

# AI/ML APPLICATIONS IN ASTRONOMY & ASTROPHYSICS

**JANUARY 6 - 10, 2025, IUCAA, INDIA**

**Venue: Bhaskara 3**

**6th January 2025 (Monday)**

**08:00-09:00 Breakfast at Chittaranjan**

**09:00-09:20 Registration and Badge Collection**

**09:20-09:30 Welcome speech by the Director, IUCAA**

**Morning Session, Chair: Arif Babul**

**09:30-10:15 Ajit Kembhavi, AI/ML Overview with Astronomy Applications**

**10:15-11:00 Ashish Mahabal, Generative AI and Astronomy**

**11:00-11:30 Tea Break**

**11:30-12:15 Ninan Sajeeth Philip, NLP techniques: Transformer architecture, attention mechanism, embeddings, etc. in the context of LLMs, SLMs, and LMMs**

**12:15-13:00 Yogesh Wadadekar, Writing astronomy codes with generative AI**

**13:00-14:00 Lunch at Chittaranjan**

**Afternoon Session, Chair: Ajit Kembhavi**

**14:00-14:45 Kaustubh Waghmare, Enabling LLMs to Reason Beyond Their Training Data**

**14:45-15:30 Hands-On 1, Yogesh Wadadekar, Writing astronomy codes with generative AI**

**15:30-16:00 Tea Break**

**16:00-16:30 Hands-On 2, Nikita Balodhi, [Estimating Coronal temperatures using Bayesian Machine Learning](#)**

**16:30-17:00 Hands-On 3, Siddharth Chaini, [Leveraging Distance Metrics for Better Machine Learning](#)**

**17:00-17:30 Snacks**

**20:00-21:00 Dinner at Chittaranjan**

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**7th January 2025 (Tuesday)**

**08:00-09:00 Breakfast at Chittaranjan**

**Morning Session, Chair: Ashish Mahabal**

**09:30-10:15 Alex Szalay, [AI-ready data in Astrophysics](#)**

**10:15-11:00 Mark Allen, [Progress and challenges for the use of AI in CDS services.](#)**

**11:00-11:30 Tea Break**

**11:30-12:15 TBD**

**12:15-13:00 Deoyani Nandrekar-Heinis, [NIST Data Management, Repository and AI techniques](#)**

**13:00-14:00 Lunch at Chittaranjan**

**Afternoon Session, Chair: Kanak Saha**

**14:00-14:30 Arunima Banerjee, [Morphological Classification of galaxies using Machine Learning](#)**

**14:30-15:00** Shravan Hansoge, **Discovery of anomalous rotators and new evolutionary phases in red giants using machine learning**

**15:00-15:15** Priya Hasan, **A Study Of YSOs in the Perseus Molecular Cloud using ML Techniques**

**15:15-15:30** Rohan Pattnaik, **SpecPT: Spectroscopy Pre-trained Transformer model for Galaxy Spectra**

**15:30-15:45** Biju Saha, **Identifying lopsidedness in galaxies using a Deep Convolutional Neural Network**

**15:45-16:15** Tea Break

**16:15-17:00** Hands-On 4, Atharva Bagul, **MargNet: Compact Galaxies**

**17:00-17:30** Snacks

**20:00-21:00** Dinner at Chittaranjan

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**8th January 2025 (Wednesday)**

**08:00-09:00** Breakfast at Chittaranjan

**Morning Session, Chair: Durgesh Tripathi**

**09:30-10:15** Brandon Panos, **Viewing the Sun through a Machine Learning Lens**

**10:15-11:00** Federica Bianco, **TBD**

**11:00-11:10** Group Photo at Kund area

**11:10-11:30** Tea Break

**11:30-12:15** Joe Philip, **ML for exoplanets and instrumentation**

**12:15-13:00 Anupam Bharadwaj, Automated classification of pulsating stars and their stellar parameters with machine learning**

**13:00-14:00 Lunch at Chittaranjan**

**Afternoon Session, Chair: Anupam Bharadwaj**

**14:00-14:30 Rishita Das, Machine learning enhanced modeling of turbulent flow dynamics**

**14:30-15:00 M. Vivek, Spectroscopic Quasar Anomaly Detection**

**15:00-15:30 Vishal Upendran, From subtle to the vast: A multi-scale understanding of the Sun aided by artificial intelligence**

**15:30-16:00 Tea Break**

**16:00-17:00 Panel Discussion, Pitfalls of using ChatGPT**

**17:00-17:30 Snacks**

**20:00-21:00 Dinner at Chittaranjan**

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**9th January 2025 (Thursday)**

**08:00-09:00 Breakfast at Chittaranjan**

**Morning Session, Chair: TBD**

**09:30-10:15 Arif Babul, Advancing science with ML/AI without falling prey to its siren song**

**10:15-11:00 Ofer Lahav, AI for Cosmological Experiments**

**11:00-11:30 Tea Break**

**11:30-12:15** Francisco Villaescusa-Navarro, **Cosmology in the machine learning era**

**12:15-12:45** T. Sivarani, **AI/ML applications to stellar abundances and stellar population studies**

**12:45-14:00** Lunch at Chittaranjan

**Afternoon Session, Chair: TBD**

**14:00-14:45** Lucio Mayer, **Multi-physics and multi-scale challenges in cosmic structure formation; from galaxy formation to black hole mergers with machine learning**

**14:45-15:15** Madhurima Choudhury, **Deciphering the Epoch of Reionization using Neural Networks**

**15:15-15:30** Soumak Maitra, **Parameter estimation from Lyman forest in Fourier space using Information Maximising Neural Network**

**15:30-15:45** Yashrajsinh Mahida, **Estimation of Reionization Parameters from 21-cm Bispectrum using BNN-based Emulator**

**15:45-16:00** Anshuman Tripathi, **ANN-Based Global 21-cm Signal Extraction with Chromatic Ionospheric Effects**

**16:00-16:30** Tea Break

**16:30-17:15** Hands-On 5, Linn Abraham, **Galaxy Ring Detection**

**17:15-17:45** Snacks

**20:00-21:00** Dinner at Chittaranjan

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**10th January 2025 (Friday)**

**08:00-09:00** Breakfast at Chittaranjan

**Morning Session, Chair: Yogesh Wadedekar**

**09:30-10:00 Anupreeta More, Machine Learning Applications to Gravitational Waves**

**10:00-10:30 Suvodip Mukherjee, Finding a Balance between Learning and Machine Learning in Gravitational Wave Astronomy**

**10:30-10:45 Badam Kushvah, Fundamentals of Artificial Neural Networks and Convolutional Neural Networks**

**10:45-11:00 Abisa Sinha, Unveiling Patterns in High Dimensions: AI/ML Innovations in Multivariate Analysis, Dimension Reduction, and Clustering**

**11:00-11:30 Tea Break**

**11:30-11:45 Rohan Raha, Gravitational wave forecasting with denoised signal using Deep Learning**

**11:45-12:00 Priyanka Gawade, Modelling strong lenses from the HSC Survey using convolutional neural networks**

**12:00-12:15 Digvijay Wadekar, Improving astrophysical scaling relations with machine learning**

**12:15-12:30 Snigdha Sen, Performance Evaluation of Efficient Interpretable Attention Inception Model for Redshift Estimation**

**12:00-12:45 Bihag Dave, Employing neural networks for learning theory parameters**

**12:45-14:00 Lunch at Chittaranjan**

**Afternoon Session, Chair: Suvodip Mukherjee**

**14:00-15:00 Panel Discussion, Future and Sustainability of AI**

**15:00-15:30 Conference Ends with Tea Break**