H. Thankful Cromartie, PhD | Curriculum Vitæ

National Research Council Postdoctoral Associate
U.S. Naval Research Laboratory
Washington, DC, USA, 20375

Email: thankful.cromartie@nanograv.org
Website: `https://tcromartie.github.io/`

Education

08/14 - 05/20 **The University of Virginia (UVA)**
Charlottesville, VA, USA
Ph.D. Astronomy (05/2020)
Dissertation title: *Massive, Bright, and Brand-New Millisecond Pulsars as Probes of Fundamental Physics* (DOI: 10.18130/v3-qq0n-2d69)
Advisor: Dr. Scott Ransom, NRAO
M.S. Astronomy (05/2016)

08/10 - 05/14 **The University of North Carolina at Chapel Hill (UNC)**
Chapel Hill, NC, USA
B.S. Physics with Highest Honors (05/2014)
Honors thesis title: *Modeling Gamma-Ray Burst-Associated Type Ic Supernovae: a Genetic Algorithm-Based Approach*
Advisor: Dr. Dan Reichart, UNC
Minor, French (05/2014)

Research Experience

09/23 - present **National Research Council Postdoctoral Associate**
U.S. Naval Research Laboratory (Washington, DC, USA)
My research focuses on Gamma-ray pulsar timing with the *Fermi*-LAT for pulsar timing array applications, including joint Gamma-ray and radio pulsar timing efforts. I have also continued my work as chair of the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) Pulsar Timing Working Group, serving as P.I. for our observing programs at the Green Bank Telescope and Very Large Array and co-leading our upcoming 20-year data set.

09/20 - 09/23 **NASA Hubble Fellowship Program Einstein Postdoctoral Fellow**
Cornell University (Ithaca, NY, USA)
Einstein Postdoctoral Fellow at Cornell University working within the Center for Astrophysics and Planetary Sciences and the Department of Astronomy

05/20 - 09/20 **NANOGrav Postdoctoral Research Associate**
National Radio Astronomy Observatory (Charlottesville, VA, USA)

08/14 - 05/20 **Graduate Research & Teaching Assistant**
University of Virginia Department of Astronomy (Charlottesville, VA, USA)

05/13 - 08/13 **Research Experience for Undergraduates (REU)**
Arecibo Observatory (Arecibo, Puerto Rico, USA)

06/11 - 08/14 **Undergraduate Research Assistant**
UNC-Chapel Hill Gamma-Ray Burst Team (Chapel Hill, NC, USA)

Publications

ORCID: `https://orcid.org/0000-0002-6039-692X`

h-index: 35 since 2015

Highlighted Refereed Publications

1. Cromartie, H. T., Fonseca, E., Ransom, S. M., et al. *Relativistic Shapiro delay measurements of an extremely massive millisecond pulsar.* NatAs, **4,** 72 (2020).

    - *Our Nature Astronomy publication drew significant press attention (CNN, ABC, Newsweek, Vice, and others). It is in the 99th percentile in online attention among all journal articles of the same age and now has >1500 citations. In addition to giving interviews, I conducted an "Ask Me Anything" Q&A on the AskScience subreddit that attracted ∼50k views.*

2. Agazie, G., Alam, M. F., Anumarlapudi, A., et al. *The NANOGrav 15 yr Data Set: Observations and Timing of 68 Millisecond Pulsars.* ApJL, **951,** L9 (2023).

    - *I contributed extensively to NANOGrav's 15-year data set. I served as chair of the timing group during development and was "second in command" in the data set, pipeline, and paper-writing efforts. I presented our results during a live-streamed event at National Science Foundation headquarters (see* Invited Talks*), was interviewed and quoted by several press outlets (including the New York Times, NPR, and Scientific American), and participated in an "Ask Me Anything" Q&A on the AskScience subreddit that attracted >450k views.*

3. Cromartie, H. T., Camilo, F., Kerr, M., et al. *Six New Millisecond Pulsars from Arecibo Searches of Fermi Gamma-Ray Sources.* ApJ, **819,** 34 (2016).

    - *Press attention from IFLScience and Phys.org*

4. Fonseca, E., Cromartie, H. T., Pennucci, T. T., et al. *Refined Mass and Geometric Measurements of the High-mass PSR J0740+6620.* ApJL, **915,** L12 (2021).

5. Chatziioannou, K., Cromartie, H. T., Gandolfi, S., et al. *Neutron stars and the dense matter equation of state: from microscopic theory to macroscopic observations.* arXiv, **a**rXiv:2407.11153 (2025).

Publications in Circulation or Preparation

1. Cromartie, H. T., Kerr, M., Ransom, S. M., Ray, P. S. et al. *Radio Shapiro delay observations of the γ-ray MSP J1231−1411.* (Submitted for *Fermi*-LAT internal review)

Reverse Chronological List of Refereed Publications

1. Fiscella, S. V. S., Lam, M. T., Agazie, G., et al. *The NANOGrav 15-Year Data Set: Improved Timing Precision With VLBI Astrometric Priors.* arXiv:2509.21203 (2025).

2. Matt, C., Gultekin, K., Kelley, L., et al. *Inferring Mbh-Mbulge Evolution from the Gravitational Wave Background.* arXiv:2508.18126 (2025).

