

Joshua S. Dillon

Curriculum Vitae

Department of Astronomy
501 Campbell Hall #3411
Berkeley, CA 94720
✉ jsdillon@berkeley.edu
🌐 www.joshdillon.com
👤 jsdillon

ID 0000-0003-3336-9958

✉ GScholar: *h*-index 38 (5,031 citations)

Academic Appointments

University of California, Berkeley, Berkeley, California.

- 2023 – Present **Assistant Research Scientist**, *Radio Astronomy Laboratory*.
2020 – 2023 **Assistant Project Scientist**, *Radio Astronomy Laboratory*.
2017 – 2020 **NSF Astronomy & Astrophysics Postdoctoral Fellow**.
2015 – 2017 **Berkeley Center for Cosmological Physics Postdoctoral Fellow**.

Education

- 2009 – 2015 **Ph.D. in Physics**, *Massachusetts Institute of Technology*, Cambridge, Massachusetts.
Advisor: Max Tegmark
GPA: 5.0 (out of 5.0)
Bruno Rossi Fellow
- 2005 – 2009 **B.S. with Distinction in Physics**, *Stanford University*, Stanford, California.
Advisor: Steven Kahn
Physics GPA: 4.03, Overall GPA: 3.96 (out of 4.0), Phi Beta Kappa
Jeffery Willick Memorial Award for Outstanding Scholarship in Astrophysics

Collaboration Memberships

Hydrogen Epoch of Reionization Array (HERA)

- 2017 – Present HERA Analysis Team Leader
2020 – Present HERA Data Quality Metrics Team Leader
2021 – 2022 HERA Diversity, Equity, and Inclusion Team Leader
2017 – 2020 HERA Undergraduate Summer Bootcamp Curriculum Lead

Packed Ultra-wideband Mapping Array (PUMA)

Precision Array for Probing the Epoch of Reionization (PAPER)

Murchison Widefield Array (MWA) Phase I Epoch of Reionization Collaboration

Grants

- 2017 – 2020 **NSF Astronomy and Astrophysics Postdoctoral Fellowship**.
\$300,000, Principal Investigator.
Data Analysis Techniques for the Epoch of Reionization and Beyond
- 2018 – 2019 **NSF Special Programs in Astronomy**.
\$22,911, Co-Investigator.
17th Annual Symposium of the NSF Astronomy & Astrophysics Postdoctoral Fellows

Peer-Reviewed Publications as First Author, Student Mentor, or Major Contributor

*Students mentored denoted with **. h-index: 38 (5,031 citations).*

34. Cox, T.A., ** A.R. Parsons, **J.S. Dillon**, et al. *Spectral Redundancy for Calibrating Interferometers and Suppressing the Foreground Wedge in 21 cm Cosmology*. MNRAS *in review*.
33. The HERA Collaboration: Z. Abdurashidova, T. Adams, J.E. Aguirre, et al. (**Lead Author: J.S. Dillon**). *Improved Constraints on the 21 cm EoR Power Spectrum and the X-Ray Heating of the IGM with HERA Phase I Observations*. ApJ. 945, 124 (2023)
32. Kim, H., B.D. Nhan, J.N. Hewitt, et al. (including **J.S. Dillon**). *The Impact of Beam Variations on Power Spectrum Estimation for 21-cm Cosmology I: Simulations of Foreground Contamination for HERA*. ApJ. 941, 207 (2022)
31. Ewall-Wice, A., **J.S. Dillon**, B.K. Gehlot, et al. *Precision Calibration of Radio Interferometers for 21 cm Cosmology with No Redundancy and Little Knowledge of Antenna Beams and the Radio Sky*. ApJ. 938, 151 (2022)
30. Xu, Z., J.N. Hewitt, K.-F. Chen, et al. (including **J.S. Dillon**). *Direct Optimal Mapping for 21cm Cosmology: A Demonstration with the Hydrogen Epoch of Reionization Array*. ApJ. 938, 128 (2022)
29. The HERA Collaboration: Z. Abdurashidova, J.E. Aguirre, P. Alexander, et al. (including **J.S. Dillon**). *HERA Phase I Limits on the Cosmic 21cm Signal: Constraints on Astrophysics and Cosmology*. ApJ. 924, 51 (2022)
28. The HERA Collaboration: Z. Abdurashidova, J.E. Aguirre, P. Alexander, et al. (including **J.S. Dillon**). *HERA Phase I Limits on the Epoch of Reionization 21 cm Power Spectrum*. ApJ. 925, 221 (2022)
27. Aguirre, J.E., S.G. Murray, R. Pascua, ** et al. (including **J.S. Dillon**). *Validation of the HERA Phase I Epoch of Reionization 21 cm Power Spectrum Pipeline*. ApJ. 924, 85 (2022)
26. Storer, D., ** **J.S. Dillon**, D.C. Jacobs, et al. *Automated Detection of Antenna Malfunctions in Large-N Interferometers: A Case Study with the Hydrogen Epoch of Reionization Array*. Radio Science, 57 (2022)
25. Ewall-Wice, A., N. Kern, ** **J.S. Dillon**, et al. *DAYENU: A Simple Filter of Smooth Foregrounds for Intensity Mapping Power Spectra*. MNRAS 500, 4 (2021).
24. Gorthi, D., ** A.R. Parsons, and **J.S. Dillon**. *Calibration Schemes with $\mathcal{O}(N \log_2 N)$ Scaling for Large-N Radio Interferometers built on a Regular Grid*. MNRAS 500, 1 (2021)
23. La Plante, P., P.K.G. Williams, and **J.S. Dillon**. *Developing a Real Time Processing System for HERA*. URSI Radio Science Letters, 2 (2020).
22. **Dillon, J.S.**, M. Lee, ** Z.S. Ali, ** et al. *Redundant-Baseline Calibration of the Hydrogen Epoch of Reionization Array*. MNRAS 499, 4 (2020)
21. Kern, N., ** **J.S. Dillon**, A.R. Parsons, et al. *Absolute Calibration for the Hydrogen Epoch of Reionization Array and its Impact on Power Spectrum Performance*. ApJ. 890, 2 (2020)
20. Kern, N., ** A.R. Parsons, **J.S. Dillon**, et al. *Mitigating Internal Instrument Coupling for 21 cm Cosmology II: A Method Demonstration with the Hydrogen Epoch of Reionization Array*. ApJ. 888, 2 (2020)
19. Kern, N., ** A.R. Parsons, **J.S. Dillon**, et al. *Mitigating Internal Instrument Coupling for 21 cm Cosmology I: Temporal and Spectral Modeling in Simulations*. ApJ. 884, 2 (2019)

