

CONTACT INFORMATION	<i>Address:</i> Center for Data Intensive Science, University of Chicago 900 East 57 Street, KCBD 10140, Chicago, IL 60637	<i>E-mail:</i> <a href="mailto:mtpatter@uchicago.edu">mtpatter@uchicago.edu</a> <i>Web:</i> <a href="http://mtpatter.github.io">mtpatter.github.io</a>
EDUCATION	New Mexico State University (NMSU) <b>Ph.D., with Honors, Astronomy</b> • Thesis Title: <i>Properties of Star Formation and the Interstellar Medium in Galaxy Outskirts</i> <b>M.S., with Honors, Astronomy</b>	Las Cruces, NM May 2013 May 2011
	University of Chicago <b>B.A., with Honors, Physics with Specialization in Astrophysics</b> • Thesis Title: <i>Direct Cherenkov Detection with the Very Energetic Radiation Imaging Telescope Array System (VERITAS)</i>	Chicago, IL June 2007
RESEARCH AND WORK APPOINTMENTS	Center for Data Intensive Science, University of Chicago <b>Postdoctoral Research Professional</b> • Researching environmental factors involved in the incidence of different diseases across the United States using geospatial analysis. • Developing machine learning algorithms for automated cloud-based processing and analysis of NASA satellite imagery with Project Matsu on the Open Science Data Cloud (OSDC). • Directly supervising research projects for two undergraduate students. • Involved with planning and organization of OSDC NSF Partnerships for International Research and Education (PIRE) data intensive science and computing fellowship program for students and early career scientists.	Chicago, IL September 2013 - present
	Royal Observatory / School of Informatics, University of Edinburgh <b>Open Science Data Cloud (OSDC) NSF PIRE Summer Fellow</b> • Explored row-oriented vs. column-oriented databases to maximize query speed in the astronomical database for the VISTA Variables in the Via Lactea (VVV) Survey.	Edinburgh, Scotland June - August 2013
	Sapling Learning Inc., Macmillan <b>Astronomy Content Author and Reviewer</b> • Created questions and solutions of varying difficulty to test students' understanding of astronomical concepts in an online interactive system for higher education course homework. • Reviewed and edited questions and solutions written by others for subject matter content and clarity and for proper software module functionality.	(Remote/Online) April 2013 - November 2013
	Department of Astronomy, New Mexico State University <b>Graduate Research Assistant</b> • Constructing detailed 3-dimensional models of the morphology and kinematics of gaseous galaxy halos to study accretion of gas as part of the <b>HALOGAS (Hydrogen Accretion in LOcal GALaxieS)</b> Survey. • Collecting and analyzing deep, wide-field optical images of galaxies to search for faint signatures of galaxy mergers and young star formation as Principal Investigator of two accepted observing proposals to the National Optical Astronomy Observatory. • Organized a 5-day scientific workshop of presentations, breakout sessions, and evening activities for the <b>HALOGAS</b> collaboration of twenty internationally-based scientists. • Reduced and analyzed spectroscopic data to study the abundances of metals in faint star forming regions.	Las Cruces, NM August 2007 - present
	<b>Head Teaching Assistant</b> • Prepared laboratory equipment for all teaching assistants, led weekly meetings to plan exercises, and operated the campus observatory telescopes for students twice weekly.	January 2010 - May 2010
	<b>Laboratory Instructor</b>	August 2007 - December 2009

- Taught laboratory component to an undergraduate Astronomy course for non-majors and operated campus observatory telescopes.

Department of Physics, University of Chicago

Chicago, IL

### Undergraduate Research Assistant

June 2005 - May 2007

- Assembled and tested equipment for the [VERITAS](#) high energy gamma ray telescopes at the Whipple Observatory in Amado, AZ.

