

Ankita Bera

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Research interests

Cosmic Reionization and Cosmic Dawn, semi-analytical modeling of 21-cm signal, evolution of high-redshift galaxies, machine learning, parameter inference.

Appointments

- **CTC Postdoctoral Fellow** **University of Maryland, College Park, USA**
High redshift galaxy evolution *September 2023 – Ongoing*
 - Research topic: Analyzing numerical simulations of galaxy formation, with a particular view at creating realistic predictions for telescopes such as JWST.
 - Advisors: Benedikt Diemer, Massimo Ricotti
- **Guest Researcher** **CCA, Flatiron Institute, New York, USA**
Generate mock observations using ML *June 2022 – January 2023*
 - Research topic: Constraining galaxy evolution using JWST-mock galaxy maps from THESAN simulation.
 - Advisors: Sultan Hassan, Marc Huertas-Company, Rahul Kannan, Aaron Smith, and Mark Vogelsberger
- **Remote pre-doctoral candidate** **CCA, Flatiron Institute, New York, USA**
Bayesian analysis for parameter estimation *February 2022 – June 2022*
 - Research topic: Bridging the Gap between Cosmic Dawn and Reionization constraints.
 - Advisors: Sultan Hassan, Aaron Smith, Renyue Cen, Enrico Garaldi, Rahul Kannan, and Mark Vogelsberger

Education

- **PhD in Astronomy** **Presidency University, Kolkata, India**
Semi-analytical modelling of Reionization *March 2018 – September 2023*
 - Dissertation Topic: Unveiling the Cosmic Dawn and Epoch of Reionization using cosmic 21-cm signal.
 - Advisors: Saumyadip Samui, Kanan K. Datta
- **Masters in Physics** **University of Calcutta, Kolkata, India**
[Rajabazar Science College, CU] *2014 – 2016*
 - Specialization in Quantum field theory, Astrophysics, and Cosmology.

Awards

- **Joint CSIR-UGC National Eligibility Test (NET):** JRF (All India Rank 174) 2017
- **Joint Entrance Screening Test (JEST):** All India Rank 332 (2017)

Fellowships and Grants

- **CTC Postdoctoral Fellowship** (2023-2026)
- **CSIR-UGC Senior Research Fellowship** (2020-2023) & **Junior Research Fellowship** (2018-2020)
- **SERB/DST International Travel Grant** (ITS/2022/002343), September 2022

Professional Service

- Journal peer review: Nature Astronomy
- Coordinator and Organizer: Center for Theory and Computation (CTC) Seminar Series
- Organizing Committee member: Departmental Hot Papers (Journal Club)
- Chambliss judge at AAS 245 & AAS 246 Chambliss Student Poster Competition

Invited talks

- GAFD seminar at UC Santa Cruz, USA, November 2024
- Pedagogical lecture on 21-cm cosmology at Spring Conference on Solid State Physics, Astrophysics, Nuclear Physics & Particle Physics, Virtual, April 2025

Contributed talks

- The 246th AAS meeting, Anchorage, Alaska, USA, June 2025
- The Inaugural Cosmic Frontier Center Conference, Austin, Texas, USA, May 2025
- Berkeley 5th Global 21-cm Workshop, Berkeley, USA, October 2022
- Reionization on a blackboard Conference at CCA, Flatiron Institute, USA, September 2022
- 8th Annual Science At Low Frequencies (SALF) Virtual Conference, December 2021
- Virtual SKA Science Conference : A precursor view of the SKA Sky, March 2021
- International Conference on the 'First Billion Years of the Universe' at IIT Indore, India, January 2020

Informal talks

- Cosmology group meeting at University of Maryland, USA, November 2023
- Special seminar at Columbia University, New York, USA, October 2022
- Astro-coffee talk at Institute of Advanced Study, New Jersey, USA, October 2022
- GALREAD at Princeton University, New Jersey, USA, August 2022
- Lars Hernquist group meeting, Harvard University , Boston, USA, July 2022
- Galaxy Formation group meeting and PACMAN at CCA, Flatiron Institute, USA, April 2022

Workshops and Schools

- Simons Collaboration on Learning the Universe annual meeting, New York, USA, September 2022
- Radio Astronomy School, NCRA, Pune, India, June 2019
- Frontiers in 21 cm Cosmology at KodaiKanal Solar Observatory, India, December 2018

