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Tahina Princy Ranaivomanana
PhD Candidate

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PROFILE

Fourth-year PhD candidate (near completion) pursuing a dual degree at Radboud University (Netherlands) and KU Leuven (Belgium), specializing in multi-wavelength time-series data analysis and machine learning applications in stellar astrophysics. Proficient in Python programming and experienced with deep learning frameworks such as TensorFlow and PyTorch for synthetic image generation, as well as machine learning for time-series characterization and classification. Published in peer-reviewed journals with extensive experience in international collaborations.

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 catalog 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-color light curves 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).

MSc project   **2016 — 2017**
University of Antananarivo   *Madagascar*

- Investigated the formation and evolution of young massive clusters in interacting galaxies using photometry and population synthesis code

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 2 bachelor research projects (two students per project)   **2022**

EDUCATION

PhD candidate, *Radboud University — KU Leuven*	**10/2021 − 10/2025 (expected)**
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 datasets from astronomical databases - Bash scripting: Automate task execution, job scheduling, and data pipeline management
Machine learning	- Familiar with Tensorflow, Keras, Pytorch libraries - Perform classification, prediction, and clustering related tasks on tabular, time-series, and image data - Deep learning: Perform synthetic data/image generation tasks for imbalanced learning
Astronomy software	- Topcat: TAP query, data manipulation, and visualization - MESA & GYRE: Perform basic modeling tasks - Period04: Frequency search − pre-whitening tasks
Data handling	- Experience with large astronomical databases: BlackGEM, ZTF, TESS, Gaia

Relevant Peer-reviewed publication

[1] P. **Ranaivomanana**, M. Uzundag, C. Johnston, et al. "Variability in hot sub-luminous stars and binaries: Machine-learning analysis of Gaia DR3 multi-epoch photometry". In: 693, A268 (Jan. 2025), A268. DOI: 10 . 1051 / 0004 – 6361 / 202452429. arXiv: 2411.18609 [astro-ph.SR].

[2] P. **Ranaivomanana**, C. Johnston, P. J. Groot, et al. "Identifying and characterising the population of hot sub-luminous stars with multi-colour MeerLICHT data". In: 672, A69 (Apr. 2023), A69. DOI: 10 . 1051 / 0004 – 6361 / 202245560. arXiv: 2302 . 07266 [astro-ph.SR].

Certification

Teaching training course: Offered by Radboud University (Online certificate)
Oxford machine learning school certificate (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) grant (EUR 600) to attend the TASC/KASC 15 conference in Porto	2024
• Receipt of the Leids Kerkhoven-Bosscha Fonds (LKBF) grant (EUR 500) to attend the Oxford machine learning school	2023
• 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
• Selected as a trainee for the Development in Africa with Radio Astronomy (DARA) Basic Training Programme	2018

Conferences Attended & Contributions

• BlackGEM meeting (talk) — Manchester, United Kingdom	2024
• KOPAL 2024 conference (flash talk) — Litomysl, Czech Republic	2024
• TASC/KASC 15 conference (Poster) — Porto, Portugal	2024
• Malagasy Astronomy Meeting (*Talk*) — Antananarivo, Madagascar	2023
• AMCVn5 workshop (*Poster*) — Armagh, UK	2023
• sdOB11 conference (*Poster*) — Armagh, UK	2023
• MW-Gaia WG2 conference (*Talk*) — Sofia, Bulgaria	2023
• TASC/KASC13 conference (*Poster*) — Leuven, Belgium	2022
• sdOB10 conference (*Poster*) — Liege, Belgium	2022

Extracurricular Activities and Memberships

• Help commissioning BlackGEM for two weeks in LaSilla, Chile	2023
• Student member of the Malagasy Astronomical Society (MAS) — IAU-adhering organization for Madagascar	2017 — Present
• Student member of the African Astronomical Society (AfAS)	2021 — Present
• Participated in African Space Generation Advisory Council (AF-SGAC) / DARA Big Data Hackathon	2020
• Project leader of a OAD/DARA funded project: *Madagascar Astronomy Magazine*	2018
• Member of the IAU100 National Committee: leader of national activities during the IAU100 celebration	2019
• National Coordinator of Malagasy Astronomical Society (MAS) — IAU-adhering organization for Madagascar	2019