PROFESSIONAL DEVELOPMENT	Reproducible Research Course	
	Johns Hopkins University through Coursera Online	May 2014
	Getting and Cleaning Data Course	
	Johns Hopkins University through Coursera Online	April 2014
	The Data Scientist's Toolbox Course	
	Johns Hopkins University through Coursera Online	April 2014
	Machine Learning Course	
	Stanford University through Coursera Online	March 2014
	Computing for Data Analysis Course	
	Johns Hopkins University through Coursera Online	January 2014
	Big Data and Cloud Computing Workshop	
	University of Edinburgh, School of Informatics	June 17 - 21, 2013
	Summer School in Statistics for Astronomers IX	
	Pennsylvania State University, Center for Astrostatistics	June 3 - 7, 2013
	Introduction to Data Science Course	
	University of Washington through Coursera Online	May 2013
	NM Celebration of Women in Computing	
	New Mexico Farm and Ranch Museum, Las Cruces, NM	November 8 - 9, 2012
	Women in Astronomy and Space Science Conference: Meeting the Challenges of an Increasingly Diverse Workforce	
	University of Maryland, College Park, MD	October 21 - 23, 2009
PUBLICATIONS AND RESEARCH PRESENTATIONS	Papers	
	<i>An oxygen abundance gradient into the outer disc of M81</i>	
	<b>M.T. Patterson</b> , R.A.M. Walterbos, R.C. Kennicutt, C. Chiappini, D.A. Thilker	
	Monthly Notices of the Royal Astronomical Society, May 2012, Volume 422, Issue 1, pages 401-419	
	<i>HALOGAS observations of NGC 4414: fountains, interaction, and ram pressure</i>	
	W.J.G. de Blok, G.I.G. Jozsa, <b>M.T. Patterson</b> , G. Gentile, G.H. Heald, E. Jutte, P. Kamphuis, R.J. Rand, P. Serra, R.A.M. Walterbos	
	Astronomy & Astrophysics, June 2014, Volume 566, id.A80, 16 pp.	
	<i>HALOGAS: Extraplanar gas in NGC 3198</i>	
	G. Gentile, G.I.G. Jozsa, P. Serra, G.H. Heald, W.J.G. de Blok, F. Fraternali, <b>M.T. Patterson</b> , R.A.M. Walterbos, T. Oosterloo	
	Astronomy & Astrophysics, June 2013, Volume 554, id.A125, 10 pp.	
	<i>HALOGAS observations of NGC 5023 and UGC 2082: Modeling of non-cylindrically symmetric gas distributions in edge-on galaxies</i>	
	P. Kamphuis, R.J. Rand, G.I.G. Jozsa, L.K. Zschaechner, G.H. Heald, <b>M.T. Patterson</b> , G.	

Gentile, R.A.M. Walterbos, P. Serra, W.J.G. de Blok  
Monthly Notices of the Royal Astronomical Society, September 2013, Volume 434, Issue 3, pages 2069-2093

*Deep observations of HI and star formation in NGC 5055 from the HALOGAS survey*

**M.T. Patterson**, R.A.M. Walterbos, G.H. Heald, G. Gentile, G.I.G. Jozsa, P. Serra, D.A. Thilker, et al., in prep

*An extended oxygen abundance gradient of M31 from HII regions*

**M.T. Patterson**, R.A.M. Walterbos, R.C. Kennicutt, C. Chiappini, in prep

#### Talks

*Gaseous Halos and Outer Disk Star Formation in the HALOGAS Survey: Results for NGC 5055*  
July 2013: Royal Observatory Edinburgh, Coffee Talk, Edinburgh, Scotland

*Evolutionary Processes in Nearby Spiral Galaxies: Characterizing the Metallicities, Star Formation, and Accretion in Galaxy Outskirts*

January 2013: [221st Meeting of the American Astronomical Society](#), Long Beach, CA

*Early Results from the HALOGAS Survey: HI Observations of NGC 5055*

April 2012: [Tully-Fisher at 35: Global Properties of HI in Galaxies Workshop](#), NRAO, Green Bank, WV

*HALOGAS: A Deep HI Survey*

March, 2012: NMSU Astronomy Department Pizza Lunch, Las Cruces, NM

*HII Region Abundances: A Metallicity Gradient for M81*

October 2011: NMSU Astronomy Department Pizza Lunch, Las Cruces, NM

*The HALOGAS Survey: HI Observations and Modeling of NGC 5055 and NGC 4258*

October 2011: 27th Annual New Mexico Symposium, Socorro, NM

#### Posters

*Deep HI Observations of NGC 5055 from the HALOGAS Survey*

May 2012: STScI May Symposium: Gas Flows in Galaxies, Baltimore, MD

**M.T. Patterson**, the HALOGAS Team

*HI Streams and Spurs in HALOGAS Observations of NGC 5055*

January 2012: 219th Meeting of the American Astronomical Society, Austin, TX

**M.T. Patterson**, R.A.M. Walterbos, G. Heald, G. Jozsa, G. Gentile, D. Thilker

*The HALOGAS Project: HI Observations of NGC 5055 and NGC 4258*

June 2011: Gas in Galaxies: From Molecular Clouds to Cosmic Web, Kloster Seeon, Germany

**M.T. Patterson**, the HALOGAS Team

*The HALOGAS Project: HI Observations of NGC 5055*

January 2011: 217th Meeting of the American Astronomical Society, Seattle, WA

**M.T. Patterson**, R.A.M. Walterbos, G. Heald, G. Jozsa, L. Zschaechner, R. Rand, D. Thilker

*HII Regions in the Outer Disk and Tidal Arms of M81*

January 2010: 215th Meeting of the American Astronomical Society, Washington D.C.