18. Orosz, N., ** **J.S. Dillon**, A. Ewall-Wice, et al. *Mitigating the Effects of Antenna-to-Antenna Variation on Redundant-Baseline Calibration for 21 cm Cosmology*. MNRAS 487, 1 (2019)
17. **Dillon, J.S.**, S.A. Kohn, A.R. Parsons, et al. *Polarized Redundant-Baseline Calibration for 21 cm Cosmology Without Adding Spectral Structure*. MNRAS 477, 4 (2018)
16. Ewall-Wice, A., ** **J.S. Dillon**, A. Liu, and J.N. Hewitt. *The Impact of Modeling Errors on Interferometer Calibration for 21 cm Power Spectra*. MNRAS 470, 2 (2017)
15. DeBoer, D., A.R. Parsons, et al. (including **J.S. Dillon**). *Hydrogen Epoch of Reionization Array (HERA)*. PASP 129, 974 (2017)
14. Jacobs, D.C., B.J. Hazelton, C.M. Trott, **J.S. Dillon**, et al. *The Murchison Widefield Array 21 cm Power Spectrum Analysis Methodology*. ApJ. 825, 2 (2016)
13. Zheng, H., ** M. Tegmark, **J.S. Dillon**, et al. *An Improved Model of Diffuse Galactic Radio Emission from 10 MHz to 5 THz*. MNRAS 464, 3 (2016)
12. Zheng, H., ** M. Tegmark, **J.S. Dillon**, et al. *Brute-Force Mapmaking with Compact Interferometers: A MITEoR Northern Sky Map from 128 MHz to 175 MHz*. MNRAS 465, 3 (2016)
11. Ewall-Wice, A., ** **J.S. Dillon**, J.N. Hewitt, et al. *First Limits on the 21 cm Power Spectrum during the Epoch of X-ray heating*. MNRAS 460, 4 (2016)
10. **Dillon, J.S.** and A.R. Parsons. *Redundant Array Configurations for 21 cm Cosmology*. ApJ. 826, 2 (2016)
9. Ewall-Wice, A., J. Hewitt, A. Mesinger, **J.S. Dillon**, et al. *Constraining High Redshift X-ray Sources with Next Generation 21 cm Power Spectrum Measurements*. MNRAS 458, 3 (2016)
8. Neben, A.R., J. Hewitt, R.F. Bradley, **J.S. Dillon**, et al. *Beamforming Errors in Murchison Widefield Array Phased Array Antennas and their effects on Epoch of Reionization Science*. ApJ. 820, 1 (2016)
7. **Dillon, J.S.**, A.R. Neben, ** J.N. Hewitt, M. Tegmark, et al. *Empirical Covariance Modeling for 21 cm Power Spectrum Estimation: A Method Demonstration and New Limits from Early Murchison Widefield Array 128-Tile Data*. Phys. Rev. D 91, 123011 (2015)
6. **Dillon, J.S.**, M. Tegmark, A. Liu, A. Ewall-Wice, J.N. Hewitt, M. Morales, A.R. Neben, A.R. Parsons, H. Zheng. *Mapmaking for Precision 21 cm Cosmology*. Phys. Rev. D 91, 023002 (2015)
5. Zheng, H., M. Tegmark, V. Buza, **J.S. Dillon**, et al. *MITEoR: A Scalable Interferometer for Precision 21 cm Cosmology*. MNRAS 445, 2 (2014)
4. Ewall-Wice, A., ** **J.S. Dillon**, A. Mesinger, and J. Hewitt. *Detecting the 21 cm Forest in the 21 cm Power Spectrum*. MNRAS 441, 3 (2014)
3. Pober, J.C., A. Liu, **J.S. Dillon**, et al. *What Next-Generation 21 cm Power Spectrum Measurements Can Teach Us About the Epoch of Reionization*. ApJ. 782, 66 (2014)
2. **Dillon, J.S.**, A. Liu, C.L. Williams, et al. *Overcoming real-world obstacles in 21 cm power spectrum estimation: A demonstration and results from early Murchison Widefield Array data*. Phys. Rev. D 89, 023002 (2014)
1. **Dillon, J.S.**, A. Liu, and M. Tegmark. *A fast method for power spectrum and foreground analysis for 21 cm cosmology*. Phys. Rev. D 87, 043005 (2013)

