JACK M. M. NEUSTADT

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SUMMARY

Astrophysicist with an expertise using machine learning to study black holes. Proven track record of designing and deploying models to analyze messy, noisy, high-dimensional data, combining a wide array of analytical and technical skills with the curiosity of a professional scientist. Passionate about collaboration. Always eager to learn something new.

APPOINTMENTS

Miller Postdoctoral Fellow in Physics & Astronomy August 2024 – Present
Johns Hopkins University

EDUCATION

Ph.D. in Astronomy The Ohio State University, Columbus, OH August 2024
Dissertation title: "On stochastic and transient variability around black holes*"

B.A. in Physics Dartmouth College, Hanover, NH June 2017
Minors: Astronomy, Japanese; Phi Beta Kappa, *Magna Cum Laude*

PUBLICATIONS

Summary: 28 total, 7 first-author; 1000+ citations, h-index: 15

First-author

8. Neustadt, J. M. M., Zakamska, N. L., Chen, Y.-C., et al. 2025, "Velocity-stratified Outflows of Extremely Red Quasars Revealed by JWST", in prep.
7. Neustadt, J. M. M., Kochanek, C. S., Montano, J., et al. 2024, "AGN STORM 2. VI. Mapping Temperature Fluctuations in the Accretion Disk of Mrk 817", *ApJ*, 961, 219
6. Neustadt, J. M. M., Kochanek, C. S., & Rizzo Smith, M. 2024, "Constraints on pre-SN outbursts from the progenitor of SN 2023ixf using the Large Binocular Telescope", *MNRAS*, 527, 5366
5. Neustadt, J. M. M., Hinkle, J. T., Kochanek, C. S., et al. 2023, "Multiple flares in the changing-look AGN NGC 5273", *MNRAS*, 521, 3810
4. Neustadt, J. M. M., & Kochanek, C. S. 2022, "Using AGN light curves to map accretion disc temperature fluctuations", *MNRAS*, 513, 1046
3. Neustadt, J. M. M., Kochanek, C. S., Stanek, K. Z., et al. 2021, "The search for failed supernovae with the Large Binocular Telescope: a new candidate and the failed SN fraction with 11 yr of data", *MNRAS*, 508, 516
2. Neustadt, J. M. M., Holoien, T. W.-S., Kochanek, C. S., et al. 2020, "To TDE or not to TDE: the luminous transient ASASSN-18jd with TDE-like and AGN-like qualities", *MNRAS*, 494, 2538
1. Neustadt, J. M. M., Fesen, R. A., & Black, C. S. 2017, "Detection of optical emission associated with the Galactic SNR G64.5+0.9", *MNRAS*, 469, 516

Contributing author (significant contributions)

14. Chen, Y.-C., Zakamska, N. L., Vayner, A., et al. 2025, "JWST IFU observations uncover host galaxy continua in extremely red and obscured quasars", *accepted to ApJ*, arXiv:2506.12124
13. Hinkle, J. T., Shappee, B. J., Auchettl, K., et al. 2025, "The most energetic transients: Tidal disruptions of high-mass stars", *Science Advances*, 11, eadt0074
12. Kochanek, C. S., Neustadt, J. M. M., & Stanek, K. Z. 2023, "The search for failed supernovae with the Large BinocularTelescope: The Mid-IR Counterpart to N6946-BH1", *ApJ*, 962, 145
11. Kochanek, C. S., Neustadt, J. M. M., & Stanek, K. Z. 2023, "The search for failed supernovae with the Large BinocularTelescope: The Mid-IR Counterpart to N6946-BH1", *ApJ*, 962, 145
10. Rizzo Smith, M., Kochanek, C. S., & Neustadt, J. M. M. 2023, "The late time optical evolution of twelve core-collapse supernovae: detection of normal stellar winds", *MNRAS*, 523, 1474
9. Holoien, T. W.-S., Neustadt, J. M. M., Vallely, P. J., et al. 2022, "Investigating the Nature of the Luminous Ambiguous Nuclear Transient ASASSN-17jz", *ApJ*, 933, 196
8. Hinkle, J. T., Holoien, T. W.-S., Shappee, B. J., Neustadt, J. M. M., et al. 2022, "The Curious Case of ASASSN-20hx: A Slowly Evolving, UV- and X-Ray-Luminous, Ambiguous Nuclear Transient", *ApJ*, 930, 12

