

# Kristen Dage

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## RESEARCH INTERESTS

optical surveys, globular clusters, X-ray binaries, machine learning, accretion physics & high energy phenomena

## APPOINTMENTS

*starting* 2023    **NASA Einstein Fellow**  
Wayne State University  
Detroit, Michigan, USA

2020 - 2023    **Postdoctoral Fellow**  
McGill University  
Montréal, Québec, Canada

2020    **Postdoctoral Research Associate**  
Michigan State University  
East Lansing, Michigan, USA

## EDUCATION

2015 - 2020    **Michigan State University**, East Lansing, Michigan, USA  
Ph.D. Astronomy & Astrophysics

2015 - 2017    **Michigan State University**, East Lansing, Michigan, USA  
M.Sc. Astronomy & Astrophysics

2012 - 2014    **University of Michigan-Dearborn**, Dearborn, Michigan, USA  
B.Sc. Physics

## AWARDS, HONOURS AND GRANTS

2023    **Einstein Fellowship**, NASA Hubble Fellowship Program

2022    **Mentorship Award**, Association of Postdoctoral Fellows, McGill University

2022    **Bourses de recherche postdoctorale**, “Sources de rayons X ultralumineuses dans les amas d’étoiles extragalactiques: contraintes des binaires de rayons X ultra-compacts, des trous noirs et des amas d’étoiles qui les hébergent”, Fonds de recherche du Québec – Nature et technologies (FRQNT)

2022    **Durand Travel Fund**, Aspen Center for Physics

2020    **Sherwood K. Haynes Graduate Physics Award for Outstanding Graduate Student**, Dept. Physics & Astronomy - Michigan State

2020    **Postdoctoral Fellowship Prize**, McGill University

2019    **Dissertation Completion Fellowship**, College of Natural Science - Michigan State

2019    **AAS International Travel Grant**, National Sciences Foundation

2014    **Outstanding Physics Student**, Dept. Natural Sciences, University of Michigan-Dearborn

2014    **Outstanding Math Tutor**, Academic Support Center, Oakland Community College

## ACCEPTED TELESCOPE PROPOSALS

2023	<b>Gemini South 2023B:</b> “High Resolution Spectroscopy of NGC 1399’s Extensive Globular Cluster System”, 26.8 hr, <b>PI: K. Dage</b>
2023	<b>Gemini South Fast Turnaround:</b> “Variability of RZ2109’s [OIII] emission line”, 5.5 hours, <b>PI: K. Dage</b>
2022	<b>NICER Cycle 5:</b> Monitoring SMC X-1’s Warped Accretion Disc Out of Excursion, 30ks, <b>PI: K. Dage</b>
2022	<b>Karl G. Jansky Very Large Array:</b> Massive black holes in young star clusters, 10 hours (A configuration) <b>PI: K. Dage</b>
2022	<b>Australian Telescope Compact Array:</b> Radio Constraints on Massive Black Hole Candidates in Nuclear Star Clusters, 72 hours <b>PI: K. Dage</b>
2022	<b>Chandra Cycle 24:</b> Characterizing the Nature of Globular Cluster ULX Sources in NGC 1399, 40ks+1 NOAO night, \$23,440 USD <b>PI: K. Dage</b>
2021	<b>Gemini South Fast Turnaround:</b> Confirming the Decline of [NII] Emission in Globular Cluster Ultraluminous X-ray Source GCU7, 5.5 hours <b>PI: K. Dage</b>
2021	<b>Chandra Cycle 23:</b> The Hunt for a new ultra-compact X-ray binary in M87’s globular cluster system, 40ks, \$21,520 USD <b>PI: K. Dage</b>
2021	<b>NICER Cycle 3:</b> Monitoring SMC X-1’s reprocessed emission during an epoch of superorbital period excursion, 120ks, <b>PI: K. Dage</b>
2020	<b>Gemini South 2021A:</b> Searching for evidence of outflows in globular cluster X-ray binary M87-GCULX1, 7.2 hours, <b>PI: K. Dage</b>
2020	<b>NuSTAR Cycle 6:</b> Complete spectral characterisation of a newly discovered ULX, 40ks and \$20,000 USD, <b>PI: K. Dage</b>
2019	<b>Niels Gehrels Swift Observatory</b> Target of Opportunity, 24ks, <b>PI: K. Dage</b>

