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## CURRICULUM VITAE OF KRISTEN LYNN THOMPSON

### ***Personal***

Born in East Liverpool, Ohio, USA in 1984.

### ***Education***

University of Kentucky, Lexington, Kentucky (2007 – 2012)

Received M.S. in December 2009 in Astrophysics.

Received Ph.D. in December 2012 in Astrophysics.

*Thesis Title:* Zeeman Effect Studies of Magnetic Fields in the Milky Way

*Thesis Committee:* T. H. Troland (chair), G. J. Ferland, W. Korsch, and F. Ettensohn

Mount Union College, Alliance, Ohio (2002 – 2006)

Received B.S. in May 2006, *magna cum laude*.

Fields of concentration: Physics and Astronomy

### ***Teaching Experience***

Davidson College (Visiting Assistant Professor 2013 – 2015, Assistant Professor 2015 - Present)

“Intermediate Astrophysics,” Course Instructor. A senior-level course discussing astrophysical concepts using the techniques of classical mechanics, electromagnetic theory, statistical mechanics, and quantum mechanics. **Spring 2014, Spring 2015, Spring 2016.**

“General Physics I with Calculus,” Course Instructor. A calculus-based study of mechanics, heat, and sound with a laboratory component. **Spring 2015.**

“Astronomy,” Course Instructor. An introductory course in astronomy with a laboratory component focusing on the physical and mathematical principles necessary for astronomers to interpret the Universe. **Spring 2014, Fall 2014, Fall 2015.**

“General Physics II with Calculus,” Course Instructor. A calculus-based study of electricity, magnetism, optics, and modern physics with a laboratory component. **Fall 2013.**

Georgia Regents University (Adjunct Faculty 2013 – 2013)

“Introductory Physics II,” Course Instructor. A trigonometry-based study of electricity and magnetism, light, and modern physics with a laboratory component. **Spring 2013.**

Bluegrass Community and Technical College (Adjunct Faculty 2010 – 2012)

“The Solar System,” Course Instructor. An introductory astronomy class for non-science majors focusing on aspects of our Solar System. **Fall 2010, Spring 2011, Fall 2011, Spring 2012.**

University of Kentucky (2007 – 2009)

Graduate Assistant for UK MacAdam Student Observatory. Ran observing sessions and operated UK’s Planewave Instruments 20 inch CDK20 Dall-Kirkham telescope for approximately 1000 undergraduate astronomy students per academic year, as well as during outreach events.

Mount Union College (2004 – 2006)

Peer tutor for General Physics I and General Physics II. Ran weekly group review sessions for undergraduate general physics classes. Also met with students by appointment, as needed.

***Research Experience***

Davidson College (2013 – Present)

Applying the spectral line synthesis code Cloudy to model the environments of giant molecular clouds to determine the role played by magnetic fields in their formation, evolution, and eventual collapse to form stars.

Analysis of 18 cm OH and 21 cm HI absorption lines in the direction of extragalactic continuum sources to determine physical properties of galactic molecular clouds such as magnetic field strength, column density, optical depth, and the ratio of molecular to atomic gas abundance. The external gravitational energy of a cloud is compared to its internal magnetic energy via the computation of the mass-to-flux ratio to determine how magnetic fields may contribute to the observed inefficiency of star formation. This project makes use of approximately 400 hours of Arecibo telescope data and is the first survey of its kind. This project is the continuation of, and expansion upon thesis work done at the University of Kentucky.

Analysis of 18 cm OH absorption lines observed with the VLA interferometer in the direction of the supermassive black hole Sgr A\* at the center of our Galaxy with the goal of determining localized magnetic field strengths near the central few parsecs of our Galaxy. This work is the continuation of, and expansion upon work started at the University of Kentucky.

University of Kentucky (2009 – 2012)

Research Assistant for Dr. Thomas Troland. Observations of 18 cm OH and 21 cm HI absorption toward molecular clouds using the Arecibo Telescope, Jansky VLA, and CARMA interferometer to determine the role of magnetic fields in the star formation process. Observations of 18 cm OH absorption using the VLA interferometer toward SgrA\* to determine magnetic fields strengths in the central region of the galaxy via the Zeeman effect.

National Radio Astronomy Observatory (2006)

Intern. Updated the existing User's Guide for the reduction of GBT data using the GBTIDL software package. The PDF version of this document was created using LATEX and an on-line version was created using LATEX2HTML.

NSF Research Experiences for Undergraduates (REU) program participant. Worked with NRAO Postdoc Larry Morgan on the reduction and analysis of 18 cm OH radio data toward bright-rimmed clouds in search of maser emission and associated star formation activity.

