

DANIEL J. OLIVER

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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
- Research on pulsar timing array (PTA) datasets, spanning pulsar timing, noise modeling, and gravitational wave detection
- Developing new pulsar timing methodologies to model chromatic effects and improve noise characterization
- Analytical derivation and implementation of PTA sensitivity to anisotropic gravitational wave backgrounds, integrated into existing PTA analysis tools
- Contributing to PTAs at international scale through data combination, timing, and noise analysis for the International Pulsar Timing Array (IPTA) data releases
- Mentoring Ph.D. students in PTA and LISA gravitational wave theory and data analysis, including supervision of 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 In Relativity (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 students name underlined. An italicized line beneath an entry describes my specific contribution to that work.

Manuscripts in Preparation

14. * **“Orphan Memory Rates for Massive Black Hole Binaries in LISA”**
K. Glasby, **D. J. Oliver**, X. Siemens
(In Prep)
13. * **“Decomposition of Overlapping Galactic Binaries in LISA Data”**
H. O’Mara, A. D. Johnson, **D. J. Oliver**, D. Kennefick
(In Prep)
12. **“Heterogeneous Noise: Analytic Scaling Laws and Time to Detection for an Isotropic and Anisotropic Gravitational Wave Background”**
D. J. Oliver, J. S. Hazboun, X. Siemens
(In Prep, Submission expected October 2026)
11. **“What Fraction of Extreme Mass Ratio Inspirals That Merge After The LISA Mission Ends Are Detectable?”**
D. J. Oliver, A. D. Johnson, J. Thompson, C. Cutler
(Under JPL Document Review before Submission)

Submitted

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. **“Directional Anisotropic Sensitivity Curves for Pulsar Timing Arrays”**
D. J. Oliver, J. S. Hazboun, M. Maggi, J. G. Baier, K. E. Gourlie, 2026
(Submitted to *Class. Quantum Grav.*), arXiv:2608.00250.
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
(Submitted to *The Astrophysical Journal*), arXiv:2607.12038
Contribution: Developed noise models used in the creation of NANOGrav’s next data set, and serve as a pulsar timer for the upcoming data release.
7. **“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*), 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, generated the corner plots, and wrote the broken power law methods and results sections.

Published

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: Developed noise models used in the creation of NANOGrav’s next data set, 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. Bécsey, et al. (67 authors), 2026
ApJ, DOI:10.3847/1538-4357/ae4ee0, arXiv:2511.22597
Contribution: Performed single pulsar noise analyses, and wrote the corresponding section of the paper.
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 <i>Klamath Falls, OR</i>	June 2026
Plenary Talk: “From Pulsar Timing to Gravitational Wave Detection with NANOGrav”	
LISA Monday Science Call <i>LISA Consortium</i>	June 2026
“Gravitational Wave Peep Contributions to Background Signal Confusion Noise for LISA”	
JPL SVCP Astrophysics Luncheon Seminar <i>NASA Jet Propulsion Laboratory</i>	Sept. 2025
“Gravitational Wave Peep Contributions to Background Signal Confusion Noise for LISA”	
LIGO Seminar <i>California Institute of Technology</i>	June 2023
“Gravitational Wave Peeps and Their Implication for LISA Data Analysis”	

CONFERENCE PRESENTATIONS

2nd Oregon Astronomy Research Symposium (OARS) <i>Corvallis, OR</i>	Sept. 2026
Oral Talk: “Analytic Heterogeneous Scaling Laws for Pulsar Timing Arrays”	
16th International LISA Symposium <i>College Park, MD</i>	June 2026
Oral Talk: “Detectability of Extreme Mass Ratio Inspirals in LISA That Merge Beyond the Mission Lifetime”	
American Physical Society (APS) Global Physics Summit <i>Denver, CO</i>	March 2026
Oral Talk: “Forecasting PTA Anisotropy with Analytical Skymaps and Sensitivity Curves”	
American Astronomical Society (AAS) Winter 247 Meeting <i>Phoenix, AZ</i>	Jan. 2026
Oral Talk: “Analytical Skymaps for PTA Stochastic Background Anisotropy”	
NANOGrav Fall Meeting <i>Missoula, MT</i>	Nov. 2025
Oral Talk: “Analytical Sensitivity Curves and Skymaps for PTA Stochastic Background Anisotropy”	
International Pulsar Timing Array Science Meeting <i>Pasadena, CA</i>	June 2025
Oral Talk: “Building PTA Sensitivity Curves for Stochastic Background Anisotropy”	

