Sammy Sharief

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Education

Université Paris-Saclay Dec 2025 – Current
PhD in Physics
- Advisors: François Lanusse, Tobias Liaudat, and Samuel Farrens

University of Montréal Sept 2023 – Sept 2025
Master of Science in Computer Science
- Advisor: Laurence Perreault-Levasseur

University of Illinois at Urbana-Champaign Aug 2019 – May 2023
Bachelor of Science in Liberal Arts & Sciences in Computer Science + Astronomy
Minor in Informatics
- Advisor: Gautham Narayan

Experience

MIRA: A Score for Conditional Distribution Accuracy and Model Comparison Paris, France
PhD Project Oct 2024 – April 2026
ICML 2026 Main Conference Spotlight Paper
- Spearheaded MIRA, a novel metric for evaluating conditional distribution accuracy and enabling model comparison across domains
- Validated MIRA across modalities and high-dimensional settings, demonstrating reliable model comparison through extensive experiments
- Led collaboration efforts by communicating results, overseeing paper drafts, and maintaining a well-documented, user-friendly repository

PQMass: Probabilistic Assessment of the Quality of Generative Models using Probability Mass Estimation Montréal, QC, CA
Feb 2024 – Jan 2025
Master's Project
- Co-developed PQMass, a statistical framework that quantifies generative model performance and tests whether two distributions match
- Benchmarked PQMass across modalities and dimensions, exposing failure modes of common metrics such as FID and FLD
- Maintained the PQMass repository, ensuring robust performance, scalability to millions of dimensions, and handling of complex edge cases

DECam Data Reduction Champaign, IL, USA
Research Assistant May 2023 – Aug 2023
- Ran data reduction for the Dark Energy Camera (DECam) supporting the Young Supernova Experiment and external DECam users
- Improved pipeline efficiency, built supernova target templates, and processed member requests for proposals and publications
- Authored detailed pipeline documentation covering reduction workflows and the improvements I contributed

Learning SESNA with Machine Learning Austin, TX, USA
Research Experience for Undergraduate NSF Intern June 2022 – Aug 2022
- Applied Multiple Imputations with Chained Equations to recover missing data across 9M Spitzer Extended Solar Neighborhood Archive (SESNA) sources
- Upsampled SESNA to balance class representation prior to training a Multi-Layer Perceptron (MLP)
- Classified 2.2M of 4.5M unlabeled sources using a probabilistic MLP classifier

Light Deflection near Kerr-Newman black hole spacetime — Rochester, NY, USA
Research Experience for Undergraduate NSF Intern — June 2021 – Aug 2021

- Investigated equatorial-plane photon trajectories near Kerr-Newman black holes, parameterized by mass, spin, and charge
- Derived approximate forms for photon orbits coinciding with the Innermost Circular Orbit as a function of the black hole's parameters
- Organized post-internship meetings to drive continued progress, culminating in a poster presentation at AAS 241

The Young Supernova Experiment Data Release 1 (YSE DR1): Light Curves and Photometric Classification of 1975 Supernovae — Champaign, IL, USA
Research Student — Jan 2021 – Apr 2023

- Built a pipeline to ingest Zwicky Transient Facility data and merge overlapping sources with the Young Supernova Experiment, producing an in-depth observational dataset
- Verified simulated supernovae against observations by extracting features with a modified Bazin fit, reducing dimensions with PCA, and using a KD-Tree for similarity matching

Publications

MIRA: A Score for Conditional Distribution Accuracy and Model Comparison — May 2026
Sammy Sharief, et al. ICML 2026 Main Conference Spotlight Paper

Uncertainty quantification metrics for scientific application — September 2025
Sammy Sharief Master's Thesis, University of Montréal

Pokie: Posterior Accuracy and Model Comparison — June 2025
Sammy Sharief, et al. Accepted to ML4Astro ICML 2025 Workshop

Field-Level Comparison and Robustness Analysis of Cosmological N-Body Simulations — May 2025
Adrian Bayer, Francisco Villaescusa-Navarro, ***Sammy Sharief***, et al. Submitted to AAS

PQMass: Probabilistic Assessment of the Quality of Generative Models using Probability Mass Estimation — Jan 2025
Pablo Lemos, ***Sammy Sharief***, et al. Accepted to ICLR Main Conference 2025

Searching for Bumps in the Cosmological Road: Do Type Ia Supernovae with Early Excesses Have Biased Hubble Residuals? — Feb 2024
Christine Ye, David O. Jones, Willem B. Hoogendam, Benjamin J. Shappee, Suhail Dhawan, ***Sammy Sharief***
Accepted by ApJ

The Young Supernova Experiment Data Release 1 (YSE DR1): Light Curves and Photometric Classification of 1975 Supernovae — Feb 2023
Patrick Aleo, Konstantin Malanchev, ***Sammy Sharief***, et al. Accepted by ApJ

SN 2022ann: A type Icn supernova from a dwarf galaxy that reveals helium in its circumstellar environment — Nov 2022
Kyle W Davis, et al Accepted by ApJ

Talks and Posters

NSF Funded SkAI Institute, Uncertainty Quantification for Generative Models in Astrophysics, *Talk* — Chicago, Feb 2026

International Conference on Learning Representations (ICLR), PQMass: Probabilistic Assessment of the Quality of Generative Models using Probability Mass Estimation, *Poster* — Singapore, April 2025

Centre de recherche en astrophysique du Québec, PQMass and its applicability to Astrophysics, *Talk* — Quebec, Canada, May 2024

Astronomy Festival (AstroFest 2023), Learning SESNA with Machine Learning, *Poster* — Illinois, USA, Jan 2023