

Tanveer Karim

ARTS & SCIENCES POSTDOCTORAL FELLOW · UNIVERSITY OF TORONTO

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Research Interests

My research focuses on the intersection of high redshift large-scale structure surveys and Bayesian inference. Methodologically, I work on designing robust frameworks that can combine multiple surveys to provide unbiased constraints of fundamental physics models, especially with a focus on dark energy and dark matter.

Professional Experience

- 2023-Pres **Arts & Sciences Postdoctoral Fellow**, University of Toronto
- Sum 2023 **Postdoctoral Fellow**, Harvard University
- 2012-2023 **Graduate Researcher**, Harvard University
- Sum 2016 **REU Intern**, Maria Mitchell Observatory
- Sum 2015 **REU Intern**, Vanderbilt University
- Spr 2015 **REU Intern**, Cerro Tololo Inter American Observatory

Education

Harvard University

Cambridge MA, USA

PHD IN ASTRONOMY & ASTROPHYSICS

2017 - 2023

- *Precision Cosmology with Emission-Line Galaxies*. Advisor: Daniel Eisenstein

University of Rochester

Rochester NY, USA

BS IN PHYSICS & ASTRONOMY

2012 - 2017

- Magna Cum Laude, Highest Distinction

Selected Awards, Fellowships & Grants

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| 2023 | Arts & Sciences Postdoctoral Fellowship , University of Toronto | CAD 96,000 |
| | Kavli Fellow , National Academy of Sciences | |
| | Barbara Bell Dissertation Fellowship , Harvard University | USD 25,000 |
| 2019 | National Science Foundation Graduate Fellowship , National Science Foundation | USD 147,000 |
| 2016 | Goldwater Scholar , The Barry Goldwater Scholarship and Excellence in Education Foundation | USD 7,500 |
| 2015 | Take Five Scholar , University of Rochester | USD 40,000 |

Collaboration Memberships

- 2018-Pres **Dark Energy Spectroscopic Instrument Collaboration**, Continuing Participant
- 2023-Pres **Dark Energy Science Collaboration**, Member

Leadership & Service

- 2024-Pres **Dark Energy Science Collaboration**, Lyman-Break Galaxies Topical Team Co-Lead
- 2024-Pres **Dark Energy Science Collaboration**, Collaboration Meeting Scientific Organizing Committee
- 2023 **Department of Astronomy Graduate Admissions Committee, Harvard University**, Committee Member
- 2021-2022 **Diversity, Equity and Inclusion Committee, DESI**, Committee Member
- 2018-2019 **Equity & Inclusion Journal Club, Harvard University**, Organizer

Mentoring

- 2024-Pres **Seo Won Yi**, Summer Research Intern, University of Toronto
- 2024-Pres **Adiba Prama**, Career Mentee, University of Rochester
- 2023-Pres **Mikel Charles**, Collaboration Mentee, DESI Collaboration
- 2022 **Ryhan Mortuza**, Career Mentee, Harvard University
- 2022 **Raisha Islam**, Career Mentee, University of Oxford

Teaching Experience

- Spr 2022 **Life as a Planetary Phenomenon**, Teaching Fellow & Guest Lecturer, Harvard University
- Spr 2020 **Prediction: The Past & The Present of the Future**, Teaching Fellow, Harvard University
- Sum 2019 **Public Speaking for Scientists**, Instructor, Banneker Institute, Harvard University
- Sum 2019 **Celestial Coordinate Systems**, Instructor, Banneker Institute, Harvard University
- Spr 2019 **Life as a Planetary Phenomenon**, Teaching Fellow, Harvard University
- Spr 2016 **Relativity, Black Holes & the Big Bang**, Teaching Assistant, University of Rochester
- Spr 2015 **Mechanics for Engineers (Flipped Classroom)**, Teaching Assistant, University of Rochester
- Spr 2014 **Cosmic Origins of Life**, Teaching Assistant, University of Rochester
- Fall 2013 **General Physics I**, Teaching Assistant, University of Rochester

