Dr. Nitesh Kumar

Assistant Professor, UPES | IUCAA Associate

Email: niteshchandra039@gmail.com X: @astro_nitesh
Mobile: +91 8742930496 LinkedIn: astro-nitesh
ORCID: 0000-0003-0668-9999 NASA ADS: Nitesh
Website: https://niteshchandra039.github.io/



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: *Automated Analysis of Stellar Photometric and Spectroscopic Astronomical Data*.
Supervisors: Prof. H. P. Singh (University of Delhi) & Prof. Philippe Prugniel (University of Lyon).

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

2015 ◇ **B.Sc. (Hons.) Physics**, Deshbandhu College, University of Delhi, Delhi.

Research Profile

Summary ◇ My research applies computational and machine-learning methods to stellar photometric and spectroscopic data. I develop and use model-based interpolation and full-spectrum analysis to study RR Lyrae variables and characterize stars in globular clusters.

Research Interests

Methods ◇ Computational stellar astrophysics and machine learning for astronomical data.

Variables ◇ RR Lyrae variability, light-curve modelling, and stellar parameter estimation.

Clusters ◇ Stellar spectroscopy and the populations of globular clusters.

Observing Proposals

Two cycles ◇ **Co - Principal Investigator**, successful observing proposals in two successive cycles for time-series photometry and spectroscopy of RR Lyrae stars in the globular cluster M3 (NGC 5272) with the 3.6 m Devasthal Optical Telescope.

Research Publications

Journal Articles

1. S. A. Gaur, **N. 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: 10.1016/j.newast.2025.102515.
2. M. Prakash, S. Das, H. P. Singh, and **N. Kumar**, "Photometric Metallicity of Galactic RR Lyrae Stars in the Gaia DR3 Era," *Galaxies*, vol. 14, no. 3, 51, p. 51, May 2026. DOI: 10.3390/galaxies14030051.
3. **N. 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, ISSN: 1384-1076. DOI: 10.1016/j.newast.2025.102416.
4. **N. 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, ISSN: 2218-1997. DOI: 10.3390/universe11070207.
5. **N. 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, ISSN: 0035-8711. DOI: 10.1093/mnras/stae1334.
6. **N. 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, ISSN: 0035-8711. DOI: 10.1093/mnras/stad937.

Academic Service & Membership

2025–Present ◇ **Coordinator, Inter-University Centre for Astronomy and Astrophysics (IUCAA) Centre for Astronomy Research and Development (ICARD), UPES, Dehradun** — Coordinating astronomy and astrophysics research, training, academic activities, and collaborative programmes with IUCAA.

Life Member ◇ **Astronomical Society of India (ASI)** — Life Member of the national professional society for astronomy and astrophysics in India.

Teaching Experience

Aug–Dec 2026 ◇ **Fundamentals of Astrophysics** — B.Sc. Physics, VII Semester; **Planetary Science** — M.Sc. Physics, IV Semester.

Jan–Jul 2026 ◇ **Computational Astrophysics**; **Physics for Computer Engineers** — B.Tech., I Year.

Aug–Dec 2025 ◇ **Classical Mechanics** — M.Sc. Physics, I Semester; **Computational Techniques** — B.Sc. (Hons.) Physics, I Semester; **Physics for Computer Engineers & Physics Labs** — B.Tech., I Year.

Jan–Jul 2025 ◇ **Introduction to Computational Physics** (C++, Fortran, Gnuplot, LaTeX, Numerical Methods) — M.Sc. Physics, II Semester; **Fundamentals of Astronomy & Observational Astronomy Lab** — B.Sc. (Hons.) Physics, VI Semester; **Physics for Computer Engineers** — B.Tech., I Year.

Teaching Experience (continued)

Aug–Dec 2024 ◇ **Introduction to Computational Physics & Lab** (C++, Fortran, Gnuplot, LaTeX, Numerical Methods) — Integrated B.Sc.+M.Sc. Physics, VII Semester; **Computational Techniques** (Python, Gnuplot, LaTeX) — B.Sc., I Semester; **Planetary Sciences** — B.Sc. (Hons.) Physics by Research, VII Semester; **Physics Labs** — B.Tech., I Semester.

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

2026–Present ◇ **M.Sc. Physics Dissertation:** Madhumita Singh (UPES) — *Homogeneous Bayesian Characterization of TESS Exoplanet Candidates*.

◇ **B.Sc. (Hons.) Physics by Research, Fourth Year:** Shagun Thakur — *Distance Determination of Pulsating Variable Stars Using the Baade–Wesselink Method*; Aniket Nishant Prakash — *Theoretical Multiphase Analysis of Pulsating Variable Stars Using MESA Stellar Evolution and Pulsation Models*; Kalpita — *Multiphase Period–Luminosity Relations of Pulsating Variable Stars Using OGLE-IV Photometry*.

◇ **B.Sc. (Hons.) Physics, Third Year:** Ananya Chona — *Photometric Redshift Estimation of Galaxies from SDSS Colours Using Machine-Learning Methods*; Deeksha Saklani — *Machine-Learning-Based Classification of Galaxies Using SDSS Photometric Data*.

2025 ◇ **M.Sc. Physics Dissertations:** Divyakrishna (UPES) — *Multiphase Period–Luminosity Relations of RR Lyrae Stars Using OGLE-IV Photometry*; Rushil Soni (UPES) — *Photometric Study of Globular Clusters Using Gaia DR3 Data*; Stuti (Dolphin (PG) Institute of Biomedical and Natural Sciences, Dehradun) — *Determination of the Age and Metallicity of a Globular Cluster*.

