

# Daniel C. Jacobs

ASU School of Earth and Space Exploration PO Box 876004 Tempe, AZ 85287-6004  
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## RESEARCH INTERESTS

**Known for: low frequency radio cosmology instruments PAPER, MWA and HERA.**

Science Areas include:

Cosmology and astrophysics during the epoch of reionization and cosmic dawn using the 21cm Hydrogen line.

General radio astronomy and instrumentation, particularly at sub GHz frequencies.

Involvement of students in hands-on development of instrumentation.

Areas of technical expertise include: Radio instrumentation and data analysis, synthesis imaging

Space-based instrumentation, particularly cubesats or similar small platforms, but also

data intensive computing and visualization, repeatability in science analysis, automation of large systems for remote operation, radio receivers, digital signal processing, drones

Areas of experience: Mentoring, teaching, project management, systems engineering, rapid prototyping, grant writing, scientific editing, space systems, field work

## EDUCATION

University of Pennsylvania, Ph.D. Physics 2011

Montana State University (M.Sc.) Physics 2008

New Mexico Institute of Mining and Technology, B.S. Physics and Astrophysics 2004

## PROFESSIONAL EXPERIENCE

Assistant Professor, School of Earth and Space Exploration, Arizona State University, 2017 – Present

NSF AAFP\* Fellow, Arizona State University 2014 – 2017

Postdoctoral scholar, Arizona State University 2011 – 2014

## LEADERSHIP

HERA Project Scientist 2020 - Present

Associate Director ASU Interplanetary Initiative - Lab Director 2020 - Present

## PROJECTS

Major funded projects where I am PI or similar level of involvement.

Hydrogen Epoch of Reionization Array <http://reionization.org>

Murchison Widefield Array [mwatelescope.org](http://mwatelescope.org)

Star Planet Activity Research CubeSat (SPARCS) [sparcs.asu.edu](http://sparcs.asu.edu)

Deployable Optical and Radio Array (DORA) [loco.lab.asu.edu/dora](http://loco.lab.asu.edu/dora)

External Calibrator for Hydrogen Observatories (ECHO) [danielcjacobs.com/echo](http://danielcjacobs.com/echo)

## PROFESSIONAL AFFILIATIONS & ACTIVITIES

American Physical Society, Maryland, USA 2002 – Present

Sigma Pi Sigma, Maryland, USA 2004 – Present

American Astronomical Society, Washington D.C., USA 2009 – Present

Union of Radio Scientists International, Boulder, CO 2018 - Present

## TEACHING

I teach with a background in physics, astronomy, and practical instrumentation engineering. At ASU my assignments have been in the SESE Exploration Systems Design and Astronomy majors.

Readings in Astrophysics (SES598) 2022

Practical Electronics and Instrumentation (SES330) 2021

Advanced Radio Astronomy (SES495) 2021

Practical Electronics and Instrumentation (SES330) 2020

Intro to Astronomy (AST 111/113) 2020

Practical Electronics and Instrumentation (SES330) 2019

Exploration Systems Engineering (SES405) 2019

Practical Electronics and Instrumentation (SES330) 2018

Exploration Systems Engineering (SES405) 2018

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\*Astronomy and Astrophysics Postdoctoral Fellow

Project	Agency/Program	Date
Large-scale Environments During the Cosmic Dawn: Unveiling the Key Transitions in Early Galaxy Formation	NASA APRA	2022 - 2025
Probing Cosmic Dawn with End-to-End Forward Models	NSF AAG	2022-2025
<b>Charting the Cosmic Dawn with Next Generation 21cm Arrays</b>	NSF CAREER	2022-2027
Star Planet Activity Research Cubesat	NASA APRA	2021-2024
<b>Collaborative Research 21 cm Reionization Science with the Murchison Widefield Array</b>	NSF AAG	2021 - 2024
<b>Deployable Optical Receiver Aperture</b>	NASA Ames	2020 - 2023
<b>HERA: Unveiling the Cosmic Dawn</b>	NSF Midscale	2018 - 2025
<b>Backend development and testing of ASU Smallsat Ground Station</b>	JPL SURP	2018 - 2019
Star Planet Activity Research Cubesat	NASA APRA	2017 - 2021
<b>Precision Beam Mapping for 21cm Cosmology</b>	NSF ATI	2016 - 2019
<b>Collaborative Research: From 21 cm Observations to Precision Reionization Science</b>	NSF AAG	2016 - 2019
<b>Observing the Epoch of Reionization with the Murchison Widefield Array</b>	NSF	2014 - 2017
<b>An External Calibrator for Hydrogen Observatories</b>	NSF ATI	2014 - 2016
<b>Charting the history of reionization with the first 21cm observations</b>	NSF AAPF	2014 - 2017
<b>Scaling up 21cm analysis pipelines for the Square Kilometer Array</b>	Amazon	2015 - 2018

Table 1: Funded proposals. **Bold** indicates I am the ASU PI.

**MENTORING AND INFORMAL TEACHING** I incorporate undergraduates into my research through programs supported by my grants. I also work with students in capstones, some of which are related to my research. Lastly I direct the Interplanetary Lab an internal aerospace company staffed by students supported by mentoring from professionals.

Interplanetary Initiative Lab Director 9 student staff and 596 student users in 2023	2020 - Present
Dept of Computer Engineering: Cubesat Software system	2020
SESE Capstone: Moonbounce array	2018
School of Computing Capstone: Radio Data Archive	2015
Lecturer Santa Fe Cosmology Summer School	2015
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Project Manager and Student Mentor, MSU Space Science and Engineering Lab	2005– 2009
Teaching Assistant MSU PHSX 205, College Physics	2004

**PRIMARY GRAD STUDENTS** Lindsay Berkhout, Exploration Systems Design, Instrumentation Started Aug 2019  
 Katherine Elder, Astrophysics Started Aug 2020  
 Amy Zhou, Exploration Systems Design, Instrumentation Started Aug 2020

**Graduated Primary**

Mrudula Gopal-Krishna, SESE Exploration Systems Design - Now at Apple RF Graduated 2022

**GRAD COMMITTEES** Thesis committee members advise students on their research, mentor career preparation, sit on annual boards and administer qualifying exams. Some students are working on a project with significant mentoring from me. These are marked with \*.

**In Progress**

• Joe Dubois	Started Aug 2023
• Cassie Whitton	Started Aug 2018
• Chris DuBuis	Started Aug 2018
• Logan Jenson	Started Aug 2018
• Yogesh Mehta	Started Aug 2019
• Jonathan Gaumont	Started Aug 2019
• Akshatha Vydula*	Started Aug 2020
• Angelica Berner	Started Aug 2020

**Graduated Committee**

• Marko Neric	Graduated 2023
• Kirk Bennett - Boeing	Graduated 2023
• Edward Buie II - Now a Assistant Professor at Vassar College	Graduated 2022
• Tyler Richey-Yowell - Now a fellow at Lowell Observatory	Graduated 2022
• Santosh Harish - Now a postdoc at Rochester.	Started Aug 2022
• Adrian Sinclair - ASU SESE, Now postdoc at DRAO	Graduated 2021
• Piyanat Kittiwisit – ASU SESE, Now Postdoc at UKZN	Graduated 2018
• Sam Gorden – ASU SESE, Now at Systems and Technology Research	Graduated 2018
• Alex Miller – ASU SESE, Now at Worldview	Graduated 2018
• Matthew Kolopanis – ASU Physics, Currently ASU Research Scientist	Graduated 2018
• Nivedita Mahesh - ASU SESE, Now Postdoc at Caltech	Graduated 2022
• Matthew Adkins - ASU SEMTE MS Eng - Now at Blue Origin	Graduated 2022

**CURRENT UNDERGRADS**

Christopher McCormick - ASU EE, Spacecraft engineering, Interplanetary Lab  
 Chandler Hutchens - ASU Aerospace, Spacecraft engineering, Interplanetary Lab  
 Ben Weber - ASU Aerospace, Spacecraft engineering, Interplanetary Lab  
 Ashley Lephram - ASU ME, Spacecraft engineering, Interplanetary Lab  
 Sam Cherian - ASU ME, Spacecraft engineering, Interplanetary Lab  
 Genevieve Cooper - ASU SESE, Outreach and student liaison  
 Maitreya Sonawane - ASU SESE, Radio instrumentation  
 Arib Islam - ASU SESE, Amateur Radio Telescope Development

