

# Chang Liu

TIME-DOMAIN ASTRONOMER

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## Education

**PHD CANDIDATE** Department of Physics and Astronomy, Northwestern University

Sep 2021 –

- Advisor: Adam A. Miller
- Thesis (in prep.): *The Progenitor Demographics of Type Ia Supernovae*

**MASTER OF SCIENCE** Department of Physics and Astronomy, Northwestern University

Sep 2021 – Jun 2023

**BACHELOR OF SCIENCE (HON)** Department of Astronomy, Peking University

Sep 2016 – Jun 2020

## Research Interests

- **Surveys & Machine Learning:** Leveraging advanced statistical and machine learning techniques to identify population-level patterns of transients in large-scale time-domain survey datasets (e.g., ZTF, LS4, LSST).
- **Supernovae (SNe):** Type Ia SN explosion mechanisms, infant SNe, nebular-phase spectroscopy, spectral modeling.
- **Tidal disruption events (TDEs):** Repeating partial TDEs, hydrodynamical simulations, volumetric rate estimation.
- **Software:** Open source software development, spectroscopic data reduction, JAX acceleration.

## Skills

<b>Astronomy</b>	Transient follow-up, spectroscopic observations and data reduction
<b>Data Science</b>	Hierarchical Bayesian modeling, Gaussian processes, gradient boosting
<b>Programming</b>	<b>Proficient:</b> Python <b>Experienced:</b> Shell, Fortran, SQL <ul style="list-style-type: none"><li>• HostSub_GP (<b>developer</b>): removing host galaxy background in transient spectroscopy</li></ul>
<b>Softwares</b>	<ul style="list-style-type: none"><li>• BayeSpecFit (<b>developer</b>): fitting blended supernova spectroscopic features with Bayesian inference</li><li>• Pypeit: optical/NIR spectrum reduction</li></ul>

## Selected Publications

7 first-author papers out of 25 publications

- **C. Liu**, A. A. Miller., HostSub\_GP: Precise Galaxy Background Subtraction in Transient Spectroscopy with Gaussian Processes, *arXiv: 2508.15278*.
- **C. Liu**, A. A. Miller, J. S. Bloom, et al., A Morphological Model to Separate Resolved–Unresolved Sources in the DESI Legacy Surveys: Application in the LS4 Alert Stream, 2025, *PASP*, 137, 084501.
- **C. Liu**, R. Yarza, & E. Ramirez-Ruiz., Repeating Partial Tidal Encounters of Sun-like Stars Leading to their Complete Disruption, 2025, *ApJ*, 979, 40.
- **C. Liu**, A. A. Miller, S. J. Boos, et al., SN 2022joj: A Peculiar Type Ia Supernova Possibly Driven by an Asymmetric Helium-shell Double Detonation, 2023, *ApJ*, 958, 178.
- **C. Liu**, A. A. Miller, A. Polin, et al., SN 2020jgb: A Peculiar Type Ia Supernova Triggered by a Helium-Shell Detonation in a Star-Forming Galaxy, 2023, *ApJ*, 946, 83.
- **C. Liu**, B. Mockler, E. Ramirez-Ruiz, et al., Tidal Disruption Events from Eccentric Orbits and Lessons Learned from the Noteworthy ASASSN-14ko, 2023, *ApJ*, 944, 184.
- **C. Liu**, X. Chen, & F. Du, Impact of an Active Sgr A\* on the Synthesis of Water and Organic Molecules Throughout the Milky Way, 2020, *ApJ*, 899, 2.

- A. A. Miller et al. (incl. **C. Liu**), The La Silla Schmidt Southern Survey, 2025, *accepted by PASP*.
- J. C. Rastinejad et al. (incl. **C. Liu**), EP 250108a/SN 2025kg: Observations of the most nearby Broad-Line Type Ic Supernova following an Einstein Probe Fast X-ray Transient, 2025, *ApJL*, 988, L13.
- N. Rehemtulla et al. (incl. **C. Liu**), The BTSbot-nearby discovery of SN 2024jlf: rapid, autonomous follow-up probes interaction in an 18.5 Mpc Type IIP supernova, 2025, *ApJ*, 985, 241.
- P. Chen et al. (incl. **C. Liu**), A 12.4 Day Periodicity in a Close Binary System after a Supernova, 2023, *Nature*, 625, 7994, 253-258.
- G. Dimitriadis et al. (incl. **C. Liu**), SN 2021zny: an early flux excess combined with late-time oxygen emission suggests a double white dwarf merger event, 2023, *MNRAS*, 521, 1162.