Peer-Reviewed Collaboration Publications

39. Garsden, H., P. Bull, M. Wilensky, et al. (including **J.S. Dillon**). *A demonstration of the effect of fringe-rate filtering in the Hydrogen Epoch of Reionization Array delay power spectrum pipeline*. MNRAS *in review*.
38. Berkhouit, L.M., D.C. Jacobs, Z. Abdurashidova, et al. (including **J.S. Dillon**). *Hydrogen Epoch of Reionization Array (HERA) Phase II Deployment and Commissioning*. PASP *in review*.
37. Kittiwitit, P., S.G. Murray, H. Garsden, et al. (including **J.S. Dillon**). *matvis: A matrix-based visibility simulator for fast forward modelling of many-element 21 cm arrays*. RASTI *in review*.
36. Murphy, G.G., P. Bull, M.G. Santos, et al. (including **J.S. Dillon**). *Bayesian estimation of cross-coupling and reflection systematics in 21cm array visibility data*. MNRAS *in review*.
35. Xu, Z., H. Kim, J.N. Hewitt, et al. (including **J.S. Dillon**). *Direct Optimal Mapping Image Power Spectrum and its Window Functions*. ApJ. *in review*.
34. Kim, H., N.S. Kern, J.N. Hewitt, et al. (including **J.S. Dillon**). *The Impact of Beam Variations on Power Spectrum Estimation for 21 cm Cosmology II: Mitigation of Foreground Systematics for HERA*. ApJ. *in press*.
33. Keller, P., B. Nikolic, N. Thyagarajan, et al. (including **J.S. Dillon**). *Search for the Epoch of Reionisation with HERA: Upper Limits on the Closure Phase Delay Power Spectrum*. MNRAS *in press*.
32. Pagano, M., J. Liu, A. Liu, et al. (including **J.S. Dillon**). *Characterization Of Inpaint Residuals In Interferometric Measurements of the Epoch Of Reionization*. MNRAS 520, 4 (2023)
31. Gorce, A., S. Ganjam, A. Liu, et al. (including **J.S. Dillon**). *Impact of instrument and data characteristics in the interferometric reconstruction of the 21cm power spectrum*. MNRAS 520, 1 (2023)
30. Wilensky, M., F. Kennedy, P. Bull, **J.S. Dillon**, et al. *Bayesian jackknife tests with a small number of subsets: Application to HERA 21cm power spectrum upper limits*. MNRAS 518, 4 (2023)
29. Gogo, T.G., Y.-Z. Ma, P. Kittiwitit, et al. (including **J.S. Dillon**). *The Correlation Calibration of PAPER-64 data*. MNRAS 510, 2 (2022)
28. Gehlot, B.K., D.C. Jacobs, J.D. Bowman, et al. (including **J.S. Dillon**). *Effects of model incompleteness on the drift-scan calibration of radio telescopes*. MNRAS 506, 3 (2021)
27. La Plante, P., P.K.G. Williams, M. Kolopanis, **J.S. Dillon**, et al. *A Real Time Processing System for Big Data in Astronomy: Applications to HERA*. Astronomy and Computing, 36 (2021)
26. Tan, J., A. Liu, N.S. Kern, et al. (including **J.S. Dillon**). *Methods of Error Estimation for Delay Power Spectra in 21 cm Cosmology*. ApJS. 255, 26 (2021)
25. Fagnoni, N., E. de Lera Acedo, D.R. DeBoer, et al. (including **J.S. Dillon**). *Understanding the HERA Phase I receiver system with simulations and its impact on the detectability of the EoR delay power spectrum*. MNRAS 500, 1 (2021)
24. Nunhokee, C.D., A.R. Parsons, N.S. Kern, et al. (including **J.S. Dillon**). *In-situ measurements of HERA primary beam patterns: methodology and first results*. ApJ. 897, 1 (2020)
23. Thyagarajan, N., C.L. Carilli, B. Nikolic, et al. (including **J.S. Dillon**). *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)
22. Ghosh, A., F. Mertens, G. Bernardi, et al. (including **J.S. Dillon**). *Foreground modelling via Gaussian process regression: an application to HERA data*. MNRAS 495, 3 (2020)
21. Kolopanis, M., D.C. Jacobs, C. Cheng, et al. (including **J.S. Dillon**). *A simplified, lossless re-analysis of PAPER-64*. ApJ. 883, 2 (2019)