7. Tucker, M. A., Shappee, B. J., Hinkle, J. T., Neustadt, J. M. M., et al. 2021, "An AMUSING look at the host of the periodic nuclear transient ASASSN-14ko reveals a second AGN", *MNRAS*, 506, 6014
6. Andrews, J. E., Jencson, J. E., Van Dyk, S. D., Smith, N., Neustadt, J. M. M., et al. 2021, "The Blue Supergiant Progenitor of the Supernova Imposter AT 2019krl", *ApJ*, 917, 63
5. Hinkle, J. T., Holoien, T. W.-S., Auchettl, K., Shappee, B. J., Neustadt, J. M. M., et al. 2021, "Discovery and follow-up of ASASSN-19dj: an X-ray and UV luminous TDE in an extreme post-starburst galaxy", *MNRAS*, 500, 1673
4. Fesen, R. A., Neustadt, J. M. M., How, T. G., & Black, C. S. 2019, "Detection of extensive optical emission from the extremely radio faint Galactic supernova remnant G182.4+4.3", *MNRAS*, 486, 4701
3. How, T. G., Fesen, R. A., Neustadt, J. M. M., Black, C. S., & Outters, N. 2018, "Optical emission associated with the Galactic supernova remnant G179.0+2.6", *MNRAS*, 478, 1987
2. Fesen, R. A., Neustadt, J. M. M., Black, C. S., & Milisavljevic, D. 2018, "A distance estimate to the Cygnus Loop based on the distances to two stars located within the remnant", *MNRAS*, 475, 3996
1. Fesen, R. A., Neustadt, J. M. M., Black, C. S., & Koeppel, A. H. D. 2015, "Discovery of an Apparent High Latitude Galactic Supernova Remnant", *ApJ*, 812, 37

Contributing author (collaborations)

7. Gutiérrez, C. P., Mattila, S., Lundqvist, P., et al. 2024, "CSS161010: a luminous, fast blue optical transient with broad blueshifted hydrogen lines", *ApJ*, 977, 162
6. Lewin, C., Kara, E., Barth, A. J., et al. 2024, "AGN STORM 2. VII. A Frequency-resolved Map of the Accretion Disk in Mrk 817: Simultaneous X-Ray Reverberation and UVOIR Disk Reprocessing Time Lags", *ApJ*, 974, 271
5. Zaidouni, F., Kara, E., Kosec, P., et al. 2024, "AGN STORM 2. IX. Studying the Dynamics of the Ionized Obscurer in Mrk 817 with High-resolution X-Ray Spectroscopy", *The Astrophysical Journal*, 974, 91
4. Homayouni, Y., Kriss, G. A., De Rosa, G., et al. 2024, "AGN STORM 2. V. Anomalous Behavior of the C IV Light Curve of Mrk 817", *ApJ*, 963, 123
3. Payne, A. V., Shappee, B. J., Hinkle, J. T., et al. 2021, "ASASSN-14ko is a Periodic Nuclear Transient in ESO 253-G003", *ApJ*, 910, 125
2. Holoien, T. W.-S., Vallely, P. J., Auchettl, K., et al. 2019, "Discovery and Early Evolution of ASASSN-19bt, the First TDE Detected by TESS", *ApJ*, 883, 111
1. Graur, O., Rodney, S. A., Maoz, D., et al. 2014, "Type-Ia Supernova Rates to Redshift 2.4 from CLASH: The Cluster Lensing And Supernova Survey with Hubble", *ApJ*, 783, 28

DATA SCIENCE AND MACHINE LEARNING PROJECTS

2. "Accentr: Building an Accent Classifier" [GitHub] Summer 2025
   - Developed a convolutional neural network using PyTorch to classify accented speech from audio spectrogram data
   - Designed as part of Erdős Institute Deep Learning Boot Camp
1. "Today's Texas Might be Tomorrow's Ohio: Building a Geographic Climate Change Predictor" [GitHub] Spring 2025
   - Built predictive model mapping current climates to 2050 projections using NOAA geospatio-temporal climate data
   - Designed as part of Erdős Institute Data Science Boot Camp, awarded Top 5 Project of Spring 2025 cohort

INVITED TALKS

6. "Stochastic and Transient Variability around Supermassive Black Holes," JHU CAS Wine & Cheese Seminars (2024, Oct.)
5. "Constraints on pre-SN Outbursts from the Progenitor of SN 2023ixf using the Large Binocular Telescope," AAS 243 (2024, Jan)
4. "Looking beyond the lamppost: a new method of understanding AGN continuum variability," IBRM Telecon (2023, Dec.)
3. "AGN STORM 2. VI. Mapping Temperature Fluctuations in the Accretion Disk of Mrk 817," AstroCoffee, JHU (2023, Nov)
2. "Looking beyond the lamppost: a new method of understanding AGN continuum variability," MAT Seminars, MIT (2023, Sep.)
1. "Using AGN lightcurves to map accretion disc temperature fluctuations," AGN Seminar, University of Kansas (2021, Apr.)