## TEACHING EXPERIENCE

2021	<b>Guest Lecturer</b> Graduate High Energy Astrophysics & Undergraduate Modern Physics and Relativity McGill University, Québec, Canada
2018	<b>Certificate in Inclusive Inquiry STEM Education</b> Institute for Scientist & Engineer Educators Professional Development University of Santa Cruz, California, USA
2018	<b>Astronomy Instructor</b> Gifted and Talented Education program Michigan State University, Michigan, USA
2015 - 2018	<b>Teaching Assistant</b> Visions of the Universe Laboratory Michigan State University, Michigan, USA
2011 - 2014	<b>German, Math, Physical Sciences Tutor</b> Academic Support Center Oakland Community College, Michigan, USA
2011	<b>Teaching Assistant</b> Physical Science Oakland Community College, Michigan, USA

## INTERNATIONAL COLLABORATIONS AND PROFESSIONAL SOCIETIES

2022 - present	Evolutionary Map of the Universe (EMU) Radio Survey
2022 - present	International Astronomical Union
2022 - present	CASTOR Time Domain Science Working Group

2021 - present	The Legacy Survey of Space & Time - Stars, Milky Way and Local Volume - Transient and Variable Stars Working Groups
2021 - present	Astrostatistics Interest Group of the American Statistical Association
2021 - 2023	Canadian Astronomical Society/Société Canadienne d'Astronomie
2020 - present	LISA Consortium, ESA L3 Approved Mission
2016 - present	American Astronomical Society

## STUDENT RESEARCH SUPERVISION

2022 - 2023	Rawan Karam, B.Sc. (Honours), McGill University, Canada
2021 - 2022	Yifan Sun, B.Sc. (Honours), McGill University, Canada
2021 - 2022	Jeff Huang, B.Sc (Honours), McGill University, Canada
2020 - 2022	Sneha Nair, B.Sc. (Honours), McGill University, Canada
2020 - 2022	Emma Barbisan, B.Sc., McGill University, Canada
2020 - 2021	Jade Ducharme, B.Sc., McGill University, Canada
2020 - 2022	Wasundara Athukoralalage, B.Sc., Michigan State University, USA
2019 - 2021	Erica Thygesen (w/ Zepf), M.Sc., Michigan State University, USA
2019	Noah Vowell, B.Sc., University of Michigan-Dearborn, USA
2018	Omid Noroozi, B.Sc. (Honours), Michigan State University, USA

## ANALYSIS, SOFTWARE AND SKILLS

- X-ray spectroscopy, imaging and timing analysis (*Chandra*, *MAXI*, *NICER*, *NuSTAR*, *RXTE*, *Swift*, *XMM*)
- Optical spectroscopy (*SOAR/GHTS*, *Gemini/GMOS*, *VLT/FORS2*)
- Ultraviolet imaging and photometry (*Swift/UVOT*, *GALEX*, *HST/ACS*)
- Infrared imaging (*Spitzer/IRAC*)
- Radio continuum imaging (*Australian Telescope Compact Array*)
- Gamma-ray binned likelihood analysis (*Fermi/LAT*)
- Conducting optical observations: *SOAR* observatory (300+ hours), ATCA (50+ hours)
- Programming: Python (astropy, numpy, scipy, scikit-learn, matplotlib, Keras), Mathematica
- Major astronomical packages: AstroPy, CIAO, HEASoft (XSpec, FTools), IRAF, CASA, Fermitools, DrizzlePAC