20. Kerrigan, J., P. La Plante, S. Kohn, et al. (including **J.S. Dillon**). *Optimizing Sparse RFI Prediction using Deep Learning*. MNRAS 488, 2 (2019)
19. Kohn, S.A., P.M. Chichura, A.S. Igarashi, et al. (including **J.S. Dillon**). *Polarized Foreground Power Spectra from the HERA-19 Commissioning Array*. ApJ. 881, 1 (2019)
18. Cheng, C., A.R. Parsons, M. Kolopanis, et al. (including **J.S. Dillon**). *Characterizing Signal Loss in the 21 cm Reionization Power Spectrum: A Revised Study of PAPER-64*. ApJ. 868, 1 (2018)
17. Li, W., J.C. Pober, B.J. Hazelton, et al. (including **J.S. Dillon**). *Comparing Redundant and Sky Model Based Interferometric Calibration: A First Look with Phase II of the MWA*. ApJ. 863, 2 (2018)
16. Carilli, C.L., B. Nikolic, N. Thyagarajan, et al. (including **J.S. Dillon**). *HI 21cm Cosmology and the Bi-spectrum: Closure Diagnostics in Massively Redundant Interferometric Arrays*. Radio Science 53, 6 (2018)
15. Patra, N., A.R. Parsons, D.R. DeBoer, et al. (including **J.S. Dillon**). *The Hydrogen Epoch of Reionization Array Dish III: Measuring Chromaticity of Prototype Element with Reflectometry*. Experimental Astronomy, 45, 2 (2018)
14. Nunhokee, C.D., G. Bernardi, S.A. Kohn, et al. (including **J.S. Dillon**). *Constraining Polarized Foregrounds for EOR Experiments II: Polarization Leakage Simulations in the Avoidance Scheme*. ApJ. 848, 1 (2017)
13. Kapinska, A.D., L. Staveley-Smith, R. Crocker, et al. (including **J.S. Dillon**). *Spectral energy distribution and radio halo of NGC 253 at low radio frequencies*. ApJ. 838, 1 (2017)
12. Paul, S., S.K. Sethi, M.F. Morales, et al. (including **J.S. Dillon**). *Delay Spectrum with Phase-Tracking Arrays: Extracting the HI power spectrum from the Epoch of Reionization*. ApJ. 833, 1 (2016)
11. Beardsley, A.P., B.J. Hazelton, I.S. Sullivan, et al. (including **J.S. Dillon**). *First Season MWA EoR Power Spectrum Results at Redshift 7*. ApJ. 833, 1 (2016)
10. Lenc, E., B.M. Gaensler, X.H. Sun, et al. (including **J.S. Dillon**). *Low frequency observations of linearly polarized structures in the interstellar medium near the south Galactic pole*. ApJ. 830, 1 (2016)
9. Carroll, P.A., J. Line, M.F. Morales, et al. (including **J.S. Dillon**). *A High Reliability Survey of Discrete Epoch of Reionization Foreground Sources in the MWA EoR0 Field*. MNRAS 461, 4 (2016)
8. Ewall-Wice, A., R.F. Bradley, D. DeBoer, et al. (including **J.S. Dillon**). *The Hydrogen Epoch of Reionization Array Dish II: Characterization of Spectral Structure with Electromagnetic Simulations and its science Implications*. ApJ. 831, 2 (2016)
7. Neben, A.R., R.F. Bradley, J.N. Hewitt, et al. (including **J.S. Dillon**). *The Hydrogen Epoch of Reionization Array Dish I: Beam Pattern Measurements and Science Implications*. ApJ. 826, 2 (2016)
6. Offringa, A.R., C.M. Trott, N. Hurley-Walker, et al. (including **J.S. Dillon**). *Parametrizing Epoch of Reionization foregrounds: a deep survey of low-frequency point-source spectra with the Murchison Widefield Array*. MNRAS 458, 1 (2016)
5. Pober, J.C., B.J. Hazelton, A.P. Beardsley, et al. (including **J.S. Dillon**). *The Importance of Wide-field Foreground Removal for 21 cm Cosmology: A Demonstration With Early MWA Epoch of Reionization Observations*. ApJ. 819, 1 (2016)
4. Trott, C.M., B. Pindor, P. Procopio, et al. (including **J.S. Dillon**). *CHIPS: The Cosmological HI Power Spectrum Estimator*. ApJ. 818, 2 (2016)
3. Thyagarajan, N., D.C. Jacobs, J.D. Bowman, et al. (including **J.S. Dillon**). *Confirmation of Wide-Field Signatures in Redshifted 21 cm Power Spectra*. ApJ. Letters 807, L28 (2015)