3. Agarwal, N., Agazie, G., Anumarlapudi, A., et al. *The NANOGrav 15 yr Data Set: Targeted Searches for Supermassive Black Hole Binaries.* arXiv:2508.16534 (2025).

4. Dey, L., Jennings, R., Taylor, J. D., et al. *NANOGrav 15-year Data Set: Search for Gravitational Scattering of Pulsars by Free-Floating Objects in Interstellar Space.* arXiv:2507.19475 (2025).

5. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Search for Gravitational-wave Memory.* ApJ, **987,** 5 (2025).

6. Lam, M. T., Kaplan, D. L., Agazie, G., et al. *The NANOGrav 15-Year Data Set: A Case Study for Simplified Dispersion Measure Modeling for PSR J1455-3330 and the Impact on Gravitational Wave Sensitivity.* arXiv:2506.03597 (2025).

7. Geiger, A., Cordes, J. M., Lam, M. T., et al. *The NANOGrav 12.5 yr Data Set: Probing Interstellar Turbulence and Precision Pulsar Timing with PSR J1903+0327.* ApJ, **986,** 191 (2025).

8. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Harmonic Analysis of the Pulsar Angular Correlations.* ApJ, **985,** 99 (2025).

9. Fiore, W., McLaughlin, M. A., Agazie, G., et al. *Pulse Profile Variability of PSR J1022+1001 in NANOGrav Data.* ApJ, **984,** 139 (2025).

10. Donlon, T., Chakrabarti, S., Lam, M. T., et al. *The Anomalous Acceleration of PSR J2043+1711: Long-period Orbital Companion or Stellar Flyby?.* ApJ, **983,** 62 (2025).

11. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr dataset: Posterior predictive checks for gravitational-wave detection with pulsar timing arrays.* PhRvD, **111,** 042011 (2025).

12. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Running of the Spectral Index.* ApJL, **978,** L29 (2025).

13. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 Yr Data Set: Removing Pulsars One by One from the Pulsar Timing Array.* ApJ, **978,** 168 (2025).

14. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Looking for Signs of Discreteness in the Gravitational-wave Background.* ApJ, **978,** 31 (2025).

15. Dey, L., McLaughlin, M. A., Wahl, H. M., et al. *Exploring Pulsar Timing Precision: A Comparative Study of Polarization Calibration Methods for NANOGrav Data from the Green Bank Telescope.* ApJ, **977,** 114 (2024).

16. Iraci, F., Chalumeau, A., Tiburzi, C., et al. *Pulsar timing methods for evaluating dispersion measure time series.* A&A, **692,** A170 (2024).

17. Chen, Y., Daniel, M., D'Orazio, D. J., et al. *Galaxy Tomography with the Gravitational Wave Background from Supermassive Black Hole Binaries.* arXiv, **a**rXiv:2411.05906 (2024).

18. Salmi, T., Deneva, J. S., Ray, P. S., et al. *A NICER View of PSR J1231-1411: A Complex Case.* ApJ, **976,** 58 (2024).

19. Larsen, B., Mingarelli, C. M. F., Hazboun, J. S., et al. *The NANOGrav 15 yr Data Set: Chromatic Gaussian Process Noise Models for Six Pulsars.* ApJ, **972,** 49 (2024).

20. Susobhanan, A., Kaplan, D. L., Archibald, A. M., et al. *PINT: Maximum-likelihood Estimation of Pulsar Timing Noise Parameters.* ApJ, **971,** 150 (2024).

21. Johnson, A. D., Meyers, P. M., Baker, P. T., et al. *NANOGrav 15-year gravitational-wave background methods.* PhRvD, **109,** 103012 (2024).

22. Agazie, G., Antoniadis, J., Anumarlapudi, A., et al. *Comparing Recent Pulsar Timing Array Results on the Nanohertz Stochastic Gravitational-wave Background.* ApJ, **966,** 105 (2024).

23. Sosa Fiscella, S. V., Lam, M. T., Arzoumanian, Z., et al. *The NANOGrav 12.5-Year Data Set: Dispersion Measure Misestimations with Varying Bandwidths.* ApJ, **966,** 95 (2024).

24. Jennings, R. J., Cordes, J. M., Chatterjee, S., et al. *An Unusual Pulse Shape Change Event in PSR J1713+0747 Observed with the Green Bank Telescope and CHIME.* ApJ, **964,** 179 (2024).

25. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Search for Transverse Polarization Modes in the Gravitational-wave Background.* ApJL, **964,** L14 (2024).

26. Agazie, G., Arzoumanian, Z., Baker, P. T., et al. *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.* ApJ, **963,** 144 (2024).

27. Agazie, G., Arzoumanian, Z., Baker, P. T., et al. *The NANOGrav 12.5 yr Data Set: Search for Gravitational Wave Memory.* ApJ, **963,** 61 (2024).

28. Bécsy, B., Cornish, N. J., Meyers, P. M., et al. *How to Detect an Astrophysical Nanohertz Gravitational Wave Background.* ApJ, **959,** 9 (2023).

29. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Search for Anisotropy in the Gravitational-wave Background.* ApJL, **956,** L3 (2023).

30. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Constraints on Supermassive Black Hole Binaries from the Gravitational-wave Background.* ApJL, **952,** L37 (2023).

31. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Bayesian Limits on Gravitational Waves from Individual Supermassive Black Hole Binaries.* ApJL, **951,** L50 (2023).

32. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Evidence for a Gravitational-wave Background.* ApJL, **951,** L8 (2023).

33. Arzoumanian, Z., Baker, P. T., Blecha, L., et al. *The NANOGrav 12.5 yr Data Set: Bayesian Limits on Gravitational Waves from Individual Supermassive Black Hole Binaries.* ApJL, **951,** L28 (2023).

34. Agazie, G., Anumarlapudi, A., Archibald, A. M., et al. *The NANOGrav 15 yr Data Set: Detector Characterization and Noise Budget.* ApJL, **951,** L10 (2023).

35. Afzal, A., Agazie, G., Anumarlapudi, A., et al. *The NANOGrav 15 yr Data Set: Search for Signals from New Physics.* ApJL, **951,** L11 (2023).

36. Falxa, M., Babak, S., Baker, P. T., et al. *Searching for continuous Gravitational Waves in the second data release of the International Pulsar Timing Array.* MNRAS, **521,** 5077 (2023).

37. Clark, C. J., Kerr, M., Barr, E. D., et al. *Neutron star mass estimates from gamma-ray eclipses in spider millisecond pulsar binaries.* NatAs, **7,** 451 (2023).

38. Bogdanov, S., Fonseca, E., Kashyap, R., et al. *Snowmass 2021 Cosmic Frontier White Paper: The Dense Matter Equation of State and QCD Phase Transitions.* arXiv, **a**rXiv:2209.07412 (2022).

39. Nieder, L., Kerr, M., Clark, C. J., et al. *Is the Black-widow Pulsar PSR J1555-2908 in a Hierarchical Triple System?.* ApJL, **931,** L3 (2022).

40. Hazboun, J. S., Simon, J., Madison, D. R., et al. *Bayesian Solar Wind Modeling with Pulsar Timing Arrays.* ApJ, **929,** 39 (2022).

41. FERMI-LAT Collaboration, Ajello, M., Atwood, W. B., et al. *A gamma-ray pulsar timing array constrains the nanohertz gravitational wave background.* Sci, **376,** 521 (2022).

42. Antoniadis, J., Arzoumanian, Z., Babak, S., et al. *The International Pulsar Timing Array second data release: Search for an isotropic gravitational wave background.* MNRAS, **510,** 4873 (2022).

43. Ray, P. S., Nieder, L., Clark, C. J., et al. *Discovery, Timing, and Multiwavelength Observations of the Black Widow Millisecond Pulsar PSR J1555-2908.* ApJ, **927,** 216 (2022).

44. Arzoumanian, Z., Baker, P. T., Blumer, H., et al. *The NANOGrav 12.5-year Data Set: Search for Non-Einsteinian Polarization Modes in the Gravitational-wave Background.* ApJL, **923,** L22 (2021).

45. Arzoumanian, Z., Baker, P. T., Blumer, H., et al. *Searching for Gravitational Waves from Cosmological Phase Transitions with the NANOGrav 12.5-Year Dataset.* PhRvL, **127,** 251302 (2021).

46. Riley, T. E., Watts, A. L., Ray, P. S., et al. *A NICER View of the Massive Pulsar PSR J0740+6620 Informed by Radio Timing and XMM-Newton Spectroscopy.* ApJL, **918,** L27 (2021).

47. Miller, M. C., Lamb, F. K., Dittmann, A. J., et al. *The Radius of PSR J0740+6620 from NICER and XMM-Newton Data.* ApJL, **918,** L28 (2021).

48. Turner, J. E., McLaughlin, M. A., Cordes, J. M., et al. *The NANOGrav 12.5 Year Data Set: Monitoring Interstellar Scattering Delays.* ApJ, **917,** 10 (2021).

49. Arzoumanian, Z., Baker, P. T., Brazier, A., et al. *The NANOGrav 11 yr Data Set: Limits on Supermassive Black Hole Binaries in Galaxies within 500 Mpc.* ApJ, **914,** 121 (2021).

50. Deneva, J. S., Ray, P. S., Camilo, F., et al. *Timing of Eight Binary Millisecond Pulsars Found with Arecibo in Fermi-LAT Unidentified Sources.* ApJ, **909,** 6 (2021).

51. Alam, M. F., Arzoumanian, Z., Baker, P. T., et al. *The NANOGrav 12.5 yr Data Set: Wideband Timing of 47 Millisecond Pulsars.* ApJS, **252,** 5 (2021).

52. Alam, M. F., Arzoumanian, Z., Baker, P. T., et al. *The NANOGrav 12.5 yr Data Set: Observations and Narrowband Timing of 47 Millisecond Pulsars.* ApJS, **252,** 4 (2021).

53. Arzoumanian, Z., Baker, P. T., Blumer, H., et al. *The NANOGrav 12.5 yr Data Set: Search for an Isotropic Stochastic Gravitational-wave Background.* ApJL, **905,** L34 (2020).

54. Arzoumanian, Z., Baker, P. T., Brazier, A., et al. *Multimessenger Gravitational-wave Searches with Pulsar Timing Arrays: Application to 3C 66B Using the NANOGrav 11-year Data Set.* ApJ, **900,** 102 (2020).