<b>UNDERGRAD ALUMNI</b>	<p>Raven Braithwaite - ASU EE</p> <p>Sarah Rogers - ASU Aerospace, Phoenix Cubesat –Now at MIT Lincoln Labs</p> <p>Shane Bechtel - ASU SESE, cosmology analysis – UC Santa Barbara for Astrophysics PhD</p> <p>David Lewis - ASU SESE, Software engineering and analysis</p> <p>Lily Whittler - ASU Physics, Cosmology analysis — Now at University of Arizona for Astrophysics PhD</p> <p>Tyler Cox - ASU SESE + Physics, Cosmology analysis – Now at UC Berkeley for Astrophysics PhD</p> <p>Lauren Turner – ASU SESE, Radio instrumentation</p> <p>Michael Horn – ASU SESE, Drone engineer - Now at Source Global</p> <p>Jacob Burba – ASU Physics 2016, Radio instrumentation – Now Postdoc at University of Manchester</p> <p>Michael Busch – Graduated ASU, SESE, Analysis and radio instrumentation – Now NSF AAPF Postdoc at Santa Cruz</p> <p>Ben Stinnett – Graduated ASU SESE, Drones and radio instrumentation – now at Lyft Inc.</p> <p>Jay Allison – Graduated, ASU SESE 2015, Drones and radio instrumentation – Now at Raytheon</p> <p>Mason Denney – Graduated, ASU SESE 2016</p> <p>David Nelson – SESE – 1991-2014</p> <p>Victoria Serrano – Graduated ASU Master’s in Electrical Engineering, 2016</p> <p>Jose Chavez – Graduated 2015, ASU Physics, now at Intel</p> <p>Marc Leatham – Graduated 2017, ASU SESE</p> <p>Victoria Serrano – Engineering Masters, now a lecturer at Universidad Tecnológica de Panamá</p>																
<b>POSTDOC ALUMNI</b>	<p>Steven Murray - Currently a Marie Cure Fellow</p> <p>Matt Kolopanis - Now ASU Research Scientist</p> <p>Adam Beardsley - Now Assistant Professor at Winona State College</p> <p>Bharat Gehlot - Now Research Scientist at ASTRON</p>																
<b>STAFF</b>	<p>This section lists people I supervise who are not students at the time of their employment. Student staff are listed in the section marked "Undergraduate Students".</p> <p>Joe Dubois - Interplanetary Lab Senior Projects Engineer</p>																
<b>ALUMNI STAFF</b>	<p>Ravi Shankar - SESE LoCo Lab, Cubesat development</p> <p>Michael Horn - SESE LoCo Lab, Drone Engineer</p> <p>Jacob Knapp - SESE LoCo Lab, Antenna Engineer</p>																
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<b>PROFESSIONAL DEVELOPMENT</b>	<ul style="list-style-type: none"> <li>▪ <b>NSF High School Teacher Radio Astronomy Workshop</b> - (2022)</li> <li>▪ <b>Association of College and University Educators (ACUE)</b> - Effective Teaching Practices (2018-2019)</li> <li>▪ <b>ASU Space Cohort</b> - NASA Development Workshops throughout 2020</li> </ul>																
<b>INTERDISCIPLINARY PROJECTS</b>	<p>Activities described in this section supported the strategic aims of the department and school.</p> <ul style="list-style-type: none"> <li>▪ <b>Interplanetary Lab</b></li> </ul>																

The Interplanetary Initiative is a university-wide program to unite all disciplines around the vision for making humans an interplanetary species. The Interplanetary Lab (IPL) is a space maker-space designed to help give more people, students, faculty, industry partners, and global citizens access to space. The primary technical focus is on supporting small spacecraft missions by PIs at the university and strategic partners. The facility is a 6500 square foot lab space located on the Tempe campus.

Customers include: NASA, Space Force, Howe Industries, ASU Luminosity Lab, Sandia Labs

- Project Definition 2017
- Construction 2018 – 2019
- Grand Opening Spring 2020
- 2020
  - Vacuum chamber installed
  - Vibration table installed
- 2021
  - **exocam**, delivered for sub-orbital flight October 2021
  - IPL becomes new home of NASA Spacegrant’s Ascend program
  - NASA orbital launch awarded to student powered Lightcube project managed by the IPL
  - LoCo Lab DORA Cubesat awarded NASA orbital launch, IPL selected for engineering support
- 2022
  - Adopted ASU cubesat ground station
  - Lab Staff member Matthew Adkins graduates with MS
  - delivery of Lightcube Cubesat December 2023

- - Student cubesat Coconut awarded NASA orbital launch
  - Lightcube deployed from ISS, operated for 26 hours before succumbing to battery failure due to heater failure
  - 2023 Statistics: 569 student users, 9 employees, 7 hardware projects, 5 faculty collaborators, and 4 industry partners.

▪ **Phoenix Cubesat** This was a student powered, faculty advised thermal remote imaging satellite started in 2016 and completed in 2020. I served as a principle advisor to this project devoting considerable resources to ensuring its success for the students and the university.

- It was ASU’s first cubesat.
- Launch to ISS Nov 9, deployment Feb 2020
- Operated through June 2020
- Engineering supported by Jacobs Lab
- Taught a cubesat class to support students with credit and technical learning

▪ **DORA Cubesat** The Deployable Optical and Radio Array (DORA) is cubesat testbed for technologies needed for future space-based radio telescope arrays.

- D Jacobs PI
- developed in partnership with JPL
- team is undergraduate student and faculty
- Subject of Masters thesis by Matthew Adkins, SEMTE, 2022
- funded by NASA Smallsat Technology Partnerships program

▪ **Ground Station Operations**

- The ASU Ground station is a project in collaboration between SESE, ASU Newspace, and JPL as an experiment to provide limited additional Deep Space Network capability for cubesats and other high risk missions. This was an early example of my leadership to build cubesat capabilities here at ASU.

2017

- awarded year 3 of a SURP supporting student work on the project 2018
- Mentored student in development of open source Deep Space Network radio, hosted collaboration visits with JPL experts. 2019
- Cubesat Data Recorder for Goldstone Apple Valley Telescope (contract from JPL DSN) 2021-present Project led by grad student Lindsay Berkhout. Aim is to track cis-lunar cubesats like ASU’s LunaHmap. System installed at Goldstone Deep Space Network, February 2022. Currently in commissioning phase pending dish works.

- **Interplanetary Initiative Pilot Projects** The SESE unit emphasizes interdisciplinarity and creativity in combining research elements. I have contributed to several such projects. My involvement was most vigorous during the first years of the professorship. After a while active funded projects began to take priority.

- **Mars Hab** 2017 - 2019  
Designed, with collaborators, an initial conceptualization of a Mars Hab experience. This became a successful Masters in Fine Arts project by Roy Wassan Valle

- **Student suborbital flights** 2017 - 2018  
With the support of II, NewSpace, and SESE the Pilot project partnered with Blue Origin to fly three student payloads on a suborbital test flight. A competition was held for student teams which received 6 entries. I mentored and guided two of these teams through to a successful award. One team was entirely online. Working with each other over the internet using video chat and FedEx to send parts around. This was well before such things were common in the post-covid world. Both teams delivered and flew.

- **ASU Capstones**  
Advising capstones is a significant contact point between faculty and students. Each capstone usually has 4-8 students. In successful capstones students learn by doing while advancing socially beneficial or scientifically meritorious causes.

- DORA Flight Software - CSE - led to masters thesis by Zachary Hoffman (SEMTE)  
11 students 2020
- Lightcube - Aerospace - Led to flight mission awarded launch from NASA CSLI.  
6 students 2019
- Moonbounce - SESE - Sponsored by private donor  
4 students 2019
- SCAM - SESE - Blue Origin suborbital flight  
5 students 2018
- BEES - EE - Blue Origin suborbital flight  
4 **online** students 2018
- Big Data Archiving Interface - CS - Led to development of present day radio telescope operations systems. 6 students 2015

**STUDENT PROGRAMS**

I run several programs which get students involved in research.

**ASU RADIO ASTRONOMY BOOTCAMP**

A week-long night class in radio interferometry with lectures and hands-on tutorials with real data. It has drawn undergrads and grads from SESE and Fulton. To my knowledge it is one of a very few such intensive extra-curricular faculty-led research trainings offered in the department.

- Attendance: 40 students from many ASU departments 2023
- Attendance: 15 students from SESE and Physics 2019
- Attendance: 12 students from SESE, Physics and Aerospace 2018

**RESEARCH EXPERIENCE FOR NON-TRADITIONAL STUDENTS (RENTU)**

Undergraduate research is an essential component in preparing students both for graduate school or for a position in the broader STEM workforce. Students often get their keystone research experience through summer REU programs, which involve travel to a new location and support through a relatively small stipend. These aspects of REUs are out of reach to some non-traditional students, who often have jobs and families to support at home. RENTU provides highly qualified students from non-traditional academic backgrounds the same research opportunities available through REUs. RENTU mentors identify student candidates and design a research experience that can meet their schedules, obligations, and financial needs. Providing this kind of research experience to non-traditional undergraduate students will enable more of them to go on to graduate school, increasing the diversity of the broader STEM community.

**RENTU 2023**

- Manaswi Kondapally - ASU Astro
- Jakob Perivolotis - ASU Astro
- Evrim Gulser - ASU Astro / Math
- Naomi Carl - ASU Astro

- Kaitlyn Ashcroft - ASU Astro / Art
- Eyan Weissbluth - ASU Astro

**RENTU 2022**

- Arib Islam - ASU Astro
- Maitreya Sonowane - ASU Astro
- Jonathan Davis - ASU Astro

**RENTU 2019**

- David Lewis - Senior, Exp. Sys. Des
- Shanika Davis - Junior, EE
- Bryanna Gutierrez-Coatney - Junior, Astro
- Ruben Ortiz - Junior, Exp. Sys. Des

**RENTU 2018**

- David Lewis - Junior, Exp. Sys. Des
- Karishma Albal - Sophomore SESE
- Edgar Escalante - Senior, SESE

**HERA CHAMP SUMMER INTERNSHIP**

CHAMP is a partnership between the HERA project and the California CAMPARE bridge program which has been successful at increasing numbers of minorities in astronomy and physics graduate programs. CHAMP offers CAMPARE students a summer research experience with a participating HERA institution. Students are prepared for a challenging summer at a weeklong "bootcamp" put on by the HERA collaboration.

