Jayshil A **Patel**

Post-doctoral Researcher

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I am a post-doctoral researcher at the Technical University of Denmark (DTU Space) in Copenhagen, Denmark. I have expertise in reducing and analysing photometric and spectroscopic data of transiting exoplanets from space-based telescopes such as JWST, CHEOPS and TESS.

Appointments

2025-present **Post-doctoral researcher**
Astrophysics and atmospheric physics division, DTU Space
Technical University of Denmark, Copenhagen, Denmark

Academics

2021-2025 **Stockholm University, Sweden**
Doctor of Philosophy in Astronomy
Advisor : Dr. Alexis Brandeker, Co-Advisor : Dr. Markus Janson
Thesis title : "Exploring close-in exoplanets with space telescopes"

2020-2021 **Université de Genève, Switzerland**
Completed 65.5 ECTS (out of 120) towards Master's in Astrophysics.

2014-2019 **Sardar Vallabhbhai National Institute of Technology (SVNIT), Surat-7, Gujarat, India**
Master of Science in Physics (*First Class with Distinction*)
Thesis Advisor : Dr. Néstor Espinoza (then at **Max-Planck-Institut für Astronomie, Heidelberg, Germany**)
Thesis title : "Study of the limb darkening effect using exoplanet transit light curves from TESS data"

Observing Time as PI

October 2025 — European Southern Observatory's Director's Discretionary Time
- Title : Probing the interior of a disintegrating planet
- Instrument/Telescope : Ultraviolet and Visual Echelle Spectrograph (UVES) on the Very Large Telescope (VLT)
- Total Observing Time : 10.7 hours (2 nights).

December 2024 to Present — CHEOPS Guaranteed Time Observations
- Title : Testing the feasibility of observing dayside emission from lava planets with CHEOPS
- Telescope : CHaracterizing ExOPlanet Satellite (CHEOPS)
- Total Observing Time : 30 orbits ($\sim$ 49 hours).

April 2023 to Present — CHEOPS Guaranteed Time Observations
- Title : *Terminators* — Constraining morning and evening terminators of exoplanets
- Telescope : CHaracterizing ExOPlanet Satellite (CHEOPS)
- Total Observing Time : 214.3 orbits ($\sim$ 353 hours).

June 2022 to November 2023 — CHEOPS Third Announcement of Opportunity (AO-3) Guest Observers Programme
- Title : *Constraining the morning and evening limbs of the hot jupiters WASP-79b and WASP-101b*
- Telescope : CHaracterizing ExOPlanet Satellite (CHEOPS)
- Total observing time : 159 orbits ($\sim$ 261 hours).

Grants and Fellowships

Alva and Lennart Dahlmark Research Grants — May 2024
I was awarded 6500 SEK to attend a *PLATO workshop on 3D climate & clouds* at the Space Research Institute, Graz, Austria.

Gustaf and Ellen Kobbs Scholarship Foundation Travel Grnat — June 2023
I have been awarded 15000 SEK to attend *Extreme Solar Systems V* in Christchurch, New Zealand during March 2024.

C. F. Liljevalch Jr. Travel Grant April 2023

I have been awarded 12000 SEK to attend *Extreme Solar Systems V* in Christchurch, New Zealand during March 2024.

Alva and Lennart Dahlmark Research Grants October 2022

I have been awarded 15000 SEK to attend a symposium on *Planetary Systems and the Origins of Life in the Era of JWST* at the Space Telescope Science Institute, Baltimore, USA during May 2023.

Indian Academy of Sciences Summer Fellowship June 2018

I received a Focus Area Science Technology Summer Fellowship (FAST-SF) from the Indian Academy of Sciences, Bengaluru to attend summer school and do an internship at the Indian Institute of Astrophysics, Bengaluru, India.

</> Software Packages

stark February 2023

co-Lead Developer | Link : github.com/Jayshil/stark
`stark` (Spectral exTraction And Reduction Kit) is a general-purpose tool to reduce and extract spectrum from raw data. The original concept and implementation were developed by Alexis Brandeker and updated by me.

juliet June 2022

Contributing Developer | Link : juliet.readthedocs.io
`juliet` is a versatile tool for modelling transiting and non-transiting exoplanetary systems. I contributed to this package to enhance its capabilities to analyse occultations and spectroscopic lightcurves.

pycdata November 2021

Lead Developer | Link : github.com/Jayshil/pycdata
A companion package of `pycheops`, which is a specialized tool to analyse CHEOPS data.

Phoenix Pipeline October 2020

Lead Developer | Link : github.com/Jayshil/Phoenix_pipeline
A semi-automatic data reduction and spectral extraction pipeline for Phoenix spectrograph at the Gemini Observatory.

Publications *(All items contain clickable links to ADS)*

First & Second Author Publications (in reverse chronological order)

1. **Patel, J. A.**, Brandeker, A., Kitzmann, D., et al., "JWST reveals a rapid and strong day side variability of 55 Cancri e", 2024, A&A, 690, A159.
2. **Patel, J. A.**, Egger, J. A., Wilson, T. G., et al., "CHEOPS and TESS View of the ultra-short period super-Earth TOI-561 b", 2023, A&A, 679, A92.
3. Janson, M., **Patel, J. A.**, Ringqvist, S. C., et al., "Imaging of exocomets with infrared interferometry", 2023, A&A, 671, A114.
4. **Patel, J. A.**, & Espinoza, N., "Empirical limb-darkening coefficients & transit parameters of known exoplanets from TESS", 2022, AJ, 163, 228.

