

Chang Liu

TIME-DOMAIN ASTRONOMER

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Education

PHD CANDIDATE Northwestern University

Sep 2021 –

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

MASTER OF SCIENCE Northwestern University

Sep 2021 – Jun 2023

BACHELOR OF SCIENCE (HON) 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):** Infant SNe, nebular-phase spectroscopy, spectral modeling.
- **Tidal disruption events (TDEs):** Repeating partial TDEs, exotic nuclear transients.
- **Software:** Open source software development, data reduction pipeline.

Skills

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

Telescope Experience

Obs Runs	Keck I (LRIS 6.5 n, MOSFIRE 0.5 n), Keck II (DEIMOS 1.5 n), Magellan (FIRE 2 n)	2023 – 2025
PI	6.5 m Magellan Baade Telescope, Northwestern 1 n	2026A
PI	10 m Keck Telescopes, Northwestern 1.5 n	2025B
PI	6.5 m Magellan Baade Telescope, Northwestern 1 n	2025B
PI	2.56 m Nordic Optical Telescope (NOT), NOIRLab 8 hr	2025B
PI	6.5 m Magellan Baade Telescope, Northwestern 1 n	2025A
PI	2.56 m Nordic Optical Telescope (NOT), NOIRLab 6 hr	2025A
PI	4.1 m Southern Astrophysical Research (SOAR) Telescope, NOIRLab 10 hr	2025A
PI	10 m Keck Telescopes, Northwestern 2 n	2024B
co-I	James Webb Space Telescope, NIRSpec + MIRI (PI Jacobson-Galán) 6 hr	DD 9492, Cycle 4
co-I	James Webb Space Telescope, NIRSpec + MIRI (PI Kwok) 12.9 hr	DD 6811, Cycle 3

Invited Talks & Seminars

Seminar Carnegie arXiv Tea, Carnegie Observatories	Pasadena, US Sep 2025
Seminar Astronomy Tea Talk, California Institute of Technology	Pasadena, US Sep 2025
Seminar DESI Special Seminar	Berkeley, US Jun 2025
Seminar University of California, Santa Cruz	Santa Cruz, US Jun 2025
Invited Talk LS4 Team Meeting	Evanston, US Mar 2025
Seminar Peking University	Beijing, China Dec 2023
Seminar Shanghai Jiao Tong University	Shanghai, China Jun 2023
Seminar Astro-Coffee@Princeton	Princeton, US Sep 2022

Contributed Talks & Posters

Talk Keck Science Meeting	Los Angeles, US Sep 2025
Poster Open SkAI 2025	Chicago, US Sep 2025
Poster CIERA Fellows at 15	Evanston, US Aug 2025
Talk One Hundred Years of Supernova Science	Saltsjöbaden, Sweden Aug 2025
Talk Cosmic Lighthouses: Astrophysical and Cosmological Challenges with Type Ia Supernovae	Cambridge, UK Jul 2025
Poster Center for Decoding the Universe Annual Conference	Stanford, US Jun 2025
Poster CoDEX: Symposium for Computation and Data Intensive Research	Evanston, US Apr 2025
Poster Transients from Space	Baltimore, US Mar 2025
Poster Rise_Time 2024	West Lafayette, US Aug 2024
Talk 243rd AAS Meeting	New Orleans, US Jan 2024
Talk The 32nd Texas Symposium on Relativistic Astrophysics	Shanghai, China Dec 2023
Talk ZTF Science Meeting	Pasadena, US Oct 2023
Poster Keck Science Meeting	Berkeley, US Sep 2023
Talk SPOKEN-WERRD 2022 Symposium	Virtual Nov 2022
Talk ZTF Science Meeting	Evanston, US Oct 2022
Talk PKU-DoA Undergraduate Astronomy Symposium	Beijing, China Sep 2020

Honors & Awards

Oct 2020	First prize & Lin-bridge Prize for Excellent Undergraduate Research , 2020 PKU-DoA Undergraduate Astronomy Symposium (endowed by Prof. Douglas Lin)
May 2020	Outstanding Graduate , College Graduate Excellence Award of Beijing
May 2020	Outstanding Graduate , College Graduate Excellence Award of Peking University
Jun 2019	Caltech Summer Undergraduate Research Fellowship (SURF) , California Institute of Technology
May 2019	National Innovation Training Program , Undergraduate Research & Training Program
Oct 2018	Wei Lin Scholarship , Annual scholarship of 2017-2018, Peking University
Oct 2017	Merit Student Pacesetter (the Utmost Annual Accolade at PKU) , Annual honor of 2016-2017, Peking University
Oct 2017	Arawana Scholarship , Annual scholarship of 2016-2017, Peking University

Advising and Teaching

CIERA Scientist Mentor REACH Further	Aug 2023
• Mentee: Isabella Chen (High School Student in the REACH Program)	
Teaching Assistant ASTRON 103-0-1 (Solar System)	Mar 2023 – Jun 2023
Teaching Assistant PHYSICS 130-2 (College Physics)	Jan 2023 – Mar 2023