CHAMP VI		2022
• Taught summer bootcamp, University of Pennsylvania.		
• Hosted 2 summer students.		
CHAMP V		2021
• Taught summer bootcamp (online)		
CHAMP IV		2020
• Taught summer bootcamp. (Online)		
CHAMP III		2019
• Organized summer bootcamp at St Johns College		
• Taught at summer bootcamp		
CHAMP II		2018
• Organizing the CHAMP bootcamp at St John's College, Santa Fe, NM		
• Taught at summer bootcamp		
• Hosted and mentored 3 summer students,		
• ASU CHAMP Students 2018		
◦ Katherine Elder - CSU Fresno		
◦ Jean Donet - San Jose State		
◦ Sean Morgan - San Francisco State University		
CHAMP I		2017
• Taught at summer bootcamp, Calpoly Pomona		

<b>MEETINGS ORGANIZED</b>	▪ Science at Low Frequencies, ASU	2019
	▪ HERA Bootcamp, St John's College	2019
	▪ HERA Annual Meeting, ASU	2018
	▪ HERA Bootcamp, St John's College	2018
	▪ Science at Low Frequencies, ASU	2015

<b>TALKS</b>	<b>INVITED TALKS</b>	
	<b>Recent developments in instruments for high redshift 21cm and exoplanets</b> UBC Astronomy	Nov 2023
	<b>Recent developments in instruments for high redshift 21cm and exoplanets</b> McGill Space Institute	Nov 2022
	<b>First results from HERA</b> School of Earth and Space Exploration	Sep 2021
	<b>New results from the Hydrogen Epoch of Reionization Array</b>	Mar 2021

University of Wisconsin, Madison	
<b>Precision Interferometry Simulation For 21cm Cosmology</b> Brookhaven National Lab, PUMA group	Oct 2020
<b>External Drone Calibration of the Long Wavelength Array</b> Invited Colloquium, University of Pennsylvania, Philadelphia, PA	Oct 2018
<b>New Instrument Double Header: 21 cm Cosmology with HERA and M-Dwarf Flares with the SPARCS Cubesat</b> Invited Colloquium, University of Pennsylvania, Philadelphia, PA	Oct 2018
<b>Low Frequency 21cm cosmology Experiment Review</b> Invited Review, Aspen Center for Physics, Aspen, CO	Feb 2018
<b>High redshift 21cm intensity mapping Past, Present, and Future</b> Kavli Institute for Cosmological Physics	Feb 2018
<b>Chasing our Cosmic Dawn with HERA</b> University of Missouri, Columbia, MO	Feb 2017
<b>Chasing our Cosmic Dawn with HERA</b> University of Wisconsin, Madison, WI	Feb 2017
<b>Chasing our Cosmic Dawn with HERA</b> University of Toronto, Toronto, Canada	Jan 2017
<b>New Horizons in Astrophysics: Exoplanets and the Cosmic Dawn,</b> Invited Colloquium School of Earth and Space Exploration, Tempe, AZ	Sep 2016
<b>HERA Season one data report,</b> Kavli HI 21cm Workshop, Cambridge UK	Jun 2016
<b>MWA Project Update,</b> Kavli HI 21cm Workshop, Cambridge UK	Jun 2016
<b>Progress report from the Hydrogen Epoch of Reionization Array Experiment,</b> Opportunities and Challenges Intensity Mapping, Stanford, Palo Alto, CA	Mar 2016
<b>Lessons learned from 21 cm experiments,</b> Opportunities and Challenges Intensity Mapping, Stanford, Palo Alto, CA	Mar 2016
<b>Probing the Epoch of Reionization with HERA, PAPER, and the MWA,</b> Yale University	Feb 2016
<b>Lecture on The Epoch of Reionization,</b> Santa Fe Cosmology Summer School, St. John's College	Mar 2015
<b>Colloquium: Chasing our cosmic dawn with HERA.</b> CCAPP, The Ohio State U.	Feb 2015
<b>Chasing our cosmic dawn with HERA.</b> Institute for Advanced Study	Feb 2015
<b>Chasing our cosmic dawn with HERA.</b> Brown University Physics Dept.	Feb 2015
<b>Chasing our cosmic dawn with HERA.</b> University of Illinois, Urbana-Champaign	Jan 2015
<b>Chasing our cosmic dawn with HERA.</b> University of Wisconsin, Madison	Feb 2015
<b>The Murchison Widefield Array Epoch of Reionization Project</b> <i>Early Science from Low Frequency Radio Telescopes, Tempe Az</i>	Dec 2014
<b>Lecture, Santa Fe Cosmology Summer School</b> St. John's College	Feb 2015
<b>LoCo1: Testing Low frequency Astronomy in Space</b> URSI, Boulder, CO	Jan 2014
<b>Shedding light on EoR Foregrounds with PAPER and MWA,</b> URSI, National Radio Science Meeting, Boulder, CO	Jan 2014
<b>Colloquium: Detecting the Epoch of Reionization with Experimental Radio Arrays</b> University of Wisconsin, Milwaukee	Nov 2013
<b>Methods for detecting the 3D percolation of photons in the early universe</b> Biomedical Astronomical Signal Processing Frontiers Workshop	Jan 2013
<b>PAPER: Status and Recent Observations</b> NRAO New Worlds New Horizons, Santa Fe, NM February 2011	Feb 2011
<b>The southern low frequency sky with PAPER</b>	



University of New Mexico, 2010	May 2010
<b>The Epoch of Reionization with a Precision Array</b>	
Santa Fe Summer Cosmology school, 10 July 2010	Jul 2010
<b>Astronomer in the Classroom</b>	
sponsored by the International Year of Astronomy, 2009	Jul 2009
<b>Public Lecture on the Epoch of Reionization</b>	
Franklin Museum, Philadelphia, PA	Jul 2009
<b>Explorer 1 [PRIME] Satellite Critical Design Review (flight awarded)</b>	
NASA Space Launch Services Site Visit, Bozeman, MT,	Apr 2009
<b>CONFERENCE TALKS</b>	
<b>Second round of results from HERA</b>	Jan 2023
URSI National Radio Science Meeting	
<b>An experimentalist's roadmap to space-based 21cm observations</b>	Jan 2023
URSI National Radio Science Meeting	
<b>Phase I results from HERA</b>	Jun 2022
American Astronomical Society	
<b>A roadmap to space-based 21cm observations</b>	May 2022
URSI-General Assembly	
<b>Collaboration Hydrogen Epoch Of Reionization Array — Report On Last Phases Of Construction And First Light</b>	Jun 2020
American Astronomical Society, Summer meeting	
<b>Hunt For The 21Cm Signature Of Cosmic Dawn And The Epoch Of Reionization: A Decade In Review</b>	Feb 2020
National Radio Astronomy Observatory "New Mexico Meeting", Socorro, NM	
<b>A reanalysis of PAPER-64 epoch of reionization observations at redshifts 7 to 11</b>	Jan 2019
American Astronomical Society, Seattle, Wa	
<b>Probing the Epoch of Reionization with MWA, PAPER, and HERA,</b>	Apr 2016
American Physical Society, April Meeting, Salt Lake City, UT	
<b>An External Calibrator for Hydrogen Observatories (ECHO)</b>	Jan 2016
Early Science for Low Frequency Radio Telescopes (Tempe Meeting II), Albuquerque, NM	
<b>An External Calibrator for Hydrogen Observatories (ECHO)</b>	Jan 2016
URSI National Radio Science Meeting, Boulder, CO	
<b>Multi-redshift 21 cm observations of the epoch of reionization</b>	Jan 2015
American Astronomical Society Annual Meeting, Seattle, WA	
<b>Chasing our Cosmic Dawn with the Hydrogen Epoch of Reionization Array</b>	Jan 2015
National Science Foundation AAPF Fellow's Symposium, Seattle	
<b>Development and Status of early pipelines for MWA and PAPER</b>	Mar 2014
AAS Exascale Radio Astronomy, Monterey CA	
<b>Shedding Light on Foregrounds with MWA and PAPER Data</b>	Jan 2014
URSI National Radio Science Meeting, Boulder, CO	
<b>LoCo1: Low Frequency Cosmology in Space</b>	Jan 2014
URSI National Radio Science Meeting, Boulder, CO	
<b>Comparing MWA/PAPER Instrumental Performance</b>	Jan 2013
American Astronomical Society, January	
<b>A PAPER Southern Sky Catalog</b>	Jan 2012
URSI National Radio Science Meeting, Boulder CO	
<b>Catalog and Galactic Emissions with PAPER</b>	Feb 2010
Aspen Winter Conference	
<b>Recent Results from the Precision Array for Probing the Epoch of Reionization (PAPER) Experiment in South Africa</b>	Jan 2010
American Astronomical Society	
<b>Global Positioning System on orbit</b>	Mar 2006
IEEE regional workshop, Big Sky, MT	
<b>A PAPER Low-Frequency, Wide-Bandwidth, All-Sky Radio Point Source Catalog</b>	Jan 2009

American Astronomical Society, Long Beach, CA  
**Explorer 1 [PRIME] A 50th anniversary reflight** Aug 2005  
 Small Satellite Conference, Logan, UT

<b>OUTREACH</b>	<p><b>SESE ESE Day, SESE Open House, ASU Night of the Open Door</b> 2012 – present  <i>Radio astronomy table staffed by group members. Average of 5 events per year over 7 years.</i></p> <p><b>East Valley Astronomy Club</b> Apr 2018  <i>New Horizons in astronomy: cosmology n cubesats</i></p> <p><b>Phoenix ComicCon Panels</b> Jun 2015  <i>Panel: Adventures and Disasters in Science</i></p> <p><b>Outreach with Star Lab</b> Oct 2015      Pascua Yaqui Boys and Girls Club, Mesa Prep Academy, Bioscience High School</p> <p><b>Science Friday</b> Feb 2014  <i>Probing the First Stars with Radio Arrays in the Deep Desert,</i>      Tempe Center for the Arts</p> <p><b>Phoenix ComicCon Panels</b> Jun 2014      4 panels, including: SETI, Cubesats, Wait Wait Science, Adventures in Science</p> <p><b>Grand Awards Judge</b> May 2013      Intel Science and Engineering Fair</p> <p><b>Outreach with Star Lab</b> Oct 2013      Salt River Pima Maricopa Reservation</p> <p><b>Outreach with Radio Detectives</b> <i>10 appearances in the period:</i> Jan 2012 – present      School of Earth and Space Exploration Open House</p> <p><b>Outreach with Radio Detectives</b> Mar 2013      Pascua Yaqui Tribal Center</p> <p><b>Public Lecture</b> Oct 2012      ASU Open Door Night</p> <p><b>Astronomer in the Classroom</b> Oct 2010      sponsored by the International Year of Astronomy</p> <p><b>Physics Society Demonstration Team</b>      New Mexico Tech, Socorro, NM 2001 – 2004      President 2003-2004</p>
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**PUBLICATIONS** **About my publication record**

- **Instrument Papers** Much of my work is contribution to instrument projects. These result in papers about instrument construction, analysis of instrument function, and results; results which would not be possible without contributions from many people. Our work is credited by inclusion in a team author list. These are marked in the publication list below **Instrument Paper** along with the instrument name.
- **My Contributions** In keeping with the growing practice of enumerating the work put in by each author on a multi-author paper, I have provided a short notation of my own contribution to each paper.
- **Academics** Compared to instrument papers, those with short author lists should be interpreted as having a more significant fraction of the work attributed to each authors. For example *Cox et al 2022*
- **Students and Postdocs** Participating postdocs and students write their own papers and are included on instrument papers. These marked on the bibliographic entries below.
- **Record Summary** There are several statistical ways to judge the extent and impact of a publication record. Here are some raw data. My h-index is 37. My papers have been cited 5235 times since 2010 and 4344 times as a professor at ASU. † Year by year plots of these metrics are provided below in figures 1, 2, and 3.

