

Kelsey Lund, PhD

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APPOINTMENTS

| | |
|---|----------------|
| N3AS Postdoctoral Fellow | 2024 - Present |
| Network for Neutrinos, Nuclear Astrophysics, and Symmetries | Seattle, WA |
| UC Berkeley / Institute for Nuclear Theory | |
| Graduate Research Fellow | 2020 - 2024 |
| Center for Nonlinear Studies | Los Alamos, NM |
| Los Alamos National Laboratory | |
| Graduate Research Assistant | 2020-2024 |
| Department of Physics | Raleigh, NC |
| North Carolina State University | |

EDUCATION

| | |
|--|--------------|
| PhD Physics | 2024 |
| North Carolina State University | Raleigh, NC |
| Dissertation Title: | |
| How the Gentle Winds Beckon: r-Process Nucleosynthesis in Neutron Star Merger Winds | |
| MS Physics | 2020 |
| North Carolina State University | Raleigh, NC |
| BS Physics | 2017 |
| University of California San Diego | La Jolla, CA |

PUBLICATIONS

| | |
|--|------|
| Gamma Rays as a Signature of r-Process Producing Supernovae: Remnants and Future Galactic Explosions | 2025 |
| Z. Liu, E. Grohs, K.A. Lund , G. C. McLaughlin, M. Reichert, I.U. Roederer, R. Surman, X. Wang arXiv:2506.14991 (<i>Accepted to The Astrophysical Journal</i>) | |
| Angle-Dependent in-situ Fast Flavor Transformations in Post-Neutron Star Merger Disks | 2025 |
| K.A. Lund , P. Mukhopadhyay, J.M. Miller, G.C. McLaughlin Astrophysical Journal Letters, 985, L9 | |
| Kilonova Emissions from Neutron Star Merger Remnants: Implications for Nuclear Equation of State | 2025 |
| K.A. Lund , R. Somasundaram, G.C. McLaughlin, J.M. Miller, M.R. Mumpower, I. Tews The Astrophysical Journal, 987, 56 | |
| Nuclear Uncertainties Associated with the Ejecta of a Neutron-Star Black-Hole Accretion Disk | 2024 |
| M.R. Mumpower, T.M. Sprouse, J.M. Miller, K.A. Lund , J.C. Garcia, N. Vassh, G.C. McLaughlin, R. Surman The Astrophysical Journal, 970, 173 | |
| Magnetic Field Strength Effects on Nucleosynthesis from Neutron Star Merger Outflows | 2024 |
| K.A. Lund , G.C. McLaughlin, J.M. Miller, M.R. Mumpower The Astrophysical Journal, 964, 111 | |
| Emergent Nucleosynthesis from a 1.2 Second Long Simulation of a Black-Hole Accretion Disk | 2024 |
| T.M. Sprouse, K.A. Lund , J.M. Miller, G.C. McLaughlin, M.R. Mumpower The Astrophysical Journal, 962, 79 | |
| Superheavy Elements in Kilonovae | 2023 |
| E.M. Holmbeck, J. Barnes, K.A. Lund , T.M. Sprouse, G.C. McLaughlin, M.R. Mumpower Astrophysical Journal Letters, 951, L13 | |
| The Influence of β Decay Rates on r-Process Observables | 2023 |
| K.A. Lund , J. Engel, G.C. McLaughlin, M.R. Mumpower, E.M. Ney, R. Surman The Astrophysical Journal, 944, 144 | |
| Kilonovae Across the Nuclear Physics Landscape: the Impact of Nuclear Physics Uncertainties on r-Process Powered Emission | 2021 |
| J. Barnes, Y.L. Zhu, K.A. Lund , T.M. Sprouse, N. Vassh, G.C. McLaughlin, M.R. Mumpower, R. Surman The Astrophysical Journal, 918, 44 | |
| Modeling Kilonova Light Curves: Dependence on Nuclear Physics Inputs | 2021 |
| Y.L. Zhu, K.A. Lund , J. Barnes, T.M. Sprouse, N. Vassh, G.C. McLaughlin, M.R. Mumpower, R. Surman The Astrophysical Journal, 906, 94 | |