Bucknell University (2005)

NSF Research Experiences for Undergraduates (REU) program participant. Reduction and analysis of  $N_2H^+$  and CO data acquired using the Mopra telescope to search several high column density regions in the Chamaeleon I dark cloud complex for evidence of recent or current star formation activity.

***Research with Undergraduates***

Fall 2015 – Independent research (course PHY 495) with Davidson senior physics major Bjorn Ordoubadian.

Spring 2015 – Independent research (course PHY 495) with Davidson junior physics major Graham Wrenn.

Summer 2014 – Summer research with Davidson rising junior Graham Wrenn. Supported by a Davidson College Faculty Study and Research Grant.

***Refereed Publications***

**Thompson, K. L.**, Troland, T. H., and Heiles, C., "OH Zeeman Effect Study of the Mass-to-Flux Ratio in Molecular Clouds." To be submitted to the *Astrophysical Journal* in spring 2016.

Ladd, E. F., Wong, T., Bourke, T.L., and **Thompson, K. L.** 2011, "Interactions Between Forming Stars and Dense Gas in the Small Low-Mass Cluster Cederblad 110," *Astrophysical Journal*, 743, 108.

Wong, T., & 14 coauthors, 2008, "Molecular Line Mapping of the Giant Molecular Cloud Associated with RCW 106 - II. Column Density and Dynamical State of the Clumps," *Monthly Notices of the Royal Astronomical Society*, 386, 1069–1084.

### **Books and Articles**

*Astronomy: An Interactive Introduction*, Mario Belloni and **Kristen Thompson**. An eBook which combines the narrative of a traditional textbook with interactive JavaScript simulations appropriate for use in an undergraduate introductory astronomy course. Anticipated release to iTunes and Google Play in Spring 2016.

Optics and Photonics Photo of the Week, **Kristen Thompson** and Shea Parikh. A photograph taken with a student during an astrophotography session for an introductory astronomy course was chosen and published online as the "photo of the week" for the publication of The Optical Society (OSA) in October 2014.

### **Media Coverage**

Phone interview with Duncan McFadden from WFAE about the September 2015 lunar eclipse. Interview aired September 24<sup>th</sup> and 25<sup>th</sup> on WFAE and WUNC.

Article on Davidson website about the September total lunar eclipse, "Ready for the Sept 27 Harvest-Supermoon-Mega Lunar Eclipse?" – September 25, 2015.

(<https://www.davidson.edu/news/news-stories/150925-harvest-supermoon-mega-lunar-eclipse>)

Live on-air interview with Bo Thompson from WBT on September 25, 2015 about the September total lunar eclipse. The audio recording can be found at:

<http://www.wbt.com/goodmorning/2015/09/25/kristen-thompson-talks-about-the-mega-lunar-eclipse>

Article in the Charlotte Observer about the New Horizon's Mission to Pluto, "Dim, Distant Pluto Shines in Carolinas Astronomers' Eyes" – July 15, 2015.

(<http://www.charlotteobserver.com/news/local/article27327232.html>)

### **Conference Proceedings**

**Thompson, K.L.**, Troland, T.H., and Heiles, C., "OH Zeeman Studies of Magnetic Field Strengths in Molecular Clouds," *Bulletin of the American Astronomical Society*, 2016.

**Thompson, K.L.**, Troland, T.H., and Heiles, C., "Measuring the Mass-to-Flux Ratio in Molecular Clouds via Zeeman Observations," *Bulletin of the American Astronomical Society*, 2015.

**Thompson, K.L.**, Belloni, M., and Christian, W., "Writing an Electronic Astronomy Book with Interactive Curricular Material," *Bulletin of the American Astronomical Society*, 2015.

**Thomas, K.L.**, Crutcher, R.M., Plante, R.L., Roberts, D.A., and Troland, T.H., "Zeeman Effect in OH Absorption Lines Toward the Galactic Center," *Bulletin of the American Astronomical Society*, 2007.

**Thomas, K.L.**, Morgan, L.K., Urquhart, J.S., Thompson, M.A., "A Search for OH Maser Emission in Bright-Rimmed Clouds," *Bulletin of the American Astronomical Society*, 2006.

**Thomas, K.L.**, Ladd, E.F., Wong, T., Mizuno, N., Mizuno, A., Bourke, T.L., and Wright, C.M., "Dense Gas and Outflow Toward Forming Stars in Chamaeleon," *Bulletin of the American Astronomical Society*, 2005.

### ***Professional Presentations and Meetings Attended***

"OH Zeeman Studies of Magnetic Field Strengths in Molecular Clouds" (Poster), American Astronomical Society (AAS) Meeting, Kissimmee, FL, January 2016.

Attendee at the NCS-AAPT Fall Meeting at Davidson College in Davidson, NC, October 2015.

