

Kristen Dage

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RESEARCH INTERESTS

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

APPOINTMENTS

- 2020 - present **FRQNT/MSI Postdoctoral Fellow**
McGill University/McGill Space Institute
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

ACCEPTED TELESCOPE PROPOSALS

- 2022 **Australian Compact Telescope Array**: Radio Constraints on Massive Black Hole Candidates in Nuclear Star Clusters, 72 hours **PI: K. Dage**
- 2022 **Chandra Cycle 24**: Characterizing the Nature of Globular Cluster ULX Sources in NGC 1399, 40ks+1 NOAO night, \$23440 USD **PI: K. Dage**
- 2021 **Gemini South Fast Turnaround**: Confirming the Decline of [NII] Emission in Globular Cluster Ultraluminous X-ray Source GCU7, 5.5 hours **PI: K. Dage**
- 2021 **Chandra Cycle 23**: The Hunt for a new ultra-compact X-ray binary in M87's globular cluster system, 40ks, \$21,520 USD **PI: K. Dage**
- 2021 **Chandra Cycle 23**: The Next Breakthroughs Community Program: Chandra-VLA Observations of Compact-Object Mergers, PIs: D. Haggard, J. Neilsen
- 2021 **NuSTAR Cycle 7**: Investigating pulsation transience in SMC X-1 during superior orbital period excursion, PI: M. Brumback
- 2021 **JWST Cycle 1**: Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar systems in the Virgo cluster, 41.2 Primary Spacecraft Hours, PI: M. Taylor
- 2021 **NICER Cycle 3**: Monitoring SMC X-1's reprocessed emission during an epoch of superior orbital period excursion, 120ks, **PI: K. Dage**
- 2020 **Gemini South 2021A**: Searching for evidence of outflows in globular cluster X-ray binary M87-GCULX1, 7.2 hours, **PI: K. Dage**
- 2020 **Chandra Cycle 22**: The LMXB population of NGC 3998: Testing for an extreme IMF, PI: S. Zepf
- 2020 **HST Cycle 28**: Far-ultraviolet insights into multiple populations in extragalactic globular clusters, PI: S. Zepf

- 2020 ***NuSTAR* Cycle 6:** Complete spectral characterisation of a newly discovered ULX, 40ks and \$20,000 USD, **PI: K. Dage**
- 2019 **Niels Gehrels Swift Observatory** Target of Opportunity, 24ks, **PI: K. Dage**
- 2019 **Chandra Cycle 21:** A high spatial resolution X-ray survey of the halo of M87, PI: M. Peacock
- 2018 **Chandra Cycle 20:** The nature of the two globular cluster ULXs in the galaxy NGC 4472, PI: S. Zepf

AWARDS, HONOURS AND GRANTS

- 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 \$500 USD
- 2020 **Sherwood K. Haynes Graduate Physics Award for Outstanding Graduate Student**, Dept. Physics & Astronomy, Michigan State University
- 2020 **MSI Postdoctoral Fellowship Prize**, Montreal, QC
- 2019 **MSU College of Natural Science Dissertation Completion Fellowship**
- 2019 **AAS International Travel Grant**, National Sciences Foundation, \$2000 USD
- 2014 **Outstanding Physics Student**, Dept. Natural Sciences, University of Michigan-Dearborn
- 2014 **Outstanding Math Tutor**, Academic Support Center, Oakland Community College

TEACHING EXPERIENCE

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

2020 - present Centre de recherche en astrophysique du Québec
 2016 - present American Astronomical Society

STUDENT RESEARCH SUPERVISION

2022 - present 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. (Senior Thesis), 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*)
- Infrared imaging (*Spitzer/IRAC*)
- Gamma-ray binned likelihood analysis (*Fermi/LAT*)
- Conducting optical observations at *SOAR* observatory, with over 300 hours experience
- Programming: Python (astropy, numpy, scipy, scikit-learn, matplotlib, Keras), Mathematica
- Major astronomical packages: AstroPy, CIAO, HEASoft (XSpec, FTools), IRAF, Fermitools

