

Benjamin M. Tofflemire

Postdoctoral Fellow

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RESEARCH INTERESTS	T Tauri stars, formation and evolution of binary stars, accretion diagnostics, magnetic reconnection events, structure and evolution of protoplanetary disks, time-domain astrophysics	
EMPLOYMENT	Postdoctoral Fellow, UT-Austin – Advisor: Prof. Adam Kraus Research Assistant, UW-Madison – Advisor: Prof. Robert Mathieu Research Assistant, UW-Madison – Advisor: Dr. Marina Orio Research Assistant, Univ. of Washington – Advisor: Prof. John Wisniewski	2018-present 2013-2018 2011-2013 2010-2011
EDUCATION	Ph.D. Astronomy University of Wisconsin-Madison • Advisor: Professor Robert D. Mathieu • Thesis: <i>Accretion Dynamics in Pre-Main Sequence Binary Stars</i> B.S. Astronomy & Physics University of Washington	July 2018 Madison, WI, USA June 2011 Seattle, WA, USA
RESEARCH EXPERIENCE	Graduate Research Assistant Advisor: Prof. Robert D. Mathieu • Measured the accretion rate for a sample of 9 pre-main sequence binaries as a function of orbital phase to test numerical models of binary accretion • Characterized the kinematics and spatial distribution of accretion streams feeding young binary star systems with time-series, high-resolution spectroscopy • Determined membership and binary population of evolved stars in the open cluster NGC 6791, as part of the WIYN Open Cluster Study, through multi-epoch, radial-velocity measurements Advisor: Dr. Marina Orio • Modeled <i>Chandra</i> and <i>XMM-Newton</i> X-ray grating spectra of recurrent novae to determine white dwarf photospheric temperatures and the physical characteristics of ejected material NSF Research Experiences for Undergraduates Advisor Prof. Alex Lazarian • Analyzed MHD simulations of ISM turbulence in search of statistical relationships between observable quantities (column density distributions) and magnetic field strength Undergraduate Research Assistant Advisor: Prof. Suzanne Hawley and Prof. John Wisniewski • Characterized the near-infrared variability of magnetic reconnection events on M dwarfs	University of Wisconsin-Madison June 2012 - present August 2011 - December 2013 University of Wisconsin-Madison June 2010 - January 2011 University of Washington September 2009 - Nov 2011
AWARDS	University of Wisconsin Jansky Award for Outstanding Research UW-Madison Graduate School Conference Presentation Award Sigma Xi Grants in Aid of Research University of Wisconsin Bautz Travel Fellowship University of Wisconsin Vilas Research Travel Grant AAS 225 Chambliss Student Prize Honorable Mention University of Wisconsin – University Housing Honored Instructor University of Washington's Astronomy Bear Prize Recipient University of Washington Mary Gates Research Scholarship	2017 (\$2,400) 2015, 2016, 2017 (\$2,500) 2015 (\$1200) 2015 (\$600) 2015 2015 2012 2011 ((\$4,000) 2010, 2011
OBSERVING EXPERIENCE	Spitzer Space Telescope • PI: Eclipse monitoring of young, low-mass eclipsing binaries (94 hrs of P1)	

Southern African Large Telescope

- **PI:** Time-Series Spectroscopy of Pre-Main Sequence Binaries (42.5 hrs of P0/P1)

WIYN 3.5-m Telescope

- **PI:** Radial velocity survey of accreting stars in NGC 2264 (2 nights)
- **PI:** Time-series spectroscopy of flare stars in Pleiades star cluster (3 nights)
- **Co-I:** WIYN Open Cluster Study radial-velocity survey (~ 90 nights over 8 semesters)

Las Cumbres Observatories Global Telescope Network

- **Co-I:** Time-series photometry of Pre-Main Sequence Binaries (980 hours over 5 semesters)

SMARTS 1.3m

- **PI:** Time-series photometry of Pre-Main Sequence Binaries (107 hours over 4 semesters)
- **PI:** Time-series spectroscopy of Pre-Main Sequence Binary V4046 Sgr (42 hours)

WIYN 0.9-m Telescope

- **PI:** High Cadence Photometry of Pre-Main Sequence Binary DQ Tau (16 nights)

APO: ARCSAT 0.5m

- **PI:** High Cadence Photometry of Pre-Main Sequence Binary DQ Tau (16 nights)

