Joshua S. Dillon

Curriculum Vitae

Department of Astronomy
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GScholar: h-index 42 (6,881 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: 42 (6,881 citations).***

37. The HERA Collaboration: Z. Abdurashidova, T. Adams, J.E. Aguirre, et al. (**including J.S. Dillon**). *First Results from HERA Phase II*. ApJ. 998, 33 (2026)

36. Cox, T.A.,** S.G. Murray, A.R. Parsons, **J.S. Dillon**, et al. *fftvis: A Non-Uniform Fast Fourier Transform Based Interferometric Visibility Simulator*. RASTI 4 (2025)

35. Chen, K.-F., M.J. Wilensky, A. Liu, **J.S. Dillon**, et al. Impacts and Statistical Mitigation of Missing Data on the 21cm Power Spectrum: A Case Study with the Hydrogen Epoch of Reionization Array . ApJ. 979, 191 (2025)

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 532, 3 (2024)

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 Reioniztion 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

43. Kim, H., J.N. Hewitt, N.S. Kern, **J.S. Dillon**, et al *Exploring One-point Statistics in HERA Phase I Data: Effects of Foregrounds and Systematics on Measuring One-Point Statistics*. ApJ. 993 189 (2025)

42. Pascua, R., Z.E. Martinot, A. Liu, et al. (including **J.S. Dillon**). *A Generalized Method for Characterizing 21-cm Power Spectrum Signal Loss from Temporal Filtering of Drift-scanning Visibilities*. ApJ. 985 127 (2025)

41. Charles, N., N.S. Kern, R. Pascua, et al. (including **J.S. Dillon**). *Mitigating calibration errors from mutual coupling with time-domain filtering of 21 cm cosmological radio observations*. MNRAS 534, 4 (2024)

40. Rath, E., R. Pascua, A.T. Josaitis, et al. (including **J.S. Dillon**). *Investigating Mutual Coupling in the Hydrogen Epoch of Reionization Array and Mitigating its Effects on the 21-cm Power Spectrum*. MNRAS 541, 2 (2025)

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 535, 4 (2024)

38. Berkhout, 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 136, 045002 (2024)

37. Kittiwisit, 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, Volume 4 (2025)

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 535, 3 (2024)

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. 971, 16 (2024)

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. 953, 136 (2023)

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 524, 1 (2023)

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 21 cm 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. Kittiwisit, 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

34. **Dillon, J.S.** and T.A. Cox. Improvements to Flagging of Low-Level RFI. HERA Memo Series #133 (2024)

33. **Dillon, J.S.**, S.G. Murray, T.A. Cox, and Z.E. Martinot. H6C Internal Data Release 2.3. HERA Memo Series #131 (2024)

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**.*

Dec. 9, 2025	**33rd Texas Symposium on Relativistic Astrophysics**, *Arizona State University, Tempe, AZ*.
Sep. 25, 2025	**8th Global 21-cm Workshop**, ***Invited Talk***. *California Institute of Technology, Pasadena, CA*.
May 8, 2025	**Research Progress Meeting**, ***Invited Talk***. *Lawerence Berkeley National Laboratory, Berkeley, CA*.
Jun. 13, 2024	**Line Intensity Mapping 2024**, *University of Illinois, Urbana-Champaign, Urbana, IL*.
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. 12, 2025 **Astronomy on Tap, East Bay**, *Oakland, CA*.

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 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:

2025 – Present **Referee, Nature Astronomy**

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**