55. Vallisneri, M., Taylor, S. R., Simon, J., et al. *Modeling the Uncertainties of Solar System Ephemerides for Robust Gravitational-wave Searches with Pulsar-timing Arrays.* ApJ, **893,** 112 (2020).

56. Hazboun, J. S., Simon, J., Taylor, S. R., et al. *The NANOGrav 11 yr Data Set: Evolution of Gravitational-wave Background Statistics.* ApJ, **890,** 108 (2020).

57. Aggarwal, K., Arzoumanian, Z., Baker, P. T., et al. *The NANOGrav 11 yr Data Set: Limits on Gravitational Wave Memory.* ApJ, **889,** 38 (2020).

58. Madison, D. R., Agarwal, D., Aggarwal, K., et al. *A Deep Targeted Search for Fast Radio Bursts from the Sites of Low-redshift Short Gamma-Ray Bursts.* ApJ, **887,** 252 (2019).

59. Aggarwal, K., Arzoumanian, Z., Baker, P. T., et al. *The NANOGrav 11 yr Data Set: Limits on Gravitational Waves from Individual Supermassive Black Hole Binaries.* ApJ, **880,** 116 (2019).

60. Deneva, J. S., Ray, P. S., Lommen, A., et al. *High-precision X-Ray Timing of Three Millisecond Pulsars with NICER: Stability Estimates and Comparison with Radio.* ApJ, **874,** 160 (2019).

61. Lam, M. T., McLaughlin, M. A., Arzoumanian, Z., et al. *The NANOGrav 12.5 yr Data Set: The Frequency Dependence of Pulse Jitter in Precision Millisecond Pulsars.* ApJ, **872,** 193 (2019).

62. Stovall, K., Freire, P. C. C., Antoniadis, J., et al. *PSR J2234+0611: A New Laboratory for Stellar Evolution.* ApJ, **870,** 74 (2019).

63. Lam, M. T., Ellis, J. A., Grillo, G., et al. *A Second Chromatic Timing Event of Interstellar Origin toward PSR J1713+0747.* ApJ, **861,** 132 (2018).

64. Deneva, J. S., Ray, P. S., Camilo, F., et al. *Multiwavelength Observations of the Redback Millisecond Pulsar J1048+2339.* ApJ, **823,** 105 (2016).

65. Camilo, F., Kerr, M., Ray, P. S., et al. *Parkes Radio Searches of Fermi Gamma-Ray Sources and Millisecond Pulsar Discoveries.* ApJ, **810,** 85 (2015).

Honors & Awards

05/20	**Allan Talbott Gwathmey Memorial Award** *"An honor reserved for the most accomplished graduate students in the physical sciences at UVA in recognition of a distinguished scholarly publication"*
01/20	**AAS Doxsey Travel Prize Honorable Mention**
09/19 - 05/20	**Grote Reber Doctoral Fellowship (NRAO)**
04/19	**American Physical Society Division of Astrophysics Travel Grant**
03/19 - present	**Member, The Raven Society (University of Virginia)** *"The Raven Society is an honor society committed to recognizing contribution to the University and to fostering academic excellence."*
01/19	**Chambliss Astronomy Achievement Award (AAS, Graduate Division)**
03/18	**Emma Williams Prize (UVA Astronomy Department)** *Awarded to an outstanding fourth-year graduate student in the department*
06/16	**IPTA Outstanding Effort Award** *International Pulsar Timing Array* — awarded to the collaboration's diversity committee (see *Selected Service, Teaching, Outreach, & Equity Work*)
04/16	**Honorable Mention: Graduate Research Fellowship Program (NSF)**
05/14	**Robert Shelton Award for Outstanding Undergraduate Research** *The University of North Carolina Department of Physics & Astronomy*
05/12 - 05/14	**North Carolina Space Grant (NASA)** I was awarded two grants to fund my research between 2012 and 2014.
11/13	**Bronze-Level Winner, University Physics Competition (APS & AAS)**

Invited Talks

NB: Talks without locations given were conducted remotely.

Scheduled	**Colloquia at Wake Forest University and Green Bank Observatory (11/25), APS Global Summit Invited Talk (03/26)**
01/25	**Two Splinter Talks, AAS Winter Meeting (National Harbor, MD)** *Science synergies between the DSA-2000 and ngVLA: pulsars* *Probing the Extremes of Physical Laws with ngVLA Pulsar Observations*
11/24	**U. of Maryland CTC Seminar (College Park, MD)** *Detecting Gravitational Waves... Updates from NANOGrav and the IPTA*
10/24	**NASA Goddard GW Astrophysics Lunch Seminar (Greenbelt, MD)** *The Future of nHz GW Studies with Radio and Gamma-Ray Pulsar Timing Arrays*
08/24	**NRL Scientific Colloquium (Washington, DC)** *Radio and Gamma-Ray PTAs Beyond the nHz GWB*

05/24 **NASA Goddard Scientific Colloquium (Greenbelt, MD)**
Detecting Gravitational Waves... Updates from NANOGrav and the IPTA

05/24 **UC Irvine Physics Colloquium (Irvine, CA)**
Detecting Gravitational Waves... Updates from NANOGrav and the IPTA

03/24 **Argonne National Laboratory Colloquium (Lemont, IL)**
Detecting Gravitational Waves... Updates from NANOGrav and the IPTA

