

DAKSHESH KOLOLGI

<https://github.com/jdpkololgi>

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Objective

I am a **highly motivated PhD researcher** in astrophysics and applied A.I. at UCL. I specialise in applying graph-based ML methods to understand how the local environments of galaxies influence their evolution. Additionally, I am working on a project to detect the gravitational redshift effect with galaxy clusters from the DESI galaxy survey. I am fascinated by graph-representation learning. With the recent growth of graph-based ML, building relational inductive biases into learning architectures is crucial for generalisable and physical models of the real-world. I am excited to leverage my skills as a physicist to further this paradigm shift.

Research Experience

University College London (UCL), PhD Data Intensive Science

2023 - Present

- **Supervisors:** Amélie Saintonge & Ofer Lahav

Projects: Graph-based machine learning for cosmic web classification and galaxy evolution; Detecting gravitational redshift effect with the DESI galaxy survey and then replace existing method with simulation-based inference.

Durham University, MSc by Research (Astrophysics)

2022 - 2023

- **Supervisor:** Hermine Landt-Wilman

Project: Applying machine learning algorithms for time-domain interpolation of light curves from active galactic nuclei.

Imperial College London, MSci Physics

2017 - 2021

- 4th-Year Project

Supervisor: Derek Lee

Project: Simulating quasi-particles (Majorana fermions) to produce topologically protected qubits for use in quantum computing applications.

- Summer Undergraduate Research Project

Supervisor: Yasmin Andrew

Project: Exploring stochastic and information theory approaches to understand the low-to-high confinement phase transition in tokamak plasmas for nuclear fusion.

Publications

- ‘Graph Based Machine Learning Methods to Detect Cosmic Web Structures for Galaxy Evolution’
D. Kololgi, A. Saintonge O. Lahav (In prep.); MNRAS.
- ‘Accretion Disk Reverberation Mapping of the Obscured Narrow-Line Seyfert 1 Galaxy Mrk 1239’
D. Kololgi, H. Landt, J. V. Hernández Santisteban, K. Horne, D. Sanmartim (In prep.); AAS.

Skills

- PhD: Developing MLPs, Random Forests, Graph-Neural Networks with PyTorch.
- MSci: Excellent theoretical physics knowledge and computational numerical methodologies.
- MSci: Experience in creating a research proposal.
- Languages: English (native), Kannada (fluent), Spanish (intermediate), French (intermediate), Hindi (novice).

- Extensive coding experience in Python, and R. Regular user of Github for version control and collaborative coding. Extensive use of high-performance computing solutions. Interest in learning Julia, C, and Fortran.
- Confident science communicator to diverse audiences (DESI Marseille conference, Burnham Grammar School careers event). STEM teaching experience (tutoring, UG teaching assistant).
- Adept independent and collaborative working ability.
- Experience in storyboarding, presenting to corporate and governmental audiences for successful decision making.

Industry Experience

Home Office (UK Civil Service), Higher Operational Research Analyst

2021 - 2022

- Training and research on difference-in-difference regression modelling with emphasis on optimising statistical significance tests.
- Contributed to the GRIP Hotspot policing analysis tooling to test the effectiveness of hotspot policing strategies against serious violent crime for different police forces across England and Wales.
- Leading the 2022-2023 Q2 GRIP analysis development. Secondly, I sought to standardise and optimise analysis pipelines for a future quarter's results. Demonstrating the effectiveness of hotspot policing is instrumental in funding and implementing effective policing strategies against homicide, assault, and other forms of serious violent crime.

Awards

- **Centre for Data Intensive Science (2023-2027):** Competitive fully-funded PhD research position at UCL.
- **Arthur Browne Prize (2022):** Competitive scholarship prize for MScR students at Durham University awarded based on academic merit.
- **Burnham Grammar School (2017):** Excellence Award in Physics and Chemistry. Academic Achievement in Further Mathematics.

Extra-curricular Activities

- Debating, current affairs, geopolitics, and history.
- Reader of effective institutional development and implementing strategies of organisational change.
- Keen on weightlifting and hiking.