

Abhijeet Anand, PhD

Independent Postdoctoral Fellow

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Research Interests

Astrophysicist specializing in galaxy formation and evolution, the circumgalactic and intergalactic medium, quasar absorption-line systems, and cosmology. My research combines large photometric and spectroscopic surveys (e.g., DESI, SDSS, 4MOST, WEAVE) with data-intensive computational methods to study cosmic gas flows, the baryon cycle, and metal enrichment in the Universe. I am also interested in connecting observations with state-of-the-art cosmological simulations (e.g., TNG, EAGLE) by comparing observed quantities with theoretical predictions and testing simulation-based predictions directly against survey data. My long-term vision is to build an independent research program at the intersection of next-generation surveys, advanced computational methods, and the physics of galaxy evolution.

Professional Experience

Dec 2025 - present: Independent Postdoctoral Fellow, IUCAA, Pune, India

Feb 2026 - present: Affiliate Scientist, Lawrence Berkeley National Lab, Berkeley, CA, USA

- *Leading independent projects on characterizing the global statistical properties of metals and their evolution in the Universe.*
- *Exploring physical properties of gas in and around galaxies using MHD simulations and observations from MUSE, SDSS and DESI.*
- *Builder and support scientist for the DESI's redshift fitter pipeline.*

Sep 2022 - Oct 2025: Postdoctoral Fellow, Lawrence Berkeley National Lab, Berkeley, CA, USA

- *Led independent projects on metal absorbers in and around galaxies using DESI, producing the largest metal absorber catalogs.*
- *Developer and support scientist for the DESI's spectral reduction pipeline; improved redshift estimation algorithms, reducing catastrophic failures by $\sim 30\%$.*
- *Contributed to high-impact DESI collaboration papers, while also initiating and reviewing independent science projects within and outside the collaboration.*

Sep 2018 - Jul 2022: PhD Fellow, Max Planck Institute for Astrophysics, Garching, Germany

- *Conducted extensive studies on the gas distribution in the circumgalactic and intracluster medium using data from SDSS and the legacy imaging survey.*
- *Developed the quasar absorber finder, [qsoabsfind](#), a tool used for detecting and analyzing metal absorbers in low-resolution quasar spectra.*

Sep 2017 - Jul 2018: UGC - JRF¹, National Institute of Advanced Studies, Bangalore, India

Education

Sep 2018 - Jul 2022: PhD in Astrophysics, Ludwig Maximilian University - Max Planck Institute for Astrophysics (MPA), Germany.

¹University Grants Commission, Govt. of India - Junior Research Fellowship

- Thesis: Probing cool and warm circumgalactic gas in galaxies and clusters with large spectroscopic and imaging surveys
- Advisors: Prof. Dr. Guinevere Kauffmann & Dr. Dylan Nelson

Jul 2016 - Jul 2017: MS, Physics, Indian Institute of Science (IISc), Bangalore, India.

- Thesis: A sensitive search for HI 21 cm emission from super disks in radio galaxies
- Advisor: Prof. Nirupam Roy

Aug 2012 - June 2016: BSc (Research), Physics, Indian Institute of Science, Bangalore, India.

- Thesis: Sources of Continuum Opacity in Hydrogen deficient stars
- Advisors: Prof. Gajendra Pandey, Indian Institute of Astrophysics (IIA)

