JILLIAN CHIN RASTINEJAD

NORTHWESTERN PRESIDENTIAL FELLOW

CONTACT

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EDUCATION

Ph.D. in Astronomy — expected May 2025
Northwestern University
Advisor: Prof. Wen-fai Fong

M.S. in Astronomy — 2021
Northwestern University

B.A. in Physics, Human Rights, *cum laude* — 2019
Minors in Astrophysics, Mathematics
University of Connecticut

- *Honors Thesis in Physics*: "Black Hole Feedback at Cosmic High Noon Revealed by 3D-HST Spectroscopy".
  Advisor: Prof. Jonathan Trump
- *Honors Thesis in Human Rights*: "Forces Behind the Numbers: Explaining Gender Disparities in Human Rights and Physics Enrollment".
  Advisor: Prof. Shareen Hertel

HONORS & AWARDS

Northwestern University Presidential Fellowship — 2024–2025
$101,000 USD over two years
Northwestern's most prestigious fellowship awarded to graduate students. Given to promising students who display outstanding intellectual or creative potential, and have the capacity to be a leader in their respective disciplines and beyond.

Gemini Observatory Graduate Student Visitor — 2024
Funded visit to Gemini-North
One of five students selected from over 60 international applicants to visit a Gemini telescope.

Northwestern University Data Science Initiative Fellowship — 2019–2021
$12,500 USD over two years
Fellowship supporting graduate students who are dedicated to the exploration of fundamental and applied advancement in data science.

PUBLICATIONS ⋆ **I have authored 22 papers (20 refereed) with $>$ 1000 citations, including 5 first-author with combined $>$ 300 citations as of December 16, 2024**.

First-author:

5. **Rastinejad, J. C.**, Fong, W., Kilpatrick, C. D. et al. 2025 *ApJ*, 979, 190. "Uniform Modeling of Observed Kilonovae: Implications for Diversity and the Progenitors of Merger-Driven Long Gamma-Ray Bursts."

4. **Rastinejad, J. C.**, Fong, W., Levan, A. J. et al. 2024 *ApJ*, 968, 14. "A Hubble Space Telescope Search for r-Process Nucleosynthesis in Gamma-ray Burst Supernovae."

3. **Rastinejad, J. C.**, Gompertz, B. P., Levan, A. J. et al. 2022 *Nature*, 612, 7939. "A Kilonova Following a Long-Duration Gamma-ray Burst at 350 Mpc."

2. **Rastinejad, J. C.**, Paterson, K., Fong, W. et al. 2022 *ApJ*, 927, 50. "A Systematic Exploration of Kilonova Candidates from Neutron Star Mergers During the Third Gravitational Wave Observing Run."

1. **Rastinejad, J. C.**, Fong, W., Kilpatrick, C. D. et al. 2021, *ApJ*, 916, 89. "Probing Kilonova Ejecta Properties Using a Catalog of Short Gamma-Ray Burst Observations."

Major contributions as co-author:

3. Hosseinzadeh, G., Paterson, K., **Rastinejad, J. C.** et al. 2024 *ApJ*, 946, 35. "SAGUARO: Time-domain Infrastructure for the Fourth Gravitational-wave Observing Run and Beyond."

2. Paterson, K., Lundquist, M., **Rastinejad, J. C.** et al. 2021 *ApJ*, 912, 128. "Searches after Gravitational Waves Using ARizona Observatories (SAGUARO): Summary of Observations and Analysis of Candidates from Advanced LIGO/Virgo's Third Observing Run."

1. Fong, W., Laskar, T., **Rastinejad, J. C.** et al. 2021 *ApJ*, 906, 127. "The Broad-band Counterpart of the Short GRB 200522A at $z = 0.5536$: A Luminous Kilonova or a Collimated Outflow with a Reverse Shock?"

Additional co-author:

14. Schroeder, G. et al. incl. **Rastinejad, J. C.**, 2024, submitted to *ApJ*. "The Long-lived Broadband Afterglow of Short γ-ray burst 231117A and the Growing Radio-Detected Short GRB Population."

13. Ibrahimzade, D. et al. incl. **Rastinejad, J. C.**, 2024, submitted to *ApJ*. "Constraints on Relativistic Jets from the Fast X-ray Transient 210423 using Prompt Radio Follow-Up Observations."

12. Schroeder, G. et al. incl. **Rastinejad, J. C.** 2023, *ApJ*, 970, 139. "A Radio Flare in the Long-Lived Afterglow of the Distant Short GRB 210726A: Energy Injection or a Reverse Shock from Shell Collisions?"