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†This estimate varies depending somewhat on the citation engine. These statistics are calculated by NASA ADS here [https://ui.adsabs.harvard.edu/public-libraries/WtA\\_QcosQWuHwOgBWheanw](https://ui.adsabs.harvard.edu/public-libraries/WtA_QcosQWuHwOgBWheanw). An alternative calculation by google scholar provides a similar result. <https://scholar.google.com/citations?user=1YRwzVwAAAAJ&hl=en>

- **Record breakdown** Table 2 counts papers by a couple useful categories including those by members of my group and those with small author lists where my contribution constituted a large fraction of the work. These are those marked in the full paper list below as having contributions like "formulation", "writing", or "principle author". This categorization is somewhat subjective.

Table 2: Summary of publication record. Papers with significant writing are counted under "Notable" contribution.

Year	All Peer reviewed	Notable contribution	Papers by students or Postdocs
2022	13	4	3
2021	7	2	1
2020	6	2	0
2019	7	2	0
2018	11	1	1

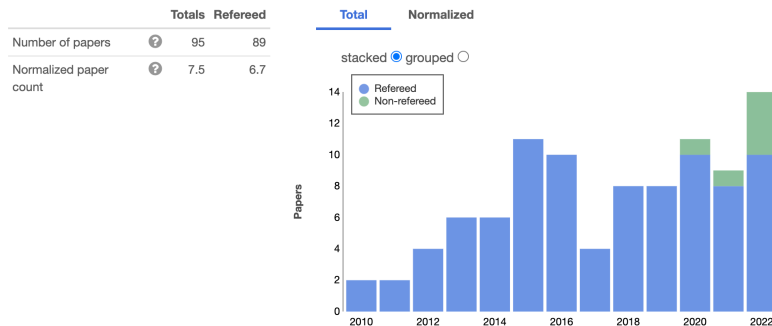


Figure 1: Paper count as tabulated by the NASA Astrophysical Data System (Sept 2022).

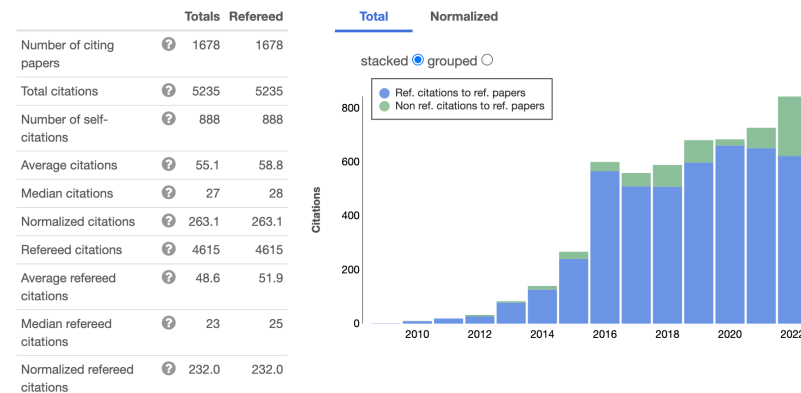


Figure 2: Cite count as tabulated by the NASA Astrophysical Data System (Sept 2022).

#### ▪ Journals in which I am published

Journal Name	Impact Factor ‡	CiteScore§
Astrophysical Journal	5.58	5.1 (88%)
Monthly Notices of the Royal Astronomical Society	5.231	4.88 (86%)
Publications of the Astronomical Society of the Pacific	4.878	3.7 (77%)
Radio Science	1.45	1.62 (71%)

#### PEER REVIEWED ARTICLES

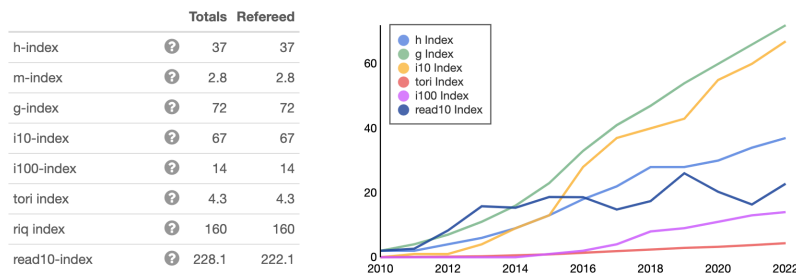


Figure 3: Various academic indices calculated by the NASA Astrophysical Data System (Sept 2022).

- [88] Ramiamananantsoa, Tahina, Bowman, Judd D., Shkolnik, Evgenya L., Loyd, Robert Oliver Parke, Ardila, David R., Barman, Travis, Basset, Christophe, Beasley, Matthew, Cheng, Samuel, Gamaunt, Johnathan, Gorjian, Varoujan, Jacobs, Daniel, Jensen, Logan, Jewell, April, Knapp, Mary, Llama, Joe, Meadows, Victoria, Nikzad, Shouleh, Peacock, Sarah, Scowen, Paul, Swain, Mark R. *Time Resolved Photometry Of The High Energy Radiation Of M Dwarfs With The Star Planet Activity Research Cubesat* *Astronomische Nachrichten*, 343, e10068, 2022
- **Instrument Paper** - SPARCS
  - My Contribution: Mission development and construction
  - Postdocs: Kolopanis - Flight software
- [87] Lanman, Adam E., Murray, Steven G., Jacobs, Daniel C. *Validation Solutions To The Full-Sky Radio Interferometry Measurement Equation For Diffuse Emission* *ApJS*, 259, 22, 2022
- My Contribution: Research direction and writing
  - Postdocs: Murray
- [86] Byrne, Ruby, Morales, Miguel F., Hazelton, Bryna, Sullivan, Ian, Barry, Nichole, Lynch, Christene, Line, Jack L. B., Jacobs, Daniel C. *A Map Of Diffuse Radio Emission At 182 Mhz To Enhance Epoch Of Reionization Observations In The Southern Hemisphere* *MNRAS*, 510, 2011-2024, 2022
- **Instrument Paper** - MWA
  - My Contribution: Survey formulation and observing.
- [85] Ramiamananantsoa, Tahina, Bowman, Judd D., Shkolnik, Evgenya L., Loyd, R. O. Parke, Ardila, David R., Jewell, April, Barman, Travis, Basset, Christophe, Beasley, Matthew, Cheng, Samuel, Gamaunt, Johnathan, Gorjian, Varoujan, Hennessy, John, Jacobs, Daniel, Jensen, Logan, Knapp, Mary, Llama, Joe, Meadows, Victoria, Nikzad, Shouleh, Peacock, Sarah, Scowen, Paul, Swain, Mark R. *Onboard Dynamic Image Exposure Control For The Star-Planet Activity Research Cubesat (Sparcs)* *MNRAS*, 509, 5702-5712, 2022
- [84] Gogo, Tamirat G., Ma, Yin-Zhe, Kittiwisit, Piyanat, Sievers, Jonathan L., Parsons, Aaron R., Pober, Jonathan C., Jacobs, Daniel C., Cheng, Carina, Kolopanis, Matthew, Liu, Adrian, Kohn, Saul A., Aguirre, James E., Ali, Zaki S., Bernardi, Gianni, Bradley, Richard F., DeBoer, David R., Dexter, Matthew R., Dillon, Joshua S., Klima, Pat, MacMahon, David H. E., Moore, David F., Nunhokee, Chuneeta D., Walbrugh, William P., Walker, Andre *The Correlation Calibration Of Paper-64 Data* *MNRAS*, 510, 1680-1696, 2022
- **Instrument Paper** - PAPER
  - My Contribution: internal editorial review

- [83] Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Bernardi, Gianni, Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Philip, Burba, Jacob, Carey, Steve, Carilli, Chris L., Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Dibblee-Barkman, Taylor, Dillon, Joshua S., Ely, John, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steven R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kern, Nicholas S., Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, La Plante, Paul, Lekalake, Telalo, Lewis, David, Liu, Adrian, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Murray, Steven G., Neben, Abraham R., Nikolic, Bojan, Nunhokee, Chuneeta D., Parsons, Aaron R., Patra, Nipanjana, Pascua, Robert, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sims, Peter, Singh, Saurabh, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan, HERA Collaboration *First Results From Hera Phase I: Upper Limits On The Epoch Of Reionization 21 Cm Power Spectrum* ApJ, 925, 221, 2022
- **Instrument Paper** - HERA
  - My Contribution: Leadership, array construction and operation, data analysis.
  - Students: Lewis
  - Postdocs: Murray, Kolopanis
- [82] Aguirre, James E., Murray, Steven G., Pascua, Robert, Martinot, Zachary E., Burba, Jacob, Dillon, Joshua S., Jacobs, Daniel C., Kern, Nicholas S., Kittiwisit, Piyanat, Kolopanis, Matthew, Lanman, Adam, Liu, Adrian, Whittler, Lily, Abdurashidova, Zara, Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Bernardi, Gianni, Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Philip, Carey, Steve, Carilli, Chris L., Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Ely, John, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steven R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Julius, Austin, Kerrigan, Joshua, Kohn, Saul A., La Plante, Paul, Lekalake, Telalo, Lewis, David, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Neben, Abraham R., Nikolic, Bojan, Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Santos, Mario G., Sims, Peter, Singh, Saurabh, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan, HERA Collaboration *Validation Of The Hera Phase I Epoch Of Reionization 21 Cm Power Spectrum Software Pipeline* ApJ, 924, 85, 2022
- My Contribution: Concept development, editing
  - Students: Lewis
  - Postdocs: Murray, Kolopanis
- [81] Storer, Dara, Dillon, Joshua S., Jacobs, Daniel C., Morales, Miguel F., Hazelton, Bryna J., Ewall-Wice, Aaron, Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Bernardi, Gianni, Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Philip, Burba, Jacob, Carey, Steven, Carilli, Chris L., Cheng, Carina, DeBoer, David R., de Lera Acedo, Eloy, Dexter, Matt, Dynes, Scott, Ely, John, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steven R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hewitt, Jacqueline N., Hickish, Jack, Huang, Tian, Josaitis, Alec, Julius, Austin, Kariseb, MacCalvin, Kern, Nicholas S., Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, La Plante, Paul, Liu, Adrian, Loots, Anita, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Martinot, Zachary E., Mesinger, Andrei, Molewa, Mathakane, Mosiane, Tshegofalang, Murray, Steven G., Neben, Abraham R., Nikolic, Bojan, Nunhokee, Chuneeta Devi, Parsons, Aaron R., Pascua, Robert, Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Riley, Daniel, Robnett, James, Rosie, Kathryn, Santos, Mario G., Sims, Peter, Singh, Saurabh, Smith, Craig, Tan, Jianrong, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Automated Detection Of Antenna Malfunctions In Large-N Interferometers: A Case Study With The Hydrogen Epoch Of Reionization Array* Radio Science, 57, e07376, 2022
- **Instrument Paper** - HERA
  - My Contribution: Method development and writing

