

Swaetha Ramkumar

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

Education

- 2021 – Present 📖 **Ph.D. in Physics, Trinity College Dublin**
(Provisional) Thesis title: *Atmospheres of Alien Worlds: Exploring New Methodology for Doppler-Resolved Spectroscopy of Exoplanets*
Supervisor: Prof. Neale P. Gibson
- 2019 – 2020 📖 **M.Sc. in Astrophysics, University College London (UCL)**
Thesis title: *Assessing the stability of nuclear disc orbits against migrating resonances.*
Supervisor: Dr. Ralph Schoenrich
Distinction
- 2016 – 2019 📖 **B.Sc. in Physics, Amrita Vishwa Vidyapeetham**
Project title: *Basic properties of Solar and Interstellar Plasma.*
Supervisor: Dr. Bharat Kishore Sharma
First Class with Distinction (CGPA: 9.10 out of 10)

Research Publications

First-Authored

- 1 **S. Ramkumar**, N. P. Gibson, S. K. Nugroho, C. Maguire, and M. Fortune, “High-resolution emission spectroscopy retrievals of MASCARA-1b with CRIRES+: strong detections of CO, H₂O, and Fe emission lines and a C/O consistent with solar,” *MNRAS*, 2023. 🔗 DOI: 10.1093/mnras/stad2476.

Co-Authored

- 1 M. Fortune, N. P. Gibson, D. Foreman-Mackey, T. M. Evans-Soma, C. Maguire, and **S. Ramkumar**, “How do wavelength correlations affect transmission spectra? Application of a new fast and flexible 2D Gaussian process framework to transiting exoplanet spectroscopy,” *arXiv e-prints*, 2024. 🔗 DOI: 10.48550/arXiv.2402.15204.
- 2 C. Maguire, N. P. Gibson, S. K. Nugroho, M. Fortune, **S. Ramkumar**, S. Gandhi, and E. de Mooij, “High-resolution atmospheric retrievals of WASP-76b transmission spectroscopy with ESPRESSO: Monitoring limb asymmetries across multiple transits,” *arXiv e-prints*, 2024. 🔗 DOI: 10.48550/arXiv.2404.10463.
- 3 C. Maguire, N. P. Gibson, S. K. Nugroho, **S. Ramkumar**, M. Fortune, S. R. Merritt, and E. de Mooij, “High-resolution atmospheric retrievals of WASP-121b transmission spectroscopy with ESPRESSO: Consistent relative abundance constraints across multiple epochs and instruments,” *MNRAS*, 2023. 🔗 DOI: 10.1093/mnras/stac3388.

Talks and Presentations

- 2024 📖 **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).

Talks and Presentations (continued)

- 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).
 - **MASCARA: does it help your eyelash? 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

- 2023
- **CRIRES+ at the Very Large Telescope (VLT)**
Phase Curve observations (K-band) in designated Visitor Mode (dVM) during cycle P112, PI: Gibson, CoI: 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
Mentor for the poster session - the Transition Year Physics Experience (TYPE) programme.
- 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)
The award recognises the best contributions to the Irish National Astronomy Meeting (INAM) by a graduate student presenter for the year 2023.
<https://astronomers.ie/peter-curran-award/>

Technical Skills

- Research Interests
- Exoplanet atmospheres (observations and modelling), High-resolution spectroscopy, Cross-correlation analysis, Atmospheric retrievals, Planet formation.
- Programming
- Python (*advanced*), C/C++ (*intermediate*), SQL (*basic*)
- Markup Languages
- L^AT_EX (*advanced*), HTML (*intermediate*)

Technical Skills (continued)

Miscellaneous  Bayesian inference with MCMC, Cross-correlation analysis

Languages

English  **Fluent**
Tamil  **Mother tongue**
Hindi  **Conversational**