

JILLIAN CHIN RASTINEJAD
NORTHWESTERN PRESIDENTIAL FELLOW

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RESEARCH · Time-domain astronomy
INTERESTS · Multi-messenger astrophysics
 · Gamma-ray bursts
 · *r*-Process Nucleosynthesis

EDUCATION **Ph.D.** in Astronomy exp. 2025
Northwestern University
Advisor: Prof. Wen-fai Fong

 M.S. in Astronomy 2021
Northwestern University

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

 · *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 & **Northwestern University Presidential Fellow** 2024-2025
AWARDS \$101,000 USD over two years
Northwestern University's most prestigious fellowship awarded to graduate students.
Awarded to promising graduate students who display outstanding intellectual or cre-
ative 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. Successful applicants meet with local scientists, see how the observatory is run on a daily basis, and participate in a night of observing with Gemini.
- National Science Foundation Graduate Research Fellowship** 2021
 Honorable Mention
- Northwestern University Data Science Initiative Fellowship** 2019
 \$12,500 USD over two years
 University fellowship supporting incoming graduate students who are dedicated to the exploration of fundamental and applied advancement in data science.
- Honors Scholar** 2015–2019
 University of Connecticut
 Fulfilled the requirements to graduate with honors, including meeting minimum GPA requirements each semester, taking 15 credits of Honors classes, and writing a thesis in each major.

TELESCOPE
 TIME AWARDED
 AS PRINCIPAL
 INVESTIGATOR

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- 19 observing nights and support funding of \$81,455 awarded across 14 proposals.**
14. **MMT Observatory** - 1 night 2024B
 “Rapid Observations of Gamma-Ray Bursts and Gravitational Wave Events”
 13. **W. M. Keck Observatory** - 3 hours 2024B
 “Follow up of Explosive Transients with Keck Target-of-Opportunity Observations”
 12. **Gemini Observatory** - 20 hours 2024A
 “Investigating the Sites of R-Process Nucleosynthesis with Strategic Follow-Up of a Nearby Long Gamma-Ray Burst”
 Granted long-term status through 2024B
 11. **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 (funding awarded when program is triggered)
 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-Millennium 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”	
	<i>Support Funding: \$24,586 USD</i>	
	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-2024B
	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 Director’s Discretionary Time - 5 hours	Cycle 1
	Principal Investigator: A. Levan	
	“Revealing the nature of the exceptional GRB 230307A: nearby nucleosynthesis or a primordial explosion?”	
	3. James Webb Space Telescope Director’s Discretionary Time - 5 hours	Cycle 1
	Principal Investigator: A. Levan	
	“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	
	“Heavy element formation in the brightest gamma-ray burst of all time”	
	Director’s Discretionary Time	

INVITED PRESENTATIONS	★ 12 invited talks including 2 conference review talks and 2 colloquia	
	Seminar, Berkeley Theoretical Astrophysics Center, <i>Berkeley, CA</i>	Sep 2024 (exp.)
	Talk, Harvard Inst. for Theory and Computation, <i>Cambridge, MA</i>	Sep 2024 (exp.)
	Review Talk, Fast-Evolving Extragalactic Transients, <i>Bormio, Italy</i>	Feb 2024
	Colloquium, University of Maryland, <i>College Park, MD</i>	Nov 2023
	Review Talk, 50 years of GRBs Conference, <i>Warrenton, VA</i>	Aug 2023
	Colloquium, Illinois State University, <i>Normal, IL</i>	Mar 2023
	Seminar, CfA/Harvard High Energy Astrophysics, <i>Cambridge, MA</i>	Feb 2023
	Talk, 241st AAS, Roman Observatory Transient Session, <i>Seattle, WA</i>	Jan 2023
	Talk, 241st AAS, Gemini Observatory Science Session, <i>Seattle, WA</i>	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
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CONTRIBUTED PRESENTATIONS	★ Total of 24 contributed presentations	
	Talk, Monday Afternoon Talk Series, MIT, <i>Cambridge, MA</i>	Sep 2024 (exp.)
	Talk, Rise_Time Conference, <i>West Lafayette, IN</i>	Aug 2024
	Talk, Gemini-North Observatory, <i>Hilo, HI</i>	May 2024
	Talk, TASTY Talk Series, University of Toronto, <i>Toronto, Canada</i>	Apr 2024
	Talk, 243rd AAS, <i>New Orleans, LA</i>	Jan 2024
	Talk, Transient Science at Space Telescope Seminar, STScI, <i>Baltimore, MD</i>	Nov 2023
	Talk, Windows on the Universe Conference, <i>Tucson, AZ</i>	Oct 2023
	Talk, The Transient & Variable Universe 2023, <i>Urbana, IL</i>	Jun 2023
	Talk, Radboud University, <i>Nijmegen, Netherlands</i>	May 2023
	Talk, Theory Group Seminar, Northwestern University, <i>Evanston, IL</i>	Mar 2023
	Talk, GWPAW 2022, <i>Melbourne, Australia</i>	Dec 2022
	Talk, SuperVirtual 2022	Nov 2022
	Talk, Las Cumbres Observatory Seminar, <i>Goleta, CA</i>	Oct 2022
	Talk, Gemini Observatory Science Meeting 2022, <i>Seoul, South Korea</i>	Jul 2022
	Talk, Big Boom Seminar Series, University of Arizona, <i>Tucson, AZ</i>	Apr 2022
	Talk, Exploring the Transient Universe with the Roman Space Telescope	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 High Energy Astrophysics Division Frontier Seminar Series	May 2021
	Colloquium (co-speaker), University of Connecticut, <i>Storrs, CT</i>	Apr 2019

