ALEXANDER W. CRISWELL

Curriculum Vitae

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Employment

2026 – Present **Research Assistant Professor, Astrophysics**
Dept. of Physics and Astronomy | Vanderbilt University

2024 – 2026 **EMIT Postdoctoral Fellow**
Expanding Multimessenger Interdisciplinary Training (EMIT) Program
Dept. of Physics and Astronomy | Vanderbilt University
Dept. of Life and Physical Sciences | Fisk University

Education

2019 – 2024 **PhD, Astrophysics**
Minor: Data Science in Astrophysics
Minnesota Institute for Astrophysics | University of Minnesota

2013 – 2018 **Bachelor of Science in Physics**
Minors: Astronomy, French
Dept. of Physics and Astronomy | Iowa State University

Honors and Awards

2023 **Early Career Contribution Award**
Gravitational Wave Populations: What's Next? | Conference in Milan, Italy

2023 **Robert O. Pepin Memorial Fellowship**
University of Minnesota | School of Physics and Astronomy

2021 **President's Student Leadership and Service Award**
University of Minnesota | Office of the President

2021 **Honorable Mention, NSF GRFP**
National Science Foundation | Graduate Research Fellowship Program

2020 **NSF Research Traineeship: Data Science in Multimessenger Astrophysics**
National Science Foundation

2020 **Outstanding Outreach TA**
University of Minnesota | Minnesota Institute for Astrophysics

Research Funding

2025 *Towards embedding population inference within the LISA global fit*
NASA LISA Preparatory Science, Award #80NSSC26K0342.
Science PI: **Alexander W. Criswell**
Institutional PI: Stephen R. Taylor
Total award: $501,021; Period of award: 01/01/2026—12/31/2028.

Publications

Refereed Journal Articles and White Papers

Criswell, A.W., et al. (2026), *A Foundation for Gravitational-wave Population Inference within the LISA Global Fit.* Submitted to *ApJS*. arXiv:2604.03390

Criswell, A.W., et al. (2026), *Archival Multiband Gravitational-Wave Signals from Massive Black Hole Binary Mergers.* Submitted to *Nat. Astron.* arXiv:2604.21013

Criswell, A.W., et al. (2026), *Flexible Spectral Separation of Multiple Isotropic and Anisotropic Stochastic Gravitational Wave Backgrounds in LISA.* Submitted to *PRD*. arXiv:2508.20308

Criswell, A.W., et al. (2025), *Templated Anisotropic Analyses of the LISA Galactic Foreground***.** *Phys. Rev. D* 111, 023025. arXiv:2410.23260

Bloom, M., Criswell, A.W., et al. (2025), *Angular resolution of a Bayesian search for anisotropic stochastic gravitational wave backgrounds with LISA*. *Phys. Rev. D* 112 (8), 083021. Mentored the (undergraduate) first author; wrote substantial portions of the text. arXiv:2412.16372

Singer, L.P., Criswell, A.W., et al. (2025), *Optimal Follow-up to Gravitational Wave Events with the UltraViolet EXplorer (UVEX). PASP* 137 074501. Contributed to simulations and statistical framework. arXiv:2502.17560

Criswell, A.W., et al. (2025), *Electromagnetic Follow-up to Gravitational Wave Events with the UltraViolet EXplorer (UVEX). PASP* 137 054101. arXiv:2501.14109

Rieck, S., Criswell, A.W., et al. (2024), *A stochastic gravitational wave background in LISA from unresolved white dwarf binaries in the Large Magellanic Cloud. MNRAS* 531 no. 2, 2642–2652. Co-first author. arXiv:2308.12437

Andreoni, I., Coughlin, M.W., Criswell, A.W., et al. (2024), *Enabling Kilonova Science with Nancy Grace Roman Space Telescope*. *Astroparticle Physics* 155, 102904. Contributed target-of-opportunity trigger criteria, statistics, and analysis of Roman performance for follow-up to binary neutron star and neutron star – black hole mergers during the 5th and 6th LIGO-Virgo-KAGRA observing runs. arXiv:2307.09511

Criswell, A.W., et al. (2023), *Needle in a Bayes Stack: a Hierarchical Bayesian Method for Constraining the Neutron Star Equation of State with an Ensemble of Binary Neutron Star Post-merger Remnants. Phys. Rev. D* 107, 043021. arXiv:2211.05250

Auclair, P., et al. (2023), *Cosmology with the Laser Interferometer Space Antenna*. *Living Reviews in Relativity* 26, no. 5. arXiv:2204.05434

Kulkarni, S.R., et al. (2021), *Science with the Ultraviolet Explorer (UVEX)*. arXiv:2111.15608 Contributed multi-messenger event selection criteria, simulations, and plots to section on UVEX electromagnetic follow-up to gravitational-wave detections.

