

JING LU

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EDUCATION **PhD in Physics, Florida State University (FSU)** 2016 – 2023
Advisor: Prof. Eric Y. Hsiao
Dissertation: Improving the Precision of Type Ia Supernova Cosmology

B.S in Physics, Nanjing Normal University (NNU), China 2012 – 2016
Advisor: Prof. Qirong Yuan
Thesis: Statistical Studies of Galaxy Evolution and Star Formation Rates

PROFESSIONAL **Postdoctoral Research Associate, Michigan State University (MSU)** 2023 – 2026
EXPERIENCE *Advisor: Prof. Wolfgang E. Kerzendorf*


- Developed a deep-learning emulator for TARDIS radiative-transfer simulations using a DenseNet architecture, achieving a 10^8 x speedup in spectral synthesis with $\sim 1\%$ prediction error [**Publication: Lu et al., 2026**; Zenodo record].
- Employed a nested sampling Bayesian inference framework utilizing the above neural network emulator, enabling fast exploration of high-dimensional parameter spaces.
- Built a pipeline linking physics-driven hydrodynamical models to synthetic observables, resulting in a scalable open-source supernova modeling framework [**Publication: Lu et al., 2025**; Zenodo record].
- Core maintainer of the open-source radiative-transfer code (TARDIS); improved reliability and maintainability through unit and regression testing, documentation, and structured code reviews.
- Led interdisciplinary coordination and community development for the TARDIS collaboration, managing Google Summer of Code participation and organizing international workshops.
- Mentored long-term projects across Google Summer of Code, M.S. thesis, and the Professorial Assistant program at Michigan State University, emphasizing maintainable, standards-compliant code.

Graduate Research Assistant, Florida State University 2017 – 2023
Advisor: Prof. Eric Y. Hsiao

- Developed generative models for supernova template spectra using Principal Components Analysis (PCA), Gaussian Process Regression and a conditional variational autoencoder, reducing redshift-driven systematics by $\sim 90\%$ [**Publication: Lu et al., 2023**].
- Statistically compared synthetic and observed data for hypothesis testing, identifying a novel causal mechanism behind an anomalous supernova time-series feature [**Publication: Ashall, Lu et al., 2022**; featured by AAS NOVA].
- Awarded top prizes at the 2021 ML4SCI Hackathon for ML solutions including a U-Net GAN for albedo reconstruction, a deep-learning predictor for dark-matter halo, and an autoencoder for circumgalactic medium spectra.

PUBLICATIONS As of April 2026, I have contributed to **40+** referred publications with **1000+ citations** (h-index of 21), which includes:

- **4 papers** as **lead-author** with 70+ citations
- **4 papers** as **significant contributors** with 200+ citations

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SKILLS	<p>Computational:</p> <ul style="list-style-type: none"> • Programming Languages: Python (10 years, primary), IDL (5 years), C, Matlab • Domain: Machine Learning, Bayesian Inference, Uncertainty Quantification, Computational Physics, High-Performance Computing, Data Visualization, Time Series Analysis, Regression • Frameworks and Tools: Pytorch, TensorFlow, Scikit-Learn, Numba, Pytest, Matplotlib, Seaborn, Plotly, Altair, Dash, Jupyter, VS code, Git, CI/CD, SLURM, Snakemake, Vim, Bash/zsh, L^AT_EX <p>Open-Source/Science Contribution:</p> <ul style="list-style-type: none"> • Author: BYOST (<i>Data-Driven Spectral Time Series Templates</i>) • Contributor: <ul style="list-style-type: none"> • TARDIS (<i>Monte Carlo Radiative-Transfer Spectral Synthesis</i>) • SNooPY (<i>Supernovae Light Curve fitting</i>) <p>Astrophysical Observations:</p> <ul style="list-style-type: none"> • Photometry: SWOPE Telescope, Las Campanas Observatory, Chile • Spectroscopy: Magellan Telescopes (IMACS, FIRE), Las Campanas Observatory, Chile
AWARDED PROPOSALS	<p>NumFocus Small Development Grant, \$10,000 2024 <i>Enhancing TARDIS Community Engagement through Improving Documentation</i></p> <p>PI. - NOIRLab, 1 night observation time on Badde Telescope 2023 <i>2023A-503636: Optical and NIR Spectroscopy of Young Supernovae</i></p> <p>Co.I. - JWST, total 168 hours on NIRSpec + MIRI 2023-2025 <i>Programs on Spectral Follow Up of Supernovae: DD-4575, 6677, 4522, 4520, 4436; GO-9264,9262, 6583,6582, 6213, 6023, 5290, 5057, 4217, 3726, 2114</i></p>
AWARDS & HONORS	<p>Evelyn and John Baugh Research Presentation Scholarship, FSU 2021,2022</p> <p>Outstanding Teaching Assistant Nomination, FSU 2020,2021</p> <p>First Prize in Machine Learning for Science hackathon (ML4SCI) 2021</p> <p>Anna H. Runyan Endowed Scholarship Fund in Physics, FSU 2021</p> <p>Clara Kibler Davis Scholarship in Physics, FSU 2020</p> <p>First Prize in Mathematical Modeling Contest, NNU 2014</p> <p>Excellent Student Scholarship (five times), NNU 2012–2016</p>
TEACHING EXPERIENCE	<p>Graduate Teaching Assistant, Florida State University 2016-2022</p> <p>I have instructed over 1,000 undergraduate students across 18 semesters of these courses:</p> <ul style="list-style-type: none"> • Lecture Instructor for <i>Planets, Stars, and Galaxies (AST1002)</i> • Studio Assistant for <i>College Physics A (PHY2053C)</i> • Lab Instructor for <ul style="list-style-type: none"> • <i>College Physics B (PHY2054C)</i> • <i>Physics and Technology for Future Presidents Laboratory (PHY1020L)</i>
MENTORING EXPERIENCE	<p>M.S. Thesis Research Mentor, Michigan State University</p> <p>Deeksha Mohanty: <i>Accelerating Convergence in Radiative Transfer Simulations</i> 2023-2025</p> <p>Yuki Matsumura: <i>Investigating Continuum Opacity in TARDIS</i> 2023</p>

