Daniel J. Oliver

918-575-5671 | oliverda@oregonstate.edu | danieljoliver.com | github.com/DanielJOliver
ORCID: 0000-0002-7374-6925 | Google Scholar | US Citizen

Education

University of Arkansas — Fayetteville, AR
Ph.D. in Space and Planetary Sciences; Concentration in Gravitational Wave Astrophysics — *May 2024*
Dissertation Title: The Gravitational Wave Peep: Improved Modeling of Highly Eccentric EMRIs for LISA Signal Confusion Noise

Oklahoma State University — Stillwater, OK
B.S. Physics, Minor: Philosophy — *May 2017*
Thesis Title: Slow Noise in a Laser with Injected Signal

Employment

NANOGrav Physics Frontiers Center Postdoctoral Research Fellow — Sept. 2024 - Present
Oregon State University — *Corvallis, OR*

- Advisors: Dr. Jeffrey Hazboun & Dr. Xavier Siemens
- Pulsar timing, noise modeling, and gravitational wave detection with PTA datasets, including timing pulsars for NANOGrav's next data release
- Developing pulsar timing methodologies for chromatic noise, and leading NANOGrav's eccentric binary all-sky search for the next dataset
- Analytical derivation and implementation of PTA sensitivity to anisotropic gravitational wave backgrounds, written as an extension to `hasasia`
- Data combination and noise analysis for the International Pulsar Timing Array (IPTA) data releases
- Running day-to-day operations of both research groups, and mentoring Ph.D. students in PTA and LISA gravitational wave theory and data analysis, including projects outside local faculty expertise

Visiting Student Researcher — March 2023-March 2024
California Institute of Technology — *Pasadena, CA*

- Primary Advisor: Dr. Curt Cutler (Jet Propulsion Laboratory)
- Host Faculty: Dr. Katerina Chatziioannou & Dr. Yanbei Chen (California Institute of Technology)
- Invited research position with the Theoretical AstroPhysics Including Relativity and Cosmology (TAPIR) group, collaborating with Jet Propulsion Laboratory staff scientists on the development of LISA data analysis tools
- Independent development of theoretical and data analysis approaches for LISA extreme mass ratio inspirals (EMRIs)

Instructor of Record, PHYS 3544 Optics Laboratory — Fall 2019 - Fall 2022
University of Arkansas — *Fayetteville, AR*

- Sole instructor for a credit-bearing optics laboratory course across six semesters, including a comprehensive redesign of the laboratory curriculum (see Teaching)

Lecturer, PHYS 2074 University Physics II — Summer 2022
University of Arkansas — *Fayetteville, AR*

- Instructor of record for calculus-based electricity and magnetism; delivered all lectures, wrote all course materials, and supervised six teaching assistants (see Teaching)

Publications

Certain publications produced by the NANOGrav and IPTA collaborations 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. Publications that I have led or where I have made critical contributions are highlighted in bold violet; collaboration publications to which I contributed as a member are shown unbolded in black. Publications where I have advised or helped to advise students are denoted by *, with the student's name underlined. An italicized line beneath an entry describes my specific contribution to that work.

Manuscripts in Preparation

16. * **"Orphan Memory Rates for Massive Black Hole Binaries in LISA"**
K. Glasby, **D. J. Oliver**, X. Siemens
(In Prep)

15. **"The Implications for LISA of an EMRI in the Nearby Universe"**
D. J. Oliver, J. S. Hazboun, S. Larson
(In Prep)

14. * **"Decomposition of Overlapping Ultra Compact Binaries in LISA Data"**
H. O'Mara, A. D. Johnson, **D. J. Oliver**, D. Kennefick
(In Prep)

13. **"Analytic Scaling Laws for Pulsar Timing Array Gravitational Wave Backgrounds"**
D. J. Oliver, J. S. Hazboun, X. Siemens
(In Prep, Submission expected December 2026)

Submitted

12. "The NANOGrav 15-year data set: A Limit on Continuous Spin Gravitons"
C. Ambasht, O. Bitcon, T. Trickle, The NANOGrav Collaboration (94 authors including **D. J. Oliver**), 2026
(Submitted), arXiv:2611.14613
Contribution: I am an author because I am a NANOGrav full member.

