

JASHANPREET SINGH

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Amritsar, Punjab, India

Summary

MSc. FYIP Physics student and ML researcher applying deep learning, state-space/transformer models and large-scale data pipelines to astrophysics and medical imaging. Author of an open-source galaxy-analysis package (under review at MNRAS), IUCAA computational grant holder, and founder of two AI startups building LLM/LMM systems.

Education

Guru Nanak Dev University - MSc. FYIP Physics - CGPA 9.10/10 **2024 – Present**
Amritsar, Punjab, India

The Millennium School - Non Medical - 84.2% **2022 – 2024**
Patiala, Punjab, India

Technical Skills

Machine Learning: Deep Learning, CNNs, Transformers, GNNs, State Space Models (Mamba), RAG, LLM Fine-tuning (SFT, LoRA, QLoRA, PEFT), Agentic AI

Frameworks: PyTorch, TensorFlow, JAX, Scikit-learn, HuggingFace, OpenCV, LangChain, LangGraph

MLOps & Tracking: Weights & Biases, MLflow, Airflow, Docker, Kubernetes, Git, Linux

Languages: Python, C++, C, R, Fortran, MATLAB, Bash, Assembly

Backend & Data: FastAPI, REST API, MERN, PostgreSQL, MySQL, MongoDB, Redis, Elasticsearch, FAISS, Pinecone

Cloud & Compute: AWS, GCP, Azure, HPC clusters (IUCAA Pegasus)

Scientific Python: NumPy, SciPy, Astropy, Matplotlib, Seaborn, Plotly

Core CS: Data Structures & Algorithms, Object-Oriented Programming

Funded Startups

Sitee (sitee.in) **2025 – Present**
Founder & CTO

- Founded and developed Sitee, an AI-powered platform that generates full-stack websites from natural-language prompts using a custom 1.2B+ parameter LLM.
- Integrated vector databases, including FAISS and Pinecone, for context retrieval, code generation, and scalable AI workflows.

Brepline (brepline.vercel.app) **2025 – Present**
Founder & CTO (Early Stage)

- Developing a 7.9B+ parameter large multimodal model (LMM) for AI-driven 3D modeling, generating parametric CAD models in STEP/B-Rep formats from natural-language prompts and sketches.
- Integrating AI with SolidWorks through custom plugins for AI-assisted CAD design, parameter editing, and automated engineering workflows.

Publications

- A Unified Deep Learning Framework for Automated Morphological Classification and Photometric Analysis using DECaLS Legacy Imaging** (MNRAS Accepted - 13/10/2026)
 - Built **Galamo**, an open-source Python package combining deep learning and statistical methods for automated galaxy morphology classification, kinematics, photometry and spectral analysis.
 - Authors: Jashanpreet Singh Dingra, **Hum Chand** & **Madhu Sudan** — www.galamo.org
- Investigating the relationship between black hole mass and galaxy dynamics in Seyfert Type II and LINER galaxies** (MNRAS Under Review)
 - Presented, for the first time, the $M_{\text{BH}}-\sigma$ correlation specifically for Seyfert Type II galaxies, a statistically challenging analysis due to nuclear dust obscuration and the torus.
 - Authors: Jashanpreet Singh Dingra and Madhu Sudan

International Collaborations

- Evolutionary Destiny and Observational Deficits of JWST “Little Red Dot” Analogues in IllustrisTNG** (Ongoing - 2026)
 - Analysed IllustrisTNG simulation data, tracking main descendant branches to $z = 0$ to predict that early-universe Little Red Dots are progenitors of present-day Brightest Cluster Galaxies. A stacked temporal analysis aligned to the quenching epoch shows radiatively efficient AGN feedback drives their rapid star-formation cessation.
 - Supported by an **IUCAA Pegasus Cluster computational grant (2026)**.
 - Authors: Jashanpreet Singh Dingra, Akanksha Kapathia (Max Planck Institute for Astronomy, Heidelberg)*
- Exploring Active Galactic Nuclei in the Sloan Digital Sky Survey: A Multiwavelength Study** (2026)
 - Conducted under the **Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences, Warsaw**.
 - Mentors & Collaborators: Marzena Sniegowska (Czech Academy of Sciences), Biswaraj Palit (Copernicus Astronomical Center)*

