

Deepthi Gorthi

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Education

University of California, Berkeley

Berkeley, CA 94720

MASTER OF ARTS, ASTRONOMY

2015 - 2017

PH.D., ASTRONOMY

2017 - 2021 (Expected)

Birla Institute of Technology and Science, Pilani

Pilani, Rajasthan, India

MASTER OF SCIENCE, PHYSICS (*Graduated Best Outgoing Student*)

2010 - 2015

BACHELOR OF ENGINEERING, ELECTRONICS AND ELECTRICAL

2010 - 2015

Collaborations

HERA

Hydrogen Epoch of Reionization Array

Major Contributor to the FX-Correlator and Associated Software

CASPER

The Collaboration for Astronomy Signal Processing and Electronics Research

Lead a portion of the annual workshops in 2017 and 2019, Minor Contributor to the [casperfpga](#) software package

Publications

FIRST AUTHOR PAPERS

1. Gorthi, D. B., Parsons, A. R. & Dillon, J. S. Calibration Schemes with $\mathcal{O}(N \log N)$ Scaling for Large-N Radio Interferometers built on a Regular Grid. *arXiv e-prints*. arXiv: 2005.03060 [[astro-ph.IM](#)] (May 2020).
2. Gorthi, D. B., Hickish, J., La Plante, P., *et al.* Implementation of the FX-Correlator and Baseline Dependent Averaging for the Hydrogen Epoch of Reionization Array. 2020. In preparation.

COLLABORATION PAPERS

Earned co-authorship through contributions to the design and commissioning of the digital signal processing pipeline and correlator

1. Ghosh, A., Mertens, F., Bernardi, G., *et al.* Foreground modelling via Gaussian process regression: an application to HERA data. *Monthly Notices of the Royal Astronomical Society*. doi:10.1093/mnras/staa1331. arXiv: 2004.06041 [[astro-ph.CO](#)] (May 2020).
2. Nunhokee, C. D., Parsons, A. R., Kern, N. S., *et al.* Measuring HERA's primary beam in-situ: methodology and first results. *The Astrophysical Journal*. arXiv: 2005.12174 [[astro-ph.IM](#)] (May 2020).
3. Thyagarajan, N., Carilli, C. L., Nikolic, B., *et al.* Detection of Cosmic Structures using the Bispectrum Phase. II. First Results from Application to Cosmic Reionization Using the Hydrogen Epoch of Reionization Array. *arXiv e-prints*. arXiv: 2005.10275 [[astro-ph.CO](#)] (May 2020).
4. Dillon, J. S., Lee, M., Ali, Z. S., *et al.* Redundant-Baseline Calibration of the Hydrogen Epoch of Reionization Array. *arXiv e-prints*. arXiv: 2003.08399 [[astro-ph.IM](#)] (Mar. 2020).
5. Carilli, C. L., Thyagarajan, N., Kent, J., *et al.* Imaging and Modeling Data from the Hydrogen Epoch of Reionization Array. *The Astrophysical Journal Supplement Series* **247**. doi:10.3847/1538-4365/ab77b1 (2020).

6. Kern, N. S., Dillon, J. S., Parsons, A. R., *et al.* Absolute Calibration Strategies for the Hydrogen Epoch of Reionization Array and Their Impact on the 21 cm Power Spectrum. *The Astrophysical Journal* **890**. doi:10.3847/1538-4357/ab67bc. arXiv: 1910.12943 [astro-ph.IM] (Feb. 2020).
7. Kerrigan, J., La Plante, P., Kohn, S., *et al.* Optimizing sparse RFI prediction using deep learning. *Monthly Notices to the Royal Astronomical Society* **488**, 2605–2615 (Sept. 2019).
8. Parsons, A., Aguirre, J. E., Beardsley, A. P., *et al.* A Roadmap for Astrophysics and Cosmology with High-Redshift 21 cm Intensity Mapping. in *Bulletin of the American Astronomical Society* **51** (Sept. 2019), 241. arXiv: 1907.06440 [astro-ph.IM].
9. Fagnoni, N., de Lera Acedo, E., DeBoer, D. R., *et al.* Electrical and electromagnetic co-simulations of the HERA Phase I receiver system including the effects of mutual coupling, and impact on the EoR window. *arXiv e-prints*. arXiv: 1908.02383 [astro-ph.IM] (Aug. 2019).
10. Surnis, M. P., Foster, G., Golpayegani, G., *et al.* Initial Results from the ALFABURST Survey. in *Pulsar Astrophysics the Next Fifty Years* (eds Weltevrede, P., Perera, B. B. P., Preston, L. L. & Sanidas, S.) **337** (Aug. 2018), 414–415. doi:10.1017/S1743921317008717. arXiv: 1710.09033 [astro-ph.HE].