02/24 **University of Tokyo ICEPP Colloquium (Bunkyo City, Tokyo, Japan)**
Detecting Gravitational Waves... Updates from NANOGrav and the IPTA

02/24 **ICEPP Workshop Invited Lecturer (Yamanochi, Nagano, Japan)**
Building the Strong Case for nHz Gravitational Waves with Pulsar Timing Arrays

01/24 **Univ. Toronto & Dunlap Institute Colloquium (Toronto, Canada)**
Detecting Gravitational Waves... Updates from NANOGrav and the IPTA

01/24 **York U. Dept. of Physics and Astronomy Colloquium (Toronto, Canada)**
Detecting Gravitational Waves... Updates from NANOGrav and the IPTA

11/23 **U. Illinois Urbana-Champaign Astro. Dept. Colloq. (Champaign, IL)**
Detecting Gravitational Waves... Updates from NANOGrav and the IPTA

10/23 **Carnegie Observatories Colloquium (Pasadena, CA)**
Detecting Gravitational Waves... Updates from NANOGrav and the IPTA

06/23 **NSF Presentation of NANOGrav 15-Year Results (Alexandria, VA)**
Chosen by NANOGrav to present the pulsar timing portion of our NSF press conference announcement. Video here: `https://www.youtube.com/watch?v=s7TqY88d4Is`

04/23 **APS April Meeting Invited Symposium Speaker (Minneapolis, MN)**
An Update on NANOGrav's Growing Pulsar Timing Data Set

03/23 **Rochester Institute of Tech. Astronomy Colloquium (Rochester, NY)**
Cutting Edge Astrophysics with the NANOGrav Pulsar Timing Array

01/23 **Union College Dept. of Phys. & Astro. Colloquium (Schenectady, NY)**
Cutting Edge Astrophysics with the NANOGrav Pulsar Timing Array

01/23 **AAS Green Bank Observatory Panel (Seattle, WA)**
Invited to give a talk and sit on a panel about science with new GBT receivers

09/22 **European Pulsar Timing Array Fall Meeting**
A NANOGrav 15-Year Data Set Update

07/22 **INT-22 "Neutron Rich Matter on Heaven and Earth"**
Current Status of Radio Pulsar Mass Measurements and Future Prospects

06/22 **DSA-2000 Splinter at Summer AAS 2022 (Pasadena, CA)**
NANOGrav & DSA-2000: A Power Couple for Low-Frequency GW Detection

06/22 **ECT* Meeting Keynote (Neutron stars as laboratories for dense matter)**
Precise Radio-Derived Mass Measurements from the NANOGrav 15-Year Data Set

03/22 **UC Berkeley Theoretical Astrophysics Center Seminar**
Cutting-Edge Astrophysics with PTAs: Where We are, and Where We're Going

02/22 **Cornell Dept. of Astronomy Colloquium and Astrophysics Lunch**
Cutting-Edge Astrophysics with PTAs: Where We are, and Where We're Going

11/21 **DSA-2000 & CHORD Workshop**
NANOGrav & DSA-2000: A Power Couple for Low-Frequency GW Detection

06/21 **ECT* Meeting (Neutron stars as laboratories for dense matter)**
Measuring Millisecond Pulsar Masses with Radio Shapiro Delay Observations

04/21 **Yale Astronomy Department Colloquium**
A Space-Based Physics Lab: Probing NS Physics & GWs with MSP Timing

02/21 **Cornell Dept. of Astronomy Colloquium**
A Space-Based Physics Lab: Probing NS Physics & GWs with MSP Timing

02/21 **Univ. of Florida Theoretical Astrophysics Seminar**
A Space-Based Physics Lab: Probing NS Physics & GWs with MSP Timing

07/20 **Green Bank Observatory**
Recent Relativistic Shapiro Delay Pulsar Observations with the GBT

07/20 **AAS High Energy Astrophysics Division**
Radio Shapiro Delay-Enabled Measurements of Two Millisecond Pulsar Masses (invited to speak from pool of applicants)

06/20 **Dominion Radio Astrophysical Observatory Seminar**
Shapiro Delay-Enabled Mass Measurements of Two Notable MSPs

11/19 **Flatiron Institute Center for Computational Astrophysics (NYC, NY)**
Invited to speak about J0740+6620 results and collaborate with several groups at the institute.

11/19 **Meeting of the Southeastern Section of the American Physical Society (Wrightsville Beach, NC)**
Relativistic Shapiro Delay Measurements of an Extremely Massive MSP

11/19 **U. of Maryland Astronomy Dept. Colloquium (College Park, MD)**
High-Mass Neutron Stars for Fun and Profit

04/19 **University of Wisconsin Center for Gravitation, Cosmology, and Astrophysics Seminar (Milwaukee, WI)**
A Selection of Millisecond Pulsar Science from NANOGrav

09/16 **Virginia Tech Center for Neutrino Physics Colloquium (Blacksburg, VA)**
MSP Discoveries with Fermi: Implications for Gravitational Wave Detection

10/13 **U.S. Naval Research Laboratory Seminar (Washington, DC)**
New Millisecond Pulsars from Arecibo Searches of Fermi Gamma-ray Sources

Other Selected Talks, Workshops & Conferences

NB: NANOGrav and IPTA talks and posters at regularly occurring meetings are listed at the end of this section.

