Chang **Liu**

TIME-DOMAIN ASTRONOMER

Department of Physics and Astronomy, Northwestern University, 2145 Sheridan Rd., Evanston, IL 60208, US

✉ ptg.cliu@u.northwestern.edu | ⌂ https://slowdiveptg.github.io | ⬡ slowdivePTG

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
Softwares	• HostSub_GP (**developer**): removing host galaxy background in transient spectroscopy using Gaussian processes and JAX accelration • BayeSpecFit (**developer**): fitting blended supernova spectroscopic features with Bayesian inference • Pypeit: optical/NIR spectrum reduction

Telescope Experience

Obs Runs	Keck I (LRIS ‖ 6 n, MOSFIRE ‖ 0.5 n), Keck II (DEIMOS ‖ 1.5 n), Magellan (FIRE ‖ 1.5 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*
Invitied 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*

Teaching Assistant PHYSICS 333-2 (Advanced Electricity & Magnetism) *Sep 2022 – Dec 2022*

Professional Service

Referee Astrophysical Journal
Referee Astrophysical Journal Letters

Outreach

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

Prof. Adam A. Miller *Evanston, US*
✉ AMILLER@NORTHWESTERN.EDU *Department of Physics and Astronomy, Northwestern University*
Prof. Enrico Ramirez-Ruiz *Santa Cruz, US*
✉ ENRICO@UCOLICK.ORG *Department of Astronomy and Astrophysics, UC Santa Cruz*
Prof. Peter Nugent *Berkeley, US*
✉ PENUGENT@LBL.GOV *Department of Astronomy, University of California, Berkeley*
Prof. Kate Maguire *Dublin, Ireland*
✉ KATE.MAGUIRE@TCD.IE *School of Physics, Trinity College of Dublin, The University of Dublin*
Prof. Xian Chen *Beijing, China*
✉ XIAN.CHEN@PKU.EDU.CN *Department of Astronomy, Peking University*

Publication List

7 first-author papers out of **27** publications (citation: **341**, 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 2022aaiq 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 Iax 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 IIλ6355, *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.*