11. Levan, A. J. et al. incl. **Rastinejad, J. C.**, 2024, *Nature*, 626, 8000. "JWST detection of heavy neutron capture elements in a compact object merger."

10. Shrestha, M. et al. incl. **Rastinejad, J. C.** 2024, *ApJ*, 961, 247. "Evidence of weak circumstellar medium interaction in the Type II SN 2023axu".

9. Rouco Escorial, A. et al. incl. **Rastinejad, J. C.** 2023 *ApJ*, 959, 13. "The Jet Opening Angle and Event Rate Distributions of Short Gamma-ray Bursts from Late-time X-ray Afterglows."

8. Gordon, A., et al. incl. **Rastinejad, J. C.**, 2023, *ApJ*, 954, 80. "The Demographics, Stellar Populations, and Star Formation Histories of Fast Radio Burst Host Galaxies: Implications for the Progenitors."

7. Levan, A. J. et al. incl. **Rastinejad, J. C.**, 2023, *ApJL*, 946, L28. "The first JWST spectrum of a GRB afterglow: No bright supernova in observations of the brightest GRB of all time, GRB 221009A."

6. Levan, A. J. et al. incl. **Rastinejad, J. C.** 2023 *Nature Astronomy*, 7, 976-985. "A long-duration gamma-ray burst of dynamical origin from the nucleus of an ancient galaxy."

5. Gompertz, B. P. et al. incl. **Rastinejad, J. C.**, 2023, *Nature Astronomy*, 7, 67-79. "A minute-long merger-driven gamma-ray burst from fast-cooling synchrotron emission."

4. Fong, W. et al. incl. **Rastinejad, J. C.**, 2022, *ApJ*, 940, 56. "Short GRB Host Galaxies I: Photometric and Spectroscopic Catalogs, Host Associations, and Galactocentric Offsets."

3. Laskar, T. et al. incl. **Rastinejad, J. C.**, 2022, *ApJL*, 935, L11. "The First Short GRB Millimeter Afterglow: The Wide-Angled Jet of the Extremely Energetic SGRB 211106A."

2. Giarratana, S. et al. incl. **Rastinejad, J. C.**, 2022, *A&A*, 664, A36. "VLBI observations of GRB 201015A, a relatively faint GRB with a hint of Very High Energy gamma-ray emission."

1. Hajela, A. et al. incl. **Rastinejad, J. C.**, 2022, *ApJL*, 927, L17. "The emergence of a new source of X-rays from the binary neutron star merger GW170817."

TELESCOPE TIME AWARDED AS PRINCIPAL INVESTIGATOR

⋆ **I have been awarded over 22 observing nights and support funding of $81,455 across 17 proposals as Principal Investigator**.

17. **Gemini Observatory** - 10 hours 2025A
"Investigating the Sites of R-Process Nucleosynthesis with Strategic Follow-Up of a Nearby Long Gamma-Ray Burst".

16. **Hubble Space Telescope** - 12 orbits Cycle 31-32
"Identifying a New Source of r-Process Nucleosynthesis with HST"
Granted long-term status through Oct. 31, 2025
Support Funding: $56,869 USD (awarded when program is triggered)

15. **MMT Observatory** - 1 night 2025A
"Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events"

14. **W. M. Keck Observatory** - 3 hours 2025A
"Follow up of Explosive Transients with Keck Target-of-Opportunity Observations"

13. **MMT Observatory** - 1 night 2024B
"Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events"

12. **W. M. Keck Observatory** - 3 hours 2024B
"Follow up of Explosive Transients with Keck Target-of-Opportunity Observations"

11. **Gemini Observatory** - 20 hours 2024A–2024B
"Investigating the Sites of R-Process Nucleosynthesis with Strategic Follow-Up of a Nearby Long Gamma-Ray Burst"

10. **MMT Observatory** - 2 nights 2024A
"Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events"

9. **MMT Observatory** - 2 nights 2023B
"Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events"

8. **Gemini Observatory** - 10 hours 2023A
"Investigating the Sites of R-Process Nucleosynthesis with Strategic Follow-Up of a Nearby Long Gamma-Ray Burst"

7. **MMT Observatory** - 2 nights 2023A
"Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events"

6. **Gemini Observatory Director's Discretionary Time** - 4 hours 2022B
"Observing a Once-in-a-Millenium Gamma-ray Burst with Gemini"

5. **Gemini Observatory** - 3 hours 2022B
   "Probing the Properties of Neutron Star Mergers: Rapid Observations of Short Gamma-ray Bursts"

4. **MMT Observatory** - 2 nights 2022B
   "Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events"