Undergraduate Mentor, Professorial Assistant, Michigan State University 2023-2025
 Erin Visser: *Open-Source Radiative Transfer Code Development and Documentation*

Google Summer of Code Mentor, TARDIS Collaboration 2024
 Asish Kumar: *TARDIS Benchmarking and Performance Improvement*

Undergraduate Research Mentor, Florida State University 2022
 Amber Collinsworth-Burnett: *Optical Spectral Diversity and Template of Type Ia Supernovae*

PROFESSIONAL
 ACTIVITIES &
 SERVICES

Peer Review

- **Panel Reviewer** for NASA ROMAN 2025
- **Journal Referee** for A&A, OJAA 2023-present

Scientific Events Organization

- **TARDIS Connector Workshop**, CCA at Flatiron Institute Mar. 2025
Developing end-to-end supernova simulation pipeline using open-source software
- **TARDIS Summer School**, Michigan State University July. 2025
Teaching the basics of radiative transfer and how to use TARDIS
- **Nuclear-Astro Meetup**, Michigan State University 2024
Connecting local nuclear-astrophysics and astronomy community
- **Google Summer of Code - Project TARDIS**, Virtual, Supported by Google 2024
Administering student selections and progress tracking

Committee and Leadership

- **Collaboration Coordinator**, TARDIS Collaboration 2023-present
- **Committee Member**, Astro Seminar, Michigan State University 2023-2024
- **Committee Member**, FSU Observatory, Florida State University 2018-2022
- **Pilot Program Designer and Maintainer**, POISE Collaboration 2019-2023

OUTREACH &
 ENGAGEMENT

Astronomy on Tap, Lansing, Michigan 2023-2026
Active Participant: Giving public talks and answering astronomy-related questions

We Are All Star Stuff Astronomy Program, Florida State University 2018-2022
Co-organizer: Introduced astronomy to local high school students

Physics Open House, Florida State University Feb. 2019
Volunteer

Astronomy Club, Nanjing Normal University 2013-2014
Leader: Organized roadside observations, star gazings, public talks, and observatory visits

SELECTED
 PRESENTATIONS

Transients From Space, Space Telescope Science Institute (*Poster Pop*) Mar. 2025
Observable Modeling for Physics-Driven Explosions of Stripped Stars

POISE Collaboration Meeting, St. George Island, Florida Nov. 2024
Synthetic Observables of Physics-Driven Stripped Massive Star Explosions

Rise_Time Conference, Purdue University (*Contributed talk*) Aug. 2024
Synthetic Observables of Physics-Driven Stripped Massive Star Explosions

TUNA Lunch Talk, NRAO, VA (*Invited*) May. 2024
The Mystery of Type I Supernovae

Astrophysics Seminar, Michigan State University. Apr. 2024
The Mystery of Type I Supernovae

Garching SN Meeting , MPIA, Germany (<i>Invited</i>) <i>Type Ic Supernovae Emulator and Inference</i>	<i>Dec. 2023</i>
17th Wuerzburg Winter Workshop , Heidelberg, Germany <i>Type Ic Supernovae Emulator and Inference</i>	<i>Dec. 2023</i>
POISE Collaboration Meeting , Space Telescope Science Institute <i>Radiative transfer emulator and inference</i>	<i>Aug. 2023</i>
SuperVirtual 2022 , virtual (<i>contributed talk</i>) <i>CSP-II: Near-infrared spectral diversity and template of Type Ia supernovae</i>	<i>Nov. 2022</i>
Supernova and Cosmology Workshop , Cooks Branch, TX (<i>Invited</i>) <i>CSP-II: Improved Near-Infrared spectral templates for K-corrections</i>	<i>Mar. 2022</i>
APS Southeastern Section Annual Meeting , Tallahassee, FL (<i>contributed talk</i>) <i>Super-Chandrasekhar (O3fg-like) Type Ia Supernova</i>	<i>Nov. 2021</i>
Astrophysics Seminar , Florida State University <i>ASASSN-15hy: A doubly weird type Ia Supernova</i>	<i>Jan. 2021</i>
