhar-Fermi Method Revisited"* 2022. MNRAS.
3. Renato Mazzei, Che-Yu Chen, Zhi-Yun Li, Richard I. Klein, Pak Shing Li, Laura M. Fissel, Michael C.-Y. Chen, **Jinsoo Park.** *"Relative Alignment Between Magnetic Fields and Molecular Gas Structure in Molecular Clouds"* 2023. MNRAS.

PRESENTATIONS

1. **Jinsoo Park**, Laura Fissel, BLAST-TNG Collaboration, SuperBIT Collaboration. *"The Use of Compression Algorithms for Balloon Borne Telescopes"*. Talk at The International Scientific Ballooning Technologies Workshop (2021)
2. **Jinsoo Park**, Laura Fissel, Martin Houde, Che-Yu Chen, Zhi-Yun Li, Renato Mazzei. *"Calibrating the Use of the Davis Chandrasekhar Fermi Method in High Density Star Forming Regions"*. Poster presentation at the Canadian Astronomical Society (2021)

EXPERIENCE

Xanadu Quantum Technologies

Jul 2023 - Present

Machine Learning Research Engineer

- o Developed an novel Transformer Encoder model used to estimate physical parameters from a non-linear photonic ring resonator. Developed an end to end training, monitoring and deployment solution using ComposerML and Databricks.
- o Created a end to end global optimization workflow for photonic ring resonance modelling with automatic logging and metric visualization through Databricks. Implemented batch fitting capabilities along with fit caching to store good quality fits that can be instantly retrieved via AWS S3.
- o Developed a end to end in-house custom optimization package used to solve stateless n-dimensional functions with remote computation capabilities via AWS lambdas. Example optimizers include: bayes, Multidriver, optuna tpe, nevergrad (and more), all of which are parallelized with Ray-Tune.

- o MLOps development using AWS, Docker, Databricks, MLFlow, Github Actions, MoasicML. Followed best practices such code review, integration & unit testing, and ensuring backward compatibility.

TD Banking Group

May 2022 - Jul 2023

Machine Learning Scientist

- o Developed a novel encoder-decoder Transformer model that uses product codes to predict missing privacy information for data tables across different lines of business at TD.
- o Proposed and lead a team of 2 co-ops to develop a proof of concept recommendation model using Graph Neural Networks (GNN) for credit card reward redemption. Demonstrated that the GNN model outperformed a standard collaborative filter model by 35% and presented the results to C-Suite executives, pushing for an adoption of use cases for deep learning models across TD.

Queen's University (Fissel Group)

Sep 2020 - Sep 2022

Msc. Student

- o Created [PyDCF](#), a statistical model (formally known as the Davis-Chandrasekhar Fermi Method) used to measure the magnetic field strength in star forming clouds. Worked with Dr. Martin Houde and Dr. Fissel to develop a Modified DCF (MDCF) method which improved the accuracy of the original model from 50% → 77% accuracy.
- o Developed a compression optimization pipeline capable of selecting the most optimal compression algorithm for any space image. This pipeline was deployed on the [NASA BLAST-TNG](#) space telescope and was capable of efficiently compressing an image up to 500% with minimal information loss.
- o Developed a multi-processing ETL pipeline to automate the image cleaning and data analysis process on more than 5000 images, saving over 30 hours/week in manual work.

WFHomie Inc.

Jan 2021 - Dec 2021

Software Engineer (part-time)

- o Integrated client/server user login authentication protocols along with the SaaS subscription payment system using APIs from Firebase and Stripe.
- o Created a search engine combined with pagination to optimize the back-end functionality, ensuring that web page requests are handled to less than 200 milliseconds.

University of Toronto (Netterfield Group)

Sep 2019 - May 2020

Undergrad Research Assistant

- o Developed a novel compression algorithm, used on the [SuperBIT](#) space telescope to reduce the down-link time of an image by over 437%.
- o Developed a Monte Carlo data simulation program that generated over 1000 gigabytes of pseudo-data, used for testing the efficiency of various compression methods.

University of Toronto (Vutha Group)

Apr 2018 - Sep 2019

Undergrad Research Assistant

- o Developed a simulation program for the [PolyEDM](#) collaboration to visualize the trajectory of super energized polyatomic molecules travelling through a molecular beam decelerator.
- o Programmed a numerical and analytical differential equation solver for the magnetic dipole moment of polyatomic molecules.

TEACHING

Queen's University

Teaching Assistant

- o Thermodynamics and Statistical Mechanics *2021*
- o Introductory Physics II *2020 - 2021*
- o Introductory Physics I *2020*

The Abelard School

High School Teacher

- Introduction to Programming
- Physical Education

2019 - 2020

2018 - 2019