

## Benjamin M. Tofflemire

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CONTACT INFORMATION	Department of Astronomy University of Wisconsin-Madison 475 N. Charter Street Madison, WI 53706 Website: tofflemire.github.io	tofflemi@astro.wisc.edu phone: (503) 805-0214
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	
EDUCATION	<b>Ph.D. Candidate Astronomy</b> University of Wisconsin-Madison <ul style="list-style-type: none"><li>• Advisor: Professor Robert D. Mathieu</li><li>• Thesis: <i>Accretion Dynamics in Pre-Main Sequence Binary Stars</i></li><li>• Expected Graduation: Spring 2018</li></ul> <b>B.S. Astronomy &amp; Physics</b> University of Washington	<b>August 2011 - present</b> Madison, WI, USA  <b>June 2011</b> Seattle, WA, USA
RESEARCH EXPERIENCE	<b>Graduate Research Assistant</b> Advisor: Prof. Robert D. Mathieu <ul style="list-style-type: none"><li>• 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</li><li>• Characterized the kinematics and spatial distribution of accretion streams feeding young binary star systems with time-series, high-resolution spectroscopy from the SALT telescope</li><li>• 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</li></ul> Advisor: Dr. Marina Orio	University of Wisconsin-Madison <b>June 2012 - present</b>  <b>August 2011 - December 2013</b>  <b>NSF Research Experiences for Undergraduates</b> Advisor Prof. Alex Lazarian <b>June 2010 - January 2011</b> <ul style="list-style-type: none"><li>• Analyzed MHD simulations of ISM turbulence in search of statistical relationships between observable quantities (column density distributions) and magnetic field strength</li></ul> <b>Undergraduate Research Assistant</b> Advisor: Prof. Suzanne Hawley and Prof. John Wisniewski <b>September 2009 - Nov 2011</b> <ul style="list-style-type: none"><li>• Characterized the near-infrared variability of magnetic reconnection events on M dwarfs</li></ul>
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	<b>2017</b> <b>(\\$2,400) 2015, 2016, 2017</b> <b>(\\$2,500) 2015</b> <b>(\\$1200) 2015</b> <b>(\\$600) 2015</b> <b>2015</b> <b>2012</b> <b>2011</b> <b>(\\$4,000) 2010, 2011</b>
OBSERVING EXPERIENCE	<b>Southern African Large Telescope</b> <ul style="list-style-type: none"><li>• <b>PI:</b> Time-Series Spectroscopy of Pre-Main Sequence Binaries (42.5 hrs of P0/P1)</li></ul> <b>WIYN 3.5-m Telescope</b> <ul style="list-style-type: none"><li>• <b>PI:</b> Radial velocity survey of accreting stars in NGC 2264 (2 nights)</li><li>• <b>PI:</b> Time-series spectroscopy of flare stars in Pleiades star cluster (3 nights)</li><li>• <b>Co-I:</b> WIYN Open Cluster Study radial-velocity survey (~ 90 nights over 8 semesters)</li></ul>	

**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)

**TALKS****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**

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****June 2015 - June 2017**

Graduate Student Mentor

University of Wisconsin-Madison

- Advised Nathan Eggen (currently a University of Minnesota graduate student) on project to produce and model the lightcurves of Pre-Main Sequence binary stars

**NSF REU****June - August 2014**

Graduate Student Mentor

University of Wisconsin-Madison

- 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 *HST*

**EAGLE School Science Mentor****Spring 2015**

Science Mentor

Madison, WI

- Held weekly meetings with junior-high student Josh DuBeau to create a class presentation on stellar evolution and exoplanet detection

