Yogesh Bhardwaj

Research Cosmologist · LLM Engineer · AI-Trainer

When I am not developing research databases, I explore advancements in my field and study the latest trends in Artificial Intelligence.
My interests span from developing AI models and designing websites to understanding the large-scale structure and origins of the universe.
I have authored a small number of articles that have gained notable recognition.
I also worked on some cosmological models in large unifying theories and models that were surprisingly powerful and robust.

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GOALS

- I am passionate about exploring the interplay of mathematics and cosmology to uncover hidden truths about the universe and its dynamics.

- I think across scales — from studying the origins and structure of the universe to solving data-driven problems in mathematics and artificial intelligence.

- I enjoy applying advanced computational tools like Python, machine learning, SQL, and Mathematica to connect theoretical models with real-world applications.

- I strive to learn and grow continuously, challenging assumptions while designing innovative solutions in applied mathematics and cosmology.

SKILLS

- Engineering
- Teaching
- Research
- AI-ML
- Cosmology & Applied Mathematics
- Cricket Music
- Speed napping
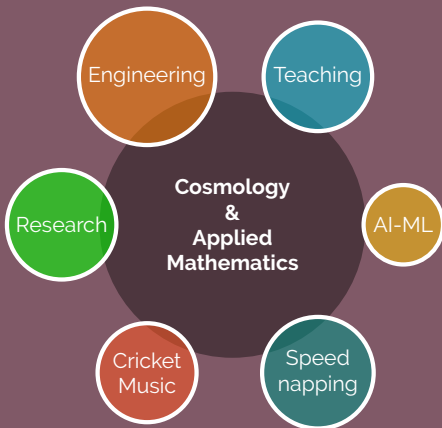
TECH

- Research
- AI-ML
- SQL
- Mathematica
- SPSS
- Matlab
- R

WORK EXPERIENCE

Research Fellow
Ongoing- Jan 2022
DELHI TECHNOLOGICAL UNIVERSITY · Delhi, India 📍
As a Research Fellow, I focus on Applied Mathematics and Cosmology, exploring the universe's large-scale structure, origins, and dynamics. I have developed databases to track research activities, implemented mathematical models to solve complex scientific problems, and applied computational tools like Python and Mathematica for data analysis. My work has contributed to impactful findings published in peer-reviewed journals.

Coders AI-Training
Ongoing- Nov 2024
OUTLIER, SAN FRANCISCO, CA, USA · Remote 📍
I enhance large language models by evaluating and improving the quality of AI-generated code. I develop functional and optimized solutions across languages such as Python, Java, C++, and MATLAB while creating clear, human-readable explanations and robust test cases. My role involves optimizing code efficiency, solving complex coding problems, and ensuring AI systems can abstract and articulate solutions effectively. I leverage my complete fluency in English to describe code and abstract concepts clearly.

LLM Senior Engineer
Ongoing- July 2024
TURING, CALIFORNIA, US · Remote 📍
I develop advanced mathematical AI models, combining research in applied mathematics with large language models to solve complex mathematical problems and explore innovative solutions in AI-driven systems.

Mathematics Specialist
Aug 2023
Jan 2023
I.A.S. MATHS ACADEMY · Patna, India .Remote 📍
Designed, administered, and evaluated assessments to measure student understanding of mathematical concepts.

Subject Matter Expert, Reviewer
Jan 2021
Jan 2020
COURSE HERO · California, US. Remote 📍
Mentored junior staff members on best practices related to subject knowledge and implementation strategies.

Subject Matter Expert
Dec 2020
Feb 2020
CHEGG · Delhi, India 📍
Providing subject matter expertise and guidance to cross-functional teams in developing advanced mathematics test series solutions.

INTERESTS & EXPERTISE

General Relativity · Modified Gravity Theories · Python · Artificial Intelligence · Machine Learning · Teaching · Learning · Cricket · Music · Travel

🎓 FORMAL EDUCATION

Ongoing - 2022

Doctor of Philosophy, Applied Mathematics

DELHI TECHNOLOGICAL UNIVERSITY · Delhi, India 📍

Delhi Technological University (DTU) is a leading institution renowned for its contributions to cutting-edge science, technology, and applied mathematics research. The university fosters innovation and interdisciplinary collaboration, focusing on solving real-world problems through advanced research, mathematical modeling, and technological development.

