

## Contact Information

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## Employment

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*CITA National Fellow, McGill University: 2024-Now*

*TSI Postdoctoral Fellow, McGill University: 2024-Now*

**Research Associate in Radio Cosmology**, University of Manchester: 2022-2024

**Postdoctoral Research Assistant**, Queen Mary University of London: 2021-2022

## Other Appointments

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Visiting Postdoc, University of Cambridge, 2022 - 2023

Research Assistant, University of Washington, 2017-2021

ASTRO3D Science Visitor, Oct 2019

Teaching Assistant, University of Washington, 2015-2017

## Education

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PhD, Physics, University of Washington, 2015-2021

BS, Physics, University of California Los Angeles, 2011-2015

## References

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Prof. Adrian Liu: [adrian.liu2@mcgill.ca](mailto:adrian.liu2@mcgill.ca)

Dr. Phil Bull: [phil.bull@manchester.ac.uk](mailto:phil.bull@manchester.ac.uk)

Prof. Miguel Morales: [miguelfm@uw.edu](mailto:miguelfm@uw.edu)

## Publications

... indicates trailing author

- [1] Chen, Kai-Feng, **Wilensky, Michael J.**, Liu, Adrian, et al. “Impacts and Statistical Mitigation of Missing Data on the 21 cm Power Spectrum: A Case Study with the Hydrogen Epoch of Reionization Array”. In: *Astrophysical Journal* 979.2, 191 (2025). DOI: [10.3847/1538-4357/ad9b91](https://doi.org/10.3847/1538-4357/ad9b91).
- [2] Bull, Philip, El-Makadema, Ahmed, ... **Wilensky, Michael J.**, et al. “RHINO: A large horn antenna for detecting the 21cm global signal”. In: *arXiv e-prints*, arXiv:2410.00076 (2024), arXiv:2410.00076. DOI: [10.48550/arXiv.2410.00076](https://doi.org/10.48550/arXiv.2410.00076).
- [3] Burba, Jacob, Bull, Philip, **Wilensky, Michael J.**, et al. “Sensitivity of Bayesian 21 cm power spectrum estimation to foreground model errors”. In: *Monthly Notices of the Royal Astronomical Society* 535.1 (2024). DOI: [10.1093/mnras/stae2334](https://doi.org/10.1093/mnras/stae2334).
- [4] Charles, N., Kern, N. S., ... **Wilensky, Michael J.**, et al. “Mitigating calibration errors from mutual coupling with time-domain filtering of 21 cm cosmological radio observations”. In: *Monthly Notices of the Royal Astronomical Society* 534.4 (2024). DOI: [10.1093/mnras/stae2303](https://doi.org/10.1093/mnras/stae2303).
- [5] Garsden, Hugh, Bull, Philip, **Wilensky, Michael J.**, et al. “A demonstration of the effect of fringe-rate filtering in the hydrogen epoch of reionization array delay power spectrum pipeline”. In: *Monthly Notices of the Royal Astronomical Society* 535.4 (2024). DOI: [10.1093/mnras/stae2541](https://doi.org/10.1093/mnras/stae2541).
- [6] Glasscock, Katrine A., Bull, Philip, and ... **Wilensky, Michael J.** “Statistical estimation of full-sky radio maps from 21 cm array visibility data using Gaussian constrained realizations”. In: *RAS Techniques and Instruments* 3.1 (2024). DOI: [10.1093/rasti/rzae041](https://doi.org/10.1093/rasti/rzae041).
- [7] Pascua, Robert, Martinot, Zachary E., ... **Wilensky, Michael J.**, et al. “A Generalized Method for Characterizing 21-cm Power Spectrum Signal Loss from Temporal Filtering of Drift-scanning Visibilities”. In: *arXiv e-prints*, arXiv:2410.01872 (2024). DOI: [10.48550/arXiv.2410.01872](https://doi.org/10.48550/arXiv.2410.01872).
- [8] Rath, E., Pascua, R., ... **Wilensky, Michael J.**, et al. “Investigating Mutual Coupling in the Hydrogen Epoch of Reionization Array and Mitigating its Effects on the 21-cm Power Spectrum”. In: *arXiv e-prints*, arXiv:2406.08549 (2024). DOI: [10.48550/arXiv.2406.08549](https://doi.org/10.48550/arXiv.2406.08549).
- [9] **Wilensky, Michael J.**, Burba, Jacob, Bull, Philip, et al. “High-dimensional inference of radio interferometer beam patterns I: parametric model of the HERA beams”. In: *RAS Techniques and Instruments* 3.1 (2024). DOI: [10.1093/rasti/rzae029](https://doi.org/10.1093/rasti/rzae029).
- [10] **Wilensky, Michael J.**, Irfan, Melis O., and Bull, Philip. “Bayesian evidence for uncorrected gain factors in Galactic synchrotron template maps”. In: *arXiv e-prints*, arXiv:2409.06770 (2024). DOI: [10.48550/arXiv.2409.06770](https://doi.org/10.48550/arXiv.2409.06770).
- [11] HERA Collaboration, Abdurashidova, Zara, ... **Wilensky, Michael J.**, et al. “Improved Constraints on the 21 cm EoR Power Spectrum and the X-Ray Heating of the IGM with HERA Phase I Observations”. In: *Astrophysical Journal* 945.2, 124 (2023). DOI: [10.3847/1538-4357/acad50](https://doi.org/10.3847/1538-4357/acad50).

