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Tahina Princy Ranaivomanana

PhD Candidate

rtprincy
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http://rtprincy.github.io

Profile

Data scientist with a strong focus on machine learning (ML) and time-series data analysis. Specialised in applying advanced ML techniques to complex, multi-wavelength astrophysical datasets. Proficient in Python, with hands-on experience building and deploying ML models for tasks such as classification, anomaly detection, and synthetic image generation. Demonstrated ability to translate performance requirements into scalable computational software solutions. Published author in peer-reviewed journals and a key contributor to large-scale international collaborations, showcasing communication, teamwork, and cross-cultural project management skills. Now looking to leverage this unique blend of research, technical software and machine-learning expertise, requirements definition, and data-driven problem- solving in data-handling challenged in the scientific domain.

Experience

PhD project **10/2021 — Present**
Radboud University — KU Leuven *The Netherlands - Belgium*

- Developed an innovative approach to: i) identify 193 new hot subdwarf variables; and ii) filter out contaminant sources from a catalogue of ∼60,000 sources, using unsupervised machine learning with UMAP and t-SNE on Gaia DR3 time-series data.
- Designed and implemented efficient frequency analysis tools to detect periodicity in sparsely sampled, multi-colour, heteroscedastic time-series data from the MeerLICHT telescope.

MPhil project **2020 — 2021**
University of Manchester *United Kingdom*

- Developed semi-supervised GAN models for pulsar data synthesis and classification, aligning with large radio surveys (SKA).

Teaching Assistant
Radboud University

- Delivered tutorials for data analysis and astronomical instrumentation courses **2023 - 2024**
- Delivered tutorials for a Data Analysis course **2021**

KU Leuven

- Supervised two bachelor research projects (two students per project) **2022**

Education

PhD in Astronomy (dual PhD degree), *Radboud University — KU Leuven* **10/2021 — 09/2025**
MPhil in Astronomy, *University of Manchester* **2020 — 2021**
M.Sc. in Astronomy, *University of Antananarivo* **2016 — 2017**
B.Sc. Honours in Astrophysics, *University of Antananarivo* **2015 — 2016**
B.Sc in Physics, *University of Antananarivo* **2012 — 2015**

Skills

- Programming
  Python: Conduct big data analysis with libraries such as Pandas, NumPy, SciPy, and Astropy
- SQL
  Perform SQL query to retrieve and manipulate large datasets, including those from astronomical databases
- Bash scripting
  Automate task execution, job scheduling, and data pipeline management on UNIX-based systems
- Machine learning libraries: Tensorflow, Keras, Pytorch
  Perform classification, prediction, and clustering related tasks on tabular, time-series, and image data
- Deep Learning
  Perform synthetic data/image generation tasks based on neural network models
- Data handling
  Experience with extracting and handling large heterogeneous data, including those from astronomical observations: BlackGEM, Gaia, TESS, ZTF

Certification

Oxford machine learning school 2025 certificate (Online certificate)
Oxford machine learning school 2023 certificate (Online certificate)
Teaching training course: Offered by Radboud University (Online certificate)
Advanced Machine Learning and Signal Processing: Offered by IBM Skills Network (online certificate)
Data Analysis with Python: Offered by IBM Skills Network (online certificate)
Exploratory Data Analysis for Machine Learning: Offered by IBM Skills Network (online certificate)

Prizes and Grants

- Receipt of the Leids Kerkhoven-Bosscha Fonds (LKBF) grants for attending conferences 2023/2024/2025
- Recipient of the UK's Newton Fund/DARA Big Data MPhil Bursary 2020
- Receipt of SKA/SARAO grant to attend the 2nd Big Data Africa School — South Africa 2018

Relevant international conferences Attended & Talk contributions

- Oxford machine learning school (OxML), Oxford, UK 2023/2025

- The 12th international meeting on hot subdwarfs & related objects — North Carolina, US 2025

Talk title: Unravelling Hot Subdwarfs and Binaries Variability with Gaia DR3 and Machine Learning

- BlackGEM meeting — Manchester, United Kingdom 2024

Talk title: Time series analysis using machine learning

- MW-Gaia WG2 conference — Sofia, Bulgaria 2023

Talk title: Classification of variable stars observed in multiple filters with MeerLICHT and BlackGEM

Extracurricular Activities and Memberships

- Help high school students with their projects on time-series analysis, Netherlands 2025
- Help commissioning BlackGEM telescopes for two weeks in LaSilla, Chile 2023
- Leader of national activities during the IAU100 celebration 2019
- Former national coordinator of Malagasy Astronomical Society (MAS) 2019
- Project leader of a OAD/DARA funded project: *Madagascar Astronomy Magazine* 2018