Dr. Nitesh Kumar (Ph. D.)

IUCAA Associate

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Employment

2024–present ◇ **Assistant Professor**, Department of Physics, Applied Science Cluster, School of Engineering, UPES, Dehradun – 248007, India.

Education

2025 ◇ **Ph.D., Astronomy and Astrophysics**, University of Delhi, Delhi.
Thesis Title: *Automated Analysis of Stellar Photometric and Spectroscopic Astronomical Data*.
Thesis Supervisors: Prof. H. P. Singh (University of Delhi) & Prof. Philippe Prugniel (University of Lyon).

2018 ◇ **M.Sc. Physics**, Hansraj College, University of Delhi, Delhi.
Secured 64.20%.

2015 ◇ **B.Sc.(H) Physics**, Deshbandhu College, University of Delhi, Delhi.
Secured 80.02%.

Research Interests

- Application of machine learning to astronomical data.
- Photometric and spectroscopic analysis of RR Lyrae stars.
- Stellar spectroscopy, with emphasis on red giants in globular clusters.
- Big data and computational challenges in astronomy.
- Investigation of variable stars to understand the structure and evolution of globular clusters.

Research Publications

Journal Articles

1. S. A. Gaur, **Nitesh Kumar**, A. Bhardwaj, and A. Raturi, "A multiband photometric study of RR lyrae stars in m53 (NGC 5024)," *New Astronomy*, vol. 124, p. 102 515, 2026, ISSN: 1384-1076. DOI: https://doi.org/10.1016/j.newast.2025.102515.

2. **Nitesh Kumar**, P. Prugniel, and H. P. Singh, "Physical parameters of stars in NGC 6397 using ANN-based interpolation and full spectrum fitting," *New Astronomy*, vol. 119, p. 102 416, 2025, [IF = 2.1], ISSN: 1384-1076. DOI: https://doi.org/10.1016/j.newast.2025.102416.

3. **Nitesh Kumar**, H. P. Singh, O. Malkov, *et al.*, "Extraction of physical parameters of rrab variables using neural network based interpolator," *Universe*, vol. 11, no. 7, 2025, [IF = 2.6], ISSN: 2218-1997. DOI: 10.3390/universe11070207.

4 **Nitesh Kumar**, A. Bhardwaj, H. P. Singh, M. Rejkuba, M. Marconi, and P. Prugniel, "Multiwavelength photometric study of RR lyrae variables in the globular cluster NGC 5272 (Messier 3)," *Monthly Notices of the Royal Astronomical Society*, vol. 531, no. 3, pp. 2976–2997, May 2024, [IF = 4.7], ISSN: 0035-8711. DOI: 10.1093/mnras/stae1334.

5 **Nitesh Kumar**, A. Bhardwaj, H. P. Singh, *et al.*, "Predicting light curves of RR Lyrae variables using artificial neural network based interpolation of a grid of pulsation models," *Monthly Notices of the Royal Astronomical Society*, vol. 522, no. 1, pp. 1504–1520, Mar. 2023, [IF = 4.8], ISSN: 0035-8711. DOI: 10.1093/mnras/stad937.

Subjects Taught

- **M.Sc. (Physics) 1st Semester** (Aug–Dec 2025): Classical Mechanics.
- **B.Sc. (Hons.) Physics 1st Semester** (Aug–Dec 2025): Computational Techniques.
- **B.Tech. 1st Year** (Aug–Dec 2025): Physics for Computer Engineers, Physics Lab 1, Physics Lab 2, Physics Lab 3.
- **M.Sc. (Physics) 2nd Semester** (Jan–July 2025): Introduction to Computational Physics (C++, Fortran, Gnuplot, LaTeX, Numerical Methods).
- **B.Sc. (Hons.) Physics 6th Semester** (Jan–July 2025): Fundamentals of Astronomy, Observational Astronomy Lab.
- **B.Tech. 1st Year** (Jan–July 2025): Physics for Computer Engineers.
- **Int. B.Sc. + M.Sc. (Physics) 7th Semester** (Aug–Dec 2024): Introduction to Computational Physics (C++, Fortran, Gnuplot, LaTeX, Numerical Methods), Introduction to Computational Physics Lab.
- **B.Sc. 1st Semester** (Aug–Dec 2024): Computational Techniques (Python, Gnuplot, LaTeX).
- **B.Tech. 1st Semester** (Aug–Dec 2024): Physics Labs.
- **B.Sc. (Hons.) Physics by Research 7th Semester** (Aug–Dec 2024): Planetary Sciences.

Skills

Coding	**Python**, C, C++, Fortran, IDL, SQL/ADQL
Web	HTML, CSS, JavaScript; Git, GitHub
AI	**Machine Learning** (development & deployment with TensorFlow, Scikit-Learn); scientific data analysis
Cloud	**Pegasus** cluster (IUCAA), large-scale scientific computation
Telescope	Celestron 11" and 8" telescopes (installation, operation, astrophotography)
Academic	Research, teaching, training, consultation, scientific writing, LaTeX publishing
Language	**English**, **Hindi** (proficient: reading, writing, speaking)

Mentorship

2025 ◇ **M.Sc. Physics (PG):**

- Divyakrishna – UPES, Bidholi, Dehradun, Uttarakhand 248007, India; Dissertation topic: *"Study of Exoplanets using JWST Data"* (Ongoing*)
- Rushil Soni – UPES, Bidholi, Dehradun, Uttarakhand 248007, India; Dissertation topic: *"Photometric Study of Globular Clusters using Gaia DR3 Data"*(Ongoing*)
- Stuti – Dolphin (PG) Institute of Biomedical and Natural Sciences, Manduwala, Dehradun, Uttarakhand 248007, India; Dissertation topic: *"Deriving age and metallicity of a Globular Cluster"*

◇ **B.Sc. (Hons.) Physics Dissertation:**

- Satyansh Srivastava – *Himalayan Fellow (Got the Himalayan Fellowship from UPES)*
- Atharava Bhatele – *"Multiwavelength study of RR Lyrae stars in a Globular Cluster"*

◇ **B.Sc. (Hons.) Physics by Research, 4th Year:**

- Neelesh – *"Characterization of Exoplanets using TESS archival data"*

◇ Mentored a group of 3 students in the Summer Internship program organised by Miranda House College, University of Delhi.