11. **"What Fraction of Extreme Mass Ratio Inspirals That Merge After the LISA Mission Ends Are Detectable?"**
D. J. Oliver, A. D. Johnson, J. E. Thompson, C. J. Cutler, 2026
(Submitted to *Phys. Rev. D*), arXiv:2609.36298.

10. "Constraints on Supermassive Black Hole Binaries from the Lack of Resolvable Sources in the NANOGrav 15-yr Dataset"
E. C. Gardiner et al. (119 authors including **D. J. Oliver**), 2026
(Submitted to *The Astrophysical Journal*), arXiv:2609.32306
Contribution: I am an author because I am a NANOGrav full member.

9. **"The NANOGrav 15 yr Data Set: Impacts of Customized Chromatic Noise Models on Gravitational Wave Analyses"**
N. Agarwal et al. (123 authors including **D. J. Oliver**), 2026
(Submitted to *The Astrophysical Journal Letters*), arXiv:2606.28554
Contribution: Assisted with developing, selecting, and analyzing the custom noise models that made this work possible. Ran the broken power law model and wrote the broken power law methods and results sections.

Published

8. **"Mitigating the Timing Impact of Anomalous Pulse Profile Shape Variability in PSR J1713+0747 with Gaussian Component Modeling"**
S. A. Nichols et al. (34 authors including **D. J. Oliver**), 2026
ApJ, DOI:10.3847/1538-4357/aeae2d, arXiv:2607.12038
Contribution: Helped develop chromatic noise models for NANOGrav's next data set as part of the chromatic task force, and serve as a pulsar timer for the upcoming data release.

7. * **"Directional Anisotropic Sensitivity Curves for Pulsar Timing Arrays"**
D. J. Oliver, J. S. Hazboun, M. M. Maggi, J. G. Baier, K. E. Gourlie, 2026
Class. Quantum Grav., DOI:10.1088/1361-6382/aeb78a, arXiv:2608.00250.

6. "Pulsar Timing Array Sensitivity to Anisotropy: Empirical Sensitivity Curves, Scaling Relations, and the Multi-resolution Pixel Basis"
T. T. Moursy et al. (118 authors including **D. J. Oliver**), 2026
ApJ, DOI:10.3847/1538-4357/ae9759, arXiv:2608.09781
Contribution: I am an author because I am a NANOGrav full member.

5. **"The NANOGrav 15 yr and 20 yr Datasets: Timing Events and Pulse Shape Changes"**
   B. Jacobson-Bell et al. (64 authors including **D. J. Oliver**), 2026
   ApJ, DOI:10.3847/1538-4357/ae6db6, arXiv:2604.05453
   Contribution: Helped develop chromatic noise models for NANOGrav's next data set as part of the chromatic task force, and serve as a pulsar timer for the upcoming data release.

4. **"The NANOGrav 15 yr Dataset: Customized Chromatic Noise Models"**
   B. Larsen, J. G. Baier**, D. J. Oliver**, K. Wayt, Y.-T. Chang, J. S. Hazboun, C. M. F. Mingarelli, et al. (56 authors), 2026
   ApJ, DOI:10.3847/1538-4357/ae677c, arXiv:2606.28571
   Contribution: Performed single pulsar white noise analyses, generated figures, and wrote several portions of the paper.

3. **"The NANOGrav 12.5 yr Dataset: Chromatic Noise Characterization and Mitigation with Time-domain Kernels"**
   J. S. Hazboun, J. Simon, J. Baier, B. Larsen**, D. J. Oliver**, P. T. Baker, B. Bécsy, et al. (67 authors), 2026
   ApJ, DOI:10.3847/1538-4357/ae4ee0, arXiv:2511.22597
   Contribution: Carried out aggregate analyses of the pulsar results, developed figures, and wrote the section on individual pulsars' preferred models.

2. **"Gravitational wave peep contributions to background signal confusion noise for LISA"**
   D. J. Oliver, A. D. Johnson, L. Janssen, J. Berrier, K. Glampedakis, D. Kennefick, 2026
   Phys. Rev. D, DOI:10.1103/kgp7-ymyj, arXiv:2507.19704.