Attendee at the North Carolina Astronomers Meeting (NCAM) at Guilford Technical Community College, October 2015.

"Determination of the Mass-to-Flux Ratio in Molecular Clouds via Zeeman Studies" (Colloquium Talk), UNC-Chapel Hill, September 2015.

"Student Perception of the Use of iPads and eBooks in Introductory Astronomy" (Talk), American Association of Physics Teachers (AAPT) National Meeting, College Park, MD, July 2015.

"OH Zeeman Observations of Molecular Clouds" (Talk), National Radio Astronomy Observatory, Green Bank, WV, June 2015.

"Student Response to the User of eBooks in Introductory Astronomy" (Talk), NCS-AAPT at Wake Forest, March 2015.

"Understanding the Role of Magnetic Fields in Star Formation" (Talk), Davidson College, February 2015.

"Careers in Astronomy" (Session leader), Conference for Undergraduate Women in Physics, Duke University, January 2015.

"Determining the Mass-to-Flux Ratio in Molecular Clouds via Zeeman Observations" (Talk), American Astronomical Society (AAS) National Meeting, Seattle, WA, January 2015.

"Writing an Electronic Astronomy Book with Interactive Curricular Material" (Poster), American Astronomical Society (AAS) Meeting, Seattle, WA, January 2015.

"Writing an Electronic Astronomy Book with Interactive Curricular Material" (Poster), North Carolina Section of the AAPT Meeting, UNC Pembroke, November 2014.

*“Writing an Electronic Astronomy Book with Interactive Curricular Material”* (Poster), North Carolina Astronomers’ Meeting (NCAM) at Guilford Technical Community College, October 2014.

Attendee at the American Association of Physics Teachers (AAPT) National Meeting, Minneapolis, MN, July 2014.

*“Writing an Electronic Astronomy Book with Interactive Curricular Material”* (Poster), Davidson College Teaching Showcase, May 2014.

*“The Role of Magnetic Fields in the Star Formation Process”* (Talk), Guilford Technical Community College Triad Starfest (TriStar) Meeting, March 2014.

Attendee at the North Carolina Astronomers’ Meeting (NCAM), Guilford Technical Community College, October 2013.

Attendee at the joint fall conference of the Southern Atlantic Coast and North Carolina Sections of the AAPT, Furman University, October 2013.

*“Determining the Role of Magnetic Fields in Star Formation”* (Talk), Davidson College, March 2013.

*“Determining the Role of Magnetic Fields in Star Formation”* (Talk), STEMinar colloquium at Georgia Regents University, February 2013.

*“Determining the Role of Magnetic Fields in Star Formation”* (Talk), Graduate Student Symposium, University of Kentucky, August 2012.

*“Measuring the Mass-to-Flux Ratio in Molecular Clouds via Zeeman Observations”* (Poster), Graduate Student Symposium, University of Kentucky, August 2012.

*“Zeeman Effect in OH Absorption Lines Toward the Galactic Center”* (Poster), American Astronomical Society Meeting, Austin, TX, January 2008.

*“A Search for OH Maser Emission in Bright-Rimmed Clouds”* (Poster), American Astronomical Society Meeting, Seattle, WA, January 2007.

*“Dense Gas and Outflows Toward Forming Stars in Chamaeleon”* (Poster), American Astronomical Society Meeting, Washington D.C., January 2006.

### **Outreach**

Set up and operated telescopes for an estimate 500 – 600 visitors for the bi-annual Fisher Farms Star Party hosted by the Charlotte Amateur Astronomers Club, Davidson Lands Conservancy, and the Town of Davidson, October 2015.

Visited Barbara Christian’s class at the Community School of Davidson with two solar telescopes, May 2014, May 2015.

Set up solar telescopes for perspective students during Decision Davidson I, May 2015.

Organized a stargazing outreach event for the members of St. Albans Episcopal Church in Davidson, NC, January 2015.

Set up and operated telescopes for a stargazing event as part of Davidson College's "Do it in the Dark" energy conservation competition, November 2014.

Organized a solar eclipse viewing party at Davidson College for the partial eclipse in October 2014.

Operation of telescopes at the monthly Look Up at Night, Augusta (LUNA) astronomy public outreach series at Georgia Regents University in Augusta, Georgia, September 2012 – March 2014.

*"Discovering the Universe: An Introduction to Astronomy at Davidson College"* (Talk), Davidson College Junior Day, February 2014.

Set up and operated telescopes for a stargazing event as part of Davidson College's "Do it in the Dark" energy conservation competition, November 2013.

*"Star Stories – Ancient Tales Written in the Sky"* (Talk), LUNA Public Outreach Event at Georgia Regents University, October 2013.