- [12] Kennedy, Fraser, Bull, Philip, **Wilensky, Michael J.**, et al. “Statistical Recovery of 21 cm Visibilities and Their Power Spectra with Gaussian-constrained Realizations and Gibbs Sampling”. In: *Astrophysical Journal Supplement* 266.2, 23 (2023). DOI: [10.3847/1538-4365/acc324](https://doi.org/10.3847/1538-4365/acc324).
- [13] **Wilensky, Michael J.**, Brown, Jordan, and Hazelton, Bryna J. “Why and when to expect Gaussian error distributions in epoch of reionization 21-cm power spectrum measurements”. In: *Monthly Notices of the Royal Astronomical Society* 521.4 (2023). DOI: [10.1093/mnras/stad863](https://doi.org/10.1093/mnras/stad863).
- [14] **Wilensky, Michael J.**, Kennedy, Fraser, Bull, Philip, et al. “Bayesian jackknife tests with a small number of subsets: application to HERA 21 cm power spectrum upper limits”. In: *Monthly Notices of the Royal Astronomical Society* 518.4 (2023). DOI: [10.1093/mnras/stac3484](https://doi.org/10.1093/mnras/stac3484).
- [15] **Wilensky, Michael J.**, Morales, Miguel F., Hazelton, Bryna J., et al. “Evidence of Ultrafaint Radio Frequency Interference in Deep 21 cm Epoch of Reionization Power Spectra with the Murchison Wide-field Array”. In: *Astrophysical Journal* 957.2, 78 (2023). DOI: [10.3847/1538-4357/acffbd](https://doi.org/10.3847/1538-4357/acffbd).
- [16] **Wilensky, Michael J.**, Hazelton, Bryna J., and Morales, Miguel F. “Exploring the consequences of chromatic data excision in 21-cm epoch of reionization power spectrum observations”. In: *Monthly Notices of the Royal Astronomical Society* 510.4 (2022). DOI: [10.1093/mnras/stab3456](https://doi.org/10.1093/mnras/stab3456).
- [17] Byrne, Ruby, Morales, Miguel F., and ... **Wilensky, Michael J.** “A unified calibration framework for 21 cm cosmology”. In: *Monthly Notices of the Royal Astronomical Society* 503.2 (2021). DOI: [10.1093/mnras/stab647](https://doi.org/10.1093/mnras/stab647).
- [18] La Plante, P., Williams, P. K. G., ... **Wilensky, Michael J.**, et al. “A Real Time Processing system for big data in astronomy: Applications to HERA”. In: *Astronomy and Computing* 36, 100489 (2021). DOI: [10.1016/j.ascom.2021.100489](https://doi.org/10.1016/j.ascom.2021.100489).
- [19] Rahimi, M., Pindor, B., ... **Wilensky, Michael J.**, et al. “Epoch of reionization power spectrum limits from Murchison Widefield Array data targeted at EoR1 field”. In: *Monthly Notices of the Royal Astronomical Society* 508.4 (2021). DOI: [10.1093/mnras/stab2918](https://doi.org/10.1093/mnras/stab2918).