Machine Learning & Research Projects

- Deep Learning Model for Alzheimer’s Detection and MRI Brain Segmentation** (2025)
 - Engineered a CNN to classify Alzheimer’s disease stages from brain MRI scans, with a semantic segmentation head delineating affected structures such as the hippocampus to aid early diagnosis.
 - Authors: Jashanpreet Singh Dingra and Hardeep Kaur*
- Pipeline to Disentangle AGN Flux from Total Galaxy Flux using the PFVG Method** (2025 - Present)
 - Building a statistical pipeline to separate AGN flux variability from host-galaxy flux using the PFVG method on COSMOS survey data.
 - Authors: Madhu Sudan, Jashanpreet Singh Dingra, Ankit Sarkar & Hum Chand*
- Galspar & RAGA - Automated Pipelines for Galaxy Morphology via GALFIT** (2025 - Present)
 - Developed **galspar** for precise photometric and morphological measurements on FITS galaxy images, and **RAGA**, an automated pipeline for large-sample statistical morphology studies with GALFIT.
 - Authors: Jashanpreet Singh Dingra, Hum Chand and Madhu Sudan (Central University of Himachal Pradesh)*
- Stellar Velocity Dispersion of SDSS Galaxies with a MILES Template: `vdisp_fit`** (2025 - Present)
 - IUCAA Visiting Student Project.** Developed a Python pipeline that fits SDSS spectra by convolving a MILES stellar template with a Gaussian broadening function and applying robust χ^2 minimisation to recover kinematic parameters.
 - Authors: Jashanpreet Singh Dingra and Gulab Chand Dewangan (IUCAA)*
- N-body Simulation of Open Star Cluster Dynamics (4th-order Runge-Kutta)** (2025)
 - Implemented a numerical N-body integrator to model long-term gravitational evolution and dissolution of open clusters; analysed trajectories and stability over cosmic timescales.
 - Authors: Jashanpreet Singh Dingra and Suprit Singh (IIT Delhi)*
- Crab Pulsar Spin-Down Rate Over 8 Years (2015–2023)** (2024)
 - Analysed archival X-ray timing data to measure the spin-down rate and braking index, and investigated timing noise and glitches.

Open-Source Contributions

Astropy — contributor to `astropy.coordinates` and other modules (2025 - Present)

Selected Achievements

- AlgOlympia, Chandigarh University** (National Hackathon) **Winner** - 50000 INR (2026)
- HACKOWASP 7.0** (TIET, North India’s biggest hackathon) **Runner Up** - 150000 INR (2025)
- Ideathon, GNDU** (Golden Jubilee Centre of Entrepreneurship and Innovation) **Winner** - 15000 INR (2025)
- AdventureX** (China’s biggest hackathon) **Final Round**, Hangzhou (2025)
- ICNPA Best Oral Presentation Award** (2024)
- JEE Mains AIR 231** (2024)
- Breakthrough Junior Challenge Finalist** (2021)

Selected Schools, Conferences & Talks

ESA Workshop: Machine Learning meets Galaxy Classification 2 , ESAC, Spain	(2026)
Himalayan School for Training in Astronomy Research (HiSTAR) , UPES, by IUCAA	(2026)
School on Galactic Astrophysics using UVIT, HST and JWST , IUCAA	(2026)
ZTF Summer School 2025 , University of Minnesota, USA	(2025)
Summer School on Analysis and Statistical Modelling of Space Science Data , MCNS	(2025)
Summer School on Gravitational-Wave Astronomy , ICTS-TIFR, Bangalore	(2025)
National Conference on Active Galactic Nuclei , CUHP	(2025)
International Conference on Nuclear Physics and Its Applications , New Delhi	(2024)

Leadership

Founder of Dingraastro.Club, a global astronomy community with 200+ members
Tech Head, Guru Nanak Dev University Physics Club
ISRO Space Tutor (2023 - Present); **IAAC Ambassador** (2024 - Present)