Banagiri, S., Criswell, A.W., et al. (2021), *Mapping the Gravitational-wave Sky with LISA: A Bayesian Spherical Harmonic Approach*. *MNRAS* 507 no. 4, 5451–5462. Contributed to code development, science writing, and simulation/analysis of the Galactic unresolved white dwarf foreground. arXiv:2103.00826

Criswell, A.W. & Struck, C. (2019), *Effects of Coplanar Satellite Bands on Galactic Disc Evolution. MNRAS* 487 no. 2, 2969-2975.

Articles in Preparation

Data Analysis R&D Working Group (in-prep), *Living Review: LISA Data Challenges.* (to be submitted to *Living Reviews in Relativity*). Contributed sections on stochastic gravitational-wave background analyses, including descriptions of analysis techniques, evaluation of results, and discussion of future challenges. Ongoing contributions to writing/editing of the text at large.

Presentations

Invited Presentations

Gravitational-wave Population Inference in the Presence of Astrophysical Foregrounds. Special Seminar, University of Minnesota, Minneapolis, MN, Apr. 2026.

Gravitational-wave Population Inference in the Presence of Astrophysical Foregrounds. Seminar, l'Observatoire de la Côte d'Azur, Nice, France, Feb. 2026.

Anisotropic Stochastic Backgrounds in LISA. Invited talk, LISA Without Frontiers Workshop, Sexten Center for Astrophysics, Sexten, Italy, Jan. 2026.

Astrostatistics II: Astrophysical Inference. Invited lecture, NANOGrav Fall 2025 Student Workshop, Missoula, MT, Nov. 2025.

Stochastic Backgrounds and Anisotropies. Invited talk, Enabling Future Gravitational Wave Astrophysics in the Milli-Hertz Regime, MIAPbP, Garching, Germany, Jul. 2025.

Needle in Bayes Stack: Constraining the Neutron Star Equation of State with an Ensemble of Binary Neutron Star Post-merger Remnants. Seminar, LIGO Lab, California Institute of Technology, Pasadena, CA, Oct. 2023.

Contributed Presentations

Gravitational-Wave Population Inference for the LISA Era and Beyond. Talk, Gravitational Wave Physics and Astronomy Workshop, Dec. 2025.

Echoes from the Grave: Orphaned Pulsar Terms from Massive Binary Black Hole Mergers. Talk, NANOGrav Fall Meeting, Missoula, MT, Nov. 2025.

Simultaneous Inference of Multiple Stochastic Backgrounds and Foregrounds in LISA. Talk, the 15th Edoardo Amaldi Conference on Gravitational Waves (virtual), Jul. 2025.

Spectral Separation of Two Unresolved White Dwarf Binary Populations with LISA. Talk, AAS 245, National Harbor, MD, Jan. 2025.

Spectral Separation of Two Unresolved White Dwarf Binary Populations. Talk, LISA Consortium Astrophysics Working Group Meeting, Garching, Germany (presented remotely), Nov. 2024.

Needle in a Bayes Stack: Constraining the Neutron Star Equation of State with an Ensemble of Binary Neutron Star Post-merger Remnants. Talk, APS April Meeting, Minneapolis, MN, Apr. 2023.

The BayeStack Analysis: Final Results and Prospects. Talk, LIGO-Virgo-KAGRA Collaboration Meeting, Evanston, IL., Mar. 2023.

Characterizing Anisotropic Stochastic Gravitational Wave Backgrounds and Foregrounds with the Bayesian LISA Pipeline (BLIP). Talk, LISA Data Analysis Workshop: from Classical Methods to Machine Learning, Toulouse, France, Nov. 2022.

Constraining the Neutron Star Equation of State with an Ensemble of Binary Neutron Star Post-merger Remnants. Talk, the Gravitational Waves Physics and Astronomy Workshop in Hannover, Germany (presented remotely), Dec. 2021.

Constraining Neutron Star Composition with Post-merger Gravitational Waves: a Hierarchical Bayesian Approach. Talk, the 14th Edoardo Amaldi Conference on Gravitational Waves (virtual), Jul. 2021.

Exploring Anisotropic Gravitational Wave Backgrounds and Foregrounds with LISA. Talk, the 16th Marcel Grossman Meeting on General Relativity (virtual), Jul. 2021.

Posters

Characterizing Stochastic Gravitational Wave Backgrounds and Foregrounds with the Bayesian LISA Pipeline (BLIP). Poster, APS April Meeting, Minneapolis, MN, Apr. 2023.

Needle in a Bayes Stack: a Hierarchical Bayesian Method for Constraining the Neutron Star Equation of State with an Ensemble of Binary Neutron Star Post-merger Remnants. Poster, AAS 241, Seattle, WA, Jan. 2023.

Investigating the Galactic Double White Dwarf Foreground with the Bayesian LISA Pipeline (BLIP). Poster, LISA Symposium XIV (virtual), Jul. 2022.

Scientific Software Development

PELARGIR. Population Estimation for Lisa in A Reverse-jump Global Inference Regime. A GPU-accelerated Python prototype for Galactic binary population inference in the LISA Global Fit. Creator and primary developer. Openly developed on GitHub.

