



Carina Cheng

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Education

University of California, Berkeley

Berkeley, California

PH.D. ASTROPHYSICS

Completed May 2019

Robert J. Trumpler Graduate Student Excellence Award

M.A. ASTROPHYSICS

2013-2015

UC Berkeley's Chancellor's Fellowship

National Science Foundation Graduate Research Fellow

University of California, Los Angeles

Los Angeles, California

B.S. ASTROPHYSICS

2009-2013

Magna Cum Laude

Highest Departmental Honors

College Honors

Phi Beta Kappa

Charles Geoffrey Hilton Excellence in Astronomy Award

Clare Boothe Luce Scholar

Research

UC Berkeley Graduate Student Researcher

Berkeley, California

ADVISOR: AARON PARSONS

Spring, 2014 - Spring, 2019

- Analysis of data taken by radio telescope PAPER (Precision Array for Probing the Epoch of Reionization).
- Development of software and computational techniques used in data analysis pipeline (e.g. calibration tools).
- Simulations of galactic foregrounds and the Epoch of Reionization signal for PAPER.

UCLA Undergraduate Researcher

Los Angeles, California

ADVISOR: ANDREA GHEZ

Fall, 2011 - Spring, 2013

- Computational analysis of photometric Galactic Center data in order to improve Adaptive Optics systems for ground based telescopes.

Teaching

UC Berkeley

Berkeley, California

GRADUATE STUDENT INSTRUCTOR

Fall, 2015, 2016, 2017, & 2018

- Instructional Techniques for Teaching Astronomy
- Co-taught a weekly course that prepares first-time graduate student instructors and emphasizes the implementation of pedagogical techniques in the classroom.

INSTRUCTOR

Fall, 2016, 2017, 2018, & Spring, 2017

- Physical Sciences Discipline Cluster Workshop
- Taught a Physical Sciences Discipline Cluster Workshop aimed at preparing first-time graduate student instructors for teaching in the physical sciences.

HEAD GRADUATE STUDENT INSTRUCTOR

Spring, 2015

- Introduction to Astronomy (Professor Alex Filippenko)

GRADUATE STUDENT INSTRUCTOR

Spring, 2014

- Introduction to Astronomy (Professor Alex Filippenko)
- Outstanding GSI Award Winner

- Introduction to Astronomy (Professor Leo Blitz)

San Francisco Bay Area Project ASTRO

Richmond, California

CLASSROOM ASTRONOMER

Spring, 2014

- Lectured and led astronomy activities during visits to an 8th grade classroom.
- Attended workshop on designing and implementing astronomy lessons in the classroom.

Outreach

Astronomy Night

Berkeley, California

CREATOR AND LEAD ORGANIZER

Spring, 2016 - Spring, 2019

- Organize monthly public talks and star parties for UC Berkeley's Astronomy Department.

UC Berkeley Astronomy Department

Berkeley, California

LARGE EVENTS ORGANIZER

Fall, 2013 - Spring, 2019

- Organize astronomy participation in large outreach events such as Berkeley Sunday Streets, the Bay Area Science Festival, and UC Berkeley's Cal Day.

Point Bonita YMCA

Sausalito, California

OUTDOOR ADVANCED LEADERSHIP ACADEMY WORKSHOP LEADER

Summer, 2017, 2018

- Presented an astronomy talk and activity for YMCA summer camp students.

Science@Cal

SCARLET CITY SCIENCE NIGHT ORGANIZING COMMITTEE

Winter, 2016 - Fall, 2016

- Organized bi-monthly public science talks at a local cafe.

UCLA Exploring Your Universe

Los Angeles, California

VOLUNTEER

2011, 2012, 2013

- Undergraduate volunteer for an annual science outreach event organized by UCLA's astronomy department.

UCLA Women in the Physical Sciences

Los Angeles, California

CO-PRESIDENT

Fall, 2012 - Spring, 2013

- Founded a club that aims to develop a supportive environment for female students in STEM fields of study and provide networking and research opportunities.

Publications

Primary Contributor Publications

- **Cheng, C.** et al. "Characterizing Signal Loss in the 21 cm Reionization Power Spectrum: A Revised Study of PAPER-64." ApJ, 868, 1, November 2018.
- Kolopanis, M., Jacobs, D., **Cheng, C.**.... "A Simplified, Lossless Re-Analysis of PAPER-64." Submitted to ApJ. May 2019.
- Ali, Z. S. et al. "Erratum: PAPER-64 Constraints on Reionization: The 21 cm Power Spectrum at $z=8.4$." ApJ, 863, 2, August 2018.
- Kerrigan, J., Pober, J., Ali, Z., **Cheng, C.**.... "Improved 21 cm Epoch of Reionization Power Spectrum Measurements with a Hybrid Foreground Subtraction and Avoidance Technique." ApJ, 864, 2, September 2018.
- Parsons, A. R., Liu, A., Ali, Z. S., **Cheng, C.** "Optimized Beam Sculpting with Generalized Fringe-Rate Filters." ApJ, 821, 51, March 2016.