2. Thyagarajan, N., D.C. Jacobs, J.D. Bowman, et al. (including **J.S. Dillon**). *Foregrounds in Wide-Field Redshifted 21 cm Power Spectra*. ApJ. 804, 1 (2015)
1. Offringa, A.R., R.B. Wayth, N. Hurley-Walker, et al. (including **J.S. Dillon**). *The low-frequency environment of the Murchison Widefield Array: radio-frequency interference analysis and mitigation*. PASA 32, e008 (2015)

Unrefereed Publications and White Papers

32. **Dillon, J.S.** and S.G. Murray. *H6C Internal Data Release 2.2*. HERA Memo Series #125 (2023)
31. **Dillon, J.S.**, S.G. Murray, and Z.E. Martinot. *H6C Internal Data Release 2.1*. HERA Memo Series #124 (2023)
30. Murray, S.G. and **J.S. Dillon**. *LST-Binning Statistics*. HERA Memo Series #123 (2023)
29. Murray, S.G. and **J.S. Dillon**. *Summary of Season Flags*. HERA Memo Series #122 (2023)
28. Nagpal, V.** and **J.S. Dillon**. *The Detectability of FRBs with HERA*. HERA Memo Series #112 (2022)
27. **Dillon, J.S.** *H1C IDR 3.2 Power Spectrum Analysis Updates and Choices*. HERA Memo Series #107 (2021)
26. **Dillon, J.S.**, A.R. Parsons, and N.S. Kern. *A Physical Model for the H1C Cross-Talk Systematic*. HERA Memo Series #104 (2021)
25. **Dillon, J.S.** *H1C Internal Data Release 3.2*. HERA Memo Series #97 (2021)
24. Ansari, R., K. Bandura, E. Castorina, et al. (including **J.S. Dillon**). *Packed Ultra-wideband Mapping Array (PUMA): Next generation facility for Sky Survey in Radio*. Letter of Interest submitted to the Snowmass2021 Proceedings (2020)
23. Ansari, R., K. Bandura, E. Castorina, et al. (including **J.S. Dillon**). *Packed Ultra-wideband Mapping Array (PUMA): Science Opportunities*. Letter of Interest submitted to the Snowmass2021 Proceedings (2020)
22. Munoz, J.B., A. Liu, Y./ Ali-Haimoud, et al. (including **J.S. Dillon**). *A 21-cm based standard ruler at $z \sim 20$* . Letter of Interest submitted to the Snowmass2021 Proceedings (2020)
21. Munoz, J.B., A. Liu, F.-Y. Cyr-Racine, Y./ Ali-Haimoud, et al. (including **J.S. Dillon**). *Cosmic dawn: A probe of dark matter at small scales*. Letter of Interest submitted to the Snowmass2021 Proceedings (2020)
20. **Dillon, J.S.** and Z.E. Martinot.** *Absolute Calibration of H1C Data with RIMEz Simulations*. HERA Memo Series #78 (2020)
19. Ahmed, Z., D. Alonso, M. Amin, et al. (including **J.S. Dillon**). *Research and Development for HI Intensity Mapping*. APC white paper submitted to the Astro2020 Decadal Survey (2019)
18. The Hydrogen Epoch of Reionization Array (HERA) Collaboration, et al. (including **J.S. Dillon**). *A Roadmap for Astrophysics and Cosmology with High-Redshift 21 cm Intensity Mapping*. APC white paper submitted to the Astro2020 Decadal Survey (2019)
17. Lee, M.** and **J.S. Dillon** *Explaining and Mitigating the Temporal Structure of Calibration Solutions*. HERA Memo Series #72 (2019)
16. **Dillon, J.S.** *H1C IDR 2.2: Calibrated, Flagged, and LST-Binned HERA Internal Data Release*. HERA Memo Series #69 (2019)