1. **"Gravitational wave peeps from EMRIs and their implication for LISA signal confusion noise"**
   D. J. Oliver, A. D. Johnson, J. Berrier, K. Glampedakis, D. Kennefick, 2024
   Class. Quantum Grav., DOI:10.1088/1361-6382/ad40f2, arXiv:2305.05793.

Invited Talks

Northwest Section American Physical Society Meeting June 2026
Klamath Falls, OR
Plenary Talk: "From Pulsar Timing to Gravitational Wave Detection with NANOGrav"

LISA Monday Science Call June 2026
LISA Consortium
"Gravitational Wave Peep Contributions to Background Signal Confusion Noise for LISA"

JPL SVCP Astrophysics Luncheon Seminar Sept. 2025
NASA Jet Propulsion Laboratory
"Gravitational Wave Peep Contributions to Background Signal Confusion Noise for LISA"

LIGO Seminar June 2023
California Institute of Technology
"Gravitational Wave Peeps and Their Implication for LISA Data Analysis"

Conference Presentations

2nd Oregon Astronomy Research Symposium (OARS) Sept. 2026
Corvallis, OR
Oral Talk: "Analytic Heterogeneous Scaling Laws for Pulsar Timing Arrays"

16th International LISA Symposium June 2026
College Park, MD
Oral Talk: "Detectability of Extreme Mass Ratio Inspirals in LISA That Merge Beyond the Mission Lifetime"

American Physical Society (APS) Global Physics Summit March 2026
Denver, CO
Oral Talk: "Forecasting PTA Anisotropy with Analytical Skymaps and Sensitivity Curves"

American Astronomical Society (AAS) Winter 247 Meeting Jan. 2026
Phoenix, AZ

Oral Talk: “Analytical Skymaps for PTA Stochastic Background Anisotropy”

NANOGrav Fall Meeting Nov. 2025

Missoula, MT

Oral Talk: “Analytical Sensitivity Curves and Skymaps for PTA Stochastic Background Anisotropy”

International Pulsar Timing Array Science Meeting June 2025

Pasadena, CA

Oral Talk: “Building PTA Sensitivity Curves for Stochastic Background Anisotropy”

American Physical Society (APS) Global Physics Summit March 2025

Anaheim, CA

Oral Talk: “Building PTA Sensitivity Curves for Stochastic Background Anisotropy”

American Astronomical Society (AAS) Winter 245 Meeting Jan. 2025

National Harbor, MD

Oral Talk: “Gravitational Wave Peep Contributions to Background Signal Confusion Noise for LISA”

American Physical Society (APS) April Meeting April 2024

Sacramento, CA

Oral Talk: “Gravitational Wave Peep Contributions to Background Signal Confusion Noise for LISA”

American Physical Society (APS) April Meeting April 2023

Minneapolis, MN

Oral Talk: “Improved Modeling of Highly Eccentric EMRI Signal Confusion Noise for LISA: The Gravitational Wave Peep and Its Implication for Data Analysis”

Mid-American Regional Astrophysics Conference (MARAC) Oct. 2022

Fayetteville, AR

Oral Talk: “Improved Modeling of Highly Eccentric EMRI Signal Confusion Noise for LISA”

American Physical Society (APS) April Meeting April 2022

New York, NY

Oral Talk: “Improved Modeling of Highly Eccentric EMRI Signal Confusion Noise for LISA”

Mid-American Regional Astrophysics Conference (MARAC) April 2022

Virtual

Poster: “Improved Modeling of EMRI Signal Confusion Noise for LISA”

American Physical Society (APS) April Meeting April 2021

Virtual

Oral Talk: “Improved Modeling of EMRI Signal Confusion Noise for LISA”

American Physical Society (APS) April Meeting April 2020

Cancelled Due to COVID-19

Oral Talk: “Modeling Populations of Highly Eccentric EMRIs for LISA Signal Confusion Noise”

9th Gulf Coast Gravity Meeting March 2020

Cancelled Due to COVID-19

Oral Talk: “Lining Up Your Shots: Capturing the Interesting Part of Highly Eccentric EMRI Gravitational Wave Snapshots”

American Physical Society (APS) April Meeting April 2019

Denver, CO

Poster: “Computation of highly eccentric EMRIs to characterize background confusion noise in LISA”

Mentoring

Oregon State University

Katelyn Glasby 2024-Present, Ph.D.

