Jacob Eli Turner

ORCID: 0000-0002-2451-7288

Email : jeturner@nrao.edu
Mobile : +1-773-577-3964

Education

- **West Virginia University** — Morgantown, WV
  Ph.D. in Physics — *Aug 2018 - Aug 2023*
  Advisor: Maura McLaughlin
- **Oberlin College** — Oberlin, OH
  B.A. with Honors in Physics — *Aug 2013 - May 2017*
  Advisor: Dan Stinebring

Publications

Harvard ADS Page

First-Author Publications

- **The Pulsar Science Collaboratory: Multi-Epoch Scintillation Studies of Pulsars**, **Turner, J. E.**, Lebron Medina, J. G., Zelensky, Z., Gustavso, K. A., Marx, J., Kothapalli, M., Cruz Vega, L. D., Lee, A., Figueroa, C. B., Reichart, D. E., Haislip, J. B., Kouprianov, V. V., White, S., Ghigo, F., Heatherly, S. A., and McLaughlin, M. A., arXiv:2405.19434, (Submitted to ApJ)
- **A Cyclic Spectroscopy Scintillation Study of PSR B1937+21 I. Demonstration of Improved Scintillometry**, **Turner, J. E.**, Dolch, T., Cordes, J. M., Ocker, S. K., Stinebring, D. R., Chatterjee, S., McLaughlin, M. A., Catlett. V. E., Jessup C., Jones, N., and Scheithauer, C., arXiv:2404.13796 (Accepted to ApJ)
- **A Simultaneous Dual-Frequency Scintillation Arc Survey of Six Bright Canonical Pulsars Using the Upgraded GiantMetrewave Radio Telescope**, **Turner, J. E.**, Joshi, B.C., McLaughlin, M. A., and Stinebring, D. R., 2024, 961, 101
- **Scattering Delay Mitigation in High Accuracy Pulsar Timing: Cyclic Spectroscopy Techniques**, **Turner, J. E.**, Stinebring, D. R., McLaughlin, M. A., Archibald, A. M., Dolch, T., and Lynch, R. S., 2023, ApJ, 944, 191
- **The NANOGrav 12.5-Year Data Set: Monitoring Interstellar Scattering Delays**, **Turner, J. E.**, et al. (36 authors), 2021 ApJ, 917, 10

Other Publications

- **NANOGrav 15-year gravitational-wave background methods**, Johnson, A. D. et al., (98 authors, including **Turner, J. E.**), 2024, PhRvD, 109, 10
- **Comparing recent PTA results on the nanohertz stochastic gravitational wave background**, The International Pulsar Timing Array Collaboration, et al., (244 authors, including **Turner, J. E.**), ApJ, 966, 1
- **The NANOGrav 12.5 yr Data Set: A Computationally Efficient Eccentric Binary Search Pipeline and Constraints on an Eccentric Supermassive Binary Candidate in 3C 66B**, Agazie, G., et al., (89 authors, including **Turner, J. E.**), 2024, ApJ, 963, 2
- **The NANOGrav 12.5 yr Data Set: Search for Gravitational Wave Memory**, Agazie, G., et al., (91 authors, including **Turner, J. E.**), 2024, ApJ, 963, 1
- **How to Detect an Astrophysical Nanohertz Gravitational Wave Background**, Bécsy, B., et al., (96 authors, including **Turner, J. E.**), 2023, ApJ, 959, 1
- **The NANOGrav 15 yr Data Set: Search for Anisotropy in the Gravitational-wave Background**, Agazie, G., et al., (93 authors, including **Turner, J. E.**), 2023, ApJL, 956, 1
- **The NANOGrav 15 yr Data Set: Constraints on Supermassive Black Hole Binaries from the Gravitational-wave Background**, Agazie, G., et al., (99 authors, including **Turner, J. E.**), 2023, ApJL, 952, 2
- **The NANOGrav 15 yr Data Set: Bayesian Limits on Gravitational Waves from Individual Supermassive Black Hole Binaries**, Agazie, G., et al., (99 authors, including **Turner, J. E.**), 2023, ApJL, 951, 2
- **The NANOGrav 15 yr Data Set: Search for Signals from New Physics**, Afzal, A., et al., (124 authors, including **Turner, J. E.**), 2023, ApJL, 951, 1

