

# Kelsey Lund, PhD

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## EXPERIENCE

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2024 - Present    **UC Berkeley / Institute for Nuclear Theory** *N3AS Postdoctoral Fellow*, Seattle, WA  
2020 - 2024    **Los Alamos National Laboratory** *Graduate Research Assistant*, Los Alamos, NM  
2018 - 2024    **North Carolina State University** *Graduate Research Assistant*, Raleigh, NC

## EDUCATION

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2024    **Ph.D. Physics** North Carolina State University, Raleigh, NC  
         **Dissertation Title** “*How the Gentle Winds Beckon: r-Process Nucleosynthesis in Neutron Star Merger Winds*”  
2020    **M.S. Physics** North Carolina State University, Raleigh, NC  
2017    **B.S. Physics** University of California San Diego, La Jolla, CA

## PUBLICATIONS

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Z. Liu, E. Grohs, **K.A. Lund** et al. “Gamma Rays as a Signature of r-Process Producing Supernovae: Remnants and Future Galactic Explosions”, *arXiv:2506.14991* (2025)  
**K.A. Lund**, P. Mukhopdhyay et al. “Angle-Dependent in-situ Fast Flavor Transformations in Post-Neutron Star Merger Disks”, *ApJL*, 985, L9 (2025)  
**K.A. Lund**, R. Somasundaram et al. “Kilonova Emissions from Neutron Star Merger Remnants: Implications for Nuclear Equation of State”, *ApJ*, 987, 56 (2024)  
M.R. Mumpower, T.M. Sprouse, J.M. Miller, **K.A. Lund** et al. “Nuclear Uncertainties Associated with the Ejecta of a Neutron-Star Black-Hole Accretion Disk”, *ApJ*, 970, 173 (2024)  
**K.A. Lund**, G.C. McLaughlin et al. “Magnetic Field Strength Effects on Nucleosynthesis from Neutron Star Merger Outflows”, *ApJ*, 964, 111 (2024)  
T.M. Sprouse, **K.A. Lund** et al. “Emergent Nucleosynthesis from a 1.2 Second Long Simulation of a Black-Hole Accretion Disk”, *ApJ* 962, 79 (2024)  
E.M. Holmbeck, J. Barnes, **K.A. Lund**, et al. “Superheavy Elements in Kilonovae”, *ApJL* 951, L13 (2023)  
**K.A. Lund**, J. Engel et al. “The Influence of Beta Decay Rates on r-Process Observables”, *ApJ* 944, 144 (2023)  
J. Barnes, Y.L. Zhu, **K.A. Lund**, et al. “Kilonovae Across the Nuclear Physics Landscape: the Impact of Nuclear Physics Uncertainties on r-Process Powered Emission”, *ApJ* 918, 44 (2021)  
Y.L. Zhu, **K.A. Lund** et al. “Modeling Kilonova Light Curves: Dependence on Nuclear Physics Inputs” *ApJ* 906, 94 (2021)

## TALKS

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### Invited Talks

2025 Oct    **APS Division of Nuclear Physics Meetings**  
         “Nuclear Uncertainties in r-Process Heavy Element Formation and Kilonova Modeling” (Chicago, IL)  
2025 Sep    **INT Program 25-2b: From Colliders to the Cosmos**  
         “Interpreting Kilonova Signals to Constrain the Nuclear Equation of State” (Seattle, WA)  
         **FRIB-TA Topical Program: Future Directions in Nuclear Beta Decay at FRIB**  
         “ $\beta$ -Decay Rates and Their Influence on Astrophysical r-Process Observables” (East Lansing, MI)  
2025 Jul    **GTSI Nuclear Science & SSI Seminar**  
         “Colors of the Winds: Painting a Picture of Neutron Star Merger Disks” (Livermore, CA)  
2025 Apr    **UTK Physics & Astrophysics Seminar**  
         “Post-Neutron Star Merger Accretion Disk Winds: A Flavor Sampler” (virtual)  
2025 Feb    **IReNA Online Seminar**  
         “Nucleosynthesis in Neutron Star Merger Remnant Winds” (virtual)  
2024 Nov    **SFB 1245 Annual Workshop**  
         “Nucleosynthesis and Neutron Star Mergers” (Leiman, Germany)  
2024 Oct    **Notre Dame Astrophysics Seminar**  
         “How the Gentle Winds Beckon: Nucleosynthesis in Neutron Star Merger Winds” (South Bend, IN)  
2024 Jul    **Los Alamos National Laboratory T-2 Seminar**  
         “How the Gentle Winds Beckon: r-Process Nucleosynthesis in Neutron Star Merger Winds” (Los Alamos, NM)  
         **BRIDGCE-IReNA 2024**  
         “Magnetic Field Strength Effects on Nucleosynthesis from Neutron Star Merger Outflows” (Guildford, UK)