2024 ◇ Mentored a group of 5 students in the Summer Internship program organised by Miranda House College, University of Delhi.

2019–2024 ◇ **Observational Astronomy Laboratory:** M.Sc. Physics IV semester, Department of Physics & Astrophysics, University of Delhi, India (mentored several master's students in their astronomy lab project work).

National Level Exams

2018 ◇ **CSIR JRF/NET**, Cleared CSIR JRF(NET) - Physical Sciences of DECEMBER & June 2018.

◇ **GATE PHYSICS**, Cleared GATE PHYSICS 2018.

Workshops and Conferences

2025 ◇ **Stellar Variability: Taking the Pulse of the Universe**
Organized by IUCAA, Pune, from 24th - 28th November 2025.

◇ **National Workshop on "Statistical Methods and Data Analysis Techniques in Astrophysics"**
Organized by the Department of Physics and Electronics, Hansraj College, University of Delhi under the aegis of ANRF-DST from 07th - 08th March 2025.

Workshops and Conferences (continued)

- **Space Science and Technology Awareness Training (START)**
  Participated in the "Future of India's Space Exploration" online training conducted by Indian Space Research Organisation (ISRO) and IIRS, Dehradun, from January 9 to 29, 2025 (19 hours 30 minutes duration).

2024

- **Introductory Workshop on Astronomy and Astrophysics (Resource Person)**
  Organized by the Department of Physics at Dolphin PG Institute of Biomedical and Natural Sciences, Dehradun in collaboration with IUCAA, Pune from December 18 to 20, 2024. (Invited Talk).
- **Workshop on Probing Stars and Galaxies Using Innovative Data Science Tools (Resource Person)**
  Organized by the Department of Applied Sciences, Gauhati University in collaboration with the Department of Physics & Astrophysics, University of Delhi, IUCAA, Pune, and NIF, Gandhinagar, from September 4 to 6, 2024. (Paper Presentation).

2023

- **Pedagogic Workshop on Astronomy, Astrophysics and Cosmology**
  Organized by St. Stephen's College, University of Delhi, from November 6 to 10, 2023.
- **Workshop on Stellar and Dynamical Evolution**
  Organized by Miranda House College, University of Delhi, from October 3 to 5, 2023.

2022

- **Indo-French Astronomy School (IFAS 7)**
  Participated in the school on *Spectroscopy and Spectrographs*, hosted at IUCAA, Pune, from November 21 to 27, 2022.
- **Young Astronomers' Meet (YAM 2022)**
  Presented "Application of Artificial Neural Networks in Generating RR Lyrae Light Curves" at ARIES, Nainital, from November 9 to 13, 2022.
- **International Staff Week 2022**
  Attended with the theme "*Internationalization in the New Era*" at WSB University, Dąbrowa Górnicza, Poland, from May 16 to 20, 2022 (Received ERASMUS+ Grant worth Euro €2800 (equivalent to Rs. 2,27,000) for attending the workshop).
- **European Astronomical Society Annual Meeting (EAS 2022)**
  Participated in the annual meeting, held from June 27 to July 1, 2022.
- **Faculty Development Program (FDP) Workshop on RTCISM**
  Engaged in a one-week FDP on *"Recent Trends and Challenges in Intelligent Systems and Machines (RTCISM)"*, organized by Amity University Patna, from July 25 to 29, 2022.

2021

- **Code/Astro**
  Completed a 40-hour course on Python-based software development for astronomers, covering software paradigms, version control, testing, documentation, packaging, and profiling.
- **39th Annual Meeting of the Astronomical Society of India (ASI 2021)**
  Presented a poster on *"Spectral Interpolation using Artificial Neural Networks (ANN)"* at the virtual ASI Annual Meeting hosted by ICTS-TIFR Bengaluru, IISER Mohali, IIT Indore, and IUCAA Pune, from February 18 to 23, 2021. [https://astron-soc.in/asi2021/abstract_details/ASI2021_66]

2020

- **Indo-French Astronomy School (IFAS 6)**
  Participated in the *6th IFAS - Treasures in the Voxels*, held online by the Centre de Recherche Astrophysique de Lyon, from July 9 to 17, 2020.

Invited Talks

2025 ◇ Delivered an expert talk titled "Measuring the Universe: The cosmic distance ladder" at Government Mahila Degree College, Budaun, Uttar Pradesh, India, on April 26, 2025.

2024 ◇ Delivered an invited lecture on "Basics of Telescopes and How to Use Them for Night Sky Observations" at Dolphin (PG) Institute of Biomedical and Natural Sciences, Dehradun, Uttarakhand, India.

2023 ◇ Delivered an expert talk titled "Introduction to Astronomy" at Government Degree College, Budaun, Uttar Pradesh, India, on January 16, 2023.

Miscellaneous

2023 ◇ Served as a reviewer for a manuscript submitted to *The Astronomical Journal* (AAS), an international journal (Impact Factor: 5.491).

2022 ◇ Acted as subject matter expert for the assessment and translation of the first-year engineering SWAYAM course "Quantum Mechanics - I" into Hindi.

◇ Developed the project website: https://ann-interpolator.web.app/.

References

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