- **The NANOGrav 15 yr Data Set: Detector Characterization and Noise Budget**, Agazie, G., et al., (92 authors, including **Turner, J. E.**), 2023, ApJL, 951, 1
- **The NANOGrav 15 yr Data Set: Observations and Timing of 68 Millisecond Pulsars** , Agazie, G., et al., (101 authors, including **Turner, J. E.**), 2023, ApJL, 951, 1
- **The NANOGrav 15 yr Data Set: Evidence for a Gravitational-wave Background**, Agazie, G., et al., (115 authors, including **Turner, J. E.**), 2023, ApJL, 951, 1
- **The NANOGrav 15-year Gravitational-Wave Background Analysis Pipeline**, Johnson, A. D., et al., (96 authors, including **Turner, J. E.**), arXiv:2306.16223
- **Searching for continuous Gravitational Waves in the second data release of the International Pulsar Timing Array** , Falxa, M., et al., (127 authors, including **Turner, J.**), 2023, MNRAS, 521, 4
- **Searching For Gravitational Waves From Cosmological Phase Transitions with the NANOGrav 12.5-year Dataset**, Arzoumanian, Z., et al., (64 authors, including **Turner, J. E.**), 2021, PRL, 127, 251302
- **The NANOGrav 12.5-year data set: Search for Non-Einsteinian Polarization Modes in the Gravitational-Wave Background**, Arzoumanian, Z., et al., (71 authors, including **Turner, J. E.**), 2021, ApJL, 923, L22
- **The NANOGrav 12.5-year Data Set: Search For An Isotropic Stochastic Gravitational-Wave Background**, Arzoumanian, Z., et al. (61 authors, including **Turner, J. E.**), 2020, ApJ, 905, L34
- **The NANOGrav 11-Year Data Set: Evolution of Gravitational Wave Background Statistics**, Hazboun, J. S., et al. (63 authors, including **Turner, J. E.**), 2020, ApJ, 890, 108
- **The NANOGrav 11 yr Data Set: Limits on Gravitational Waves from Individual Supermassive Black Hole Binaries**, Aggarwal, K., et al. (63 authors, including **Turner, J. E.**), 2019, ApJ, 880, 116
- **A Second Chromatic Timing Event of Interstellar Origin toward PSR J1713+0747**, Lam, M. T., Ellis, J. A., Grillo, G., Jones, M. L., Hazboun, J. S., Brook, P. R., **Turner, J. E.**, et al. (37 authors), 2018, ApJ, 861, 132

Professional Employment and Research Experience

- 2023–Present: Green Bank Observatory Postdoctoral Fellow
  Responsibilities include training observers, reviewing technical justifications for proposals, assisting in the development and testing of the real-time cyclic spectroscopy backend, serving as the on-call scientist for observations, and organizing science lunch talks and colloquia
  Green Bank Observatory, Green Bank, WV
- 2019–2023: Graduate Research Assistant
  Department of Physics & Astronomy, West Virginia University, Morgantown, WV
- 2018–2019: Graduate Teaching Assistant
  Department of Physics & Astronomy, West Virginia University, Morgantown, WV
- 2018: Visiting Scholar
  Eberly College of Arts and Sciences, Department of Physics and Astronomy, West Virginia Universty, Morgantown, WV
- 2017: Research Analyst
  North American Nanohertz Observatory for Gravitational Waves/Center for Gravitation, Cosmology, and Astrophysics, College of Letters and Sciences, University of Wisconsin-Milwaukee, Milwaukee, WI
- 2016: Summer Researcher
  Visiting Undergrad Research Program, California Institute of Technology, Pasadena, CA
- 2017: Drop-in Tutor
  Department of Physics & Oberlin College, Oberlin OH
- 2015: Undergraduate Teaching Assistant
  Department of Physics & Astronomy, Oberlin College, Oberlin OH

Invited Talks

- University of Dallas, *"Two Paths to Radio Astronomy"*, April 2024
- McDaniel College, *"Characterizing the Interstellar Medium through Radio Observations of Pulsars"*, November 2023
- Green Bank Observatory, *"Correcting for Interstellar Scattering Delays in Millisecond Pulsars"*, November 2020
- Oberlin College, *"Detecting Gravitational Waves with Pulsars: Removing the Effects of the Interstellar Medium"*, April 2017

Contributed Conference Talks

- International Pulsar Timing Array Conference, *"Cyclic Spectroscopy Studies of the ISM in PTA Observing Setups"*, June 2024
- Fields, Flows, and Filaments in the Magnetic ISM, *"Cyclic Spectroscopy Studies of the ISM in PTA Observing Setups"*, May 2024
- Spring 2024 GBO-NRAO Internal Symposium, *"The Pulsar Science Collaboratory: Multi-Epoch Scintillation Studies of Pulsars"*, May 2024
- NRAO/GBO Postdoc Symposium 2024, *"Using Cyclic Spectroscopy in High-Accuracy Pulsar Timing Efforts"*, March 2024
- Scintillometry 2023, *"Using Cyclic Spectroscopy in High-Accuracy Pulsar Timing Efforts"*, November 2023
- North American Nanohertz Observatory for Gravitational Waves Conference, *"Scattering Delay Mitigation in High Accuracy Pulsar Timing: Cyclic Spectroscopy Techniques"*, March 2023
- 241st American Astronomical Society Meeting, *"Characterizing and Mitigating Scattering Delays in Radio Observations of Pulsars"*, January 2023
- North American Nanohertz Observatory for Gravitational Waves Conference, *"The NANOGrav 12.5-Year Data Set: Monitoring Interstellar Scattering Delays"*, October 2019
- International Pulsar Timing Array Conference, *"The NANOGrav 12.5-Year Data Set: Monitoring Interstellar Scattering Delays"*, June 2019