2021-2019

Master of Science, Applied Mathematics

DELHI TECHNOLOGICAL UNIVERSITY · Delhi, India 📍

Delhi Technological University (DTU) provides a rigorous and research-driven Master's program in Applied Mathematics, focusing on advanced mathematical theories and their real-world applications. The program emphasizes problem-solving, mathematical modeling, and analytical methods, preparing students for research and industry. My time at DTU involved exploring topics like differential equations, numerical methods, and operational research, fostering a deep understanding of applied mathematics and its interdisciplinary relevance

🖥 SELF-EDUCATION

2024

Data-driven Astronomy

COURSERA 🖥

This course focused on applying data science techniques to astronomical datasets, teaching data analysis and visualization skills, and using software tools like Python to solve real-world astronomical problems.
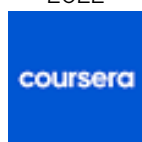
2023

100 Days of Code:The Complete Python Pro Bootcamp

UDEMY 🖥

This comprehensive course provided in-depth training in Python programming, covering topics from basic syntax to advanced concepts such as web development, data analysis, and automation.

2022

Programming for Everybody (Getting Started with Python)

COURSERA 🖥

This introductory course laid the foundation for Python programming, covering fundamental concepts and enabling proficiency in writing basic programs and scripts.

📑 PUBLICATIONS

Aug 2024

Constraining Variable Generalized Chaplygin Gas model in Matter Creation Cosmology

COMMUNICATION IN THEORETICAL PHYSICS 📄

We explore the variable generalized Chaplygin gas (VGCG) model in the theory of matter creation cosmology within the framework of a spatially homogeneous and isotropic flat Friedmann-Lemaître-Robertson-Walker space-time. Matter creation cosmology is based on reinterpretation of energy-momentum tensor in Einstein's field equations. This creation corresponds to an irreversible energy flow from the gravitational field to the created matter constituents. The variable Chaplygin gas (VCG) is also studied as a particular solution. We use the Markov Chain Monte Carlo method to constrain the free parameters of three models, namely, ΛCDM, VGCG, and VCG models with and without matter creation from the latest observational data from baryon acoustic oscillations, cosmic chronometer, type Ia supernovae (Pantheon) including gamma-ray burst, quasars, and the local measurement of H_0 from R21 data. Two different combinations of datasets provide a fairly tight constraint on the parameters of the ΛCDM, VGCG, and VCG models.

Jan 2024

Matter creation cosmology with generalized Chaplygin gas In Journal
ASTROPHYSICS AND SPACE SCIENCE 📄

In this work, we discuss the dynamics of a spatially homogeneous and isotropic flat Friedmann-Lemaître-Robertson-Walker (FLRW) model of the Universe powered by the gravitationally induced 'adiabatic' matter creation with generalized Chaplygin gas (GCG) equation of state. In recent years, the GCG has been proposed successfully to unify the dark matter and dark energy by using an exotic equation of state $p = -A/\rho^\alpha$. Considering adiabatic matter creation cosmology, as developed by Prigogine et al., we examine the effect of matter creation in describing the unification with GCG by assuming the natural phenomenological matter creation rate $\Gamma = 3\beta H$, where β is a constant and H is the Hubble parameter. We constrain the proposed model using a joint observational dataset of Type Ia supernovae Pantheon, $H(z)$ and BAO with Markov-Chain Monte-Carlo (MCMC) method. In addition, we discuss the selection criterion (AIC and BIC) and stability criteria to analyze the dynamics and differences with the standard ΛCDM model.

May 2021

 AN EXTENDED MULTILEVEL TRANSPORTATION PROBLEM WITH MULTIPLE INPUTS AND OUTPUTS
DSPACE JSPUI, DELHI TECHNOLOGICAL UNIVERSITY 📄

We have suggested an extension to the classic multilevel transportation problem in which for each transportation problem, each shipment connection has several incompatible input and output. The relative efficiency definition is established for each shipment connection. To evaluate the most efficient transportation strategy, two linear programming problem is solved, one is direct transportation and second one is multilevel transportation. A numerical is illustrated to explain the method.