KPNO: 2.1m

- **Co-I:** High Cadence, NIR Photometry of M Dwarf Flare Stars (5 nights)

TALKS**Cool Stars 20**

Contributed Talk

August 2018

Boston, MA

AAS 231

Dissertation Talk

January 2018

National Harbor, MD

Vanderbilt University

Astrophysics Lunch

November 2017

Nashville, TN

Institute for Theory and Computation (Harvard-CfA)

Stars and Planets Seminar (Invited)

March 2017

Cambridge, MA

American Museum of Natural History

Astronomy Seminar

March 2017

New York, NY

Space Telescope Science Institute

Exoplanets, Star and Planet Formation Seminar

March 2017

Baltimore, MD

University of Texas-Austin

Stars Seminar (Invited)

October 2016

Austin, TX

Cool Stars 19

Contributed Talk

June 2016

Uppsala, Sweden

Science with SALT

Contributed Talk

June 2015

Stellenbosch, South Africa

X-ray Binaries - 50 Years Since the Discovery of Sco X-1

Contributed Talk

July 2012

Chandra X-ray Center, Boston, MA

SERVICE

UT Austin BashFest 2019 LOC

2019

UW-Madison Astronomy Graduate Admissions Committee (Elected)

2015 - 2016

NASA ROSES Review Panel Secretary

2015

Graduate Student-Faculty Liaison (Elected)

2014 - 2015

Undergraduate Liaison to the Univ. of Washington Astronomy Department

2010 - 2011

Stars Coffee Curator (weekly department meeting)

2013 - present**MENTORING
EXPERIENCE****DELTA (CIRTL) Mentor Training Seminar****Summer 2014**

Class focused on establishing realistic expectations, considering the issues of human diversity, and developing a reflective approach to mentoring

	UW-Madison Undergrad Research Graduate Student Mentor • Advised Nathan Eggen (currently a University of Minnesota graduate student) on project to produce and model the lightcurves of Pre-Main Sequence binary stars June 2015 - June 2017 University of Wisconsin-Madison
	NSF REU Graduate Student Mentor • Co-advised Sarah Kessler (currently an Ohio State graduate student) and Francis Klein on a project searching for triple companions to spectroscopic binaries in open cluster M67 using <i>HST</i> June - August 2014 University of Wisconsin-Madison
	EAGLE School Science Mentor Science Mentor • Held weekly meetings with junior-high student Josh DuBeau to create a class presentation on stellar evolution and exoplanet detection Spring 2015 Madison, WI
TEACHING EXPERIENCE	Course Development & Teaching Astronomy 140: The Exoplanet Revolution • Co-developed curriculum and labs for an intro-level, inquiry-based course on exoplanets with Prof. Mathieu • Co-taught first implementation of course with Prof. Mathieu in Spring 2018 University of Wisconsin-Madison Astronomy 307: Introductory Astronomy • Guest lectured an activity based lesson on parallax and absolute magnitudes The University of Texas at Austin Teaching Assistant Astronomy 103: The Evolving Universe • Taught six discussion sections per week, which included developing lesson plans and in-class activities University of Wisconsin-Madison Fall 2012, Fall 2015
OUTREACH	Universe in the Park • Visit Wisconsin state parks to host public observing and astronomy presentations (>15 events hosted) 2011-present Washburn Public Observing Nights • Host public and private observing nights at the historic Washburn observatory (>15 events hosted) 2011-present Girls Inc. Planetarium Shows • Presented planetarium shows to Madison's local chapter of Girls Inc. 2014 Space Place • Invited lecture to amateur astronomy community (televised) November 2016 Madison, WI Senior Summer School • Invited lecture to the Senior Summer School educational, vacation program July 2014 Chicago, IL
TECHNICAL SKILLS	Programming Languages • Experienced: python, IDL, HTML • Basic Knowledge: Fortran, SQL Tools • \LaTeX , IRAF, DS9, Source Extractor, Git, Jekyll (web development)
PEER-REVIEWED PUBLICATIONS (H-INDEX: 14)	First Author Publications 7. Tofflemire , B. M., Mathieu, R. D., et al. 2019, in prep <i>Accretion Kinematics in the T Tauri Binary TWA 3A: Evidence for Preferential Accretion onto the TWA 3A Primary</i> 6. Tofflemire , B. M., Mathieu, R. D., Herczeg, G. J., Akeson, R. L., & Ciardi, D. R. 2017b, ApJL, 842, L12 <i>Pulsed Accretion in the T Tauri Binary TWA 3A</i> 5. Tofflemire , B. M., Mathieu, R. D., Ardila, D. R., Akeson, R. L., Ciardi, D. R., Johns-Krull, C., Herczeg, G. J., & Quijano-Vodniza, A. 2017a, ApJ, 835, 8 <i>Accretion and Magnetic Reconnection in the Classical T Tauri Binary DQ Tau</i>