15. **Dillon, J.S.** Properly Normalized χ^2 /DoF in Redundant-Baseline Calibration. HERA Memo Series #61 (2019)
14. Liu, A., J. Aguirre, Y. Ali-Haimoud, et al. (including **J.S. Dillon**). *Cosmology with the Highly Redshifted 21cm Line*. Submitted for the Astro2020 Decadal Survey Science white paper call (2019)
13. Mirocha, J., D. Jacobs, **J.S. Dillon**, et al. *Astro2020 Science White Paper: First Stars and Black Holes at Cosmic Dawn with Redshifted 21-cm Observations*. Submitted for the Astro2020 Decadal Survey Science white paper call (2019)
12. Furlanetto, S., J. Bowman, J. Mirocha, et al. (including **J.S. Dillon**). *Astro 2020 Science White Paper: Fundamental Cosmology in the Dark Ages with 21-cm Line Fluctuations*. Submitted for the Astro2020 Decadal Survey Science white paper call (2019)
11. Furlanetto, S., C. Carilli, J. Mirocha, et al. (including **J.S. Dillon**). *Astro2020 Science White Paper: Insights Into the Epoch of Reionization with the Highly-Redshifted 21-cm Line*. Submitted for the Astro2020 Decadal Survey Science white paper call (2019)
10. Furlanetto, S., A. Beardsley, C. Carilli, et al. (including **J.S. Dillon**). *Astro2020 Science White Paper: Synergies Between Galaxy Surveys and Reionization Measurements*. Submitted for the Astro2020 Decadal Survey Science white paper call (2019)
9. Alvarez, M.A., A. Fialkov, P. La Plante, et al. (including **J.S. Dillon**). *Mapping Cosmic Dawn and Reionization: Challenges and Synergies*. Submitted for the Astro2020 Decadal Survey Science white paper call (2019)
8. Parsons, A.R. and **J.S. Dillon**. *Omnical Convergence*. HERA Memo Series #50 (2018)
7. **Dillon, J.S.** H1C IDR 2.1: Calibrated, Flagged, and LST-Binned HERA Internal Data Release. HERA Memo Series #45 (2018)
6. Kern, N.S., C. Carilli, S. Kohn, **J.S. Dillon**, et al. *Sky-Based Antenna Delays as a Starting Point for Redundant Calibration*. HERA Memo Series #41 (2017)
5. **Dillon, J.S.**, A. Liu, S. Kohn, et al. *Redundant Calibration Degeneracies with Four Polarizations*. HERA Memo Series #30 (2017)
4. **Dillon, J.S.** and A.R. Parsons. *Omnical Degeneracy Removal*. HERA Memo Series #24 (2017)
3. **Dillon, J.S.** and D.C. Jacobs. *The HERA Observing Season*. HERA Memo Series #8 (2015)
2. **Dillon, J.S.** *It's Always Darkest Before the Cosmic Dawn: Early Results from Novel Tools and Telescopes for 21 cm Cosmology*. MIT Ph.D. Thesis. (2015)
1. Zheng, H., M. Tegmark, V. Buza, **J.S. Dillon**, et al. *Mapping our Universe in 3D with MITEoR*. 2013 IEEE International Symposium on Phased Array Systems and Technology (2013)

Professional Talks and Presentations

Slides for all talks are available at JoshDillon.com/Talks.

- Feb. 22, 2024 **KICP Seminar, Invited Talk.** University of Chicago, Chicago, IL.
- Jul. 3, 2023 **Shedding New Light on the First Billion Years of the Universe, Invited Talk.** 16th Edition of the GECO Team Conference Cycle, Marseille, France (delivered remotely).
- April. 19, 2023 **University of Waterloo Special Physics and Astronomy Seminar, Invited Talk.** Waterloo, ON, Canada.

- Feb. 21, 2023 **Frontiers in Cosmology, *Invited Talk*.** Raman Research Institute, Bengaluru, Karnataka, India (*delivered remotely*).
- Feb. 17, 2023 **York University Special Astrophysics Seminar, *Invited Talk*.** Toronto, ON, Canada.
- Jan. 12, 2023 **241st Meeting of the American Astronomical Society,** Seattle, WA.
- Dec. 13, 2022 **PUMA Collaboration Meeting, *Invited talk*.** Held online.
- Dec. 2, 2022 **McWilliams Center for Cosmology Astrolunch, *Invited Talk*.** Carnegie Mellon University, Pittsburgh, PA.
- Oct. 17, 2022 **5th Global 21-cm Workshop, Berkeley, CA.**
- Jul. 6, 2022 **Cosmology from Home, Held Online** ([video link](#)). **Invited plenary talk.**
- Mar. 22, 2022 **Reionization and Cosmic Dawn: Looking Forward To the Past, Berkeley Center for Cosmological Physics Workshop.** **Invited overview talk.** Berkeley, CA.
- Mar. 14, 2022 **SAZERAC 21cm 2022, Held online.**
- Dec. 10, 2021 **First Results from the Hydrogen Epoch of Reionization Array, Specialist Discussion Meeting at the Royal Astronomical Society,** *Invited talk.* Held online.
- Dec. 7, 2021 **Science at Low Frequencies VIII,** Held online.
- Aug. 12, 2021 **CMB-S4 Summer Workshop, *Invited talk*.** Held online.
- Jun. 17, 2021 **SAZERAC 2.0, Held online.**
- Apr. 22, 2021 **Washington University in St. Louis, Department of Physics Special Research Seminar, *Invited talk*.** Held online.
- Apr. 21, 2021 **Washington University in St. Louis, Department of Physics Colloquium, *Invited talk*.** Held online.
- Jan. 29, 2021 **SAZERAC: The 21-cm Signal from Cosmic Dawn and the Epoch of Reionisation,** Held online.
- Jan. 8, 2021 **URSI National Radio Sciences Meeting, Held online.**
- Oct. 5, 2020 **Harvard-Smithsonian CfA Galaxies & Cosmology Seminar, *Invited talk*.** Held online.
- Sep. 3, 2020 **Cosmology from Home, Held online** ([video link](#)).
- Aug. 13, 2020 **PUMA Collaboration Meeting, *Invited talk*.** Held online.
- Jan. 17, 2020 **KIPAC Tea Talk, *Invited Talk*.** Menlo Park, CA.
- Jan. 16, 2020 **Stanford Astrophysics Colloquium, *Invited Talk*.** Stanford, CA.
- Jan. 5, 2020 **235th Meeting of the American Astronomical Society, Honolulu, HI.**
- Jan. 3, 2020 **18th Annual Symposium of the NSF Astronomy & Astrophysics Postdoctoral Fellows, *Invited talk*.** Honolulu, HI.
- Dec. 11, 2019 **Science at Low Frequencies VI, Arizona State University, Tempe, AZ.**
- Nov. 14, 2019 **ObsCos Seminar, *Invited Talk*.** Caltech, Pasadena, CA.
- Jul. 10, 2019 **Lines in the Large-Scale Structure, Marseille, France.**
- Feb. 7, 2019 **Special Astrophysics Seminar, *Invited talk*.** Columbia University, New York, NY.
- Jan. 10, 2019 **233rd Meeting of the American Astronomical Society, Seattle, WA.**
- Jan. 5, 2019 **17th Annual Symposium of the NSF Astronomy & Astrophysics Postdoctoral Fellows, *Invited talk*.** Seattle, WA.
- Dec. 13, 2018 **Nuclear, Particle, and Astrophysics Seminar, *Invited talk*.** Yale University, New Haven, CT.
- Nov. 30, 2018 **Future by the Future: Workshop on the Vision for the Next Decades in Astrophysics with Gravitational Waves and Other Cosmic Messengers, *Invited talk*.** Columbia University, New York City, NY.