Collaborations

- SKA India & SKAO International Science Working Group
- Learning the Universe (LtU)

Technical skill

- **Simulation hands-on:** THESAN, EREBOS, FIREBOX^{HR}, Simfast21_Galaxies_AGN
- **Supercomputing experiences:** XSEDE/PSC, RUSTY/POPEYE (gpus) [FI], Engaging [MIT], AWS
- **Software and Packages:** Git, emcee, Cloudy, Astronomical Image Processing System (AIPS), Common Astronomy Software Applications (CASA), HEAsoft (XSPEC), SAOImage DS9
- **Operating system & Programming Languages:** Mac, Linux, Windows ; Python, C, C++, Fortran

Outreach

- Mentor at GRAD-MAP summer workshop at the University of Maryland, USA (June - August 2025)
- Mentor at GRAD-MAP winter workshop at the University of Maryland, USA (January 2025)
- Mentor at Technica – the world's largest hackathon for underrepresented genders at University of Maryland, USA (October 2024)
- Presenter at 'Ask an Astronomer' for Maryland day celebration, University of Maryland, USA (April 2024)
- Posters and presentations for school students on National Science Day at IUCAA, Pune, India (2020)
- Public awareness on mega science projects at Vigyan Samagam, Science City, Kolkata, India (2019)

Students

- **Ridmi D. Madarasinghe:** Parameter inference techniques in the context of reionization (on-going)
- **Quinlan Oneil:** AGN contribution to reionization in light of recent JWST observations (on-going)
- **Durva V. Sonawane:** 21-cm global signal and power spectrum for varying SFRDs (on-going)
- **Pulkit Sheoran:** Constraints on photon escape fraction using EoR observations (on-going)

Publication list: NASA/ADS

○ Refereed Journals

First author contributions:

- **Ankita Bera**, Benedikt Diemer, Massimo Ricotti, *A universal relation on mass accretion rate*, in preparation, to be submitted to ApJ
- **Ankita Bera**, Sultan Hassan, Robert Feldmann, Claude-André Faucher-Giguère, *Synergies between cosmic reionization and JWST galaxy surveys in unveiling the early universe*, in preparation, to be submitted to ApJ
- **Ankita Bera**, Sultan Hassan, Aaron Smith, Renyue Cen, Enrico Garaldi, Rahul Kannan, and Mark Vogelsberger, *Bridging the gap between Cosmic Dawn and Reionization favors Faint Galaxies-dominated Models*, 2023, ApJ, 959, [arXiv:2209.14312](#)
- **Ankita Bera**, Saumyadip Samui, and Kanan K. Datta, *Impact of cosmic rays on the global 21-cm signal during cosmic dawn*, 2023, MNRAS, 519, [arXiv:2202.12308](#)
- **Ankita Bera**, Raghunath Ghara, Atrideb Chatterjee, Kanan K. Datta, Saumyadip Samui, *Studying Cosmic Dawn using redshifted HI 21-cm signal: A brief review*, 2023, Journal of Astrophysics and Astronomy, 44 [arXiv:2210.12164](#)
- **Ankita Bera**, Kanan K. Datta and Saumyadip Samui, *Primordial magnetic fields during the cosmic dawn in light of EDGES 21-cm signal*, 2020, MNRAS, 498, [arXiv:2005.14206](#)

Other contributions:

- Sultan hassan, Christopher C. Lovell + including **Ankita Bera**, *JWST Constraints on the UV Luminosity Density at Cosmic Dawn: Implications for 21 cm Cosmology*, 2023, ApJ, 958 [arXiv:2305.02703](#)
- Kanan K. Datta, Aritra Kundu, Ankit Paul, and **Ankita Bera**, *The cosmic recombination history in light of EDGES measurements of the cosmic dawn 21-cm signal*, 2020, Physical Review D, 102, [arXiv:2001.06497](#)

○ Conference Proceedings

- **Ankita Bera**, Arpita Mishra, Mala Das, Abhijit Saha, Maitreyee Nandy, *Study of Optical Absorption in Gamma Irradiated Borosilicate Glass*, NSRP-20, Bangalore, 2015.