- 2024 Jan **Caltech Astronomy Tea Talk**  
*"Magnetic Field Effects on r-Process Nucleosynthesis in Post-Merger Disk Outflows"* (Pasadena, CA)
- 2023 Oct **University of Minnesota Nuclear Theory Seminar**  
*"To The Actinides and Beyond: Nucleosynthesis in Neutron Star Merger Disks"* (virtual)
- 2023 Sep **ECT\* Workshop: MICRA (Microphysics in Computational Relativistic Astrophysics)**  
*"Magnetic Field Effects on Nucleosynthesis in Post-Merger Disk Outflows"* (Trento, Italy)
- 2023 Aug **INT Program 23-2: Astrophysical Neutrinos and the Origin of the Elements**  
*"A "Beta" Look at Post-merger Nucleosynthesis"* (Seattle, WA)
- 2023 Apr **Virginia Tech Astronomy Seminar**  
*Uncertainties and Opportunities in r-Process Observables* (Blacksburg, VA)
- 2022 Oct **Remnants of Neutron-Star Mergers: Connecting Hydrodynamics Models to Nuclear, Neutrino, and Kilonova Physics**  
*Key Uncertainties in Astrophysical r-process Nucleosynthesis* (Darmstadt, Germany)
- 2022 Aug **N3AS Seminar**  
*"Effects of Nuclear Uncertainties on r-Process Observables"* (virtual)  
**Los Alamos National Laboratory T-Division Seminar**  
*"Probing Sources of Uncertainty in Kilonova Modeling"* (Los Alamos, NM)
- 2021 Oct **Universitat Politècnica de Barcelona**  
*"Nucleosynthesis in the Universe"* (Barcelona, Spain)  
**INT Program 21-3- Radionuclides: Nuclear Physics, Astrophysical Models, and Observations**  
*"Nuclear Physics in Kilonova Modeling"* (virtual)

## Contributed Talks

- 2025 Jun **International Symposium on Nuclei in the Cosmos XVIII**  
*Neutrino Oscillations in Post-Merger Disks* (Girona, Spain)
- 2024 Oct **APS Division of Nuclear Physics Meeting**  
*r-Process Nucleosynthesis from Neutron Star Merger Winds* (Boston, MA)
- 2023 Jul **T-Division Student Lightning Talks**  
*Magnetic Field Strength Effects on Nucleosynthesis in Merger Driven Outflows* (Los Alamos, NM)
- 2022 Sep **International School of Nuclear Physics, 43rd Course**  
*Kilonova Modeling: Nuclear Physics, Magnetic Fields, Neutrinos* (Erice, Sicily)
- 2022 Aug **T-Division Student Lightning Talks**  
*Magnetic Fields in Kilonova Modeling* (Los Alamos, NM)  
**Awarded 1<sup>st</sup> Place prize**  
**N3AS Summer School in Multi-Messenger Astrophysics**  
*Kilonova Modeling* (Santa Cruz, CA)
- 2022 Jul **15<sup>th</sup> International Conference on Nuclear Data for Science and Technology**  
*Probing Nuclear Uncertainties in Kilonova Modeling* (virtual)  
**Center for Nonlinear Studies Student Series**  
*Kilonova Modeling: Magnetic Fields, Neutrinos, Nuclear Physics* (Los Alamos, NM)
- 2022 Jan **ChETEC-INFRA Schools on Nuclear Astrophysics Questions**  
*Actinide Dating Stars: Nuclear Uncertainties in Cosmic Age* (virtual)
- 2021 Jun **ECT\* Workshop: KRINA (Key Reactions in Nuclear Astrophysics)**  
*Sensitivity of the Observed Kilonova Signal to Nuclear Physics* (virtual)
- 2020 Nov **SESAPS Meeting**  
*Identification of Key Isotopes in Kilonova Heating* (virtual)  
**APS Division of Nuclear Physics Meeting**  
*Identification of Key Isotopes in Kilonova Heating* (virtual)
- 2020 Jul **FIRE Collaboration Annual Meeting**  
*Identification of Key r-Process Isotopes in Kilonova Heating* (virtual)
- 2019 Oct **APS Division of Nuclear Physics Meeting**  
*Uncertainties in Kilonova Heating from Nuclear Physics Inputs* (Crystal City, VA)
- 2019 Jun **FIRE Collaboration Annual Meeting**  
*Uncertainties in Kilonova Light Curves from Nuclear Physics: A Case Study* (Upton, NY)
- 2016 **NRAO Seminar Series**  
*Probing Magnetized Turbulence in the Fermi Bubbles* (Socorro, NM)  
**APS Pacific Coast Gravity Meeting**  
*On The Astrophysical Origin of the Elements* (Fullerton, CA)
- 2014 **Honors Transfer Council of California Research Conference**  
*Quantum Relativistic Effects on Inorganic Matter* (Irvine, CA)

## Posters

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

## FUNDING

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- 2023 LANL Center for Nonlinear Studies Graduate Research Fellowship  
EUSTIPEN Travel Grant  
JINA Travel Grant
- 2022 Seaborg Institute Graduate Student Research Fellowship  
LANL Center for Nonlinear Studies Graduate Research Fellowship  
JINA Travel Grant
- 2019 EUSTIPEN Travel Grant  
JINA Travel Grant

## OUTREACH

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- 2023 Jan **Astronomy Days** at North Carolina Museum of Natural Sciences ([Raleigh, NC](#))
- 2022 Nov **Astronomy on Tap** ([Durham, NC](#))
- 2020 Jan **Astronomy Days** at North Carolina Museum of Natural Sciences ([Raleigh, NC](#))
- 2018 Aug **LEAP Workshop** at North Carolina State University ([Raleigh, NC](#))
- 2017 Jul **Designed plan for Galaxy Garden** at VLA visitor center ([Magdalena, NM](#))
- 2017 Jul **Restored 2-dish interferometer** at Frank T. Etschorn Observatory ([Socorro, NM](#))
- 2016 Jul **Public Tours** of Very Large Array (VLA) facilities ([Magdalena, NM](#))

## PROFESSIONAL DEVELOPMENT

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- 2025 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](#))

## LANGUAGES

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**Native Proficiency:** English, Catalan, Spanish

**Working Proficiency:** Italian

**Elementary Proficiency:** French, German

**Computational:** Python, HPC, Mathematica, Data Visualization

## SELECTED REFERENCES

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**Prof. Gail McLaughlin**

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NC State University  
Raleigh, NC 27697  
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**Dr. Jonah Miller**

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