3. **Hubble Space Telescope** - 2 orbits Cycle 29
   "Solidifying the Origin of a Possible Kilonova at 350 Mpc"
   Support Funding: $24,586 USD

2. **MMT Observatory** - 1.5 nights 2022A
   "Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events"

1. **MMT Observatory** - 1.5 nights 2021B
   "Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events"

SELECTED TELESCOPE TIME AWARDED AS CO-INVESTIGATOR

6. **Gemini Observatory** - 28 hours 2023B-2025A
   Principal Investigator: W. Fong
   "Diversifying the Population of Short Gamma-ray Burst Afterglows with Gemini"

5. **James Webb Space Telescope** - 23 hours Cycle 2
   Principal Investigator: R. Chornock
   "Infrared Spectroscopy of a Neutron Star Merger with JWST"

4. **James Webb Space Telescope** - 5 hours Cycle 1
   Principal Investigator: A. Levan, Director's Discretionary Time
   "Revealing the nature of the exceptional GRB 230307A: nearby nucleosynthesis or a primordial explosion?"

3. **James Webb Space Telescope** - 5 hours Cycle 1
   Principal Investigator: A. Levan, Director's Discretionary Time
   "The late time spectrum of a kilonova in the exceptionally bright GRB 230307A"

2. **James Webb Space Telescope** - 12 hours Cycle 1
   Principal Investigator: E. Berger
   "Fine-Tuned Search for Kilonova Emission in a Short Gamma-Ray Burst: Implications for Gravitational Wave Sources and r- Process Nucleosynthesis"

1. **James Webb Space Telescope** - 2 hours Cycle 1
   Principal Investigator: A. Levan, Director's Discretionary Time
   "Heavy element formation in the brightest gamma-ray burst of all time"

INVITED PRESENTATIONS

⋆ **I have been invited to give 13 talks at national and international venues, including 2 conference review talks and 2 colloquia.**

Talk, 245th AAS, HEAD Special Session, *National Harbor, MD*	Jan 2025
Seminar, Berkeley Theoretical Astrophysics Center, *Berkeley, CA*	Sep 2024
Talk, Harvard Inst. for Theory and Computation, *Cambridge, MA*	Sep 2024
Review Talk, Fast-Evolving Extragalactic Transients, *Bormio, Italy*	Feb 2024
Colloquium, University of Maryland, *College Park, MD*	Nov 2023
Review Talk, 50 years of GRBs Conference, *Warrenton, VA*	Aug 2023
Colloquium, Illinois State University, *Normal, IL*	Mar 2023
Seminar, CfA/Harvard High Energy Astrophysics, *Cambridge, MA*	Feb 2023
Talk, 241st AAS, Roman Observatory Transient Session, *Seattle, WA*	Jan 2023
Talk, 241st AAS, Gemini Observatory Science Session, *Seattle, WA*	Jan 2023
Talk, Explosive Astronomy Seminar Series, U. C. Berkeley	May 2022
Talk, Astronomy Journal Club, University of Chicago	May 2022
Talk, SPIMAX Seminar Series, Oxford University	Nov 2021

CONTRIBUTED PRESENTATIONS

Thesis Talk, 245th AAS, *National Harbor, MD*	Jan 2025 (exp.)
Talk, Monday Afternoon Talk Series, MIT, *Cambridge, MA*	Sep 2024
Talk, Rise_Time Conference, *West Lafayette, IN*	Aug 2024
Talk, Gemini-North Observatory, *Hilo, HI*	May 2024
Talk, TASTY Talk Series, University of Toronto, *Toronto, Canada*	Apr 2024
Talk, 243rd AAS, *New Orleans, LA*	Jan 2024
Talk, Transient Science at Space Telescope, STScI, *Baltimore, MD*	Nov 2023
Talk, Windows on the Universe Conference, *Tucson, AZ*	Oct 2023
Talk, The Transient & Variable Universe 2023, *Urbana, IL*	Jun 2023
Talk, Radboud University, *Nijmegen, Netherlands*	May 2023
Talk, Theory Group Seminar, Northwestern University, *Evanston, IL*	Mar 2023
Talk, GWPAW 2022, *Melbourne, Australia*	Dec 2022
Talk, SuperVirtual 2022	Nov 2022
Talk, Las Cumbres Observatory Seminar, *Goleta, CA*	Oct 2022
Talk, Gemini Observatory Science Meeting 2022, *Seoul, South Korea*	Jul 2022
Talk, Big Boom Seminar Series, University of Arizona, *Tucson, AZ*	Apr 2022
Talk, Exploring the Transient Universe with *Roman*	Feb 2022
Talk, Gravitational Wave Physics & Astronomy Workshop (GWPAW)	Dec 2021
Talk, European Astronomical Society Meeting 2021	Jun 2021