- Students: Lewis, Kolopanis
  - Postdocs: Murray
- [80] Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Barkana, Rennan, Beardsley, Adam P., Bernardi, Gianni, Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Philip, Burba, Jacob, Carey, Steve, Carilli, Chris L., Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Dillon, Joshua S., Ely, John, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fialkov, Anastasia, Fritz, Randall, Furlanetto, Steven R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Heimersheim, Stefan, Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kern, Nicholas S., Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, La Plante, Paul, Lekalake, Telalo, Lewis, David, Liu, Adrian, Ma, Yin-Zhe, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Mirocha, Jordan, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Muñoz, Julian B., Murray, Steven G., Neben, Abraham R., Nikolic, Bojan, Nunhokee, Chuneeta D., Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Qin, Yuxiang, Razavi-Ghods, Nima, Reis, Itamar, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Santos, Mario G., Sikder, Sudipta, Sims, Peter, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Hera Phase I Limits On The Cosmic 21 Cm Signal: Constraints On Astrophysics And Cosmology During The Epoch Of Reionization* ApJ, 924, 51, 2022
- **Instrument Paper** - HERA
  - My Contribution: Array construction and operation, validation, and internal science editorial review
  - Postdocs: Murray, Kolopanis
- [79] Cox, Tyler A., Jacobs, Daniel C., Murray, Steven G. *Estimating The Feasibility Of 21Cm-LyAlpha Synergies Using The Hydrogen Epoch Of Reionization Array* MNRAS, 512, 792-801, 2022
- My Contribution: Led by my undergraduate student. I advised work and helped write the paper
  - Students: Cox
  - Postdocs: Murray
- [78] Tan, Jianrong, Liu, Adrian, Kern, Nicholas S., Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Bernardi, Gianni, Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Philip, Burba, Jacob, Carey, Steven, Carilli, Christopher L., Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Dillon, Joshua S., Ely, John, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steve R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, La Plante, Paul, Lekalake, Telalo, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Murray, Steven G., Neben, Abraham R., Nikolic, Bojan, Nunhokee, Chuneeta D., Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sims, Peter, Singh, Saurabh, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Methods Of Error Estimation For Delay Power Spectra In 21 Cm Cosmology* ApJS, 255, 26, 2021
- **Instrument Paper** - HERA
  - My Contribution: Data and internal editorial review
  - Students: Lewis
  - Postdocs: Murray, Kolopanis

- [77] Fagnoni, Nicolas, de Lera Acedo, Eloy, DeBoer, David R., Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Bernardi, Gianni, Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Phil, Burba, Jacob, Carilli, Chris L., Cheng, Carina, Dexter, Matt, Dillon, Joshua S., Ewall-Wice, Aaron, Fritz, Randall, Furlanetto, Steve R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Josaitis, Alec, Julius, Austin, Kern, Nicholas S., Kerrigan, Joshua, Kim, Honggeun, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, Plante, Paul La, Lekalake, Telalo, Liu, Adrian, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mena Parra, Juan, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Neben, Abraham R., Nikolic, Bojan, Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Robnett, James, Rosie, Kathryn, Sims, Peter, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Understanding The Hera Phase I Receiver System With Simulations And Its Impact On The Detectability Of The Eor Delay Power Spectrum* MNRAS, 500, 1232-1242, 2021
- **Instrument Paper** - HERA
  - My Contribution: Stood back and cheered wildly
- [76] Byrne, R., Jacobs, D. *Development Of A High Throughput Cloud-Based Data Pipeline For 21 Cm Cosmology* Astronomy and Computing, 34, 100447, 2021
- My Contribution: Developed concept system, analysis, principle author
- [75] La Plante, P., Williams, P. K. G., Kolopanis, M., Dillon, J. S., Beardsley, A. P., Kern, N. S., Wilensky, M., Ali, Z. S., Abdurashidova, Z., Aguirre, J. E., Alexander, P., Balfour, Y., Bernardi, G., Billings, T. S., Bowman, J. D., Bradley, R. F., Bull, P., Burba, J., Carey, S., Carilli, C. L., Cheng, C., DeBoer, D. R., Dexter, M., de Lera Acedo, E., Ely, J., Ewall-Wice, A., Fagnoni, N., Fritz, R., Furlanetto, S. R., Gale-Sides, K., Glendenning, B., Gorthi, D., Greig, B., Grobbelaar, J., Halday, Z., Hazelton, B. J., Hewitt, J. N., Hickish, J., Jacobs, D. C., Julius, A., Kerrigan, J., Kittiwisit, P., Kohn, S. A., Lanman, A., Lekalake, T., Lewis, D., Liu, A., MacMahon, D., Malan, L., Malgas, C., Maree, M., Martinot, Z. E., Matsetela, E., Mesinger, A., Molewa, M., Morales, M. F., Mosiane, T., Murray, S., Neben, A. R., Nikolic, B., Parsons, A. R., Pascua, R., Patra, N., Pieterse, S., Pober, J. C., Razavi-Ghods, N., Ringuette, J., Robnett, J., Rosie, K., Santos, M. G., Sims, P., Smith, C., Syce, A., Thyagarajan, N., Zheng, H. *A Real Time Processing System For Big Data In Astronomy: Applications To Hera* Astronomy and Computing, 36, 100489, 2021
- **Instrument Paper** - HERA
  - My Contribution: System formulation and design. Writing.
  - Students: Lewis
- [74] Trott, C. M., Jordan, C. H., Line, J. L. B., Lynch, C. R., Yoshiura, S., McKinley, B., Dayal, P., Pindor, B., Hutter, A., Takahashi, K., Wayth, R. B., Barry, N., Beardsley, A., Bowman, J., Byrne, R., Chokshi, A., Greig, B., Hasegawa, K., Hazelton, B. J., Howard, E., Jacobs, D., Kolopanis, M., Mitchell, D. A., Morales, M. F., Murray, S., Pober, J. C., Rahimi, M., Tingay, S. J., Webster, R. L., Wilensky, M., Wyithe, J. S. B., Zheng, Q. *Constraining The 21 Cm Brightness Temperature Of The Igm At  $Z = 6.6$  Around Laes With The Murchison Widefield Array* MNRAS, 507, 772-780, 2021
- **Instrument Paper** - MWA
  - My Contribution: Experiment development, data collection
- [73] Yoshiura, S., Pindor, B., Line, J. L. B., Barry, N., Trott, C. M., Beardsley, A., Bowman, J., Byrne, R., Chokshi, A., Hazelton, B. J., Hasegawa, K., Howard, E., Greig, B., Jacobs, D., Jordan, C. H., Joseph, R., Kolopanis, M., Lynch, C., McKinley, B., Mitchell, D. A., Morales, M. F., Murray, S. G., Pober, J. C., Rahimi, M., Takahashi, K., Tingay, S. J., Wayth, R. B., Webster, R. L., Wilensky, M., Wyithe, J. S. B., Zhang, Z., Zheng, Q. *A New Mwa Limit On The 21 Cm Power Spectrum At Redshifts 13-17* MNRAS, 505, 4775-4790, 2021
- **Instrument Paper** - MWA
  - My Contribution: Observation and initial data inspection
  - Postdocs: Kolopanis