Publications

IN REVIEW

TK, Rezaie M., Singh S., Eisenstein, D. et al., Measuring σ_8 using DESI Legacy Imaging Surveys Emission-Line Galaxies and Planck CMB Lensing and the Impact of Dust on Parameter Inference. *In DESI Collaboration Review*

FIRST AUTHOR PUBLISHED (98 CITATIONS)

TK, Rezaie M., Singh S. & Eisenstein, D. 2023. On the Impact of Observational Systematics on Cosmological Parameter Inference. *MNRAS*, 525, 311 - 324

TK, Lee, J., Eisenstein, D., Burtin, E. et al., 2020. Validation of Emission-Line Galaxies Target Selection Algorithms for the Dark Energy Spectroscopic Survey Using the MMT Binospec, *MNRAS*, 497, 4587

TK, Fox A., Jenkins, E. B., Bordoloi, R. et al., 2018. Probing the Southern Fermi Bubble in Ultraviolet Absorption Using Distant AGNs, *ApJ*, 860, 2, 98

TK, & Mamajek, E., 2017. Revised Geometric Estimates of the North Galactic Pole and the Sun's Height Above the Galactic Midplane, *MNRAS*, 465, 472

TK, Stassun, K. G., Briceño, C., Vivas, A. K. et al., 2016. The Rotation Period Distributions of 4 – 10 Myr T Tauri Stars in Orion OB1: New Constraints on Pre-main-sequence Angular Momentum Evolution, *AJ*, 152, 198

CO-AUTHORED PUBLISHED (428 CITATIONS)

Ross, A. J. et al., 2024. The Construction of Large-scale Structure Catalogs for the Dark Energy Spectroscopic Instrument, *JCAP*

- Raichoor, A., Moutakas, J., Newman, J. A., **TK** et al., 2023. Target Selection and Validation of DESI Emission Line Galaxies, *AJ*, 165, 3, 126
- Myers, A., Moutakas, J., Bailey, S., Weaver, B. et al., 2023. The Target-selection Pipeline for the Dark Energy Spectroscopic Instrument, *AJ*, 165, 2, 50
- DESI Collaboration et al., 2022. Overview of the Instrumentation for the Dark Energy Spectroscopic Instrument, *AJ*, 164, 5, 207
- Ashley, T., Fox, A. J., Cashman, F. H., Lockman, F. J. et al., 2022. Diverse metallicities of Fermi bubble clouds indicate dual origins in the disk and halo, *Nature Astronomy*, 6, 968-975
- Raichoor, A., Eisenstein, D., **TK**, Newman, J. A. et al., 2020. Preliminary Target Selection for the DESI Emission Line Galaxy (ELG) Sample, *RNAAS*, 4, 10, 180
- Ashley, T., Fox, A. J., Jenkins, E. B., Wakker, B. P. et al., 2020. Mapping Outflowing Gas in the Fermi Bubbles: A UV Absorption Survey of the Galactic Nuclear Wind, *ApJ*, 898, 2, 128

Presentations

INVITED TALKS

- Summer 2024. *Observational Considerations in Spectroscopic Surveys*. Invited talk: ML for Fundamental Physics, Aspen Center for Physics, CO USA.
- Spring 2024. *Imaging Systematics Estimator is Biased in Power Spectrum*. Invited talk: Dark Energy Science Collaboration Seminar.
- Spring 2024. *Illuminating the Dark Universe*. Invited talk: National Academy of Sciences Kavli Frontiers of Science Symposium plenary, CA USA.
- Fall 2023. *Constraining Cosmology with Emission-Line Galaxies*. Invited talk: Yale Cosmology Seminar, CT USA.
- Summer 2022. *Model Minority myth and its impact on policymaking: A case study on Asian-Americans*. Invited talk: European Astronomical Society Early Career Astronomers Session, Valencia Spain.