## ACADEMIC SERVICE

2023	EMU Survey Data Validator
2022	Rubin Observatory Data Preview 2 Delegate
2022-2024	NICER User's Group
2022-	co-Chair, Star Clusters Science Subgroup for Rubin Observatory
2022	Canadian Space Agency High Energy Astrophysics Topical Team
2021-	Publication referee: Monthly Notices of the Royal Astronomical Society, The Astrophysical Journal, Chinese Journal of Physics
2021-	Time/Funding Allocation Committees: NASA ADAP, NSF AAG, Chandra, NICER (deputy chair), NuSTAR (deputy chair), Swift, XRISM GS
2021-	External Reviewer: Canadian Time Allocation Committee (CanTAC), Indian Space Research Organisation (ISRO), Hubble Space Telescope, James Webb Space Telescope

## MENTORING

2022-2023	Laser Interferometer Space Antenna – Early Career Scientist Mentor
2021-2022	Physics and Astronomy Research Experiences for Drew Scholars, Michigan State University, Michigan, USA
2021-2022	Mentoring for Women in Physics, Supernova Foundation
2020	Undergraduate Professional Development Seminars, Michigan State University and University of Michigan-Dearborn, Michigan, USA
2019-2020	Co-founder, Stellar Mentoring Program, Michigan State University, Michigan, USA

## SELECTED SEMINAR TALKS

– 19 invited seminar talks in 6 countries since 2017.	
2023 Jul	Rubin Observatory Transient and Variable Stars Colloquium
2023 May	Liverpool John Moores University, United Kingdom
2023 Mar	University of Waterloo, Ontario, Canada
2023 Feb	Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil
2022 Sept	University of Texas Rio Grande Valley, Texas, USA
2021 Mar	American Museum of Natural History, New York, USA
2021 Jan	Institute of Astrophysics-FORTH, Heraklion, Crete
2017 Feb	Gemini South Observatory, Coquimbo, Chile

## SELECTED CONFERENCE TALKS

– 17 talks since 2014.	
2023 May	The 10th Microquasar Workshop: the various facets of extreme gravity, Heraklion, Crete
2022 Aug	Star Clusters at McMaster University, Ontario, Canada
2022 May	Intermediate Mass Black Holes: New Science From Stellar Evolution to Cosmology, San Juan, Puerto Rico
2021 Aug	Rubin Observatory Project & Community Workshop, Seattle, WA, USA
2021 Apr	LISA Canada Workshop, British Columbia, Canada
2020 Jan	235th American Astronomical Society Meeting, Hawaii, USA
2019 Mar	17th High Energy Astrophysics Division Meeting, California, USA
2014 Apr	Compact Objects in Michigan 2, Michigan, USA

## SELECTED PUBLIC TALKS

– 12 public talks since 2017.	
2021	STEM Week, Vanier College, Québec, Canada
2021	Abrams Planetarium Night Sky Chat, Michigan, USA
2020	Quiet Adventures Symposium, Michigan, USA
2017	Astronomy on Tap, Michigan, USA

## SELECTED OUTREACH AND VOLUNTEER ACTIVITIES

– Involved in 19 different outreach events since 2014.	
2022	Carbondale Radio Physics, KDNK, Colorado, USA
2020	Science Briefing, NASA Universe of Learning, Maryland, USA
2019	Event Supervisor, Science Olympiad State Level Astronomy division, Michigan, USA
2018	Primary Astronomy Organizer, MSU Science Festival Expo Days, Michigan, USA

