

Swaetha Ramkumar

PhD Candidate in Astrophysics | Trinity College Dublin

✉ ramkumas@tcd.ie

🆔 0000-0003-0815-8366

🌐 <https://swaetharamkumar.github.io/>

Education

- 2021 – Present 📖 **Ph.D. in Astrophysics**, Trinity College Dublin
Supervisor: Prof. Neale P. Gibson
- 2019 – 2020 📖 **M.Sc. in Astrophysics**, University College London (UCL)
Supervisor: Dr. Ralph Schoenrich
Distinction
- 2016 – 2019 📖 **B.Sc. in Physics**, Amrita Vishwa Vidyapeetham
Supervisor: Dr. Bharat Kishore Sharma
First Class with Distinction (CGPA: 9.10 out of 10)

Research Experience

- 2021-Present 📖 **PhD Researcher**, Trinity College Dublin
- Atmospheric characterisation of exoplanets (primarily highly-irradiated gas giants) using high-resolution emission spectroscopy.
 - Analysed day-side atmospheres across different phase sequences with CRILES+ to investigate variations in atmospheric properties as the planet rotates.
- Mar 2020-Sep 2020 📖 **Master's Research Project**, University College London (UCL)
- Studied the non-axisymmetric bar of the Milky Way and performed simulations using an orbit integrator (written in C++).
 - Investigated the behaviour of x_2 orbits and their interactions with the bar.
 - Explored the behaviour of orbital resonances and x_2 orbits when introducing a nuclear disk.
- Feb 2019-May 2019 📖 **Undergraduate Research Project**, Amrita Vishwa Vidyapeetham
- Investigated the basic properties of Solar and Interstellar Plasma.
 - The simulation output was investigated in Python, to determine the plasma parameters (such as Debye length, and Debye number) as a function of temperature. These results were then compared with observed values in the Solar wind and Interstellar medium.

Research Publications (Peer-Reviewed)










First-Authored

- 1 **S. Ramkumar**, N. P. Gibson, S. K. Nugroho, M. Fortune, and C. Maguire, 2025, [DOI: 10.48550/arXiv.2502.11180](https://doi.org/10.48550/arXiv.2502.11180)
- 2 **S. Ramkumar**, N. P. Gibson, S. K. Nugroho, C. Maguire, and M. Fortune, 2023, [DOI: 10.1093/mnras/stad2476](https://doi.org/10.1093/mnras/stad2476)



Co-Authored

- 1 M. Fortune, N. P. Gibson, D. Foreman-Mackey, T. M. Evans-Soma, C. Maguire, and **S. Ramkumar**, 2024, [DOI: 10.1051/0004-6361/202347613](https://doi.org/10.1051/0004-6361/202347613)
- 2 C. Maguire, N. P. Gibson, S. K. Nugroho, M. Fortune, **S. Ramkumar**, S. Gandhi, and E. de Mooij, 2024, [DOI: 10.1051/0004-6361/202449449](https://doi.org/10.1051/0004-6361/202449449)
- 3 C. Maguire, N. P. Gibson, S. K. Nugroho, **S. Ramkumar**, M. Fortune, S. R. Merritt, and E. de Mooij, 2023, [DOI: 10.1093/mnras/stac3388](https://doi.org/10.1093/mnras/stac3388)




Talks and Presentations

- 2025  **“Ultra-hot” Jupiters: Where a Year Lasts a Day**
IOP Ireland Spring Conference: Rosse Medal entrant, Feb 28-01 Mar, 2025 (poster presentation).
- 2024  **MASCARA: Does it help your eyelash?**
Two HoRSEs, July 15-19, 2024 (poster presentation).
-  **MASCARA: Does it help your eyelash?**
Exoplanets 5, June 17-21, 2024 (poster presentation).
-  **Atmospheres of Alien Worlds.**
IOP Ireland Spring Conference: Rosse Medal entrant, Apr 06, 2024 (poster presentation).
- 2023  **MASCARA: does it help your eyelash?**
Irish National Astronomy Meeting (INAM) 2023, Aug 24-25, 2023 (contributed talk).
-  **High-resolution emission spectroscopy retrievals of MASCARA-1b with CRIRES+**
Exoplanets by the Lake Summer School, Jul 31-Aug 4, 2023 (contributed talk).
-  **High-resolution emission spectroscopy retrievals of MASCARA-1b with CRIRES+**
Trinity College Dublin Astrophysics Seminar (seminar talk).
-  **High-resolution emission spectroscopy retrievals of MASCARA-1b with CRIRES+**
2023 Sagan Exoplanet Summer Hybrid Workshop, Jul 24-28, 2023 (poster presentation).
-  **The atmosphere of MASCARA-1b through the eyes of CRIRES+**
Theo Murphy meeting, the Royal Society: Spectroscopy of exoplanets at high resolution, Feb 6-7, 2023 (flash talk).

Observing Experience and Proposals

- 2024  **CRIRES+ at the Very Large Telescope (VLT)**
Phase Curve observations (K-band) during cycle P113, PI: Nugroho, CoI: S. Ramkumar.
- 2023  **CRIRES+ at the Very Large Telescope (VLT)**
Phase Curve observations (K-band) during cycle P112, PI: Gibson, dPI: S. Ramkumar.

Teaching and Outreach

- 2021 – 2024  **Teaching Assistant in PYU33AP4 - JS AP Astro Computational Lab**
Trinity College Dublin
- Oct 2023 – Nov 2023  **Teaching Assistant in PYU33AP3 - JS Practical in Astrophysics**
Trinity College Dublin
- Apr 2023  **Transition Year Physics Experience (TYPE) Mentor**
Trinity College Dublin

Teaching and Outreach (continued)

Nov 2022 – Mar 2023

- STEM@Universi-TY Educator
Trinity Walton Club, Trinity College Dublin
<https://www.tcd.ie/waltonclub/ty.php>

Prizes, Awards & Grants

2021 – Present

- Research Grant, Provost's PhD Award
Trinity College Dublin

Aug 2023

- Peter Curran Award
Astronomical Society of Ireland (ASI)
Best student talk at the Irish National Astronomy Meeting (INAM) for the year 2023.
<https://astronomers.ie/peter-curran-award/>

June 2024

- Science in Shorts 2024
Nature Awards
Science in Shorts is one of Nature's Awards, where you present your research in a 1-minute video. My video was selected for inclusion in the Shortlist and is featured on their YouTube channel: Science in Shorts: Turn into a force ghost!

Technical Skills

Research Interests

- Exoplanet atmospheres (observations and modelling), Low- and High-resolution spectroscopy, Cross-correlation analysis, Atmospheric retrievals, Planet formation.

Programming

- Python, C/C++ (*intermediate*), SQL (*basic*)

Markup Languages

- LaTeX, HTML/CSS

Design & Publishing

- Affinity Designer, Affinity Publisher

Data Visualisation

- Matplotlib, Gnuplot, Seaborn

Miscellaneous

- Bayesian inference with MCMC, Cross-correlation analysis, Web development, Data Reduction pipelines

Soft Skills

Communication

- Public speaking, Just-A-Minute (JAM) Talks

Languages

English

- Fluent

Tamil

- Mother tongue

Hindi

- Conversational

Telugu

- Conversational