09/24 **NANOGrav Detection Working Group Busy Week (Evanston, IL)**
Served as a pulsar timing liaison; gave talks about IPTA DR3 and NG20

10/23 **U. Maryland Physics of Neutron Stars (College Park, MD)**
Talk: *The Current State of Radio Pulsar Mass Measurements*

09/23 ***Fermi*-LAT Collaboration Meeting**
Talk: *Recent Radio Pulsar Timing Array Results from NANOGrav and the IPTA*

07/23 **Amaldi15 International Gravitational Wave Conference**
Talk: *The NANOGrav 15-Year Data Release and Synergistic Science Results (In lieu of Dr. Joe Swiggum)*

09/22 **NASA Hubble Fellowship Program Symposium (Baltimore, MD)**
Talk: *Binary MSP Mass Measurements from the NANOGrav 15-Year Data Set*

06/22 **American Astronomical Society Summer 2022 Meeting (Pasadena, CA)**
Poster: *Binary Millisecond Pulsar Mass Measurements from the NANOGrav 15-year Data Set*

10/21 **NASA Hubble Fellowship Program Symposium**
Talk: *Updates from the North American Nanohertz Observatory for Grav. Waves*

09/20 **NASA Hubble Fellowship Program Symposium**
Talk: *Shapiro Delay-Enabled Mass Measurements of Two Notable MSPs*

01/20 **American Astronomical Society Winter 2020 Meeting (Honolulu, HI)**
Thesis talk: *Fundamental Physics with Millisecond Pulsars: Gravitational waves, the Neutron Star Equation of State, and Beyond*

04/19 **NANOGrav NSF Site Visit (Milwaukee, WI)**
Poster: *A very massive neutron star: relativistic Shapiro delay measurements of PSR J0740+6620*

04/19 **American Physical Society April Meeting (Denver, CO)**
Talk: *A very massive neutron star: relativistic Shapiro delay measurements of PSR J0740+6620*

01/19 **American Astronomical Society Winter 2019 Meeting (Seattle, WA)**
Poster: *Probing the Neutron Star Equation of State via MSP Shapiro Delay*
Won Chambliss Astronomy Achievement Award

01/18 **American Astronomical Society Winter 2018 Meeting & NANOGrav PTA Observatory Planning Meeting (National Harbor, MD)**
Poster: *A Space-Based Physics Lab: the Search for Very High-Mass Neutron Stars via Shapiro Delay*

10/17 **NANOGrav NSF Site Review Visit (West Virginia University)**
Poster: *New MSPs in Fermi γ-Ray Sources: Expediting the Growth of Our PTA*

09/15 **NANOGrav GW Detection Workshop & Busy Week (Caltech)**

2015 - present **NANOGrav Collaboration Meetings**
– Arecibo Observatory, Puerto Rico (02/15)
– Montreal, Canada (10/15)
– Urbana-Champaign, IL (10/16)
– Charlottesville, VA (03/18, talk)
– Green Bank, WV (10/18, talk)
– Ithaca, NY (10/19, talk)
– Remote (10/20 & 05/21)
– Nashville, TN (10/21, talk & discussion moderation)
– NYC, NY (03/22, talk & discussion moderation)
– Milwaukee, WI (10/22, invited to sit on two panels)
– Corvallis, OR (03/23, invited to sit on a panel
– Remote (03/24, invited to sit on a panel)
– Remote (04/25, invited to sit on a panel, led working group busy times)

2015 - present **International Pulsar Timing Array Meetings**
– NSW, Australia (07/15)
– Stellenbosch, South Africa (06/16)
– Albequerque, NM (07/18, oral presentation)
– Pune, India (06/19, talk)
– Remote (09/20)
– Remote (06/21, NANOGrav overview talk)
– Remote (06/22, NANOGrav timing group overview talk)

– Busy week in NYC, USA (11/22, NANOGrav 15-year data set overview talk)
– Sydney and Port Douglas, Australia (06/23, overview talk about NANOGrav and 15-year timing results)
– Busy week in Bonn, Germany (11/23, overview talk about NANOGrav 15-year noise and timing analysis)
– Sexten, Italy (06/24, oral presentation)
– Pasadena, CA, USA (06/25, oral presentation)

Observing Campaigns & Other Projects

Green Bank Telescope, P.I. Cromartie:
– 24B-427: *The North American Nanohertz Observatory for Gravitational Waves (∼2000 hours over 3 years, GBT and VLA)*
– GLST171181: *Radio Observations of Forgotten Spiders for the* Fermi *PTA (48 hours)*
– 24A-400: *A GBT Search for Gaia-Selected Binary Pulsars (16 hours)*
– 19A-429: *An Important Mass Measurement of a Nearby Pan-Spectrum MSP (22 hours)*
– 18B-372: *Shapiro Delay Measurements to Refine an MSP's Remarkably High Mass (10 hours)*
– 18B-289: *Mass Measurements for Four MSPs Using Relativistic Shapiro Delay (30 hours)*
– 17B-306: *Measuring the Mass of Two Outstanding MSPs via Shapiro Delay (24 hours)*
– 17A-230: *Black Widow Obs. for NANOGrav Inclusion & Astrophys. Study (46.5 hours)*