Selected visits, talks and conferences

ⁱInvited Talks, ^cContributed Talks, ^sSchools & Workshops

- ⁱ June 2025: *Astro Webinar*, Raman Research Institute, Bangalore, India, June 23, 2025 (*Virtual*)
- ⁱ May 2025: *Astro Lunch seminar*, University of Washington, Seattle, USA, May 20, 2025 (*talk*)
- ⁱ Dec 2024: *Joint Astronomy Program Seminar*, IISc, Bangalore, India, Dec 11, 2024 (*talk*)
- ^c Dec 2024: *Baryons Beyond Galactic Boundaries*, IUCAA Pune, India, Dec 2 - Dec 6, 2024 (*talk*)
- ^c Nov 2024: *ISSAC Conference*, St. Stephen's College, New Delhi, Nov 20 - Nov 22, 2024 (*talk*)
- ⁱ Feb 2024: *Extragalactic Seminar*, MPA Garching, Germany, Feb 29, 2024 (*talk*).
- ⁱ Feb 2024: *Cosmology Seminar*, MPA Garching, Germany, Feb 27, 2024 (*talk*).
- ⁱ Mar 2022: *Computational Galaxy Formation and Evolution Group*, ZAH/ITA, University of Heidelberg, 14-16 Mar 2022 (*Visitor*).
- ⁱ Feb 2022: *High Energy Group Seminar*, MPE Garching, 15 Feb, 2022 (*Virtual*).
- ⁱ Feb 2022: *DESI Group Seminar*, Berkeley Lab, 1 Feb, 2022 (*Virtual*).
- ⁱ Dec 2021: *Galaxies & Cosmology Seminar*, CfA Harvard, 13 Dec, 2021 (*Virtual*).
- ⁱ Sep 2021: *STARs lab*, Arizona State University, 24 Sep, 2021 (*Virtual*).

Mentoring

- Paryag Sharma (CUHP PhD): project on exploring CGM of quasars and AGNs using SDSS and DESI (manuscript in prep.), (2026 - present).
- Joanne Tan (MPA PhD): project on metal absorbers in TNG-100 simulations (manuscript in prep.), (2025 - present).
- Corey Dodeson (UC Berkeley UG) (short-term reading project on CGM), 2023

Honors & Awards

- **DESI Builder Award (2025)** for outstanding contributions to the data systems operations.
- Core member of the DESI Data Team; the DESI Collaboration awarded the 2026 **Berkeley Prize** of American Astronomical Society.
- DESI Early Career Travel Grant to attend conferences in 2024-2025.
- **IMPRS PhD Fellowship**, 2018–2022.
- University Grants Commission - Junior Research Fellowship of Govt. of India, 2017-2018.
- Department of Science & Technology, Govt. of India - Higher Studies Scholarship, 2012-2017.

Programming skills

Programming Language —

- Python (numpy, scipy, astropy, scikit-learn, matplotlib), bash, SQL with focus on high-performance, large-scale survey pipelines.

Tools & Workflows —

- Git, Jupyter, slurm (NERSC), LaTeX, Unix/Linux

Open-source Contributions —

- [qsoabsfind](#): QSO metal absorber finder (*sole Developer*)
- [redrock](#): Redshift fitter for DESI (*Main Contributor*).
- [desispec](#): DESI spectroscopic pipeline(*Contributor*).

Professional services & activities

Referee —

- Astronomy & Astrophysics (2023-), Astrophysical Journal (2023-), Internal Reviewer for DESI papers (2023-)

Member & Organizer—

- Core committee member, IUCAA Computing Facilities, (202627)
- Core committee member, [DESI Professional Development Committee](#), (202425), contributed to early-career support and mentoring initiatives.
- Organizer, [INPA Weekly Seminar](#), Physics Division, LBNL (2023-2024).

Teaching Experience —

- Served as online physics tutor at E-acharya (>20 students)² from June 2017 to Aug 2018.

Outreach activities

Press releases —

- My papers ([I](#), [II](#)) featured in the monthly research highlight of MPA and appeared on [astrobites](#).

Interviews & podcast —

- Interviewed by [Vidpeds podcast](#) to discuss my astronomy journey and how people from small cities can become successful astronomers.
- Gave [interview](#) to [The Interview Portal](#) to help Indian college students plan their careers.

Public Presentations —

- Presented pedagogical and scientific posters for general public on National Science Day 2026, IUCAA, Pune, India.

²an initiative to help poor students in suburban and rural areas of Bihar, India.