INVITED TALKS

INVITED SEMINARS

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| <i>Upcoming:</i> NYU Astrophysics Seminar (New York, NY) | Apr 2026 |
| GTSI Nuclear Science & SSI Seminar (Livermore, CA) | Jul 2025 |
| “Colors of the Winds: Painting a Picture of Neutron Star Merger Disks” | |
| University of Tennessee, Knoxville Physics & Astrophysics Seminar (virtual) | Apr 2025 |
| “Post-Neutron Star Merger Accretion Disk Winds: A Flavor Sampler” | |
| IReNA Online Seminar (virtual) | Feb 2025 |
| “Nucleosynthesis in Neutron Star Merger Remnant Winds” | |
| Notre Dame Astrophysics Seminar (South Bend, IN) | Oct 2024 |
| “How the Gentle Winds Beckon: Nucleosynthesis in Neutron Star Merger Winds” | |
| Los Alamos National Laboratory T-2 Distinguished Seminar Series (Los Alamos, NM) | Jul 2024 |
| “How the Gentle Winds Beckon: r-Process Nucleosynthesis in Neutron Star Merger Winds” | |
| Caltech Astronomy Tea Talk (Pasadena, CA) | Jan 2024 |
| “Magnetic Field Effects on r-Process Nucleosynthesis in Post-Merger Disk Outflows” | |
| University of Minnesota Nuclear Theory Seminar (virtual) | Oct 2023 |
| “To The Actinides and Beyond: Nucleosynthesis in Neutron Star Merger Disks” | |
| Virginia Tech Astronomy Seminar (Blacksburg, VA) | Apr 2023 |
| “Uncertainties and Opportunities in r-Process Observables” | |
| N3AS Seminar (virtual) | Aug 2022 |
| “Effects of Nuclear Uncertainties on r-Process Observables” | |
| Los Alamos National Laboratory T-2 Distinguished Seminar Series (Los Alamos, NM) | Jul 2022 |
| “Probing Sources of Uncertainty in Kilonova Modeling” | |

INVITED CONFERENCES & WORKSHOPS

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| <i>Upcoming:</i> APS Global Physics Summit (Denver, CO) | Mar 2026 |
| <i>Upcoming:</i> Physics and Astrophysics of Neutrino-Dense Environments Workshop (Aspen, CO) | Jan 2026 |
| APS Division of Nuclear Physics Meeting (Chicago, IL) | Oct 2025 |
| “Nuclear Uncertainties in r-Process Heavy Element Formation and Kilonova Modeling” | |
| INT Program 25-2b: From Colliders to the Cosmos (Seattle, WA) | Sep 2025 |
| “Interpreting Kilonova Signals to Constrain the Nuclear Equation of State” | |
| FRIB-TA Topical Program: Future Directions in Nuclear Beta Decay at FRIB (East Lansing, MI) | Sep 2025 |
| “ β -Decay Rates and Their Influence on Astrophysical r-Process Observables” | |
| SFB 1245 Annual Workshop (Leiman, Germany) | Nov 2024 |
| “Nucleosynthesis and Neutron Star Mergers” | |
| BRIDGCE-IReNA 2024 Annual Meeting (Guildford, UK) | Jul 2024 |
| “Magnetic Field Strength Effects on Nucleosynthesis from Neutron Star Merger Outflows” | |
| ECT* Workshop: MICRA (Microphysics in Computational Relativistic Astrophysics) (Trento, Italy) | Sep 2023 |
| “Magnetic Field Effects on Nucleosynthesis in Post-Merger Disk Outflows” | |
| INT Program 23-2: Astrophysical Neutrinos and the Origin of the Elements (Seattle, WA) | Aug 2023 |
| “A ‘Beta’ Look at Post-merger Nucleosynthesis” | |
| Remnants of Neutron-Star Mergers: Connecting Hydrodynamics Models to Nuclear, Neutrino, and Kilonova Physics (Darmstadt, Germany) | Oct 2022 |
| “Key Uncertainties in Astrophysical r-process Nucleosynthesis” | |
| INT Prog. 21-3: Radionuclides: Nuclear Physics, Astrophysical Models, and Observations (virtual) | Oct 2021 |
| “Nuclear Physics in Kilonova Modeling” | |

LECTURES

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| INTURN Lecture Series (Seattle, WA) | Nov 2025 |
| “Using Design to Communicate Physics Results” | |
| INTURN Lecture Series (Seattle, WA) | Apr 2025 |
| “Introduction to Nucleosynthesis in the Universe” | |
| North Carolina State University Nuclear Astrophysics Group (Raleigh, NC) | Jan 2022 |
| “matplotlib Tutorial for Nuclear Astrophysics” | |
| Universitat Politècnica de Barcelona (Barcelona, Spain) | Oct 2021 |
| “Nucleosynthesis in the Universe” | |