- [20] Trott, C. M., Jordan, C. H., ... **Wilensky, Michael J.**, et al. “Constraining the 21 cm brightness temperature of the IGM at  $z = 6.6$  around LAEs with the murchison widefield array”. In: *Monthly Notices of the Royal Astronomical Society* 507.1 (2021). DOI: [10.1093/mnras/stab2235](https://doi.org/10.1093/mnras/stab2235).
- [21] Yoshiura, S., Pindor, B., ... **Wilensky, Michael J.**, et al. “A new MWA limit on the 21 cm power spectrum at redshifts 13-17”. In: *Monthly Notices of the Royal Astronomical Society* 505.4 (2021). DOI: [10.1093/mnras/stab1560](https://doi.org/10.1093/mnras/stab1560).
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- [23] **Wilensky, Michael J.**, Barry, Nichole, Morales, Miguel F., et al. “Quantifying excess power from radio frequency interference in Epoch of Reionization measurements”. In: *Monthly Notices of the Royal Astronomical Society* 498.1 (2020). DOI: [10.1093/mnras/staa2442](https://doi.org/10.1093/mnras/staa2442).
- [24] Zhang, Zheng, Pober, Jonathan C., ... **Wilensky, Michael J.**, et al. “The impact of tandem redundant/sky-based calibration in MWA Phase II data analysis”. In: *Publications of the Astronomical Society of Australia* 37, e045 (2020). DOI: [10.1017/pasa.2020.37](https://doi.org/10.1017/pasa.2020.37).
- [25] Barry, N., **Wilensky, Michael J.**, Trott, C. M., et al. “Improving the Epoch of Reionization Power Spectrum Results from Murchison Widefield Array Season 1 Observations”. In: *Astrophysical Journal* 884.1, 1 (2019). DOI: [10.3847/1538-4357/ab40a8](https://doi.org/10.3847/1538-4357/ab40a8).
- [26] Li, W., Pober, J. C., ... **Wilensky, Michael J.**, et al. “First Season MWA Phase II Epoch of Reionization Power Spectrum Results at Redshift 7”. In: *Astrophysical Journal* 887.2, 141 (2019). DOI: [10.3847/1538-4357/ab55e4](https://doi.org/10.3847/1538-4357/ab55e4).
- [27] Trott, Cathryn M., Watkinson, Catherine A., ... **Wilensky, Michael J.**, et al. “Gridded and direct Epoch of Reionisation bispectrum estimates using the Murchison Widefield Array”. In: *Publications of the Astronomical Society of Australia* 36, e023 (2019). DOI: [10.1017/pasa.2019.15](https://doi.org/10.1017/pasa.2019.15).
- [28] **Wilensky, Michael J.**, Morales, Miguel F., Hazelton, Bryna J., et al. “Absolving the SSINS of Precision Interferometric Radio Data: A New Technique for Mitigating Faint Radio Frequency Interference”. In: *Publications of the Astronomical Society of the Pacific* 131.1005 (2019). DOI: [10.1088/1538-3873/ab3cad](https://doi.org/10.1088/1538-3873/ab3cad).