Instrumentation Projects

Baseline Dependent Averaging on the HERA X-engine

Supervisor: DR. JACK HICKISH

Designed, built and deployed baseline dependent averaging as part of the X-engine pipeline using Hashpipe tools

Jan 2019 - Present

UC, Berkeley

F-engine/Spectrometer for the HERA Correlator

Supervisors: DR. JACK HICKISH, DR. AARON PARSONS

Contributed to the FPGA design, lead testing for deployment and wrote software for initializing and setting design parameters

Aug 2016 - Aug 2018

UC, Berkeley

Voltage Recorder for Radio Antennas

Supervisor: DR. AARON PARSONS

Designed, built and deployed a SNAP-board based signal processing pipeline for recording raw voltages from radio antennas with a bandwidth of 150 MHz or less

May 2016 - Jan 2018

UC, Berkeley

5 GHz Bandwidth Spectrometer for capturing Crab Giant Pulses

Supervisor: DR. DAN WERTHIMER

Mentored two undergraduate students in designing a 8192-channel spectrometer for the 4.2m Leuschner telescope

Aug 2016 - 2018

UC, Berkeley

Signal Processing Pipeline for the Ooty Radio Telescope

Supervisor: DR. JAYARAM CHENGALUR at the National Centre for Radio Astronomy

Built a digital polyphase filterbank for the 500m cylindrical Ooty Radio Telescope as part of the Phase-II upgradation

Aug 2014 - 2015

Pune, India

Broadband Radiometer for the Effelsberg Telescope

Supervisor: DR. RAMESH KARUPPUSAMY at the Max Planck Institute for Radio Astronomy

May 2013 - Aug 2013

Bonn, Germany

Honors & Awards

Jan 2019 **Special Recognition for Outstanding Teaching of Astronomy**, UC Berkeley Department of Astronomy

Aug 2015 **Allan and Kathleen Gateway Fellowship**, International House at Berkeley

Aug 2014 **Best Outgoing Student**, BITS Pilani Physics Department

May 2013 **DAAD Scholarship**, German Academic Exchange Service

2010 - 2011 **Merit Scholarship**, Birla Institute of Technology and Science at Pilani

Teaching Assistantship

Astronomy 121: Undergraduate Radio Lab	Spring 2018
C13: Origins- from the Big Bang to the Emergence of Humans	Fall 2016
Astronomy 121: Undergraduate Radio Lab	Spring 2016
Astronomy 101: Introduction to General Astronomy	Fall 2015

Talks

CONFERENCE AND SEMINAR TALKS

Aug 2019	CASPER Workshop , Harvard University, Boston Taught a mini-course on Fourier Transforms and applications to signal processing
Jan 2019	Astronomy Seminar Talk , Indian Institute of Sciences, Bangalore
Jan 2019	Astronomy Instrumentation Seminar Talk , Raman Research Institute, Bangalore
Jan 2018	National Radio Science Meeting (USNC-URSI) , University of Colorado, Boulder
Dec 2017	Physics Seminar , Indian Institute of Technology, Bombay
Dec 2017	Astrophysics Seminar , Tata Institute of Fundamental Research, Mumbai
Aug 2017	CASPER Workshop California Institute of Technology, Pasadena
Feb 2017	Fast Radio Bursts: New Probes of Fundamental Physics Aspen Center for Physics

PUBLIC OUTREACH TALKS

Nov 2019	The CLEAR Project Monthly PubScience Talk
Oct 2019	Marin County JCC Monthly Science Talk
Aug 2019	Stockton Astronomical Society
Jun 2019	Claremont Public Library Summer Science Series
Nov 2018	San Francisco Verdi Club
Aug 2018	San Jose Astronomical Association

Community Outreach and Service

AT THE UNIVERSITY OF CALIFORNIA, BERKELEY

Head Outreach Coordinator

Aug 2017 - Present

DEPARTMENT OF ASTRONOMY

- Organized events to represent the department at the annual campus-wide scientific open house day
- Organized students and volunteers to perform outreach demonstrations at the annual Bay Area Science Festival, San Francisco
- Led department participation at Berkeley Sunday Streets, an annual community event in Berkeley

Volunteer at monthly Astro Night lecture series and night-sky observing

Aug 2016 - Present

Webmaster of the Berkeley Astronomy Department Graduate Student Wiki

Aug 2016 - Present

Referee for the Monthly Notices of the Royal Astronomical Society Journal

Jan 2019 - Present

AT BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

Student lead of the Institute Mess Services

Coordinator of campus-wide events during the annual technical festival

Initiator of the Sygyzy Lecture Series at Astronomy Club