Other Contributions (in reverse chronological order)

1. Zilinskas, M., van Buchem, C. P. A., Zieba, S., et al. (including **Patel, J. A.**), "Characterising the atmosphere of 55 Cancri e : 1D forward model grid for current and future JWST observations", 2025, A&A, 697, A34
2. Hu, R., Bello-Arufe, A., Zhang, M. et al. (including **Patel, J. A.**), "A secondary atmosphere on the rocky Exoplanet 55 Cancri e", 2024, Nature, 630, 609.
3. Krenn, A. F., Kubyshkina, D., Fossati, L., et al. (including **Patel, J. A.**), "Characterisation of the TOI-421 planetary system using CHEOPS, TESS, and archival radial velocity data", 2024, A&A, 686, A301.
4. Singh, V., Scandariato, G., Smith, A. M. S., et al. (including **Patel, J. A.**), "CHEOPS observations of KELT-20 b/MASCARA-2 b : an aligned orbit and signs of variability from a reflective dayside", 2024, A&A, 683, A1.
5. Tuson, A., Queloz, D., Osborn, H. P., et al. (including **Patel, J. A.**), "TESS and CHEOPS Discover Two Warm Sub-Neptunes Transiting the Bright K-dwarf HD 15906", 2023, MNRAS, 523, 3090.
6. Krenn, A. F., Lendl, M., **Patel, J. A.**, et al., "The geometric albedo of the hot Jupiter HD 189733 b measured with CHEOPS", 2023, A&A, 672, A24.

7. Demory, B. -O., Sulis, S., Meier Valdes, E., et al. (including **Patel, J. A.**), "55 Cancri e's occultation captured with CHEOPS", 2023, A&A, 669, A64.
8. Zakhozhay, O., Launhardt, R., Mueller, A., et al. (including **Patel, J. A.**), "RVSPY – Radial Velocity Survey for Planets around Young Stars. Target characterization and high-cadence survey", 2022, A&A, 667, A63.
9. Zakhozhay, O., Launhardt, R., Trifonov, T., et al. (including **Patel, J. A.**), "RVSPY - Radial Velocity Survey for Planets around Young Stars. A warm Super-Jovian companion around HD 114082, a young star with a debris disk", 2022, A&A, 667, A14.
10. Brandeker, A., Heng, K., Lendl, M., et al. (including **Patel, J. A.**), "CHEOPS geometric albedo of the hot Jupiter HD 209458 b", 2022, A&A, 659, L4.

Positions and Services

November 2024	Member of PLATO Mission Consortium; member of several PLATO science work packages.
August 2023	Coordinator of the monthly departmental meetings of Stars, Planets & Astrobiology Group at Stockholm University until December 2024.
January 2023	Program manager for a CHEOPS GTO program, *Terminators*.
December 2022	Member of Local Organising Committee for CHEOPS Science Team Meeting - 27 in Kiruna, Sweden.
December 2021	Collaborator to the CHEOPS Science Team since December 2021.

Talks & Poster Presentations

September 2025	Invited talk at the astrophysics seminar at Uppsala University, Sweden.
June 2025	Invited virtual talk at Yuk Lunch Seminar at Division of Geological and Planetary Sciences, CalTech, USA.
May 2025	Contributed talk at PLATO National Meeting at Stockholm University, Sweden.
December 2024	Contributed talk in the *Cosmic Origins Workshop* jointly organised by U. of Virginia, USA, Chalmers University, Sweden and Flatiron Institute, USA (Virtual attendance).
October 2024	Invited talk at the astrophysics seminar at Space Research Institute, Graz, Austria.
July 2024	Invited seminar talk at the Veer Narmad South Gujarat University in Surat, Gujarat, India.
June 2024	Poster presentation in *Exoplanets V* in Leiden, the Netherlands.
March 2024	Poster presentation in *Extreme Solar System V* in Christchurch, New Zealand.
August 2023	Contributed talk in *Exoplanets by the Lake* mini-conference in Munich, Germany.
May 2023	Poster presentation in *STScI Spring Symposium* in Baltimore, USA (Virtual Attendance).
June 2022	Talk given at *Annual PhD Conference* at Department of Astronomy, Stockholm University, Sweden.

Student Supervision & Mentoring

Ella Ledin — July – August 2025

Bachelor project co-Supervisor | Department of Astronomy, Stockholm University, Sweden
Project title : Radiation pressure on circumstellar gas as a function of column density.

Fredrik Hanson — March – June 2024

Bachelor project co-Supervisor | Department of Astronomy, Stockholm University, Sweden
Project title : Studying planet-planet occultation using CHEOPS.

Outreach

Science Summer School — June 2025

I designed and supervised a project for high school students in a summer school organised by Stockholm University.

Explore the worlds of exoplanets : Ask an Astronomer — July 2024-

I delivered astronomy talks focused on my research and an interactive Q&A session at several high schools in India and Sweden.

Public Talk

February 2024

I gave an online public talk on “Exploring Exoplanets with JWST” on the occasion of National Science Day celebrated in India.

Science Columnist

January 2020

Before the pandemic, I served as a science columnist at the ‘Science City’ magazine (a popular science magazine in my native language) for a brief period; currently, I write popular science articles on my blog.

References

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