- May. 30, 2018 **Thirteenth Conference on the Intersections of Particle and Nuclear Physics, *Invited talk*.** *Indian Wells, CA.*
- Feb. 8, 2018 **Cosmological Signals from Cosmic Dawn to the Present,** *Aspen Center for Physics, Aspen, CO.*
- Jan. 8, 2018 **16th Annual Symposium of the NSF Astronomy & Astrophysics Postdoctoral Fellows, *Invited talk*.** *National Harbor, MD.*
- Oct. 3, 2017 **IAU Symposium 333: Peering towards Cosmic Dawn,** *Dubrovnik, Croatia.*
- Feb. 13, 2017 **Cosmology on Safari,** *KwaZulu-Natal, South Africa.*
- Jan. 11, 2017 **Cosmology with Neutral Hydrogen,** *Berkeley Center for Cosmological Physics, University of California, Berkeley.*
- Jan. 4, 2017 **URSI National Radio Sciences Meeting,** *Boulder, CO.*
- Oct. 14, 2016 **McWilliams Center for Cosmology Coffee Talk,** *Carnegie Mellon University, Pittsburgh, PA.*
- Aug. 4, 2016 **U.S. Radio/Millimeter/Submillimeter Science Futures II, *Invited Talk*.** *Baltimore, MD.*
- Jun. 29, 2016 **HI 21 cm Cosmology Workshop, *Invited talk*.** SOC member. *Kavli Institute for Cosmology, Cambridge, UK.*
- Apr. 25, 2016 **University of California, Santa Cruz CosmoClub, *Invited talk*.** *Santa Cruz, CA.*
- Apr. 1, 2016 **Institute for Nuclear and Particle Astrophysics Seminar, *Invited talk*.** *Lawrence Berkeley National Laboratory, Berkeley, CA.*
- Mar. 8, 2016 **The Reionization Epoch: New Insights and Future Prospects,** *Aspen Center for Physics, Aspen, CO.*
- Dec. 9, 2015 **Cosmology and First Light,** *Institut d'Astrophysique de Paris. Paris, France.*
- May. 22, 2015 **The Olympian Symposium,** *Mount Olympus, Greece.*
- Apr. 17, 2015 **MIT Department of Physics Thesis Defense,** *Cambridge, MA.*
- Mar. 17, 2015 **CCAPP Seminar, *Invited talk*.** *The Ohio State University, Columbus, OH.*
- Jan. 8, 2015 **225th Meeting of the American Astronomical Society, Dissertation Talk.** *Seattle, WA.*
- Dec. 10, 2014 **Early Science from Low Frequency Radio Telescopes,** *Tempe, AZ.*
- Oct. 30, 2014 **CfA ITC Luncheon,** *Cambridge, MA.*
- Oct. 24, 2014 **KIPAC Tea Talk,** *Menlo Park, CA.*
- Oct. 21, 2014 **Berkeley Cosmology Seminar Series, *Invited talk*.** *Berkeley, CA.*
- Aug. 27, 2014 **University of Washington Dark Universe Science Center Seminar, *Invited talk*.** *Seattle, WA.*
- Feb. 26, 2014 **Brown Astrophysics Seminar Series, *Invited talk*.** *Providence, RI.*
- Feb. 21, 2014 **University of Chicago Kavli Institute Friday noon seminar, *Invited talk*.** *Chicago, IL.*
- Feb. 12, 2014 **MIT Physics Graduate Student Council "Kaleidoscope" lunch series, *Invited talk*.** *Cambridge, MA.*
- Jan. 9, 2014 **URSI National Radio Sciences Meeting,** *Boulder, CO.*
- Jul. 17, 2013 **Reionization in the Red Centre: New windows on the high redshift Universe (CAASTRO),** *Ayers Rock Resort, Australia.*
- Apr. 18, 2013 **Innovative Techniques in 21 cm Analysis, *Invited talk*.** *Ohio State University.*
- Jul. 5, 2012 **62nd Lindau Nobel Laureate Meeting,** *Lindau, Germany.*
- May. 24, 2011 **218th Meeting of the American Astronomical Society,** *Boston, MA.*