OTHER TALKS

CONTRIBUTED TALKS

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| International Symposium on Nuclei in the Cosmos XVIII (Barcelona, Spain) | Jun 2025 |
| “Neutrino Oscillations in Post-Merger Disks” | |
| APS Division of Nuclear Physics Meetings (Boston, MA) | Oct 2024 |
| “r-Process Nucleosynthesis from Neutron Star Merger Winds | |
| Los Alamos T-Division Student Lightning Talks (Los Alamos, NM) | Jul 2023 |
| “Magnetic Field Strength Effects on Nucleosynthesis in Merger Driven Outflows | |
| International School of Nuclear Physics, 43rd Course (Erice, Italy) | Sep 2022 |
| “Kilonova Modeling: Nuclear Physics, Magnetic Fields, Neutrinos | |
| Los Alamos T-Division Student Lightning Talks (Los Alamos, NM) | Aug 2022 |
| “Magnetic Fields in Kilonova Modeling” | |
| Awarded 1st Place prize | |
| N3AS Summer School in Multi-Messenger Astrophysics (Santa Cruz, CA) | Aug 2022 |
| “Kilonova Modeling” | |
| 15th International Conference on Nuclear Data for Science and Technology (virtual) | Jul 2022 |
| “Probing Nuclear Uncertainties in Kilonova Modeling” | |
| Center for Nonlinear Studies Student Series (Los Alamos, NM) | Jul 2022 |
| “Kilonova Modeling: Magnetic Fields, Neutrinos, Nuclear Physics” | |
| ChETEC-INFRA Schools on Nuclear Astrophysics Questions (virtual) | Jan 2022 |
| “Actinide Dating Stars: Nuclear Uncertainties in Cosmic Age | |
| ECT* Workshop: KRINA (Key Reactions in Nuclear Astrophysics) (virtual) | Jun 2021 |
| “Sensitivity of the Observed Kilonova Signal to Nuclear Physics” | |
| Southeast Section APS (SESAPS) Meeting (virtual) | Nov 2020 |
| “Identification of Key Isotopes in Kilonova Heating” | |
| APS Division of Nuclear Physics Meeting (virtual) | Nov 2020 |
| “Identification of Key Isotopes in Kilonova Heating” | |
| FIRE Collaboration Annual Meeting (virtual) | Jul 2020 |
| “Identification of Key r-Process Isotopes in Kilonova Heating” | |
| APS Divsion of Nuclear Physics Meetings (Crystal City, VA) | Oct 2019 |
| “Uncertainties in Kilonova Heating from Nuclear Physics Inputs” | |
| FIRE Collaboration Annual Meeting (Upton, NY) | Jun 2019 |
| “Uncertainties in Kilonova Light Curves from Nuclear Physics: A Case Study” | |
| NRAO Seminar Series (Socorro, NM) | 2016 |
| “Probing Magnetized Turbulence in the Fermi Bubbles” | |
| APS Pacific Coast Gravity Meeting (Fullerton, CA) | 2016 |
| “On The Astrophysical Origin of the Elements” | |

POSTERS

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| RIKEN iTHEMS NOW&NEXT25 (Wakō, Japan) | Jul 2025 |
| “Neutrino Fast Flavor Oscillations in Neutron Star Merger Disks” | |
| Neutrinos in Physics and Astrophysics (Berkeley, CA) | Jan 2025 |
| “r-Process Nucleosynthesis from Post-Merger Disks with Monte Carlo Neutrino Transport: Effects of Magnetic Field Strength” | |
| International Symposium on Nuclei in the Cosmos XVII (Daejeon, Korea) | Sep 2023 |
| “Magnetic Field Effects on Nucleosynthesis from Merger Outflows” | |
| Awarded prize for Outstanding Poster Presentation | |
| JINA Frontiers in Nuclear Astrophysics Meeting (South Bend, IN) | May 2022 |
| “Actinide-Dating Stars: Nuclear Uncertainties in Cosmic Age” | |
| North Carolina State University Graduate Student Research Symposium (Raleigh, NC) | Apr 2022 |
| “Actinide-Dating Stars: Nuclear Uncertainties in Cosmic Age” | |
| AAS Winter Meeting (Grapevine, TX) | Jan 2017 |
| “Probing Magnetized Turbulence in the Fermi Bubbles” | |
| NAC IV Workshop (Washington, DC) | Oct 2016 |
| “Probing Magnetized Turbulence in the Fermi Bubbles” | |