American Physical Society (APS) Global Physics Summit <i>Anaheim, CA</i>	March 2025
Oral Talk: “Building PTA Sensitivity Curves for Stochastic Background Anisotropy”	
American Astronomical Society (AAS) Winter 245 Meeting <i>National Harbor, MD</i>	Jan. 2025
Oral Talk: “Gravitational Wave Peep Contributions to Background Signal Confusion Noise for LISA”	
American Physical Society (APS) April Meeting <i>Sacramento, CA</i>	April 2024
Oral Talk: “Gravitational Wave Peep Contributions to Background Signal Confusion Noise for LISA”	
American Physical Society (APS) April Meeting <i>Minneapolis, MN</i>	April 2023
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) <i>Fayetteville, AR</i>	Oct. 2022
Oral Talk: “Improved Modeling of Highly Eccentric EMRI Signal Confusion Noise for LISA”	
American Physical Society (APS) April Meeting <i>New York, NY</i>	April 2022
Oral Talk: “Improved Modeling of Highly Eccentric EMRI Signal Confusion Noise for LISA”	
Mid-American Regional Astrophysics Conference (MARAC) <i>Virtual</i>	April 2022
Poster: “Improved Modeling of EMRI Signal Confusion Noise for LISA”	
American Physical Society (APS) April Meeting <i>Virtual</i>	April 2021
Oral Talk: “Improved Modeling of EMRI Signal Confusion Noise for LISA”	
American Physical Society (APS) April Meeting <i>Cancelled Due to COVID-19</i>	April 2020
Oral Talk: “Modeling Populations of Highly Eccentric EMRIs for LISA Signal Confusion Noise”	
9th Gulf Coast Gravity Meeting <i>Cancelled Due to COVID-19</i>	March 2020
Oral Talk: “Lining Up Your Shots: Capturing the Interesting Part of Highly Eccentric EMRI Gravitational Wave Snapshots”	
American Physical Society (APS) April Meeting <i>Denver, CO</i>	April 2019
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 MBHBHs in LISA”	
Martine Maggi	2024-Present, Ph.D.
• “Directional Anisotropic Sensitivity Curves for Pulsar Timing Arrays” (third author on Oliver et al., Submitted to CQG)	
Kyle Gourlie	2024-Present, B.S.
• First-author project on Fisher Information Matrix approach to sensitivity-curve calculations (in preparation)	
• Contributor to Directional Anisotropic Sensitivity Curves for Pulsar Timing Arrays (Oliver et al., Submitted to CQG)	

University of Arkansas

Harry O’Mara	2024-Present, Ph.D.
• “Decomposition of Overlapping Galactic 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 <i>International LISA Symposium</i> Competitive travel award (up to \$1,500) supporting attendance and participation in the 16th International LISA Symposium	2026
Executive Award from Graduate and Professional Student Congress (GPSC) <i>University of Arkansas</i> Recognition for outstanding contributions to graduate students leadership at the University of Arkansas	May 2022
Lloyd B. Ham Award for Outstanding Teaching Assistant <i>University of Arkansas</i> Recognition for outstanding teaching contributions during the COVID-19 transition to fully online instruction	May 2021
Professor Daniel S. Stevens Scholarship Fund <i>Oklahoma State University</i> Departmental scholarship recognizing outstanding undergraduate achievement in physics	May 2015/May 2016
President's Leadership Council <i>Oklahoma State University</i> Selective undergraduate leadership award granted based on academic achievement and leadership potential	2013-2014

WORKSHOPS

LISA Sprint 4	May 2026
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 Intensive summer school on gravitational-wave data analysis for LIGO, LISA, and pulsar timing arrays (38 hours of active participation)	August 2021
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 Physical Review Letters, Physical Review D, Monthly Notices of the Royal Astronomical Society	2025-Present
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OUTREACH

Initiatives

NASA Physics of the COSmos (PhysCOS) Represented NASA LISA science at American Astronomical Society and American Physical Society conferences through PhysCOS outreach initiatives	2025-Present
Gravitational Wave Collaborations (NANOGrav, LIGO-Virgo-KAGRA, LISA Science Consortium) Coordinated public outreach for multiple gravitational-wave collaborations at major scientific conferences	2023-Present
Astronomy on Tap Co-Organizer of the Corvallis, Oregon Astronomy on Tap chapter	2024-Present
Letters to a Pre-Scientist (LPS) A year-long STEM mentoring program pairing low-income middle school students with STEM professionals	2023-Present

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
<i>Oregon State University</i>	
“Gravity Speaks, LISA Listens”	
Science Café	Sept. 2015
<i>Oklahoma State University</i>	
“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