## Talks

1. URSI NRSM, 2025, “Evidence for uncorrected gain factors in Galactic synchrotron template maps,” CU Boulder
2. *Invited talk (informal)*, PanEx journal club, 2024, “Evidence for uncorrected gain factors in Galactic synchrotron template maps,” (delivered remotely)
3. *Invited talk*, CITA Jamboree, 2024, “A small survey of systematic challenges in 21-cm cosmology,” CITA
4. *Invited talk (informal)*, LOFAR EoR Review Club, 2024, “Towards a constrainable analytic model of the HERA beams,” ASTRON (delivered remotely)
5. *Invited panel member*, 21cmWG Precision Calibration Workshop, 2024, RFI Panel member, McGill University
6. LIM Workshop, 2024, “Chiborg: a Bayesian jackknife framework for testing consistency of multiple measurements,” University of Illinois Urbana-Champaign
7. SALF IX, 2023, “Evidence of Ultra-faint RFI in Deep 21-cm Power Spectra,” ASTRON
8. *Invited Talk*, Trottier Space Institute Cosmo-ph discussion, 2023, “Evidence of Ultra-faint RFI in Deep 21-cm Power Spectra with the Murchison Widefield Array,” McGill University

9. *Invited Talk*, 2023, “Chiborg: a Bayesian jackknife framework for testing consistency of multiple measurements,” Center for Computational Astrophysics
10. *Invited Seminar*, Yale Wright Lab Seminar, 2023, “Addressing the Challenges in 21-cm Cosmology using Bayesian Inference and other Data Analysis Techniques,” Yale University
11. YERAC, 2023, “Chiborg: a Bayesian jackknife framework for testing consistency of multiple measurements,” University of Manchester
12. URSI GASS, 2023, “Chiborg: a Bayesian jackknife framework for testing consistency of multiple measurements,” Sapporo, Japan
13. MWA Project Meeting, 2023, “Evidence of Ultra-Faint RFI in Deep 21-cm Power Spectra,” 2023, Curtin University, **won best talk**
14. *Invited Seminar*, Cambridge Summer Intern Seminar, 2023, “Mapping out the Early Universe by Observing Cosmic Radio Waves,” University of Cambridge
15. SKA Cosmology Science Working Group Meeting, 2023, “Chiborg, a Bayesian jackknife framework for testing consistency of multiple measurements,” University of Manchester
16. RFI2022, 2022, “Predicting and Measuring the Effect of RFI on 21-cm Epoch of Reionization Power Spectrum Measurements,” Virtual
17. *Invited Seminar*, 2021, “Improving 21-cm Epoch of Reionization Power Spectrum Limits by Characterizing and Mitigating Radio Frequency Interference,” Queen Mary University of London
18. URSI, “Consequences of RFI and RFI Excision for 21-cm EoR Science,” 2020, Virtual
19. SALF VI, 2019, “Characterizing RFI Contamination in Epoch of Reionization Power Spectra,” Arizona State University
20. *Invited Colloquium* ASTRO3D Visitor Colloquium, 2019, “Characterizing and Mitigating Radio Frequency Interference in Reionization Cosmology,” University of Melbourne
21. MWA Project Meeting, 2019, “The SSINS of the MWA EoR Highband,” Brown University
22. URSI, 2019, “A New Technique for Ultra-Faint RFI Contamination,” University of Colorado at Boulder
23. MWA Project Meeting, 2018, “A New Technique for Ultra-Faint RFI Contamination,” Nagoya University

## **Service**

1. Astrophysical Journal Referee
2. Trottier Space Institute Undergraduate Research Fellowship Committee
3. NASA ADAP Referee
4. Postdoc hiring committee for HERA research group at JBCA

## **Software**

1. Sky-Subtracted Incoherent Noise Spectra (SSINS): <https://github.com/mwilensky768/SSINS>
2. Chiborg: <https://github.com/mwilensky768/Chiborg>

## **Outreach/Mentorship/Teaching**

1. Thesis advisor for an M.Sc. student at University of Manchester investigating the Hubble tension via Bayesian hierarchical modeling.
2. Guided an investigation into using gaussian constrained realizations for inpainting flagged data in 21-cm power spectrum estimates. Consists mainly of informal discussions on the topic, usually in the form of providing technical feedback for problem-solving obstacles. We co-authored a paper [12].
3. Designed and guided a mathematical investigation into precise propagation of error bars through 21-cm power spectrum estimation pipeline with an undergraduate researcher. Consisted of weekly meetings to discuss mathematical concepts, software debugging, and general research techniques. We co-authored a paper [13].
4. Taught a statistics module for PhD level students at Queen Mary University of London. Duties mainly consisted of constructing guided tutorials through various statistical concepts using Python. Course material spanned basic Bernoulli urn style problems all the way to generalized linear regression/Wiener filtering.
5. Advised an undergraduate student through analysis and identification of subtle instrumental effects through sensitive quality metrics. Also advising them through enhancement of RFI filtering algorithm in SSINS software.
6. Introduced CHAMP student to fundamental radio astronomy concepts, python programming, and high performance computation. Advised student through analysis of HERA radio frequency interference environment using SSINS software.
7. Similar to previous entry, but not through CHAMP program.
8. Hosted one student through University of Washington Out in STEM (OSTEM) shadowing program.