Posters

- 243rd American Astronomical Society Meeting , *"Cyclic Spectroscopy-Aided Studies of the ISM in PTA Observing Setups"*, January 2024
- North American Nanohertz Observatory for Gravitational Waves Conference, *"Cyclic Spectroscopy-Aided Studies of the ISM in PTA Observing Setups"*, October 2023
- International Pulsar Timing Array Conference, *"The NANOGrav 12.5-Year Data Set: Monitoring Interstellar Scattering Delays"*, June 2018
- North American Nanohertz Observatory for Gravitational Waves Physics Frontiers Center Reverse Site Visit, *"Preliminary Continuous Wave Limits from NANOGrav 11-Year Dataset "*, October 2017
- North American Nanohertz Observatory for Gravitational Waves Physics Frontiers Center Reverse Site Visit, *"NANOGrav Timing Pipeline: Adding a Scattering Delay Correction"*, October 2017

Awarded Grants

- 2022: West Virginia University Eberly College of Arts & Sciences Travel Grant, *3V459 A. Keith and Sandra F. McClung Enrichment Endowment, $600, Principal Investigator*

Scheduled Observations

- Green Bank Telescope, GBT24B-039, *Cyclic Spectroscopy of Three Pulsars with Considerable Pulse Broadening* (Observation PI)
- Green Bank Telescope, GBT24B-040, *Multi-Hour Scintillation Studies by the PSC: GBT Follow-up to GBO 20m Campaign* (Observation PI)
- Green Bank Telescope, GBT24A-475, *Constraining the Scintillation Constant C_1 in a Scatter-Broadened Pulsar* (Observation PI)
- Giant Metrewave Radio Telescope, 44_035, *Examining the Relation Between Scintillation Arc Curvature and Asymmetry* (Observation PI)
- Giant Metrewave Radio Telescope, 40_019, *Scintillation Arcs and Dispersion Measure Changes: A Follow-up to Pilot Observations* (Observation PI)
- Green Bank Telescope, GBT20A-588, *A Cyclic Spectroscopy Pilot Program: Baseband Observations of Three MSPs*
- Giant Metrewave Radio Telescope, 38_041, *Scintillation Arcs and Dispersion Measure Changes: A Pilot Project* (Observation PI)

Organizations

- American Astronomical Society: *Member*
- North American Nanohertz Observatory for Gravitational Waves (NANOGrav): *Full Member*

Professional Community Service/Leadership

- 2024: LOC *NRAO/GBO Postdoc Symposium*

Teaching Experience

- 2019: Graduate Teaching Assistant, West Virginia University: *PHYS 102L: Introductory Physics 2 Laboratory*
- 2018: Graduate Teaching Assistant, West Virginia University: *PHYS 101L: Introductory Physics 1 Laboratory*
- 2017: Drop-in Tutor, Oberlin College: *PHYS-068: Energy Science & Technology*
- 2015: Undergraduate Teaching Assistant, Oberlin College: *Physics 104: Elementary Physics II Laboratory*

Student Research Mentorship Supervision

- 2021–Present: Pulsar Science Collaboratory Research Team Leader: Scintillation Measurement Project
  - — Students: *Juan G. Lebron Medina (PostBac Student), Zachary Zelensky (PostBac Student), Manvith Kothapalli (High School Student), Luis D. Cruz Vega (Undergrad), Alexander Lee (Undergrad), Caryelis B. Figueroa (Undergrad), Martina Salichs-Maidana (Undergrad), Sanjit Subramaniam (High School Student)*
  - — Authored Peer-Reviewed Paper With 6 Students
- 2024: Green Bank Observatory REU Summer Student Mentor
  - — Students: *Rachel King (Undergrad)*

Outreach

- 2023–Present: Adopt-A-Physicist
- 2020–Present: Skype A Scientist (over 15 talks given to various elementary, middle, and high schools)

Skills

- **Programming Languages**: Python, Bash, C shell, Unix/Linux
  - **Scientific Python Packages**: Numpy, Scipy, Matplotlib, Astropy, PyCyc, Scintools, Pypulse
- **Software Packages**: Simulink, LaTeX, TEMPO/TEMPO2, PSRCHIVE, DSPSR, Slurm, Jupyter/IPython

Honors and Awards

- John Frederick Oberlin Scholarship, 2013