Jacob Eli Turner

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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

NOTE: Certain publications produced by the NANOGrav collaboration have all authors or a subset of the authors listed in alphabetical order. This ordering does not represent the proportion of contributions made to the papers. Bold and italicized titles indicate papers where I was the main contributor to the research effort. Papers where I have "*" next to my name indicate that, while I was not first author, I made a significant contribution to the paper.

- ***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 (Submitted to ApJ)
- *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
- ***A Simultaneous Dual-Frequency Scintillation Arc Survey of Six Bright Canonical Pulsars Using the Upgraded Giant Metrewave Radio Telescope***, **Turner, J. E.**, Joshi, B.C., McLaughlin, M. A., and Stinebring, D. R., 2024, 961, 101
- *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
- *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.**), arXiv:2309.00693
- *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

- ***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
- *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: Monitoring Interstellar Scattering Delays***, **Turner, J. E.**, et al. (36 authors), 2021 ApJ, 917, 10
- *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

- 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

- 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 Observatory, 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

- 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