The Bayesian LISA Inference Package (BLIP). A Python package for simulation and Bayesian inference of multiple isotropic and anisotropic stochastic gravitational wave signals in LISA. Major contributor, current primary developer. Openly developed on GitHub.

UVEX-followup. A codebase for estimating prospects and evaluating strategies for follow-up with the UVEX space telescope to gravitational wave events. Creator and primary developer. Openly developed on GitHub.

UVEX Rate Updater. A simple tool for updating derived rate estimates for follow-up to gravitational wave events based on evolving rate estimates for the underlying population of compact binary mergers. Openly developed on GitHub.

BAYESTACK. Creator and primary developer. Openly developed on GitHub.

Professional Organizations

2025 – Present **Core Member, LISA Consortium**
Representative, LISA Consortium Council 2025-Present
2019 – 2025 **Member, Former LISA Consortium**
2024 – Present **Member, NANOGrav Collaboration**
2021 – Present **Member, Gravitational Wave Early Career Scientists**
2020 – Present **Member, UVEX Science Team**
2019 – Present **Member, American Astronomical Society**
2019 – Present **Member, LIGO-Virgo-KAGRA Scientific Collaboration**

Teaching

2025 **Guest Lecturer, ASTR 8090 (Relativistic Astrophysics)**
Vanderbilt University | Dept. of Physics and Astronomy

2025 **Guest Lecturer, ASTR 8070 (Astrostatistics)**
Vanderbilt University | Dept. of Physics and Astronomy

2025, 2026 **Guest Lecturer, ASTR 8001 (Order of Magnitude Astrophysics)**
Vanderbilt University | Dept. of Physics and Astronomy

2023 **Instructor of Record, AST 1001 (Introductory Astronomy)**
University of Minnesota | Minnesota Institute for Astrophysics

2021 **Teaching Assistant, AST 5731 (Bayesian Astrostatistics)**
University of Minnesota | Minnesota Institute for Astrophysics

2019 – 2020 **Lab Teaching Assistant, AST 1001 (Introductory Astronomy)**
University of Minnesota | Minnesota Institute for Astrophysics

Service

2025 – Present **LISA Consortium Council Representative**
Member Group Representative for BHAMMS

Fall 2025 **Organizing Committee Member, Fall 2025 Student Workshop**
NANOGrav Collaboration

2024 – Present **Steering Committee Member**
NSF Research Traineeship: Expanding Multimessenger Interdisciplinary Training (EMIT) | Fisk & Vanderbilt Universities

2023 – 2024 **Student Representative, Graduate Education Committee**
University of Minnesota | School of Physics and Astronomy

2023 – 2024 **Organizer, DSMMA Journal Club**
NSF Research Traineeship: Data Science in Multimessenger Astrophysics (DSMMA) | University of Minnesota | School of Physics and Astronomy

2022 – 2023 **Co-chair, Social Media & Outreach Committee**
Gravitational Wave Early Career Scientists

2022 – 2023 **Co-chair, Diversity, Equity, and Inclusion Committee**
Gravitational Wave Early Career Scientists

2021 – 2022 **Volunteer, AIP TEAM-UP**
University of Minnesota | School of Physics and Astronomy

2021 – 2022 **Student Representative**
NSF Research Traineeship: Data Science in Multimessenger Astrophysics (DSMMA) | University of Minnesota | School of Physics and Astronomy

Spring 2020 **Organizer/Panel Moderator, Symposium for Women in Data Science**
University of Minnesota | College of Science and Engineering

Outreach

2025 **Presenter and DJ, 10th Anniversary of Gravitational Waves**
Vanderbilt University

2023 – 2024 **Coordinator, Outreach through Science and Art**
Member, 2021 – Present; *Silent Sky* project lead, Fall 2022.
University of Minnesota

2022 – 2023 **Co-organizer and MC, Astronomy on Tap MPLS**
University of Minnesota | Minnesota Institute for Astrophysics

2020 – 2021 **Co-founder and Coordinator, Universe @ Home**
University of Minnesota | Minnesota Institute for Astrophysics

2019 – Present **Featured Speaker, Multiple Outreach Series**
Astronomy on Tap; Minnesota Institute for Astrophysics Public Nights; Science Under the Stars; Universe in the Park; Universe @ Home; MN Spacefest; Statewide Star Party

Educational Programming

Summer 2025 **Interdisciplinary Data Science Education in Astrophysics (IDEA)**
Fisk University | Dept. of Life and Physical Sciences
Co-founder and mentor. Secured funding, solicited applications, and supported 3 Fisk University data science students with $5000 stipends for 10 weeks of interdisciplinary research in machine learning + astrophysics.

Summer 2025 **EMIT Summer School**
Vanderbilt University | Dept. of Physics and Astronomy
Assisted in organization of school programming; contributed lecture on multimessenger astrophysics with LISA.