Arecibo Observatory, P.I. Cromartie:
– P3132: *Observing J1745+1017 for NANOGrav Inclusion and Astrophysical Study (10 hours)*
– P3227: *Timing Six New Fermi MSPs Discovered with the Arecibo Telescope (35.5 hours)*
– P3308: *Probing the Massive Companion of MSP J1304+12 with Shapiro Delay (16.75 hours)*

FAST Telescope, P.I. Cromartie:
– PT2021_0129: *Continued Timing of Six NANOGrav Pulsars (12 hours)*

Notable Co-I observing campaigns:
NB: Dozens of successful programs (comprising thousands of hours) on which I am a co-author have been omitted from this list, including early NANOGrav programs at the GBT, VLA, and Arecibo.
– GBT 22A-399: *Targeted Shapiro-delay Observations of Five NANOGrav Binary Pulsars (35 hours)*
– GBT 18B-368: *820-MHz observations of PSR J1304+12 (2 hours)*
– GBT 16B-387/P3138: *A search for radio transients from a recent low-z short GRB (33 hours)*
– GLST 091250/P3166: *New Searches for Radio MSPs in Fermi Sources (81.5 hours)*
– GLST131121: *Radio Searches for MSPs Among the 10 Year* Fermi *LAT Sources (40 hours)*
– GLST151135: *New Searches for Radio MSPs in Fermi Sources with 4FGL-DR3 (50 hours)*

***Fermi* Guest Investigator Projects:**
– PI (2024): *Radio Observations of Forgotten Spiders for the Fermi Pulsar Timing Array*
– Co-I (2022): *New Searches for Radio MSPs in Fermi Sources with the 4FGL-DR3 Catalog*
– Co-I (2022): *Building the Fermi Pulsar Timing Array*

Selected Service, Teaching, Outreach, & Equity Work

Service Activities:

07/25 - present **Member of the NRAO Time Allocation Committee**
I am a member of the National Radio Astronomy Observatory's Time Allocation Committee (TAC), chairing the "Pulsars and Compact Objects" Science Review Panel. The Review Panels and TAC are responsible for reviewing proposals and determining how time is allocated for the Very Large Array, Green Bank Telescope, and the Very Long Baseline Array/High Sensitivity Array.

02/21 - present **Chair, NANOGrav Pulsar Timing Working Group**
Elected chair of NANOGrav's pulsar timing working group, which concerns itself

with the NANOGrav observing program and curation of data releases. Responsibilities include leading weekly group meetings and documenting minutes, attending NANOGrav "Council of Chairs" meetings, interfacing with the Management Team, attending NANOGrav advisory board meetings, organizing virtual "busy days," weekly "busy times," and more.

10/22 - present **Member, DSA-2000 Science Advisory Council**

11/22 - 07/24 **Board Member, Arecibo Science Advocacy Partnership**

06/22 **AAS Summer Meeting Arecibo EPO Panel**
I sat on a panel to discuss the impact of Arecibo's outreach programs on my career.

03/22 **NSF Proposal Review Panel**

12/21 **Cornell Astronomy Graduate Student Application Evaluation**

12/20 **NASA Guest Investigator Proposal Review Panel**

10/20 - 09/22 **Cornell Astronomy Journal Club**
I co-organized the weekly Cornell Astronomy journal club. Topics included new arXiv papers, diversity and inclusion-related publications, and research.

09/20 - present **Manuscript Reviews**
MNRAS (09/20, 07/21), *ApJ* (07/23, 12/24), *A&A* (09/23), *Fermi*-LAT (08/24)

10/16 - present **Scientific Organizing Committee Service**
NANOGrav: Fall 2016 and Spring 2019 meetings; IPTA: Summer 2023 meeting

05/16 - 08/19 **Astronomy Representative, UVA Graduate School of Arts and Sciences Council & Huskey Graduate Research Exhibition Organizer**
I represented the Astronomy department from 05/16 to 08/19 (except while on leave). I was the Research Committee Chair for the 2018-2019 school year, planning the school-wide Huskey Graduate Research Exhibition.

<u>Teaching & Mentoring:</u>

01/18 - present **High School, Undergraduate & Graduate Mentoring**
I served as the primary research advisor for one Cornell undergraduate student starting in early 2021 and co-advisor for another since early 2022. Between May 2022 and August 2023 I mentored a young secondary school student who participated in science competitions (and won medals in several). I served as co-mentor for two 2022 REU students and one 2023 REU student at Cornell. Several of these projects have resulted in publicly-available software, and will be published when the project is complete. One of these projects resulted in a successful GBT program (24A-400). I have also served as a resource for undergraduate and graduate summer students and NANOGrav members.

08/23 **Tompkins Cortland Community College Seminar for Physics Teachers**
Invited to give a seminar about NANOGrav for community college professors.

07/23 **2023 Cornell REU Workshop on GW Astronomy**

06/23 **IPTA Student Week Speaker and Mentor (Sydney, NSW, Australia)**
Invited to give a talk about pulsar timing and help students with activities; participated in a simultaneous busy week for the third IPTA data release.

03/23 **NANOGrav Spring Meeting Student Workshop Lecture and Activity**
I taught NANOGrav students about pulsar timing and led activities.