ACADEMIC SERVICE

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
 2022 Executive Secretary in NASA Astrophysics Senior Review
 2021- Publication referee: Monthly Notices of the Royal Astronomical Society
 2021- Time/Funding Allocation Committees: Chandra, NICER, ADAP, Swift, NuSTAR, NSF AAG, XRISM GS
 2021- External Reviewer: CanTAC, Indian Space Research Organisation, Hubble Space Telescope
 2021 McGill Space Institute Undergrad Awards Committee
 2020-2022 Postdoc Liaison, McGill Physics Equity, Diversity, and Inclusion
 2016-2020 MSU Astronomy Journal Discussion Organizer

MENTORING

2021-2022 Physics & MSI Summer Student Program, McGill University, Québec, Canada
 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

INVITED TALKS

2022 Jun Curtin Institute of Radio Astronomy, Western Aus., Australia
2021 Oct Howard University, D.C., USA
2021 May University of California Santa Cruz, California, USA
2021 Mar American Museum of Natural History, New York, USA
2021 Feb Texas Tech University, Texas, USA
2021 Jan Institute of Astrophysics-FORTH, Heraklion, Crete
2020 Dec Science Briefing, NASA Universe of Learning, Maryland, USA
2020 Feb McGill Space Institute, Québec, Canada

SELECTED CONFERENCE AND SEMINAR TALKS

– 18 talks in four countries since April, 2014.
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
2019 Mar 17th High Energy Astrophysics Division Meeting, California, USA
2018 Aug International Centre for Radio Astronomy Research, Western Aus., Australia
2017 Feb Gemini South Observatory, Coquimbo, Chile
2014 Apr Compact Objects in Michigan 2, Michigan, USA

SELECTED PUBLIC TALKS

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

SELECTED OUTREACH AND VOLUNTEER ACTIVITIES

– Involved in 17 different outreach events since April, 2014.
2022 Radio Physics, KDNK, Carbondale CO, USA
2021 Co-organizer, McGill Space Institute Astronomy Trivia Night, Québec, Canada
2020 Presenter, 2020 STEM Pathways for Girls conference, New Mexico, USA
2019 Event Supervisor, Science Olympiad State Level Astronomy division, Michigan, USA
2019 Organizer, IAU Women and Girls in Astronomy Month, Abrams Planetarium, Michigan, USA
2018 Primary Astronomy Organizer, MSU Science Festival Expo Days, Michigan, USA

PUBLICATIONS

† indicates students under my supervision

Refereed

24. K. Dage, Y. Sun†, A. Kundu, S. Zepf, D. Haggard, “Far Ultra-Violet Insights Into NGC 1399’s Globular Cluster Population”, 2022, MNRAS (submitted)

23. Wasundara Ranhari Athukoralalage† et al (including **K. Dage**), “Optical and X-ray Follow-Up to a Globular Cluster Ultraluminous X-ray Source in NGC 4472”, 2022, MNRAS (submitted)
22. The Rubin LSST TVS Science Collaboration (including **K. Dage**), “Rubin Observatory LSST Transients and Variable Stars Roadmap”, 2022, PASP (submitted)
21. E. Thygesen†, Y. Sun†, J. Huang†, et al (including **K. Dage**), “Globular Cluster Ultraluminous X-ray Sources in the Furthest Early-Type Galaxies”, 2022, MNRAS (submitted)
20. J. Stader, et al (including **K. Dage**), “V1535 Sco: An eccentric post-nova cataclysmic variable with an evolved companion”, 2022, The Astrophysical Journal (submitted)
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, MNRAS
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, MNRAS
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. Amaro-Seoane et al (including **K. Dage**), "Astrophysics with the Laser Interferometer Space Antenna", Living Reviews In Relativity, 2022
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