- [72] Gehlot, Bharat K., Jacobs, Daniel C., Bowman, Judd D., Mahesh, Nivedita, Murray, Steven G., Kolopanis, Matthew, Beardsley, Adam P., Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Bernardi, Gianni, Billings, Tashalee S., Bradley, Richard F., Bull, Phil, Burba, Jacob, Carey, Steve, Carilli, Chris L., Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Dillon, Joshua S., Ely, John, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steven R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Julius, Austin, Kern, Nicholas S., Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Lanman, Adam, La Plante, Paul, Lekalake, Telalo, Lewis, David, Liu, Adrian, Ma, Yin-Zhe, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Monsalve, Raul A., Morales, Miguel F., Mosiane, Tshagofalang, Neben, Abraham R., Nikolic, Bojan, Parsons, Aaron R., Pascua, Robert, Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Santos, Mario G., Sims, Peter, Smith, Craig, Syce, Angelo, Tegmark, Max, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Effects Of Model Incompleteness On The Drift-Scan Calibration Of Radio Telescopes* MNRAS, 506, 4578-4592, 2021
- **Instrument Paper** - HERA
  - My Contribution: Formulation and principle author
  - Postdocs: Gehlot
- [71] Rahimi, M., Pindor, B., Line, J. L. B., Barry, N., Trott, C. M., Webster, R. L., Jordan, C. H., Wilensky, M., Yoshiura, S., Beardsley, A., Bowman, J., Byrne, R., Chokshi, A., Hazelton, B. J., Hasegawa, K., Howard, E., Greig, B., Jacobs, D., Joseph, R., Kolopanis, M., Lynch, C., McKinley, B., Mitchell, D. A., Murray, S., Morales, M. F., Pober, J. C., Takahashi, K., Tingay, S. J., Wayth, R. B., Wyithe, J. S. B., Zheng, Q. *Epoch Of Reionization Power Spectrum Limits From Murchison Widefield Array Data Targeted At Eor1 Field* MNRAS, 508, 5954-5971, 2021
- [70] Beardsley, A. P., Johnston-Hollitt, M., Trott, C. M., Pober, J. C., Morgan, J., Oberoi, D., Kaplan, D. L., Lynch, C. R., Anderson, G. E., McCauley, P. I., Croft, S., James, C. W., Wong, O. I., Tremblay, C. D., Norris, R. P., Cairns, I. H., Lonsdale, C. J., Hancock, P. J., Gaensler, B. M., Bhat, N. D. R., Li, W., Hurley-Walker, N., Callingham, J. R., Seymour, N., Yoshiura, S., Joseph, R. C., Takahashi, K., Sokolowski, M., Miller-Jones, J. C. A., Chauhan, J. V., Bojčić, I., Filipović, M. D., Leahy, D., Su, H., Tian, W. W., McSweeney, S. J., Meyers, B. W., Kitaëff, S., Vernstrom, T., Gürkan, G., Heald, G., Xue, M., Riseley, C. J., Duchesne, S. W., Bowman, J. D., Jacobs, D. C., Crosse, B., Emrich, D., Franzen, T. M. O., Horsley, L., Kenney, D., Morales, M. F., Pallot, D., Steele, K., Tingay, S. J., Walker, M., Wayth, R. B., Williams, A., Wu, C. *Science With The Murchison Widefield Array: Phase I Results And Phase Ii Opportunities - Corrigendum* PASA, 37, e014, 2020
- **Instrument Paper** - MWA
  - My Contribution: writing
- [69] Kern, Nicholas S., Parsons, Aaron R., Dillon, Joshua S., Lanman, Adam E., Liu, Adrian, Bull, Philip, Ewall-Wice, Aaron, Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Bernardi, Gianni, Bowman, Judd D., Bradley, Richard F., Burba, Jacob, Carilli, Chris L., Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steve R., Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, La Plante, Paul, Lekalake, Telalo, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshagofalang, Murray, Steven G., Neben, Abraham R., Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sims, Peter, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Mitigating Internal Instrument Coupling For 21 Cm Cosmology. Ii. A Method Demonstration With The Hydrogen Epoch Of Reionization Array* ApJ, 888, 70, 2020
- **Instrument Paper** - HERA
  - My Contribution: Experiment development, operation, and science analysis



- [68] Ghosh, Abhik, Mertens, Florent, Bernardi, Gianni, Santos, Mário G., Kern, Nicholas S., Carilli, Christopher L., Grobler, Trienko L., Koopmans, Léon V. E., Jacobs, Daniel C., Liu, Adrian, Parsons, Aaron R., Morales, Miguel F., Aguirre, James E., Dillon, Joshua S., Hazelton, Bryna J., Smirnov, Oleg M., Gehlot, Bharat K., Matika, Siyanda, Alexander, Paul, Ali, Zaki S., Beardsley, Adam P., Benefo, Roshan K., Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Cheng, Carina, Chichura, Paul M., DeBoer, David R., de Lera Acedo, Eloy, Ewall-Wice, Aaron, Fadana, Gcobisa, Fagnoni, Nicolas, Fortino, Austin F., Fritz, Randall, Furlanetto, Steve R., Gallardo, Samavarti, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Hickish, Jack, Josaitis, Alec, Julius, Austin, Igarashi, Amy S., Kariseb, MacCalvin, Kohn, Saul A., Kolopanis, Matthew, Lekalake, Telalo, Loots, Anita, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Mathison, Nathan, Matsetela, Eunice, Mesinger, Andrei, Neben, Abraham R., Nikolic, Bojan, Nunhokee, Chuneeta D., Patra, Nipanjana, Pieterse, Samantha, Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sell, Raddwine, Smith, Craig, Syce, Angelo, Tegmark, Max, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Foreground Modelling Via Gaussian Process Regression: An Application To Hera Data* MNRAS, 495, 2813-2826, 2020
- **Instrument Paper** - HERA
  - My Contribution: Experiment development, operation, data curation, and editorial review
  - Students: Lewis
- [67] Kern, Nicholas S., Dillon, Joshua S., Parsons, Aaron R., Carilli, Christopher L., Bernardi, Gianni, Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Philip, Burba, Jacob, Carey, Steven, Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Ely, John, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steve R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, La Plante, Paul, Lekalake, Telalo, Liu, Adrian, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Murray, Steven G., Neben, Abraham R., Nikolic, Bojan, Nunhokee, Chuneeta D., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sims, Peter, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Absolute Calibration Strategies For The Hydrogen Epoch Of Reionization Array And Their Impact On The 21 Cm Power Spectrum* ApJ, 890, 122, 2020
- **Instrument Paper** - HERA
  - My Contribution: Experiment development, operation, and data curation
- [66] Trott, Cathryn M., Jordan, C. H., Midgley, S., Barry, N., Greig, B., Pindor, B., Cook, J. H., Sleep, G., Tingay, S. J., Ung, D., Hancock, P., Williams, A., Bowman, J., Byrne, R., Chokshi, A., Hazelton, B. J., Hasegawa, K., Jacobs, D., Joseph, R. C., Li, W., Line, J. L. B., Lynch, C., McKinley, B., Mitchell, D. A., Morales, M. F., Ouchi, M., Pober, J. C., Rahimi, M., Takahashi, K., Wayth, R. B., Webster, R. L., Wilensky, M., Wyithe, J. S. B., Yoshiura, S., Zhang, Z., Zheng, Q. *Deep Multiredshift Limits On Epoch Of Reionization 21 Cm Power Spectra From Four Seasons Of Murchison Widefield Array Observations* MNRAS, 493, 4711-4727, 2020
- **Instrument Paper** - MWA
  - My Contribution: Experiment operation, pipeline development, and data curation

- [65] Thyagarajan, Nithyanandan, Carilli, Chris L., Nikolic, Bojan, Kent, James, Mesinger, Andrei, Kern, Nicholas S., Bernardi, Gianni, Matika, Siyanda, Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Burba, Jacob, Carey, Steve, Cheng, Carina, DeBoer, David R., Dexter, Matt, Acedo, Eloy de Lera, Dillon, Joshua S., Ely, John, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steven R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, La Plante, Paul, Lekalake, Telalo, Lewis, David, Liu, Adrian, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Neben, Abraham R., Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sims, Peter, Smith, Craig, Syce, Angelo, Williams, Peter K. G., Zheng, Haoxuan *Detection Of Cosmic Structures Using The Bispectrum Phase. Ii. First Results From Application To Cosmic Reionization Using The Hydrogen Epoch Of Reionization Array* Phys. Rev. D, 102, 022002, 2020
- **Instrument Paper** - HERA
  - My Contribution: Experiment development, operation, und data curation
  - Students: Lewis
- [64] Nunhokee, Chuneeta D., Parsons, Aaron R., Kern, Nicholas S., Nikolic, Bojan, Pober, Jonathan C., Bernardi, Gianni, Carilli, Chris L., Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Burba, Jacob, Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Dillon, Joshua S., Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steve R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Jacobs, Daniel C., Julius, Austin, Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, L Plante, Paul, Lekalake, Telalo, Liu, Adrian, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Neben, Abraham R., Patra, Nipanjana, Pieterse, Samantha, Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sims, Peter, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Measuring Hera'S Primary Beam In Situ: Methodology And First Results* ApJ, 897, 5, 2020
- **Instrument Paper** - HERA
  - My Contribution: Experiment development and internal review
  - Students: Lewis
- [63] Zhang, Zheng, Pober, Jonathan C., Li, Wenyang, Hazelton, Bryna J., Morales, Miguel F., Trott, Cathryn M., Jordan, Christopher H., Joseph, Ronniy C., Beardsley, Adam, Barry, Nichole, Byrne, Ruby, Tingay, Steven J., Chokshi, Aman, Hasegawa, Kenji, Jacobs, Daniel C., Lanman, Adam, Line, Jack L. B., Lynch, Christene, McKinley, Benjamin, Mitchell, Daniel A., Murray, Steven, Pindor, Bart, Rahimi, Mahsa, Takahashi, Keitaro, Wayth, Randall B., Webster, Rachel L., Wilensky, Michael, Yoshiura, Shintaro, Zheng, Qian *The Impact Of Tandem Redundant/Sky-Based Calibration In Mwa Phase Ii Data Analysis* PASA, 37, e045, 2020
- **Instrument Paper** - MWA
  - My Contribution: Experiment development, data collection
  - Postdocs: Murray, Kolopanis