TEACHING EXPERIENCE	<b>Course Development &amp; Teaching</b> Astronomy 140: The Exoplanet Revolution	<b>Fall 2017, Spring 2018</b> University of Wisconsin-Madison
	<ul style="list-style-type: none"> <li>• Co-developing curriculum and labs for an intro-level class on exoplanets with Prof. Mathieu</li> <li>• Co-teaching first implementation of course with Prof. Mathieu in Spring 2018</li> </ul>	
	<b>Teaching Assistant</b> Astronomy 103: The Evolving Universe	<b>Fall 2012, Fall 2015</b> University of Wisconsin-Madison
	<ul style="list-style-type: none"> <li>• Taught six discussion sections per week, which included developing lesson plans and in-class activities</li> </ul>	
OUTREACH	<b>Universe in the Park</b>	<b>2011-present</b>
	<ul style="list-style-type: none"> <li>• Visit Wisconsin state parks to host public observing and astronomy presentations (&gt;15 events hosted)</li> </ul>	
	<b>Washburn Public Observing Nights</b>	<b>2011-present</b>
	<ul style="list-style-type: none"> <li>• Host public and private observing nights at the historic Washburn observatory (&gt;15 events hosted)</li> </ul>	
	<b>Girls Inc. Planetarium Shows</b>	<b>2014</b>
	<ul style="list-style-type: none"> <li>• Presented planetarium shows to Madison's local chapter of Girls Inc.</li> </ul>	
	<b>Space Place</b>	<b>November 2016</b>
	<ul style="list-style-type: none"> <li>• Invited lecture to amateur astronomy community (televised)</li> </ul>	
	<b>Senior Summer School</b>	<b>July 2014</b>
	<ul style="list-style-type: none"> <li>• Invited lecture to the Senior Summer School educational, vacation program</li> </ul>	
TECHNICAL SKILLS	<b>Programming Languages</b>	
	<ul style="list-style-type: none"> <li>• Experienced: python, IDL, HTML</li> <li>• Basic Knowledge: Fortran</li> </ul>	
	<b>Tools</b>	
	<ul style="list-style-type: none"> <li>• L<sup>A</sup>T<sub>E</sub>X, IRAF, DS9, Source Extractor, Git, Jekyll (web development)</li> </ul>	
PEER-REVIEWED PUBLICATIONS	<b>First Author Publications</b>	
	<ol style="list-style-type: none"> <li>6. <b>Tofflemire</b>, B. M., Mathieu, R. D., Herczeg, G. J., Akeson, R. L., &amp; Ciardi, D. R. 2017b, ApJL, 842, L12 – <i>Pulsed Accretion in the Classical T Tauri Binary TWA 3A</i></li> <li>5. <b>Tofflemire</b>, B. M., Mathieu, R. D., Ardila, D. R., Akeson, R. L., Ciardi, D. R., Johns-Krull, C., Herczeg, G. J., &amp; Quijano-Vodniza, A. 2017a, ApJ, 835, 8 – <i>Accretion and Magnetic Reconnection in the Classical T Tauri Binary DQ Tau</i></li> <li>4. <b>Tofflemire</b>, B. M., Gosnell, N. M., Mathieu, R. D., &amp; Platais, I. 2014, AJ, 148, 61 – <i>WIYN Open Cluster Study. LIX. Radial Velocity Membership of the Evolved Population of the Old Open Cluster NGC 6791</i></li> <li>3. <b>Tofflemire</b>, B. M., Orio, M., Page, K. L., Osborne, J. P., Ciroi, S., Cracco, V., Di Mille, F., &amp; Maxwell, M. 2013, ApJ, 779, 22 – <i>X-Ray Grating Observations of Recurrent Nova T Pyxidis during the 2011 Outburst</i></li> <li>2. <b>Tofflemire</b>, B. M., Wisniewski, J. P., Kowalski, A. F., Schmidt, S. J., Kundurthy, P., Hilton, E. J., Holtzman, J. A., &amp; Hawley, S. L. 2012, AJ, 143, 12 – <i>The Implications of M Dwarf Flares on the Detection and Characterization of Exoplanets at Infrared Wavelengths</i></li> <li>1. <b>Tofflemire</b>, B. M., Burkhart, B., &amp; Lazarian, A. 2011, ApJ, 736, 60 – <i>Interstellar Sonic and Alfvénic Mach Numbers and the Tsallis Distribution</i></li> </ol>	
	<b>Co-Author Publications</b>	
	<ol style="list-style-type: none"> <li>12. Peretz, U., Orio, M., Behar, E., Bianchini, A., Gallagher, J., Rauch, T., <b>Tofflemire</b>, B., &amp; Zemko, P., 2016, ApJ 829, 2 829, 2 – <i>Chemical and Physical Parameters from X-Ray High-resolution Spectra of the Galactic Nova V959 Mon</i></li> <li>11. Milliman, K., Leiner, E., Mathieu, R., <b>Tofflemire</b>, B., &amp; Platais, I. 2016, AJ, 151, 152 – <i>WIYN Open Cluster Study. LXXI. Spectroscopic Membership and Orbits of NGC 6791 Sub-Subgiants</i></li> </ol>	

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, in press – *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 Poster Abstracts**

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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