06/22 - 07/22 **Cornell Course: Teaching and Learning in the Diverse Classroom**
I completed a course for Postdocs and Faculty at Cornell about equitable teaching.

07/22 **2022 Cornell REU Workshop on GW Astronomy**

07/22 **VIPER Gravitational Wave Summer Workshop Speaker**
I taught NANOGrav and Vanderbilt summer students about pulsar timing.

11/21 **Pulsar Search Collaboratory Guest Lecture**

09/21 **Cornell ASTR 1101 Guest Lecture**

Spring 2015 **Lecturer, ASTR 1559: Our Place in Space Lab**
I was wholly responsible for teaching ASTR 1559, an undergraduate course at UVA focusing on remote observing (Professor of record: Dr. Ed Murphy).

2015 - 2018 **Grader, Teaching Assistant (UVA)**
I was a teaching assistant for several undergraduate astronomy courses during graduate school. I also graded for the graduate radio astronomy course.

06/14 & 06/15 **Coordinator, Educational Research in Radio Astronomy Course (ERIRA)**
I attended the weeklong ERIRA course twice as a coordinator, leading projects and teaching students about concepts in radio astronomy *(GBO, Green Bank, WV)*

02/13 - 03/13 **Sponsor and Mentor, *What If? Prize* Middle School Competition**

08/12 - 12/12 **Grader, Astronomy 101 Lab (UNC-Chapel Hill)**

Public Outreach:

02/24 **Colloquium for Senior Citizens (Chapel Hill, NC)**
Listening to the Hum of a Deep Cosmic Symphony

08/23 **Society of Amateur Radio Astronomers Colloquium**
Invited to speak at the SARA meeting and contribute to their Proceedings.

11/22 **Cornell Friends of Astronomy Seminar**
Gravitational Waves, Pulsar Timing, and Neutron Star Interiors

05/22 **Cary Academy (High School) Virtual Visit**
I was invited to speak to high-school-aged women interested in astrophysics about my research and career path.

02/21 **Cornell Friends of Astronomy Seminar**
Millisecond Pulsars: Phenomenal Space-Based Physics Labs

10/20 **Cornell Astronomical Society Lecture**
A Space-Based Physics Lab: Probing NS Physics & GWs with MSP Timing

03/19 **Charlottesville Astronomy on Tap**
Featured speaker (March 2019), volunteer (2019-2020)

11/18 **Charlottesville Astronomical Society Lecture**
A Space-Based Physics Lab: Probing Neutron Star Physics with MSP Timing

01/17 - 01/19 **Writer for Astrobites**
Astrobites is a graduate-student-run astronomy blog for which I wrote monthly posts (`https://astrobites.org/author/thankful/`)

01/17 **Congressional Outreach for NANOGrav & Arecibo**
I traveled to Washington, D.C. in 2017 to speak to several U.S. Senators, Representatives, and their advisors about telescope funding in the US.

2011 - 2014 **Host, Morehead Planetarium Guest Night (Chapel Hill, NC)**
I regularly hosted guest nights, which included answering questions about astronomy and operating the 0.6-m telescope for guests to explore the sky.

Diversity, Equity and Inclusion:

05/22 - 09/24 **NHFP Mentoring Program**
I served for two years as a mentor in the NASA Hubble Fellowship Program's graduate student mentoring program (AMP-UP), which aims to support BIPOC graduate students in their final year as they navigate postdoc and other applications. This involves monthly meetings, being a source of advice and assistance, reading applications, listening to talks, etc.

06/21 **American Astronomical Society CSWA Blog**
I wrote a blog post for the AAS Committee on the Status of Women in Astronomy as part of their "Women of Arecibo" series.
(`http://womeninastronomy.blogspot.com/2021/06/women-of-arecibo-dr-thankful-cromartie.html`)

07/20 - 09/23 **Founding Member & Group Lead, NHFP Anti-Racism Efforts**
I was a co-founder and participant in a large effort by NASA Hubble Fellowship Program postdocs to combat anti-Black racism in our field, including informally leading a working group dedicated to securing funds for outreach projects. In addition to working group and all-hands meetings, I have given several presentations at NHFP Symposia and NASA review panels about our work (alongside other fellows). I was a direct line of communication between the NHFP leads and Fellows. See `http://nhfp-equity.org`

2011 - present **Advocacy Activities Promoting Women in STEM**
My passion for improving the experience of women and other minoritized people in STEM fields started with my co-founding and presidency of the UNC Women in Physics group (2011-2014) as well as my co-presidency of the UNC Society for Physics Students (2013-2014). I helped resurrect and lead the group for graduate and postdoc women in astronomy at UVA and the NRAO. I also penned and read aloud a letter on behalf of (and with assistance from) the astronomy graduate students in response to our concerns about sexual harassment and inclusion in the UVA Astronomy Department. This effort led the faculty and graduate students to create a code of conduct in our department.

07/15 - 03/23 **Founding & Elected Member, IPTA Diversity Committee**
After the International Pulsar Timing Array (IPTA) Summer 2015 meeting, I asked that the collaboration's steering committee create a group of delegates from each region's pulsar timing array to discuss issues relating to diversity and harassment. I was then elected to serve on the committee by NANOGrav. At the 2016 IPTA meeting, we were awarded the IPTA Outstanding Effort Award, in part for our creation of a comprehensive code of conduct.