Poster, University of Connecticut Physics Department, <i>Storrs, CT</i>	Apr 2019
Poster, C.U.W.i.P., <i>Amherst, MA</i>	Jan 2019
Poster, 233rd American Astronomical Society meeting (AAS), <i>Seattle, WA</i>	Jan 2019

PUBLICATIONS

First-author:

4. **Rastinejad, J. C.**, Fong, W., Levan, A. J. et al. 2024 *The Astrophysical Journal*, 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 *The Astrophysical Journal*, 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, *The Astrophysical Journal*, 916, 89. “Probing Kilonova Ejecta Properties Using a Catalog of Short Gamma-Ray Burst Observations.”

Significant co-author:

3. Hosseinzadeh, G., Paterson, K., **Rastinejad, J. C.** et al. 2024 *The Astrophysical Journal*, 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 *The Astrophysical Journal*, 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 *The Astrophysical Journal*, 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 *The Astrophysical Journal*. “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 *The Astrophysical Journal*. “Constraints on Relativistic Jets from the Fast X-ray Transient 210423 using Prompt Radio Follow-Up Observations.”
12. 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.”

11. Shrestha, M. et al. incl. **Rastinejad, J. C.** 2024, *The Astrophysical Journal*, 961, 247. “Evidence of weak circumstellar medium interaction in the Type II SN 2023axu”.
10. Rouco Escorial, A. et al. incl. **Rastinejad, J. C.** 2023 *The Astrophysical Journal*, 959, 13. “The Jet Opening Angle and Event Rate Distributions of Short Gamma-ray Bursts from Late-time X-ray Afterglows.”
9. Gordon, A., et al. incl. **Rastinejad, J. C.**, 2023, *The Astrophysical Journal*, 954, 80. “The Demographics, Stellar Populations, and Star Formation Histories of Fast Radio Burst Host Galaxies: Implications for the Progenitors.”
8. Schroeder, G. et al. incl. **Rastinejad, J. C.** 2023, in review at *The Astrophysical Journal*. “A Radio Flare in the Long-Lived Afterglow of the Distant Short GRB 210726A: Energy Injection or a Reverse Shock from Shell Collisions?”
7. Levan, A. J. et al. incl. **Rastinejad, J. C.**, 2023, *The Astrophysical Journal Letters*, 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, *The Astrophysical Journal*, 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, *The Astrophysical Journal Letters*, 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, *The Astrophysical Journal Letters*, 927, L17. “The emergence of a new source of X-rays from the binary neutron star merger GW170817.”

PRESS

★ 3 distinct press releases and spotlighted in a [NASA Universe Twitter takeover post](#) with >125,000 views while at Northwestern.

Selected articles featuring [“A Kilonova Following a Long-Duration Gamma-ray Burst at 350 Mpc”](#) (Rastinejad et al. 2022b):

94 total mentions, total reach of 13.9 million.