## Telescope Experience

<b>Observing Runs</b>	Keck I (LRIS    7 n, MOSFIRE    1 n), Keck II (DEIMOS    1 n), Magellan (FIRE    3 n)	2023 – 2025
<b>PI</b>	10 m Keck Telescopes, Northwestern    1.5 n	2025B
<b>PI</b>	6.5 m Magellan Baade Telescope, Northwestern    1 n	2025B
<b>PI</b>	2.56 m Nordic Optical Telescope (NOT), NOIRLab    8 hr	2025B
<b>PI</b>	6.5 m Magellan Baade Telescope, Northwestern    1 n	2025A
<b>PI</b>	2.56 m Nordic Optical Telescope (NOT), NOIRLab    6 hr	2025A
<b>PI</b>	4.1 m Southern Astrophysical Research (SOAR) Telescope, NOIRLab    10 hr	2025A
<b>PI</b>	10 m Keck Telescopes, Northwestern    2 n	2024B

## Talks & Posters

<b>Seminar</b>	Carnegie arXiv Tea, Carnegie Observatories	Pasadena, US	Sep 2025
<b>Seminar</b>	Astronomy Tea Talk, California Institute of Technology	Pasadena, US	Sep 2025
<b>Talk</b>	Keck Science Meeting	Los Angeles, US	Sep 2025
<b>Poster</b>	Open SkAI 2025	Chicago, US	Sep 2025
<b>Poster</b>	CIERA Fellows at 15	Evanston, US	Aug 2025
<b>Talk</b>	One Hundred Years of Supernova Science	Saltsjöbaden, Sweden	Aug 2025
<b>Talk</b>	Cosmic Lighthouses: Astrophysical and Cosmological Challenges with SNe Ia	Cambridge, UK	Jul 2025
<b>Seminar</b>	DESI Special Seminar	Berkeley, US	Jun 2025
<b>Poster</b>	Center for Decoding the Universe Annual Conference	Stanford, US	Jun 2025
<b>Seminar</b>	University of California, Santa Cruz	Santa Cruz, US	Jun 2025
<b>Poster</b>	CoDEX: Symposium for Computation and Data Intensive Research	Evanston, US	Apr 2025
<b>Poster</b>	Transients from Space	Baltimore, US	Mar 2025
<b>Talk</b>	LS4 Team Meeting	Evanston, US	Mar 2025
<b>Poster</b>	Rise_Time 2024	West Lafayette, US	Aug 2024
<b>Talk</b>	243rd AAS Meeting	New Orleans, US	Jan 2024
<b>Talk</b>	The 32nd Texas Symposium on Relativistic Astrophysics	Shanghai, China	Dec 2023
<b>Seminar</b>	Peking University	Beijing, China	Dec 2023
<b>Talk</b>	ZTF Science Meeting	Pasadena, US	Oct 2023
<b>Poster</b>	Keck Science Meeting	Berkeley, US	Sep 2023
<b>Seminar</b>	Shanghai Jiao Tong University	Shanghai, China	Jun 2023
<b>Talk</b>	SPOKEN-WERRD 2022 Symposium	Virtual	Nov 2022
<b>Talk</b>	ZTF Science Meeting	Evanston, US	Oct 2022
<b>Talk</b>	Astro-Coffee@Princeton	Princeton, US	Sep 2022
<b>Talk</b>	PKU-DoA Undergraduate Astronomy Symposium	Beijing, China	Sep 2020

## Advising and Teaching

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**CIERA Scientist Mentor** REACH Further (Independent Research Experience for REACH Students)

Aug 2023

• Mentee: Isabella Chen

**Teaching Assistant** ASTRON 103-0-1 (Solar System)

Mar 2023 – Jun 2023

**Teaching Assistant** PHYSICS 130-2 (College Physics)

Jan 2023 – Mar 2023

**Teaching Assistant** PHYSICS 333-2 (Advanced Electricity & Magnetism)

Sep 2022 – Dec 2022

## Professional Service

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**Referee** Astrophysical Journal

**Referee** Astrophysical Journal Letters

## Outreach

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**Presenter**

Evanston, US

RESEARCH EXPERIENCE IN ASTRONOMY AT CIERA FOR HIGH SCHOOL STUDENTS (REACH)

Jul 2023

**Invited Speaker (*supernovae: from the past to the future*)**

Beijing, China

PEKING UNIVERSITY YOUTH ASTRONOMY SOCIETY (PKU-YAS)

Apr 2021

**Volunteer**

Beijing, China

SUMMER CAMP OF ASTRONOMY FOR HIGH SCHOOL STUDENTS, PEKING UNIVERSITY

Jul 2018

## References

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**Prof. Adam A. Miller**

Evanston, US

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**Prof. Enrico Ramirez-Ruiz**

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Department of Astronomy and Astrophysics, UC Santa Cruz

**Prof. Peter Nugent**

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Department of Astronomy, University of California, Berkeley

**Prof. Kate Maguire**

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School of Physics, Trinity College of Dublin, The University of Dublin

**Prof. Xian Chen**

Beijing, China

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