## PUBLICATIONS

† indicates students under my supervision

### Refereed

28. M. Brumback et al., (including **K. Dage**), “Constraining the evolution of the unstable accretion disk in SMC X-1 with NICER”, 2023, *The Astrophysical Journal*
27. Amaro-Seoane et al., (including **K. Dage**), “Astrophysics with the Laser Interferometer Space Antenna”, 2023, *Living Reviews In Relativity*
26. C. Usher, **K. Dage**, et al., “Rubin Observatory LSST Stars Milky Way and Local Volume Star Clusters Roadmap”, 2023, *Publications of the Astronomical Society of the Pacific*
25. C.-P. Hu et al (including **K. Dage**), “Monitoring observations of SMC X-1’s excursions (MOOSE)-II: A new excursion accompanies spin-up acceleration”, 2023, *Monthly Notices of the Royal Astronomical Society*
24. S. Nair† et al (including **K. Dage**), “The X-ray Point Source Population Hosted by Globular Clusters in the Elliptical Galaxy NGC 4261”, 2023, *Monthly Notices of the Royal Astronomical Society*
23. The Rubin LSST TVS Science Collaboration (including **K. Dage**), “Rubin Observatory LSST Transients and Variable Stars Roadmap”, 2022, *Publications of the Astronomical Society of the Pacific* (submitted)
22. **K. Dage**, Y. Sun†, A. Kundu, S. Zepf, D. Haggard, “Far Ultra-Violet Insights Into NGC 1399’s Globular Cluster Population”, 2022, *Monthly Notices of the Royal Astronomical Society*
21. Wasundara Ranthari Athukoralalage† et al (including **K. Dage**), “Optical and X-ray Follow-Up to a Globular Cluster Ultraluminous X-ray Source in NGC 4472”, 2022, *Monthly Notices of the Royal Astronomical Society*
20. E. Thygesen†, Y. Sun†, J. Huang†, et al (including **K. Dage**), “Globular Cluster Ultraluminous X-ray Sources in the Furthest Early-Type Galaxies”, 2022, *Monthly Notices of the Royal Astronomical Society*
19. **K. Dage**, M. Brumback, J. Neilsen, C.-P. Hu, D. Altamirano, A. Bahramian, P. A. Charles, W. I. Clarkson, D. Haggard, R. C. Hickox, J. Kennea, “Monitoring Observations of SMC X-1’s Excursions (MOOSE) I: Programme Description and Initial High-State Spectral Results”, 2022, *Monthly Notices of the Royal Astronomical Society*
18. E. Barbisan†, J. Huang† et al (including **K. Dage**), “Using Machine Learning to Identify Extragalactic Globular Cluster Candidates from Ground-Based Photometric Surveys of M87”, 2022, *Monthly Notices of the Royal Astronomical Society*
17. S. J. Swihart, et al (including **K. Dage**), “4FGL J1120.0-2204: A Unique Gamma-ray Bright Neutron Star Binary with an Extremely Low Mass Proto-White Dwarf”, 2022, *The Astrophysical Journal*
16. D. L. Tucker et al (including **K. Dage**), “SOAR/Goodman Spectroscopic Assessment of Candidate Counterparts of the LIGO–Virgo Event GW190814”, 2022, *The Astrophysical Journal*
15. C. Kilpatrick et al (including **K. Dage**), “The Gravity Collective: A Search for the Electromagnetic Counterpart to the Neutron Star-Black Hole Merger GW190814”, 2021, *The Astrophysical Journal*
14. **K. Dage**, N. Vowell†, E. Thygesen†, A. Bahramian, D. Haggard, K. Kovelakas, A. Kundu, T. J. Maccarone, J. Strader, R. Urquhart, S. E. Zepf, “Ultraluminous X-ray Sources in Seven Edge-On Spiral Galaxies”, 2021, *Monthly Notices of the Royal Astronomical Society*
13. T. Jayasinghe et al (including **K. Dage**), “The Loudest Stellar Heartbeat: Characterizing the Most Extreme Amplitude Heartbeat Star System”, 2021, *Monthly Notices of the Royal Astronomical Society*
12. **K. Dage**, A. Kundu, E. Thygesen†, A. Bahramian, J.A. Irwin, D. Haggard, T.J. Maccarone, S. Nair†, M.B. Peacock, J. Strader, S.E. Zepf, “Three Ultraluminous X-ray Sources in NGC 1316”, 2021, *Monthly Notices of the Royal Astronomical Society*
11. S. Swihart et al (including **K. Dage**), “Discovery of a New Redback Millisecond Pulsar Candidate: 4FGL J0940.3-7610”, 2021, *The Astrophysical Journal*
10. J. M. Miller (including **K. Dage**), “A New Candidate Transitional Millisecond Pulsar in the Sub-luminous Disk State: 4FGL J0407.7–5702”, 2020, *The Astrophysical Journal*