	Talk, 238th AAS	Jun 2021
	Talk, AAS HEAD Frontier Seminar Series	May 2021
	Colloquium (co-speaker), University of Connecticut, *Storrs, CT*	Apr 2019
	Poster, University of Connecticut Physics Department, *Storrs, CT*	Apr 2019
	Poster, C.U.W.i.P., *Amherst, MA*	Jan 2019
	Poster, 233rd AAS, *Seattle, WA*	Jan 2019

PUBLIC SOFTWARE

"Kilonova Candidate Vetting" Github, Zenodo

Rastinejad, J. C. and Hosseinzadeh, G. 2023.
Assesses viability of candidate counterparts to gravitational wave events.

"SAGUARO Target and Observation Manager" Github, Zenodo

Hosseinzadeh, G., **Rastinejad, J. C.** and Shrestha, M. 2023.

MENTORING

Lucas Kritz, Northwestern Undergraduate — Fall 2024-present
Co-mentoring with Wen-fai Fong
"Off-axis Afterglow Predictions for Neutron Star Mergers with Afterglowpy"

Jake M., High school student — Summer 2023
"Comparing Afterglow and Supernova Properties of Four GRB Events"

León García, High school student — Fall 2021 - Spring 2022
"Simulating Off-Axis Short GRB Afterglows to Inform GW Follow-Up"
Finalist, International Science and Engineering Fair 2022

Sophie L., High school student — Summer 2021
"Estimating the Ejecta Masses of Short GRB Kilonova Candidates"

PRESS

⋆ **My work has been highlighted in three distinct press releases. I was also spotlighted in a NASA Universe Twitter takeover post with >125,000 views.**
Selected articles featuring Rastinejad et al. 2022b:

- Quanta, "Extra-Long Blasts Challenge Our Theories of Cosmic Cataclysms"
- NOIRLab, "Kilonova Discovery Challenges our Understanding of Gamma-Ray Bursts"
- CNN, "Rare cosmic collision acted like one of the 'factories of gold' in the universe"
- BBC, "Remarkable space blast identified as black hole collision"

94 total mentions, total reach of 13.9 million.

Selected press on our optical follow-up of the "Brightest Of All Time" GRB:

- NOIRLab Science Release, "Record-Breaking Gamma-Ray Burst Possibly Most Powerful Explosion Ever Recorded"
- NSF Science Now Video, "Star Collapses into NEW Black Hole"

126 total mentions, total reach of 20.7 million.

Selected articles on Fong, Laskar, Rastinejad et al. 2021:

- National Science Foundation News, "Birth of magnetar from colossal collision potentially spotted for first time"
- Pop Science, "This 'kilonova' shines so bright, it defies the odds"

TEACHING

Teaching Assistant, *Dept. of Physics & Astronomy, Northwestern University*

Physics 135: General Physics, Electricity & Magnetism	Fall 2020
Astronomy 120: Highlights of Astronomy	Fall 2021

LEADERSHIP, OUTREACH & SERVICE

Short GRB Topical Coordinator for *Swift*'s NASA Senior Review — 2024

Referee for *The Astrophysical Journal Letters* — 2022-2024

CIERA High School Mentoring Program (REACH) [Website] — 2020-2023
Mentor of 3 high schoolers on astronomy projects. Lead organizer for 1-on-1 mentoring in 2022, leading weekly group meetings with 12 students.

CIERA Data Science for Public Good Conference [Website] — 2020-2021
Created and led the organization of a virtual conference for high schoolers held July 2021. Developed approachable demonstrations of using data science techniques to further public good (e.g., using machine learning to model past women's health decisions and predict future needs in public health).

OTHER OUTREACH & COMMUNITY ENGAGEMENT

Astronomy on Tap Talks:

Feb. 2023, Chicago: "The Dramatic Inspirals of Cosmic Couples"

Oct. 2022, Santa Barbara, "Things That Go Bump in the Night"

SPARK Stargazing Nights, *Storrs, CT*, Summer 2019:
Co-led weekly stargazing nights for STEM summer camp girls ages 10-13.

Community Legal Services and Counseling Center (now De Novo Center for Justice and Healing), *Cambridge, MA*, Summer 2018 (20 hours/week):
Performed research and analysis of news articles, NGO publications, data from human rights organizations, and government reports to create summaries that would be submitted with asylum applications.

Windham High School Tutoring, *Windham, CT*, 2016–2017:
Weekly tutor of a ninth-grade science class in an under-served area.