- “Orphan Memory Rates for Massive Black Hole Binaries in LISA”

Martine Maggi 2024-Present, Ph.D.

- “Directional Anisotropic Sensitivity Curves for Pulsar Timing Arrays” (third author on Oliver et al., Published in CQG)

Kyle Gourlie 2024-Present

- Mentored as a B.S. student at Oregon State University (2024-2025), now a Ph.D. student at University of Wisconsin-Milwaukee
- First-author project on his undergraduate thesis on Fisher Information Matrix approach to sensitivity-curve calculations (in preparation)
- Contributor to Directional Anisotropic Sensitivity Curves for Pulsar Timing Arrays (Oliver et al., Published in CQG)

University of Arkansas

Harry O'Mara 2024-Present, Ph.D.

- "Decomposition of Overlapping Ultra Compact Binaries in LISA Data" (in preparation)

Teaching

University of Arkansas

PHYS 2074 University Physics II Lecturer

- Instructor of record for a calculus-based electricity and magnetism course (Summer 2022)
- Designed and delivered all lectures; developed all homework assignments, exams, and supporting course materials
- Supervised and coordinated a team of six teaching assistants responsible for laboratories and grading

PHYS 3544 Optics Laboratory Instructor of Record

- Instructor of record for a standalone, credit-bearing optics laboratory course
- Led comprehensive redesign of the laboratory curriculum, transitioning assignments from worksheets to full lab reports
- Taught and assessed experimental optics across six semesters (Fall 2019-Fall 2022); Co-instructor during initial offering (Fall 2018)

PHYS 2074L University Physics II Lab TA

- **Lead TA (3 terms):** Spring 2021-Spring 2022
- Managed instructional operations for a large multi-section laboratory course, supervising 20+ teaching assistants during peak enrollments
- TA: Spring 2018, Fall 2022

ASTR/PHYS 2001L Introduction to Astronomy Lab TA

- TA: Summer 2018-Spring 2024 (7 terms)

PHYS 1021L Physics for Human Affairs Lab TA

- TA: Spring 2023-Spring 2024

PHYS 2054L University Physics I Lab TA

- TA: Spring 2022

PHYS 2031L College Physics II Lab TA

- TA: Summer 2019

Additional Experience

Summer Internship May 2021 - August 2021

University of Nebraska-Kearney *Kearney, NE*

- Advisor: Dr. Joel Berrier
- Developed population modeling code for LISA gravitational wave background studies using black hole mass functions derived from Illustris cosmological simulations
- Collaborated on methods for extracting and validating supermassive black hole mass functions from Illustris, forming the basis of subsequent dissertation work and first-author publications

Assistant at Mendenhall Observatory Sept. 2014 - Jan. 2016

Oklahoma State University *Stillwater, OK*

- Supported operation of a 24-inch research telescope during facility renovations
- Led public and donor observing events, operating the telescope and delivering guided astronomical observations contributing to successful fundraising for long-term observatory repairs and expanded public outreach

Professional Development

Preparing for the Professoriate Graduate Microcertificate December 2022

University of Arkansas

- Graduate-level, interdisciplinary credential administered by the Graduate School and focused on faculty careers in higher education (9 credit hours)
- Coursework addressed teaching and learning theory, assessment, research funding and grant development, faculty roles and responsibilities, and equity and inclusion in higher education

Honors & Awards

LISA Symposium Travel Grant 2026

International LISA Symposium

- Competitive travel award (up to $1,500) supporting attendance and participation in the 16th International LISA Symposium

Executive Award from Graduate and Professional Student Congress (GPSC) May 2022

University of Arkansas

- Recognition for outstanding contributions to graduate student leadership at the University of Arkansas