- Quanta Magazine, “[Extra-Long Blasts Challenge Our Theories of Cosmic Cataclysms](#)”
- NOIRLab Science Release, “[Kilonova Discovery Challenges our Understanding of Gamma-Ray Bursts](#)”
- NASA Science Release, “[NASA Missions Probe Game-Changing Cosmic Explosion](#)”
- Space.com, “[Bizarre long gamma-ray burst came from merging stellar corpses](#)”
- CNN, “[Rare cosmic collision acted like one of the ‘factories of gold’ in the universe](#)”
- BBC, “[Remarkable space blast identified as black hole collision](#)”

Selected press features on our optical follow-up of the “Brightest Of All Time” Gamma-ray Burst, GRB 221009A:

126 total mentions, total reach of 20.7 million.

- Northwestern Now, “[Brightest-ever gamma-ray burst breaks records](#)”
- NOIRLab Science Release, “[Record-Breaking Gamma-Ray Burst Possibly Most Powerful Explosion Ever Recorded](#)”
- NSF Science Now Video, “[Star Collapses into NEW Black Hole](#)”

Selected articles on “[The Broadband Counterpart of the Short GRB 200522A at \$z = 0.5536\$: A Luminous Kilonova or a Collimated Outflow with a Reverse Shock?](#)” (Fong, Laskar, Rastinejad et al. 2021):

- Northwestern Now, “[Birth of magnetar from colossal collision potentially spotted for first time](#)”
- 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](#)”

SOFTWARE	<p>Kilonova Candidate Vetting Github, Zenodo</p> <p>Assesses viability of candidate counterparts to gravitational wave events.</p> <p>Rastinejad, J. C. and Hosseinzadeh, G. 2023.</p>
TEACHING	<p>Teaching Assistant, <i>Dept. of Physics & Astronomy, Northwestern University</i></p> <p>Physics 135: General Physics, Electricity & Magnetism Fall 2020</p> <p>Astronomy 120: Highlights of Astronomy Fall 2021</p>
MENTORING	<p>Jake M., High school student Summer 2023</p> <p>“Comparing Afterglow and Supernova Properties of Four GRB Events”</p> <p>León García, High school student Fall 2021 - Spring 2022</p> <p>“Simulating Off-Axis Short GRB Afterglows to Inform GW Follow-Up”</p> <p>Finalist, International Science and Engineering Fair 2022</p> <p>Sophie L., High school student Summer 2021</p> <p>“Estimating the Ejecta Masses of Short GRB Kilonova Candidates”</p>

LEADERSHIP & SERVICE	Referee for <i>The Astrophysical Journal Letters</i>	2022-2024
	CIERA High School Mentoring Program (REACH)	2020-2023
	<ul style="list-style-type: none"> • Summer 2023: Mentored high school student on a project to search for afterglow trends amongst a population of GRB supernovae. • Summer 2022: Lead organizer for two three-week mentoring sessions between 12 high school students and 13 CIERA members in Summer 2022. This entailed holding weekly planning and check-in sessions with mentors, leading twice weekly group meetings with the high school students and coordinating between individual mentors and students. • Summer 2021: Mentored high school student on a project to estimate the ejecta masses of short GRB kilonova candidates. • Summer 2020: Led virtual instruction of 12 high school students in Python notebook about gamma-ray burst afterglows. 	
	CIERA Data Science for Public Good Conference	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 AND COMMUNITY ENGAGEMENT	CIERA Social Justice Training Committee	2020
	Participated in a search for organizations to provide social justice training to CIERA.	
	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 middle school-age girls at STEM summer camp.	
	UConn Model United Nations, Storrs, CT, 2015–2018:	
	Served on executive board (2018) charged with organization of Model U.N. conference for ~300 high schoolers and co-led staff of ~100 UConn students. Led and moderated mock UNICEF and Security Council committees of ~20 high school students (2015-2017).	
	Community Legal Services and Counseling Center (now De Novo Center for Justice and Healing), <i>Cambridge, MA</i> , 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.	
	Kids In Need of Defense, Boston, MA , Summer 2017 (30 hours/week):	
	Helped Central American minors seeking asylum in the U.S. obtain social services.	

Windham High School Tutoring, Windham, CT, 2016–2017:

Weekly tutor of a ninth-grade science class at a public high school in an under-served area.

West Avenue After School Program, Windham, CT, 2016–2017:

Volunteered weekly at a community center in an under-served area, helping elementary school-age children with homework and leading them in group activities.