Set up and operated telescopes for the bi-annual Fisher Farms Star Party hosted by the Charlotte Amateur Astronomers Club, Davidson Lands Conservancy, and the Town of Davidson, October 2013

*"Comets: Vagabonds of the Solar System"* (Talk), LUNA Public Outreach Event at Georgia Regents University, April 2013.

*"Our Solar System's Shining Star – The Sun"* (Talk), LUNA Public Outreach Event at Georgia Regents University, February 2013.

*"Our Solar System's Shining Star – The Sun"* (Talk), Kentucky SkyTalk Public Outreach Event, May 2011.

Operation of telescope at University of Kentucky's observatory for public outreach events (2007 – 2009)

### ***Professional Proposals and Grants Received***

#### Proposals:

**March 2015 – Davidson College Teaching with iPads Initiative** proposal accepted to provide iPads for 32 students for the Fall 2015 semester. The iPads were used for access to the astronomy eBook written by Belloni and Thompson, as well as to provide an interactive classroom and laboratory experience through the use of applications such as Lunar Maps, Star Walk planetarium software, and Socrative classroom polling.

**March 2014 - Davidson College Teaching with iPads Initiative** proposal funded for Fall 2014 semester. See description above for more recent application.

**October 2010 - Arecibo telescope:** 200 hours proposed to expand L-Band radio frequency survey of mass-to-flux ratios in molecular clouds to a larger number of target sources. Full proposal accepted as project A2600.

**October 2010 - Expanded Very Large Array (EVLA):** 12 hours of proposed telescope time to observe 1667 MHz OH and 21 cm HI in the direction of a subset of continuum sources observed as part of the Arecibo molecular cloud survey A2470 to obtain high spatial resolution continuum maps of the background sources and determine the ratio of atomic to molecular gas along our lines-of-sight. Proposal accepted as project at391.

**August 2010 - Combined Array for Research in Millimeter-wave Astronomy (CARMA):** 75 hours of proposed telescope time to observe  $^{13}\text{CO}$ , CS, and CN in the direction of a subset of the continuum sources observed as part of the Arecibo molecular cloud survey A2470 to obtain high spatial resolution maps of molecular column density. Received a total of 4.8 hours in the D and E array configurations to do “proof of concept” observations as project c0707.

#### Grants:

**January 2015** - \$1000 FAMOUS (Funds for Astronomical Meetings: Outreach to Underrepresented Scientists) travel grant from the American Astronomical Society for travel to the 2015 Winter meeting in Seattle, Washington to present research.

**May 2014** - \$3500 Faculty Study and Research Grant to support summer research for Davidson physics major Graham Wrenn.

#### ***Professional Development and Other Experience***

Attended the 4-day intensive New Faculty Workshop sponsored by the AAPT, AAS, APS, and NSF in College Park, MD, November 2015.

Center for Astronomy Education (CAE) Regional Teaching Exchange participant, Guilford Technical Community College, October 2015.

Attended the “Data Analysis for Astronomy Educators” workshop at the AAPT Summer Meeting in College Park, MD, July 2015.

Worked at the National Radio Astronomy Observatory in Green Bank, WV for two weeks as a Visiting Scientist, June 2015.

Center for Astronomy Education (CAE) Tier I Teaching Excellence Workshop participant, American Astronomical Society Meeting, Seattle, WA, January 2015.



Davidson College Women in Physics (WiP) faculty advisor. Helped organize and institute the Women in Physics organization on campus open to individuals with an interest in women's issues in the sciences, specifically physics and astronomy. Fall 2014 – present.

Writing of new astronomy labs implemented in the Spring 2014 Astronomy course at Davidson College.

Center for Astronomy Education (CAE) Regional Teaching Exchange participant, Guilford Technical Community College, October 2014.

Center for Astronomy Education (CAE) Regional Teaching Exchange participant, Guilford Technical Community College, October 2013.

NRAO Synthesis Imaging Workshop participant, 2008.

Use of the Green Bank Telescope (GBT) for radio astronomy observations, 2006.

Use of the Mopra Radio Telescope in Coonabarabran, Australia for radio astronomy observations, 2005.

### ***Professional Memberships***

American Association of Physics Teachers (2014 – Present)

North Carolina Section of the American Association of Physics Teachers (2014 – Present)

American Astronomical Society (2005 – Present)

Sigma Pi Sigma physics honorary society

Pi Mu Epsilon mathematics honorary society

### ***Professional Service***

Referee for the Journal of Astronomy & Earth Sciences Education (JAESE)

Reviewer for NSF Improving Undergraduate STEM Education (IUSE) proposals

### ***Other Awards***

Mount Union College Presidential Scholar.

Valedictorian, Southern Local High School, Salineville, Ohio, 2002.