Lloyd B. Ham Award for Outstanding Teaching Assistant May 2021

University of Arkansas

- Recognition for outstanding teaching contributions during the COVID-19 transition to fully online instruction

Professor Daniel S. Stevens Scholarship Fund May 2015/May 2016

Oklahoma State University

- Departmental scholarship recognizing outstanding undergraduate achievement in physics

President's Leadership Council 2013-2014

Oklahoma State University

- Selective undergraduate leadership award granted based on academic achievement and leadership potential

Workshops

LISA Sprint 4 May 2026

- Member of the "Testing the Global Fit" team where we ran a prototype LISA global fit code on a simplified dataset of Galactic white dwarf binaries and massive black hole binaries, recovering source parameters in the Wilson-Daubechies-Meyer time-frequency domain

NASA Physics of the COSmos (PhysCOS) Early Career Workshop 2 Sept. 2025

LISA Sprint 3 April 2025

NASA Physics of the COSmos (PhysCOS) Early Career Workshop Nov. 2024

Vanderbilt NANOGrav Hack Week July 2024

Vanderbilt Initiative in Probes of Extreme Relativity (VIPER) Pulsar Timing Array Summer School July 2024

LISA Sprint 2 April 2024

LISA Analysis Tools Workshop April 2024

Niels Bohr International Academy: Summer School on Gravitational Wave Astrophysics August 2021

- Intensive summer school on gravitational-wave data analysis for LIGO, LISA, and pulsar timing arrays (38 hours of active participation)

Gravitational Wave Astronomy Northwest (GWANW) Student Workshop June 2021

Gravitational Wave Early Career Scientists Funding Opportunity Workshop June 2021

Workshop on Gravitational Wave Astrophysics for Early Career Scientists May 2021

Professional Service

Journal Referee 2025-Present

- Physical Review Letters, Physical Review D, Monthly Notices of the Royal Astronomical Society

Outreach

Initiatives

NASA Physics of the COSmos (PhysCOS) 2025-Present
- Represented NASA LISA science at American Astronomical Society and American Physical Society conferences through PhysCOS outreach initiatives

Gravitational Wave Collaborations (NANOGrav, LIGO-Virgo-KAGRA, LISA Science Consortium) 2023-Present
- Coordinated public outreach for multiple gravitational-wave collaborations at major scientific conferences

Astronomy on Tap 2024-Present
- Co-Organizer of the Corvallis, Oregon Astronomy on Tap chapter

Letters to a Pre-Scientist (LPS) 2023-Present
- A year-long STEM mentoring program pairing low-income middle school students with STEM professionals

Space Hogs (University of Arkansas) 2018-2022
- Vice-President (2021-2022); led astronomy-focused outreach events for local schools and communities

OSU Astro Club (Oklahoma State University) 2014-2017
- Founding member and President (2015-2017); organized public observing nights and astronomy lectures

Society of Physics Students (Oklahoma State University) 2014-2017
- President (2016-2017); organized physics outreach events for students and local communities

Talks

Astronomy on Tap May 2026
Oregon State University
"Gravity Speaks, LISA Listens"

Science Café Sept. 2015
Oklahoma State University
"Astronomy and Physics"

Conference & Workshop Organization

Gravitational Wave Investigative Science Experience (GravWISE) August 2025
- Co-organized undergraduate research workshop supporting transfer students entering four-year institutions
- Delivered instructional lecture on gravitational waveform modeling
- Mentored student-led research projects focused on single-pulsar noise analysis

LISA Sprint 2 April 2024
- Member of the local organizing group for an international collaborative workshop on LISA data analysis methods at Caltech

Professional Memberships

International Pulsar Timing Array (IPTA) 2024-Present

NASA Physics of the COSmos (PhysCOS) 2024-Present
- Gravitational Wave Science Interest Group (GW SIG)
- Habitable Worlds Science Interest Group (HWO SIG)

LISA Science Consortium 2021-Present
- Community Member

North American Nanohertz Observatory for Gravitational Waves (NANOGrav) 2020-Present
- Full Member (2026-Present), Member (2020-2026)

American Astronomical Society (AAS) 2018-Present

American Physical Society (APS) 2018-Present