9. S. Swihart et al (including **K. Dage**), "A New Likely Redback Millisecond Pulsar Binary with a Massive Neutron Star: 4FGL J2333.1-5527", 2020, The Astrophysical Journal
8. **K. Dage**, S.E. Zepf, E. Thygesen†, A. Bahramian, A. Kundu, M.B. Peacock, T. J. Maccarone, J. Strader, "X-Ray Spectroscopy of Newly Identified ULXs Associated With M87's Globular Cluster Population", 2020, Monthly Notices of the Royal Astronomical Society
7. **K. Dage**, S.E. Zepf, A. Bahramian, J. Strader, Thomas J. Maccarone, M.B. Peacock, A. Kundu, M. Steele, C. Britt, "Slow Decline and Rise of the Broad [OIII] Emission Line in Globular Cluster Black Hole Candidate RZ2109", 2019, Monthly Notices of the Royal Astronomical Society
6. E. Aydi, et al (including **K. Dage**), "Flaring, Dust Formation, And Shocks In The Very Slow Nova ASASSN-17pf (LMCN 2017-11a)", 2019, The Astrophysical Journal
5. **K. Dage**, S.E. Zepf, M.B. Peacock, A. Bahramian, O. Noroozi†, A. Kundu, T.J. Maccarone, "X-Ray Spectral Variability of Ultraluminous X-Ray Sources in Extragalactic Globular Clusters", 2019, Monthly Notices of the Royal Astronomical Society.
4. Strader, J., et al (including **K. Dage**), "Optical spectroscopy and demographics of redback millisecond pulsar binaries", 2018, The Astrophysical Journal
3. M. A. Tucker, et al (including **K. Dage**), "ASASSN-18ey: The Rise of a New Black-Hole X-ray Binary" 2018, The Astrophysical Journal
2. **K. Dage**, W.I. Clarkson, P.A. Charles, S. Laycock, I-C. Shih "A Search for Spin-Superorbital Period Correlation in SMC X-1", 2018, Monthly Notices of the Royal Astronomical Society.
1. **K. Dage**, S. E. Zepf, A. Bahramian, A. Kundu, T. J. Maccarone, M. B. Peacock, "X-Ray Variability from the Ultraluminous Black Hole Candidate X-ray Binary in the Globular Cluster RZ 2109", 2018, The Astrophysical Journal

## Unrefereed

9. **K. Dage** et al., "Extragalactic Star Cluster Science with the Nancy Grace Roman Space Telescope's High Latitude Wide Area Survey and the Vera C. Rubin Observatory", 2023, Roman CCS White Paper
8. J. Huang†, Y. Sun†, **K. Dage**, D. Haggard, "Probing M87 Globular Clusters for Flaring Ultraluminous X-Ray Sources", 2021, RNAAS, 5, 136
7. D. Tucker et al (including **K. Dage**), "LIGO/Virgo S190814bv: SOAR spectroscopy of DECAM candidates AT2019npw and AT2019num", 2019, GCN 25484
6. E. Aydi et al (including **K. Dage**), "SOAR classification of ASASSN-19qv as a classical nova in the SMC", The Astronomer's Telegram, No. 12907
5. J. Strader, L. Chomiuk, **K. Dage**, J.L. Prieto, K. Z. Stanek, "Spectroscopic classification of ASASSN-19kz as a young Type II supernova in NGC 2207", The Astronomer's Telegram, No. 12706
4. K.V. Sokolovsky et al (including **K. Dage**), "ASAS-SN Discovery of a Bright Candidate Microlensing Event ASASSN-19cq", 2019, The Astronomer's Telegram, No. 12495
3. S.K. Sarbadhicary, et al (including **K. Dage**), "SOAR optical spectroscopy of the Wolf-Rayet star WR96 during the dimming event", The Astronomer's Telegram, No. 12511
2. **K. Dage**, et al, "Spectroscopic Classification of SN 2018agk with SOAR/Goodman", 2018, The Astronomer's Telegram, No. 11433
1. A. Bahramian, J. Strader, **K. Dage**, "SOAR/Goodman optical spectroscopy of MAXI J1820+070", 2018, The Astronomer's Telegram, No. 11424