4. **Tofflemire**, B. M., Gosnell, N. M., Mathieu, R. D., & Platais, I. 2014, AJ, 148, 61
WIYN Open Cluster Study. LIX. Radial Velocity Membership of the Evolved Population of the Old Open Cluster NGC 6791
3. **Tofflemire**, B. M., Orio, M., Page, K. L., Osborne, J. P., Ciroi, S., Cracco, V., Di Mille, F., & Maxwell, M. 2013, ApJ, 779, 22
X-Ray Grating Observations of Recurrent Nova T Pyxidis during the 2011 Outburst
2. **Tofflemire**, B. M., Wisniewski, J. P., Kowalski, A. F., Schmidt, S. J., Kundurthy, P., Hilton, E. J., Holtzman, J. A., & Hawley, S. L. 2012, AJ, 143, 12
The Implications of M Dwarf Flares on the Detection and Characterization of Exoplanets at Infrared Wavelengths
1. **Tofflemire**, B. M., Burkhart, B., & Lazarian, A. 2011, ApJ, 736, 60
Interstellar Sonic and Alfvénic Mach Numbers and the Tsallis Distribution

Co-Author Publications

15. Newton, E., Mann, A., **Tofflemire**, B., et al. 2019, submitted
TESS Hunt for Young and Maturing Exoplanets (THYME) I: A planet in the 45 Myr Tucana-Horologium association
14. Kounkel, M., Covey, K., Moe, M., et al. (including **Tofflemire**, B. and 25 co-authors) 2019, submitted
Close companions around young stars
13. Zemko, P., Ciroi, S., Orio, M., et al. (including **Tofflemire**, B. and 8 co-authors) 2018, MNRAS, 480, 4489Z
Optical Observations of Novae in Quiescence
12. Peretz, U., Orio, M., Behar, E., Bianchini, A., Gallagher, J., Rauch, T., **Tofflemire**, B., & Zemko, P., 2016, ApJ 829, 2
Chemical and Physical Parameters from X-Ray High-resolution Spectra of the Galactic Nova V959 Mon
11. Milliman, K., Leiner, E., Mathieu, R., **Tofflemire**, B., & Platais, I. 2016, AJ, 151, 152
WIYN Open Cluster Study. LXXI. Spectroscopic Membership and Orbits of NGC 6791 Subgiants
10. Mack, C., III, Ge, J., Deshpande, R., et al. (including **Tofflemire**, B. and 41 co-authors) 2013, AJ, 145, 139
A Cautionary Tale: MARVELS Brown Dwarf Candidate Reveals Itself to be a Very Long Period, Highly Eccentric Spectroscopic Stellar Binary
9. Orio, M., Behar, E., Gallagher, J., Bianchini, A., Chiosi, E., Luna, G., Nelson, T., Rauch, T., Schaefer, B., & **Tofflemire**, B., 2013, MNRAS, 429, 1342
Thomson scattering and collisional ionization in the X-ray grating spectra of the recurrent nova U Scorpii
8. Fleming, S. W., Ge, J., Barnes, R., et al. (including **Tofflemire**, B. and 58 co-authors) 2012, AJ, 144, 72
Very Low Mass Stellar and Substellar Companions to Solar-like Stars from MARVELS. II. A Short-period Companion Orbiting an F Star with Evidence of a Stellar Tertiary and Significant Mutual Inclination
7. Wisniewski, J. P., Ge, J., Crepp, J. R., et al. (including **Tofflemire**, B. and 41 co-authors) 2012, AJ, 143, 107
Very Low Mass Stellar and Substellar Companions to Solar-like Stars from MARVELS. I. A Low-mass Ratio Stellar Companion to TYC 4110-01037-1 in a 79 Day Orbit
6. Sayres, C., Subasavage, J. P., Bergeron, P., Dufour, P., Davenport, J., AlSayyad, Y., & **Tofflemire**, B., 2012, AJ, 143, 103
A Multi-survey Approach to White Dwarf Discovery