Collaboration Publications

- Carilli, C. L. et al. "HI 21cm Cosmology and the Bi-spectrum: Closure Diagnostics in Massively Redundant Interferometric Arrays." *Radio Science*, 53, 6, May 2018.
- Kohn, S. et al. "Polarized Foreground Power Spectra from the HERA-19 Commissioning Array." Submitted to *ApJ*, ArXiv 1802.04151. February 2018.
- Patra, N. et al. "The Hydrogen Epoch of Reionization Array Dish III: Measuring Chromaticity of Prototype Element with Reflectometry." *Experimental Astronomy*, 45, 2, April 2018.
- DeBoer, D. R., et al. "Hydrogen Epoch of Reionization Array (HERA). Publications of the Astronomical Society of the Pacific, 129, 974. March 2017.
- Ewall-Wice, A. et al. "The HERA Dish II: Electromagnetic Simulations and Science Implications." *ApJ*, 831, 196, November 2016.
- Neben, A. R. et al. "The Hydrogen Epoch of Reionization Array Dish I: Beam Pattern Measurements and Science Implications." *ApJ*, 826, 2, August 2016.
- Pober, J. C. et al. "PAPER-64 Constraints on Reionization II: The Temperature of the $z=8.4$ Intergalactic Medium." *ApJ*, 809, 62, August 2015
- Ali, Z. S. et al. "PAPER-64 Constraints on Reionization: The 21cm Power Spectrum at $z=8.4$." *ApJ*, 809, 61, August 2015.

Conference Proceedings

- Fitzgerald, M. P. et al. "Modeling Anisoplanatism in the Keck II Laser Guide Star Adaptive Optics System." *Proc. SPIE*. 2012.

Presentations

Professional Talks

- **UC Berkeley Astronomy Department Exit Talk** (Spring, 2019): *Observing the Epoch of Reionization*
- **American Astronomical Society Meeting** (Winter, 2019): *Dissertation Talk: 21cm Power Spectrum Analysis Lessons*
- **Nagoya University Science at Low Frequencies V** (Fall, 2018): *From PAPER to HERA: 21cm Power Spectrum Techniques*
- **UCLA Journal Club** (Fall, 2018): *21cm Power Spectrum Analysis is Really Hard*
- **UC Berkeley Astronomy Department Lunch Talk Series** (Winter, 2018): *Updated 21cm Power Spectrum Results from the PAPER Experiment*
- **USNC-URSI National Radio Science Meeting** (Winter, 2018): *21cm Power Spectrum Lessons: Updated Results from the PAPER Experiment*
- **University of Sydney Science at Low Frequencies IV** (Fall, 2017): *21cm Power Spectrum Lessons: Updated Results from the PAPER Experiment*
- **Cambridge University HI 21cm Cosmology Meeting** (Summer, 2016): *Redundant Calibration and its Application to PAPER*
- **American Astronomical Society Meeting** (Winter, 2016): *PAPER-128 Status Update: Towards a Power Spectrum Detection*

Popular Talks

- **The Computer History Museum** (Summer, 2018): *Science Slam!*
- **American High School** (Spring, 2018): *Scientists Eat & Greet Keynote Speech*
- **tasteofscience** (Winter, 2018): *Stories of Discovery: The Universe on Large Scales*
- **Wonderfest's Ask-a-Science-Envoy** (Fall, 2017): *Observing the Night Sky*

Posters

- **NSF Mathematics and Physical Sciences Visit** (Winter, 2015): *21cm Epoch of Reionization Experiments PAPER and HERA*
- **American Astronomical Society Meeting** (Winter, 2015): *Instrumental Simulations of the 21cm Epoch of Reionization Signal*
- **UCLA Science Poster Day** (Spring, 2013): *Measuring the Effect of Limited Point Spread Function Halo Knowledge on Astrometry Measurements*
- **American Astronomical Society Meeting** (Winter, 2013): *Measuring the Effect of Limited Point Spread Function Halo Knowledge on Astrometry Measurements*
- **UCLA Summer Program for Undergraduate Research** (Summer, 2012): *New Methodologies for Testing the Performance of High Precision Photometry with Adaptive Optics*
- **UCLA Science Poster Day** (Spring, 2012): *Improved Technology for Obtaining Sharper Images with Ground Based Astronomical Telescopes*

Other

Wonderfest

SCIENCE ENVOY

- Participation in a year-long program that trains researchers in science communication excellence.

Bay Area, California

2017-2018

UCLA Volunteer Income Tax Assistance

TAX FILER VOLUNTEER

- Acquired IRS certification and prepared personal income tax returns for eligible clients.

Los Angeles, California

2011,2012,2013

Griffith Observatory

MUSEUM GUIDE

- Presented astronomical demonstrations and answered scientific questions.

Los Angeles, California

Summer, 2011

Skills

Computing

Python (numpy, scipy, matplotlib, pandas), Git, LaTeX, Mathematica, BASH, HTML, CSS

Teaching

Completion of the UC Berkeley Certificate of Teaching and Learning in Higher Education (Spring, 2017)

Completion of CIRTL MOOC “An Introduction to Evidence-Based Undergraduate STEM Teaching” (Fall, 2016)