Professional Service

Referee Astrophysical Journal

Referee Astrophysical Journal Letters

Outreach

Presenter

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

Evanston, US

Jul 2023

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

PEKING UNIVERSITY YOUTH ASTRONOMY SOCIETY (PKU-YAS)

Beijing, China

Apr 2021

Volunteer

SUMMER CAMP OF ASTRONOMY FOR HIGH SCHOOL STUDENTS, PEKING UNIVERSITY

Beijing, China

Jul 2018

References

Prof. Adam A. Miller

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Department of Physics and Astronomy, Northwestern University

Prof. Enrico Ramirez-Ruiz

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Santa Cruz, US

Department of Astronomy and Astrophysics, UC Santa Cruz

Prof. Peter Nugent

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Berkeley, US

Department of Astronomy, University of California, Berkeley

Prof. Kate Maguire

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Dublin, Ireland

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

Prof. Xian Chen

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Beijing, China

Department of Astronomy, Peking University

Publication List

7 first-author papers out of 27 publications (citation: **350**, h-index: **11** as of Nov 2025)

Submitted Papers

- **C. Liu**, A. A. Miller., HostSub_GP: Precise Galaxy Background Subtraction in Transient Spectroscopy with Gaussian Processes, *arXiv: 2508.15278*, submitted to *PASP*.
- L. A. Kwok, **C. Liu**, S. W. Jha, et al., JWST Spectroscopy of SN Ia 2022aaq and 2024gy: Evidence for Enhanced Central Stable Ni Abundance and a Deflagration-to-Detonation Transition, *arXiv: 2510.09760*, submitted to *ApJ*.
- M. Singh et al. (incl. **C. Liu**), Photometry and Spectroscopy of SN 2024pxl: A Luminosity Link Among Type Ia Supernovae, 2025, submitted to *ApJ*.

Refereed Papers

- **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.
- M. M. Kasliwal et al. (incl. **C. Liu**), ZTF25abjmnps (AT2025ulz) and S250818k: A Candidate Superkilonova from a Sub-threshold Sub-Solar Gravitational Wave Trigger, *arXiv: 2510.09760*, accepted by *ApJL*.
- J. Pearson et al. (incl. **C. Liu**), Mid-Infrared Dust Evolution and Late-time Circumstellar Medium Interaction in SN 2017eaw, 2025, *ApJ*, 993, 213.
- A. C. Gordon et al. (incl. **C. Liu**), Mapping the Spatial Distribution of Fast Radio Bursts within their Host Galaxies, 2025, *ApJ*, 993, 119.
- A. A. Miller et al. (incl. **C. Liu**), The La Silla Schmidt Southern Survey, 2025, *PASP*, 137, 094204.
- P. J. Pessi et al. (incl. **C. Liu**), The ambiguous AT2022rze: Changing-look AGN mimicking a supernova in a merging galaxy system, 2025, *MNRAS*, 542, 4.
- L. A. Kwok et al. (incl. **C. Liu**), JWST and Ground-based Observations of the Type Iax Supernovae SN 2024pxl and SN 2024vjm: Evidence for Weak Deflagration Explosions, 2025, *ApJL*, 989, L33.
- A. Y. Q. Ho et al. (incl. **C. Liu**), A Luminous Red Optical Flare and Hard X-ray Emission in the Tidal Disruption Event AT2024kmq, 2025, *ApJ*, 989, 54.
- 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.
- Y. Yao et al. (incl. **C. Liu**), A Massive Black Hole 0.8 kpc from the Host Nucleus Revealed by the Offset Tidal Disruption Event AT2024tvd, 2025, *ApJL*, 985, L48.
- 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.
- K. Das et al. (incl. **C. Liu**), Low-Luminosity Type IIP Supernovae from the Zwicky Transient Facility Census of the Local Universe. I: Luminosity Function, Volumetric Rate, 2025, *PASP*, 137, 044203.
- L. Harvey et al. (incl. **C. Liu**), ZTF SN Ia DR2: High-velocity components in the Si II λ 6355, 2025, *A&A*, 695, A264.
- T. Eftekhari et al. (incl. **C. Liu**), The Massive and Quiescent Elliptical Host Galaxy of the Repeating Fast Radio Burst FRB 20240209A, 2025, *ApJL*, 979, L22.
- G. Dimitriadis et al. (incl. **C. Liu**), ZTF SN Ia DR2: The diversity and relative rates of the thermonuclear supernova population, 2024, *A&A*, 694, A10.
- Z. Wu et al. (incl. **C. Liu**), Gaia22dkvLb: A Microlensing Planet Potentially Accessible to Radial-Velocity Characterization, 2024, *AJ*, 168, 62.
- K. Das et al. (incl. **C. Liu**), SN 2023zaw: an ultra-stripped, nickel-poor supernova from a low-mass progenitor, 2024, *ApJL*, 969, L11.
- 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.