- [62] Carilli, C. L., Thyagarajan, N., Kent, J., Nikolic, B., Gale-Sides, K., Kern, N. S., Bernardi, G., Mesinger, A., Matika, S., Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Phil, Burba, Jacob, Cheng, Carina, DeBoer, David R., Dexter, Matt, Acedo, Eloy de Lera, Dillon, Joshua S., Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steve R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Josaitis, Alec, Julius, Austin, Kerrigan, Joshua, Kim, Honggeun, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, La Plante, Paul, Lekalake, Telalo, Liu, Adrian, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Neben, Abraham R., Parra, Juan Mena, Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Robnett, James, Rosie, Kathryn, Sims, Peter, Syce, Angelo, Williams, Peter K. G., Zheng, Haoxuan *Imaging And Modeling Data From The Hydrogen Epoch Of Reionization Array* ApJS, 247, 67, 2020
- **Instrument Paper** - HERA
  - My Contribution: Experiment development, operation and data curation
- [61] Dillon, Joshua S., Lee, Max, Ali, Zaki S., Parsons, Aaron R., Orosz, Naomi, Nunhokee, Chuneeta Devi, La Plante, Paul, Beardsley, Adam P., Kern, Nicholas S., Abdurashidova, Zara, Aguirre, James E., Alexander, Paul, Balfour, Yanga, Bernardi, Gianni, Billings, Tashalee S., Bowman, Judd D., Bradley, Richard F., Bull, Phil, Burba, Jacob, Carey, Steve, Carilli, Chris L., Cheng, Carina, DeBoer, David R., Dexter, Matt, de Lera Acedo, Eloy, Ely, John, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steven R., Gale-Sides, Kingsley, Glendenning, Brian, Gorthi, Deepthi, Greig, Bradley, Grobbelaar, Jasper, Halday, Ziyaad, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kerrigan, Joshua, Kittiwisit, Piyanat, Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, Lekalake, Telalo, Lewis, David, Liu, Adrian, Ma, Yin-Zhe, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Murray, Steven, Neben, Abraham R., Nikolic, Bojan, Pascua, Robert, Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Santos, Mario G., Sims, Peter, Smith, Craig, Syce, Angelo, Tegmark, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Redundant-Baseline Calibration Of The Hydrogen Epoch Of Reionization Array* MNRAS, 499, 5840-5861, 2020
- **Instrument Paper** - HERA
  - My Contribution: Experiment development, array operation, data collection
- [60] Lanman, Adam, Hazelton, Bryna, Jacobs, Daniel, Kolopanis, Matthew, Pober, Jonathan, Aguirre, James, Thyagarajan, Nithyanandan *Pyuvsim: A Comprehensive Simulation Package For Radio Interferometers In Python*. The Journal of Open Source Software, 4, 1234, 2019
- My Contribution: Code design, construction, documentation, and test
  - Postdocs: Kolopanis
- [59] Kerrigan, Joshua, La Plante, Paul, Kohn, Saul, Pober, Jonathan C., Aguirre, James, Abdurashidova, Zara, Alexander, Paul, Ali, Zaki S., Balfour, Yanga, Beardsley, Adam P., Bernardi, Gianni, Bowman, Judd D., Bradley, Richard F., Burba, Jacob, Carilli, Chris L., Cheng, Carina, DeBoer, David R., Dexter, Matt, Acedo, Eloy de Lera, Dillon, Joshua S., Estrada, Julia, Ewall-Wice, Aaron, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steve R., Glendenning, Brian, Greig, Bradley, Grobbelaar, Jasper, Gorthi, Deepthi, Halday, Ziyaad, Hazelton, Bryna J., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kern, Nicholas S., Kittiwisit, Piyanat, Kolopanis, Matthew, Lanman, Adam, Lekalake, Telalo, Liu, Adrian, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary E., Matsetela, Eunice, Mesinger, Andrei, Molewa, Mathakane, Morales, Miguel F., Mosiane, Tshegofalang, Neben, Abraham R., Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sims, Peter, Smith, Craig, Syce, Angelo, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Optimizing Sparse Rfi Prediction Using Deep Learning* MNRAS, 488, 2605-2615, 2019
- My Contribution: HERA Experiment: development, operation, and science analysis.
  - Postdocs: Beardsley
- [58] Morales, Miguel F., Beardsley, Adam, Pober, Jonathan, Barry, Nichole, Hazelton, Bryna, Jacobs, Daniel, Sullivan, Ian *Understanding The Diversity Of 21 Cm Cosmology Analyses* MNRAS, 483, 2207-2216, 2019

- My Contribution: Discussion and editorial
  - Postdocs: Beardsley
- [57] Kohn, Saul A., Aguirre, James E., La Plante, Paul, Billings, Tashalee S., Chichura, Paul M., Fortino, Austin F., Igarashi, Amy S., Benefo, Roshan K., Gallardo, Samavarti, Martinot, Zachary E., Nunhokee, Chuneeta D., Kern, Nicholas S., Bull, Philip, Liu, Adrian, Alexander, Paul, Ali, Zaki S., Beardsley, Adam P., Bernardi, Gianni, Bowman, Judd D., Bradley, Richard F., Carilli, Chris L., Cheng, Carina, DeBoer, David R., de Lera Acedo, Eloy, Dillon, Joshua S., Ewall-Wice, Aaron, Fadana, Gcobisa, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steven R., Glendenning, Brian, Greig, Bradley, Grobbelaar, Jasper, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kariseb, MacCalvin, Kolopanis, Matthew, Lekalake, Telalo, Loots, Anita, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Mathison, Nathan, Matsetela, Eunice, Mesinger, Andrei, Morales, Miguel F., Neben, Abraham R., Nikolic, Bojan, Parsons, Aaron R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sell, Raddwine, Smith, Craig, Syce, Angelo, Tegmark, Max, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *The Hera-19 Commissioning Array: Direction-Dependent Effects* ApJ, 882, 58, 2019
- **Instrument Paper** - HERA
  - Postdocs: Beardsley, Kolopanis
- [56] Barry, N., Wilensky, M., Trott, C. M., Pindor, B., Beardsley, A. P., Hazelton, B. J., Sullivan, I. S., Morales, M. F., Pober, J. C., Line, J., Greig, B., Byrne, R., Lanman, A., Li, W., Jordan, C. H., Joseph, R. C., McKinley, B., Rahimi, M., Yoshiura, S., Bowman, J. D., Gaensler, B. M., Hewitt, J. N., Jacobs, D. C., Mitchell, D. A., Udaya Shankar, N., Sethi, S. K., Subrahmanyan, R., Tingay, S. J., Webster, R. L., Wyithe, J. S. B. *Improving The Epoch Of Reionization Power Spectrum Results From Murchison Widefield Array Season 1 Observations* ApJ, 884, 1, 2019
- **Instrument Paper** - MWA
  - My Contribution: Observing and commissioning
- [55] Kolopanis, Matthew, Jacobs, Daniel C., Cheng, Carina, Parsons, Aaron R., Kohn, Saul A., Pober, Jonathan C., Aguirre, James E., Ali, Zaki S., Bernardi, Gianni, Bradley, Richard F., Carilli, Chris L., DeBoer, David R., Dexter, Matthew R., Dillon, Joshua S., Kerrigan, Joshua, Klima, Pat, Liu, Adrian, MacMahon, David H. E., Moore, David F., Thyagarajan, Nithyanandan, Nunhokee, Chuneeta D., Walbrugh, William P., Walker, Andre A *Simplified, Lossless Reanalysis Of Paper-64* ApJ, 883, 133, 2019
- **Instrument Paper** - PAPER
  - My Contribution: Experiment operation, data analysis, and text
  - Students: Kolopanis
  - Postdocs: Kolopanis
- [54] Li, W., Pober, J. C., Barry, N., Hazelton, B. J., Morales, M. F., Trott, C. M., Lanman, A., Wilensky, M., Sullivan, I., Beardsley, A. P., Booler, T., Bowman, J. D., Byrne, R., Crosse, B., Emrich, D., Franzen, T. M. O., Hasegawa, K., Horsley, L., Johnston-Hollitt, M., Jacobs, D. C., Jordan, C. H., Joseph, R. C., Kaneuji, T., Kaplan, D. L., Kenney, D., Kubota, K., Line, J., Lynch, C., McKinley, B., Mitchell, D. A., Murray, S., Pallot, D., Pindor, B., Rahimi, M., Riding, J., Sleaf, G., Steele, K., Takahashi, K., Tingay, S. J., Walker, M., Wayth, R. B., Webster, R. L., Williams, A., Wu, C., Wyithe, J. S. B., Yoshiura, S., Zheng, Q. *First Season Mwa Phase Ii Epoch Of Reionization Power Spectrum Results At Redshift 7* ApJ, 887, 141, 2019
- **Instrument Paper** - MWA
  - My Contribution: Observing and commissioning of instrument and processing
- [53] Beardsley, A. P., Johnston-Hollitt, M., Trott, C. M., Pober, J. C., Morgan, J., Oberoi, D., Kaplan, D. L., Lynch, C. R., Anderson, G. E., McCauley, P. I., Croft, S., James, C. W., Wong, O. I., Tremblay, C. D., Norris, R. P., Cairns, I. H., Lonsdale, C. J., Hancock, P. J., Gaensler, B. M., Bhat, N. D. R., Li, W., Hurley-Walker, N., Callingham, J. R., Seymour, N., Yoshiura, S., Joseph, R. C., Takahashi, K., Sokolowski, M., Miller-Jones, J. C. A., Chauhan, J. V., Bojčić, I., Filipović, M. D., Leahy, D., Su, H., Tian, W. W., McSweeney, S. J., Meyers, B. W., Kitaeff, S., Vernstrom, T., Gürkan, G., Heald, G., Xue, M., Riseley, C. J., Duchesne, S. W., Bowman, J. D., Jacobs, D. C., Crosse, B., Emrich, D., Franzen, T. M. O., Horsley, L., Kenney, D., Morales, M. F., Pallot, D., Steele, K., Tingay, S. J., Walker, M., Wayth, R. B., Williams, A., Wu, C. *Science With The Murchison Widefield Array: Phase I Results And Phase Ii Opportunities* PASA, 36, e050, 2019
- **Instrument Paper** - MWA
  - My Contribution: Description of 21cm foreground observing program
  - Postdocs: Beardsley