CONTRIBUTED TALKS

4. "Stochastic and Transient Variability in Active Galactic Nuclei," AAS 241 (2024, Jan)
3. "Looking beyond the lamppost: a new method of understanding AGN continuum variability," The Restless Nature of AGN: 10 years later (2023, Jun)
2. "Looking under the lamppost: a new model of AGN continuum variability," AAS 241 (2023, Jan)

1. "The search for failed supernovae with the Large Binocular Telescope: the failed SN fraction and new candidates with 11 yr of data ," AAS 237 (2021, Jan)

CONFERENCE POSTERS

5. "Multiple flares in the changing-look AGN NGC 5273," eXtreme Black Holes (2023, Mar)
4. "Using AGN lightcurves to map accretion disc temperature fluctuations," NASA Physics of the Cosmos (PCOS) Time Domain And Multi-Messenger (TDAMM) Initiative Workshop (2022, Aug)
3. "Using AGN lightcurves to map accretion disc temperature fluctuations," PoSTER 2022 (2022, May)
2. "To TDE or not to TDE: The luminous transient ASASSN-18jd with TDE-like and AGN-like qualities," AAS 235 (2020, Jan)
1. "Optical Observations of Galactic Supernova Remnant G64.5+0.9", AAS 229 (2017, Jan)

ACADEMIC HONORS & AWARDS

- Top 5 Project Erdős Institute Data Science Boot Camp — Spring 2025
- Allan H. Markowitz Award in Observational Astronomy (OSU) — August 2023
  "For excellence in observational astronomy"
- International Travel Grant (AAS) — June 2023
- Extended Dean's Distinguished University Fellowship (OSU) — 2018–21, 2023–24
- 2^{nd} place in Mathematical & Physical Sciences - Hayes Graduate Research Forum (OSU) — April 2021
- Dorrit Hoffleit Undergraduate Research Scholarship (Yale University) — Summer 2017
- High Honors in Physics (Dartmouth) — Spring 2017
- NASA Space Grant (Dartmouth) — Spring 2015, Winter & Spring 2017
- Denis G. Sullivan Fund for Undergraduate Research (Dartmouth) — Spring 2016
- James O. Freedman Presidential Scholar (Dartmouth) — Fall 2015 & Winter 2016

MENTORING EXPERIENCE

- **Polaris Mentoring Program** — January 2019 – June 2024
  Mentor to OSU undergraduates majoring in Physics/Astronomy
  Mentees:
  - Brickelle Rahmaan Bixler (Access Network Assembly Fellow 2024) — 2023–24
  - Noah Downing (Yale Astronomy Graduate Student 2025) — 2022–23
  - Nicole Fedor (OSU SURP Student 2023) — 2021–22
  - Mary Rickel (Notre Dame Physics Graduate Student 2024) — 2020–21
  - Aditi Fulsundar (OSU Physics Graduate Student 2023) — 2019–20
- **Ohio Supercomputer Center Summer Institute**
  Assistant instructor w/ Prof. Adam Leroy — June 2019

LEADERSHIP EXPERIENCE

- **Joint JHU/STScI Colloquium Committee Member** — June 2025 – Present
  Keeping up with latest innovations and trends in astronomy (+ ML) research to select research colloquium speakers
- **JHU AstroCoffee Organizer** — August 2024 – Present
  Leading weekly discussions of recent publications by local Hopkins researchers and visiting research colloquium speakers
- **Polaris Mentoring Program - Leadership Committee** — August 2022 – August 2024
  Created curriculum and delivered lectures for Polaris Mentoring Program (PHYSICS 2050)

AWARDED TELESCOPE TIME

2. Co-I: "Confirming the Formation of a Black Hole," JWST, PI: C. S. Kochanek — 1.48 hr, cycle 2
1. Co-I: "Confirming the Formation of Black Holes," HST, PI: C. S. Kochanek — 2 orbits, cycle 30

Target of Opportunity (ToO) observations

- Neil Gehrels Swift Observatory — 120 ksec, combined
- NICER Observatory — 20 ksec, combined

OBSERVING EXPERIENCE

- **Large Binocular Telescope** — Mount Graham International Observatory, AZ
  41 nights, using LBC, MODS, and LUCI
- **McGraw-Hill 1.3m Telescope** — MDM Observatory, Kitt Peak, AZ
  30+ nights, using direct imaging
- **Hiltner 2.4m Telescope** — MDM Observatory, Kitt Peak, AZ
  5 nights, using direct imaging and OSMOS
- **Radcliffe 1.9m Telescope** — SAAO, Sutherland, SA
  5 nights, using SHOC

REFEREE EXPERIENCE

- *Nature Astronomy*
- *Monthly Notices of the Royal Astronomical Society* (*MNRAS*)
- *Astrophysical Journal* (*ApJ*)
- Canada France Hawaii Telescope - Canadian Time Allocation Committee

REFERENCES

Prof. Christopher Kochanek — The Ohio State University
PhD. advisor — kochanek.1@osu.edu

Prof. Krzysztof Stanek — The Ohio State University
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Prof. Nadia Zakamska — Johns Hopkins University
Collaborator — zakamska@jhu.edu