MENTORSHIP

University of Washington / Institute for Nuclear Theory:

Part of leadership team for INT Undergraduate Research Network (INTURN)
Current research mentor for **one undergraduate student** through INTURN

UC Berkeley:

Current research mentor for **one undergraduate student** through N3AS
Current career mentor for **two undergraduate students** through N3AS

Other:

Ongoing mentorship and research assistance provided to graduate students at various institutions

OTHER ACADEMIC ACTIVITIES

2025

Community Work:

- University of Washington Physics Postdoc Professional Development Committee Member (*ongoing*)
- Rising Researchers Seminar Series Core Committee member (*ongoing*)
- Organizer for N3AS Seminar Series (*ongoing*)
- Panelist at Time Domain and Multi-Messenger Astrophysics (TDAMM) IV Workshop *Oct 2025*
- Organizing Committee CeNAM Frontiers 2026 (*upcoming in College Station, TX*)
- Local Organizing Committee for International Symposium on Nuclei in the Cosmos (*until Jun 2025*)

Workshops & Schools:

- Nuclei in the Cosmos School ([Barcelona, Spain](#))
- CeNAM/INT Nucleosynthesis Uncertainties Workshop ([Seattle, WA](#))

2024

- INT Workshop 24-89W: EOS Measurements with Next-Generation Gravitational-Wave Detectors ([Seattle, WA](#))

2022

- N3AS Summer School in Multi-Messenger Astrophysics ([Santa Cruz, CA](#))
- JINA-CEE Frontiers in Nuclear Astrophysics Meeting ([South Bend, IN](#))

2021

- INT Workshop 21-79W: New Directions in Neutrino Flavor Evolution in Astrophysical Systems ([virtual](#))
- International Neutrino Summer School ([virtual](#))
- ECT* Workshop: Probing Nuclear Physics with Neutron Star Mergers ([virtual](#))
- International Workshop on Weak Interactions and Neutrinos ([virtual](#))

2020

- JINA-Horizons Workshop ([virtual](#))

2019

- ECT* Workshop: Nuclear and Astrophysics Aspects for the Rapid Neutron Capture Process in the Era of Multi-Messenger Observations ([Trento, Italy](#))
- FOE19 Fifty-one Erg Conference ([Raleigh, NC](#))
- JINA First Frontiers Summer School ([East Lansing, MI](#))

2018

- Neutron Physics Summer School ([Raleigh, NC](#))

OUTREACH

Upcoming Astronomy on Tap public talk ([Seattle, WA](#))

Nov 2025

Astronomy Days at North Carolina Museum of Natural Sciences ([Raleigh, NC](#))

Jan 2023

Astronomy on Tap public Talk ([Durham, NC](#))

Nov 2022

Astronomy Days at North Carolina Museum of Natural Sciences ([Raleigh, NC](#))

Jan 2022

LEAP Workshop at North Carolina State University ([Raleigh, NC](#))

Aug 2018

Designed plan for Galaxy Garden at VLA visitor center ([Magdalena, NM](#))

Jul 2017

Restored 2-dish interferometer at Frank T. Etscorn Observatory ([Socorro, NM](#))

Jul 2017

Public Tours of Very Large Array (VLA) facilities ([Magdalena, NM](#))

Jul 2016

LANGUAGES

Native Proficiency: English, Catalan, Spanish

Working Proficiency: Italian

Elementary Proficiency: French, German

Computational: Python, HPC and large-scale simulations, Mathematica, Data Visualization, Data analysis

SELECTED REFERENCES

Gail McLaughlin

Professor

Dept. of Physics

North Carolina State University

Raleigh, NC

gcmclaug@ncsu.edu

Ingo Tews

Staff Scientist

T-2

Los Alamos National Laboratory

Los Alamos, NM

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Rebecca Surman

Professor

Dept. of Physics

Notre Dame University

South Bend, IN

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Jonah Miller

Staff Scientist

SPARC

Los Alamos National Laboratory

Ann Arbor, MI

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George Fuller

Professor

Dept. of Physics

UC San Diego

La Jolla, CA

gfuller@ucsd.edu