◇ **B.Sc. (Hons.) Physics Dissertations:** Satyansh Srivastava — Himalayan Fellow, UPES (recipient of the Himalayan Fellowship); Atharava Bhatele — *Multiwavelength Study of RR Lyrae Stars in a Globular Cluster*.

◇ **B.Sc. (Hons.) Physics by Research, Fourth Year:** Neelesh — *Characterization of Exoplanets Using TESS Archival Data*.

2025 ◇ **Summer Research Mentorship:** mentored three students in the Summer Internship Programme organized by Miranda House, University of Delhi.

2024 ◇ **Summer Research Mentorship:** mentored five students in the Summer Internship Programme organized by Miranda House, University of Delhi.

Mentorship (continued)

2019–2024 ◇ **Observational Astronomy Laboratory:** mentored several M.Sc. Physics students in observational astronomy laboratory projects, Department of Physics & Astrophysics, University of Delhi.

National Level Exams

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

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

Conferences & Workshops Organized

2026 ◇ **Workshop Coordinator — 1st Himalayan School for Training in Astronomy Research (HiSTAR)**
Coordinated the astronomy training school jointly organized by UPES, Dehradun, and Dolphin (PG) Institute of Biomedical & Natural Sciences, in collaboration with IUCAA, Pune, from 8–12 June 2026.

◇ **Workshop Coordinator — National Workshop on Data Science in Astronomy**
Coordinated the national workshop organized at UPES, Dehradun, in collaboration with IUCAA, Pune, from 24–26 February 2026.

Conferences, Workshops & Schools

2026 ◇ **12th BRICS Astronomy Working Group Meeting (BAWG 2026):** Meeting on *"Multi-messenger and Multi-wavelength Transients"*, organized by IUCAA and the Department of Science & Technology (DST), Government of India, at IUCAA, Pune.

◇ **44th Annual Meeting of the Astronomical Society of India (ASI 2026):** Presented the Ph.D. thesis *"Automated Analysis of Stellar Photometric and Spectroscopic Astronomical Data"* as an oral presentation in the **K. D. Abhyankar Best Thesis Presentation** category at IIT Guwahati, from 15–19 May 2026.

◇ **Rubin–LSST Alert Brokers: Alerts to Discoveries:** Workshop on Rubin Observatory LSST alert streams, brokers, and time-domain astronomical discoveries, scheduled to be held at IUCAA, Pune, from 2–5 November 2026.

2025 ◇ **Stellar Variability: Taking the Pulse of the Universe:** Participated in the workshop held at IUCAA, Pune, from 24–28 November 2025.

◇ **National Workshop on Statistical Methods and Data Analysis Techniques in Astrophysics:** Participated in the national workshop organized by the Department of Physics & Electronics, Hansraj College, University of Delhi, under the aegis of ANRF–DST, from 7–8 March 2025.

◇ **Space Science and Technology Awareness Training (START):** Completed the ISRO–IIRS online training programme on *"Future of India's Space Exploration"*, held from 9–29 January 2025 (19.5 hours).

2024 ◇ **Introductory Workshop on Astronomy and Astrophysics — Resource Person:** Delivered an **invited talk** at the workshop organized by the Department of Physics, Dolphin (PG) Institute of Biomedical & Natural Sciences, Dehradun, in collaboration with IUCAA, Pune, from 18–20 December 2024.

Conferences, Workshops & Schools (continued)

- **Probing Stars and Galaxies Using Innovative Data Science Tools — Resource Person:** Presented research at the workshop organized by Gauhati University in collaboration with the University of Delhi, IUCAA, Pune, and NIF, Gandhinagar, from 4–6 September 2024.

2023
- **Pedagogic Workshop on Astronomy, Astrophysics and Cosmology:** Participated in the workshop organized by St. Stephen's College, University of Delhi, from 6–10 November 2023.
- **Workshop on Stellar and Dynamical Evolution:** Participated in the workshop organized by Miranda House, University of Delhi, from 3–5 October 2023.

2022
- **Indo-French Astronomy School (IFAS 7):** Participated in the school on *"Spectroscopy and Spectrographs"*, held at IUCAA, Pune, from 21–27 November 2022.
- **Young Astronomers' Meet (YAM 2022):** Presented *"Application of Artificial Neural Networks in Generating RR Lyrae Light Curves"* at ARIES, Nainital, from 9–13 November 2022.
- **European Astronomical Society Annual Meeting (EAS 2022):** Participated in the European Astronomical Society Annual Meeting, held from 27 June–1 July 2022.
- **International Staff Week 2022:** Participated in the program on *"Internationalization in the New Era"* at WSB University, Dąbrowa Górnicza, Poland, from 16–20 May 2022; supported by an **ERASMUS+ Grant of €2,800**.
- **Faculty Development Programme on Recent Trends and Challenges in Intelligent Systems and Machines (RTCISM):** Participated in the one-week FDP organized by Amity University Patna, from 25–29 July 2022.

2021
- **Code/Astro:** Completed a 40-hour intensive program on scientific software development for astronomy, including Python programming, version control, testing, documentation, packaging, and profiling.
- **39th Annual Meeting of the Astronomical Society of India (ASI 2021):** Presented the poster *"Spectral Interpolation Using Artificial Neural Networks (ANN)"* at the virtual ASI Annual Meeting, from 18–23 February 2021. [https://astron-soc.in/asi2021/abstract_details/ASI2021_66]

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

Miscellaneous (continued)

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

Available on Request