- [52] Trott, Cathryn M., Jordan, C. H., Murray, S. G., Pindor, B., Mitchell, D. A., Wayth, R. B., Line, J., McKinley, B., Beardsley, A., Bowman, J., Briggs, F., Hazelton, B. J., Hewitt, J., Jacobs, D., Morales, M. F., Pober, J. C., Sethi, S., Shankar, U., Subrahmanyam, R., Tegmark, M., Tingay, S. J., Webster, R. L., Wyithe, J. S. B. *Assessment Of Ionospheric Activity Tolerances For Epoch Of Reionization Science With The Murchison Widefield Array* ApJ, 867, 15, 2018
- **Instrument Paper** - MWA
  - My Contribution: Experiment operation and commissioning
  - Postdocs: Beardsley
- [51] Cheng, Carina, Parsons, Aaron R., Kolopanis, Matthew, Jacobs, Daniel C., Liu, Adrian, Kohn, Saul A., Aguirre, James E., Pober, Jonathan C., Ali, Zaki S., Bernardi, Gianni, Bradley, Richard F., Carilli, Chris L., DeBoer, David R., Dexter, Matthew R., Dillon, Joshua S., Klima, Pat, MacMahon, David H. E., Moore, David F., Nunhokee, Chuneeta D., Walbrugh, William P., Walker, Andre *Characterizing Signal Loss In The 21 Cm Reionization Power Spectrum: A Revised Study Of Paper-64* ApJ, 868, 26, 2018
- My Contribution: Developed experiment, discovered analysis effect, described method, and mentored student author.
  - Postdocs: Kolopanis
- [50] Kerrigan, Joshua R., Pober, Jonathan C., Ali, Zaki S., Cheng, Carina, Beardsley, Adam P., Parsons, Aaron R., Aguirre, James E., Barry, Nichole, Bradley, Richard F., Bernardi, Gianni, Carilli, Chris L., DeBoer, David R., Dillon, Joshua S., Jacobs, Daniel C., Kohn, Saul A., Kolopanis, Matthew, Lanman, Adam, Li, Wenyang, Liu, Adrian, Sullivan, Ian *Improved 21 Cm Epoch Of Reionization Power Spectrum Measurements With A Hybrid Foreground Subtraction And Avoidance Technique* ApJ, 864, 131, 2018
- **Instrument Paper** - PAPER
  - My Contribution: Experiment development, operation, and science analysis.
  - Postdocs: Kolopanis, Beardsley
- [49] Ali, Zaki S., Parsons, Aaron R., Zheng, Haoxuan, Pober, Jonathan C., Liu, Adrian, Aguirre, James E., Bradley, Richard F., Bernardi, Gianni, Carilli, Chris L., Cheng, Carina, DeBoer, David R., Dexter, Matthew R., Grobelaar, Jasper, Horrell, Jasper, Jacobs, Daniel C., Klima, Pat, MacMahon, David H. E., Maree, Matthys, Moore, David F., Razavi, Nima, Stefan, Irina I., Walbrugh, William P., Walker, Andre *Erratum: "Paper-64 Constraints On Reionization: The 21 Cm Power Spectrum At  $Z = 8.4$ "* (<A Href="Http://Doi.Org/10.1088/0004-637X/809/1/61">2015, Apj, 809, 61</A>) ApJ, 863, 201, 2018
- **Instrument Paper** - PAPER
  - My Contribution: Discovery and initial analysis.
- [48] Li, W., Pober, J. C., Hazelton, B. J., Barry, N., Morales, M. F., Sullivan, I., Parsons, A. R., Ali, Z. S., Dillon, J. S., Beardsley, A. P., Bowman, J. D., Briggs, F., Byrne, R., Carroll, P., Crosse, B., Emrich, D., Ewall-Wice, A., Feng, L., Franzen, T. M. O., Hewitt, J. N., Horsley, L., Jacobs, D. C., Johnston-Hollitt, M., Jordan, C., Joseph, R. C., Kaplan, D. L., Kenney, D., Kim, H., Kittiwisit, P., Lanman, A., Line, J., McKinley, B., Mitchell, D. A., Murray, S., Neben, A., Offringa, A. R., Pallot, D., Paul, S., Pindor, B., Procopio, P., Rahimi, M., Riding, J., Sethi, S. K., Udaya Shankar, N., Steele, K., Subrahmanian, R., Tegmark, M., Thyagarajan, N., Tingay, S. J., Trott, C., Walker, M., Wayth, R. B., Webster, R. L., Williams, A., Wu, C., Wyithe, S. *Comparing Redundant And Sky-Model-Based Interferometric Calibration: A First Look With Phase Ii Of The Mwa* ApJ, 863, 170, 2018
- **Instrument Paper** - MWA
  - My Contribution: Experiment operation and commissioning
  - Postdocs: Beardsley
- [47] Kittiwisit, Piyanat, Bowman, Judd D., Jacobs, Daniel C., Beardsley, Adam P., Thyagarajan, Nithyanandan *Erratum: Sensitivity Of The Hydrogen Epoch Of Reionization Array And Its Build-Out Stages To One-Point Statistics From Redshifted 21 Cm Observations* MNRAS, 477, 864-866, 2018

- [46] Patra, Nipanjana, Parsons, Aaron R., DeBoer, David R., Thyagarajan, Nithyanandan, Ewall-Wice, Aaron, Hsyu, Gilbert, Leung, Tsz Kuk, Day, Cherie K., de Lera Acedo, Eloy, Aguirre, James E., Alexander, Paul, Ali, Zaki S., Beardsley, Adam P., Bowman, Judd D., Bradley, Richard F., Carilli, Chris L., Cheng, Carina, Dillon, Joshua S., Fadana, Gcobisa, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steve R., Glendenning, Brian, Greig, Bradley, Grobbelaar, Jasper, Hazelton, Bryna J., Jacobs, Daniel C., Julius, Austin, Kariseb, MacCalvin, Kohn, Saul A., Lebedeva, Anna, Lekalake, Telalo, Liu, Adrian, Loots, Anita, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary, Mathison, Nathan, Matsetela, Eunice, Mesinger, Andrei, Morales, Miguel F., Neben, Abraham R., Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sell, Raddwine, Smith, Craig, Syce, Angelo, Tegmark, Max, Williams, Peter K. G., Zheng, Haoxuan *The Hydrogen Epoch Of Reionization Array Dish Iii: Measuring Chromaticity Of Prototype Element With Reflectometry* Experimental Astronomy, 45, 177-199, 2018
- **Instrument Paper** - HERA
  - My Contribution: HERA experiment development and operation. Part of a series of instrumental development papers.
- [45] Kittiwisit, Piyanat, Bowman, Judd D., Jacobs, Daniel C., Beardsley, Adam P., Thyagarajan, Nithyanandan *Sensitivity Of The Hydrogen Epoch Of Reionization Array And Its Build-Out Stages To One-Point Statistics From Redshifted 21 Cm Observations* MNRAS, 474, 4487-4499, 2018
- My Contribution: Analysis discussion and text edits
  - Students: Kittiwisit
  - Postdocs: Beardsley
- [44] Hazelton, Bryna J., Jacobs, Daniel C., Pober, Jonathan C., Beardsley, Adam P. *Pyuvdata: An Interface For Astronomical Interferometric Datasets In Python* The Journal of Open Source Software, 2, 140, 2017
- My Contribution: Code design, construction, documentation and test
  - Postdocs: Beardsley
- [43] Moore, David F., Aguirre, James E., Kohn, Saul A., Parsons, Aaron R., Ali, Zaki S., Bradley, Richard F., Carilli, Chris L., DeBoer, David R., Dexter, Matthew R., Gugliucci, Nicole E., Jacobs, Daniel C., Klima, Pat, Liu, Adrian, MacMahon, David H. E., Manley, Jason R., Pober, Jonathan C., Stefan, Irina I., Walbrugh, William P. *Limits On Polarized Leakage For The Paper Epoch Of Reionization Measurements At 126 And 164 Mhz* ApJ, 836, 154, 2017
- **Instrument Paper** - PAPER
  - My Contribution: Experiment development, operation, and science analysis.
- [42] DeBoer, David R., Parsons, Aaron R., Aguirre, James E., Alexander, Paul, Ali, Zaki S., Beardsley, Adam P., Bernardi, Gianni, Bowman, Judd D., Bradley, Richard F., Carilli, Chris L., Cheng, Carina, de Lera Acedo, Eloy, Dillon, Joshua S., Ewall-Wice, Aaron, Fadana, Gcobisa, Fagnoni, Nicolas, Fritz, Randall, Furlanetto, Steve R., Glendenning, Brian, Greig, Bradley, Grobbelaar, Jasper, Hazelton, Bryna J., Hewitt, Jacqueline N., Hickish, Jack, Jacobs, Daniel C., Julius, Austin, Kariseb, MacCalvin, Kohn, Saul A., Lekalake, Telalo, Liu, Adrian, Loots, Anita, MacMahon, David, Malan, Lourence, Malgas, Cresshim, Maree, Matthys, Martinot, Zachary, Mathison, Nathan, Matsetela, Eunice, Mesinger, Andrei, Morales, Miguel F., Neben, Abraham R., Patra, Nipanjana, Pieterse, Samantha, Pober, Jonathan C., Razavi-Ghods, Nima, Ringuette, Jon, Robnett, James, Rosie, Kathryn, Sell, Raddwine, Smith, Craig, Syce, Angelo, Tegmark, Max, Thyagarajan, Nithyanandan, Williams, Peter K. G., Zheng, Haoxuan *Hydrogen Epoch Of Reionization Array (Hera)* PASP, 129, 045001, 2017
- **Instrument Paper** - HERA
  - My Contribution: Experiment development, operation, and science analysis. Text
  - Postdocs: Beardsley
- \*\* [41] Jacobs, Daniel C., Burba, Jacob, Bowman, Judd D., Neben, Abraham R., Stinnett, Benjamin, Turner, Lauren, Johnson, Kali, Busch, Michael, Allison, Jay, Leatham, Marc, Serrano Rodriguez, Victoria, Denney, Mason, Nelson, David *First Demonstration Of Echo: An External Calibrator For Hydrogen Observatories* PASP, 129, 035002, 2017
- My Contribution: Experiment design, student mentor, data collection, analysis, and principle author
  - Students: Burba, Stinnett, Turner, Johnson, Busch, Allison, Leatham, Rodriguez, Denney, Nelson

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#### **ABSTRACTS**

This list mainly includes "conference proceedings" a category in which peer review quality and academic significance varies widely across physics, astronomy, instrumentation, and space mission development.

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