Public Talks

- Aug. 1, 2019 **Berkeley Astronomy Department Astro Night, Berkeley, CA.**
- May. 11, 2019 **Mount Tam Astronomy Program, part of Wonderfest: The Bay Area Beacon of Science, *Invited public talk*. Mill Valley, CA.**
- Oct. 17, 2018 **San Francisco Amateur Astronomers Monthly Lecture Series, *Invited public talk*. San Francisco, CA.**
- Mar. 15, 2018 **Adler After Dark, *Invited public talk*. Adler Planetarium, Chicago, IL.**
- Dec. 16, 2017 **Science@Cal Lecture Series, *Invited public talk*. Berkeley, CA.**
- Jan. 16, 2014 **MIT Kavli Institute Frontiers of Astronomy, Astrophysics, and Space Science lecture series, *Invited public talk*. Cambridge, MA.**

Teaching Assistantships at MIT

- Spring 2015 **8.02 TEAL: Electricity and Magnetism** (Rated 5.7/7.0)
- Fall 2013 **8.942 Graduate Cosmology**
- Fall 2013 **8.021 Electricity and Magnetism** (Rated 6.2/7.0)
- Spring 2013 **8.901 Graduate Astrophysics I** (Rated 6.4/7.0)
- Fall 2012 **8.01L Classical Mechanics** (Rated 6.8/7.0)
- Spring 2012 **8.02 TEAL: Electricity and Magnetism** (Rated 6.1/7.0)
- Fall 2011 **8.033: Relativity**
- Fall 2010 **8.01 TEAL: Classical Mechanics**
- Spring 2012 Completed *MIT Graduate Student Teaching Certificate Program*.

Service

To the Public:

2015 – Present **Chair of the Board of the Science Ambassador Scholarship**

- The Science Ambassador Scholarship is a full-ride undergraduate scholarship for women in STEM fields and funded by the Cards Against Humanity “Science Pack.”
- Our panel of over 50 women with advanced degrees in STEM fields have selected seven annual scholarship winners.
- We have raised over \$1,400,000 so far.

2011 – Present **Co-moderator and astrophysics panelist of Reddit’s AskScience**

- AskScience is an online community with over 22,000,000 subscribers dedicated to answering laypeople’s scientific questions and promoting public understanding and appreciation of science.

To the Astrophysics Community:

2024 – Present **Referee, Publications of the Astronomical Society of Australia**

2022 **SOC/LOC member for Reionization and Cosmic Dawn in Berkeley, CA**

2021 – 2022 **HERA Diversity, Equity, and Inclusion Team Leader**

2021 – Present **Referee, Physical Review D**

2019 – Present **Referee, Physical Review Letters**

2019 – Present **AAS Chambliss Astronomy Achievement Student Award Judge**

2019 **NASA FINESST Future Investigators Grant Program Reviewer**

- 2019 **Co-organizer of 2019 NSF AAPF Symposium at AAS 233 in Seattle, WA**
2016 **NASA Astrophysics Data Analysis Program (ADAP) Panelist**
2016 **SOC member for the HI 21cm Cosmology Workshop in Cambridge, UK**
2014 – Present **Referee, Monthly Notices of the Royal Astronomical Society**

At the University of California, Berkeley:

- 2018 – 2020 **Postdoctoral Representative to the Astronomy Department**
2016 – Present **Volunteer at Astro Night public talk series and rooftop observing**
2015 – Present **Member of the “AstroJustice” social justice discussion group**

At the Massachusetts Institute of Technology:

- 2010 – 2015 **Volunteer tutor for the MIT Office of Minority Education**
2010 – 2012 **Astro representative to the Physics Graduate Student Council**
2010 – 2012 **MIT Kavli Institute weekly journal club organizer**
2010 – 2012 **Weekly physics department colloquium speaker lunch organizer**

At Stanford University:

- 2007 – 2008 **Resident tutor in a freshman dorm**
2007 – 2008 **Representative to the physics undergraduate studies committee**