5. Schmidt, S., Kowalski, A., Hawley, S., Hilton, E., Wisniewski, J., & **Tofflemire**, B., 2012, *ApJ*, 745, 14
Probing the Flare Atmospheres of M Dwarfs Using Infrared Emission Lines
4. Hornbeck, J., Grady, C., Perrin, M., Wisniewski, J., **Tofflemire**, B., et al. (11 co-authors) 2012, *ApJ*, 744, 54
PDS 144: The First Confirmed Herbig Ae-Herbig Ae Wide Binary
3. Eisenstein, D. J., Weinberg, D. H., Agol, E., et al. (including **Tofflemire**, B. and 252 co-authors) 2011, *AJ*, 142, 72
SDSS-III: Massive Spectroscopic Surveys of the Distant Universe, the Milky Way, and Extra-Solar Planetary Systems
2. Aihara, H., Allende Prieto, C., An, D., et al. (including **Tofflemire**, B. and 176 co-authors) 2011, *ApJS*, 193, 29
The Eighth Data Release of the Sloan Digital Sky Survey: First Data from SDSS-III
1. Janson, M., Carson, J., Thalmann, C., et al. (including **Tofflemire**, B. and 44 co-authors) 2011, *ApJ*, 728, 85
Near-infrared Multi-band Photometry of the Substellar Companion GJ 758 B

OTHER
PUBLICATIONS

Conference Proceedings

4. **Tofflemire**, B., Mathieu, R., Herczeg, G., et al. 2017, Francesco's Legacy: Star Formation in Space and Time, *Memorie della Società Astronomica Italiana*, Vol 88 n. 4, 820
Accretion Dynamics in Pre-main Sequence Binaries
3. **Tofflemire**, B., 2015, SALT Science Conference 2015 (SSC2015), 26
Accretion Dynamics in Pre-Main Sequence Binaries
2. **Tofflemire**, B., 2012, X-ray Binaries. Celebrating 50 Years Since the Discovery of Sco X-1, 57
X-ray Grating Observations of Recurrent Nova T Pyx
1. **Tofflemire**, B., Wisniewski, J., Hilton, E., et al. 2011, 16th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun, 448, 1287
M Dwarf Flares: Exoplanet Detection Implications

Conference Abstracts

6. **Tofflemire**, B., Mathieu, R., Herczeg, G., et al. 2018, American Astronomical Society Meeting Abstracts, 231, 414.05
An Observational Study of Accretion Dynamics in Short-Period Pre-Main Sequence Binaries
5. **Tofflemire**, B., Mathieu, R., Ardila, D., et al. 2016, American Astronomical Society Meeting Abstracts, 227, 236.06
Accretion and Magnetic Reconnection in the Pre-Main Sequence Binary DQ Tau as Revealed through High-Cadence Optical Photometry
4. **Tofflemire**, B., Mathieu, R., Ardila, D., & Ciardi, D. 2015, American Astronomical Society Meeting Abstracts, 225, 348.11
Time-series Photometry of the Pre-Main Sequence Binary V4046 Sgr: Testing the Accretion Stream Theory
3. **Tofflemire**, B., Gosnell, N., & Mathieu, R., 2013, American Astronomical Society Meeting Abstracts, 222, 214.04
WIYN Open Cluster Study: Radial Velocity Membership of the Evolved Population of Open Cluster NGC 6791
2. **Tofflemire**, B., Lazarian, A., & Burkhart, B., 2011, Bulletin of the American Astronomical Society, 43, 251.02
Analysis of MHD Interstellar Turbulence using Tsallis Statistics
1. **Tofflemire**, B., Wisniewski, J., Kowalski, A., et al. 2010, Bulletin of the American Astronomical Society, 42, 423.15
M Dwarf Flares: Exoplanet Implications

Astronomer's Telegram

2. Orio, M., **Tofflemire**, B., & Truran, J. 2012, The Astronomer's Telegram, 4092
Chandra X-ray grating observation of Nova LMC 2012
1. **Tofflemire**, B., Orio, M., Kuulkers, E., et al. 2011, The Astronomer's Telegram, 3762
A Chandra grating observation of T Pyxidis

CARMA Memo

1. Wright, M., Pound, M., Plambeck, R., et al. (including **Tofflemire**, B.), 2011, CARMA Summer School 2011, CARMA Memoranda Index #56

REFERENCES

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