January 2010: 25th Annual New Mexico Symposium, Socorro, NM

**M.T. Patterson**, R.A.M. Walterbos, D.A. Thilker, R.C. Kennicutt, C. Chiappini

*Extraplanar Gas Extent of Edge-on Galaxies: A Comparison of the Galaxies NGC 4244 and NGC 891*

June 2009: Galaxy Metabolism Conference, Sydney, Australia

**M.T. Patterson**, R.A.M. Walterbos

*Interstellar Gas and Massive Stars in External Galaxies: Initial Results for the Galaxies M33 and NGC 4517*

April 2009: NMSU Graduate Research and Arts Symposium, Las Cruces, NM

**M.T. Patterson**, R.A.M. Walterbos

*Multi-long-slit Spectroscopy for Kinematic Studies. I. Implementation and Demonstration*

January 2008: 211th Meeting of the American Astronomical Society, Austin, TX

R.A.M. Walterbos, J. Choi, S. Cisneros, **M.T. Patterson**, C. Wu

*Multi-long-slit Spectroscopy for Kinematic Studies. II. Initial Results for the Edge-On Galaxies NGC 891 and NGC 4244*

January 2008: 211th Meeting of the American Astronomical Society, Austin, TX

J. Choi, S. Cisneros, C. Wu, **M.T. Patterson**, R.A.M. Walterbos

#### SUCCESSFUL TELESCOPE OBSERVING PROPOSALS

“Continuing Observations of Stellar Streams and Star Formation in the Outskirts of HALOGAS Spiral Galaxies”

- National Optical Astronomy Observatory (NOAO) Proposal ID: 2012A-0185
- 4 full nights granted on the Kitt Peak National Observatory (KPNO) Mayall 4-meter Telescope Mosaic 1.1 Wide Field Imager

“Stellar Streams and Star Formation in the Outskirts of HALOGAS Spiral Galaxies“

- NOAO Proposal ID: 2011B-0355
- 4 full nights granted on the KPNO Mayall 4-meter Telescope Mosaic 1.1 Wide Field Imager

#### AWARDS AND GRANTS

Academic Fellowships and Awards

- Open Science Data Cloud NSF PIRE Fellowship Summer 2013
- OSDC-PIRE Challenge, 3rd Place Paper June 2013
- Murrell Award for Professional Development and Research Accomplishment 2013
- NMSU Outstanding Graduate Assistant Award (awarded twice) 2008-2009 & 2012-2013
- Pegasus Award for Excellence in Teaching 2010
- New Mexico Space Grant Graduate Research Fellowship (awarded twice) 2009-2010 & 2010-2011
- New Mexico Higher Education Department Fellowship 2008 - 2011
- NMSU Merit-Based Enhancement Fellowship 2009 - 2010

Conference and Travel Grants

- *NM Celebration of Women in Computing* Conference Scholarship Las Cruces, NM, 2012
- NMSU College of Arts and Sciences Graduate Student Travel Award  
*Gas Flows in Galaxies May Symposium* Baltimore, MD, 2012
- American Astronomical Society International Travel Grant  
*HALOGAS Collaboration Workshop* Bochum, Germany, 2011
- *Women in Astronomy and Space Science* Conference Travel Grant College Park, MD, 2009
- *The Evolution of Galaxies Through the Neutral Hydrogen Window* Conference Travel Grant  
Arecibo Observatory Puerto Rico, 2008

#### EXTRA- CURRICULAR AND VOLUNTEER EXPERIENCE

Open Science Café

[opensciencecafe.org](http://opensciencecafe.org)

**Blogger**

April 2014 - present

- Promoting interdisciplinary data analysis resource and opportunity news.
- Posting short reproducible analyses of scientific data with several other PhD scientists.

Kaggle competition participant

[kaggle.com](http://kaggle.com)

**‘Kaggler’ tier**

ranked 2820th of 191,000+ as of July 2014

University of Chicago

Chicago IL

**Volunteer, UChicago Alumni Schools Committee**

August 2009 - present

- Interviewing prospective undergraduates for possible admission to the University of Chicago.

**Committee Member, UChicago Class of 2007 Council** August 2007 - present

- Responsible for planning class reunions, raising funds for the University, and acting as a liason for the University to alumnae.

**Treasurer, Samahan Filipino Cultural Association** August 2005 - May 2007

- Maintained account records, processed reimbursements, and prepared annual allocations budget proposal for Student Government Fund Committee approval

New Mexico State University Las Cruces, NM

**Colloquium Committee Member** August 2011 - May 2013

- Organized scheduling of visiting colloquium speakers to the Astronomy Department.

**Astronomy Team Captain, ACS Relay for Life** December 2010 - April 2011

- Led Astronomy Team to raise over \$2000 for American Cancer Society.

**Committee Member, NMSU Relay for Life** October 2008 - April 2009

- Organized NMSU's American Cancer Society all-night walk-a-thon fundraiser.

**Secretary, NMSU Astronomy GSO** August 2008 - May 2009

- Responsible for re-chartering Astronomy Graduate Student Organization.

COLLABORATORS Dr. Robert Grossman - (Advisor) University of Chicago, Chicago, IL  
 Dr. Rene Walterbos - (Thesis Advisor) New Mexico State University, Las Cruces, NM  
 Dr. George Heald - ASTRON, Dwingeloo, Netherlands  
 Dr. David Thilker - Johns Hopkins University, Baltimore, MD  
 Dr. Malcolm Atkinson - University of Edinburgh, School of Informatics, Edinburgh, Scotland, UK  
 Dr. Bob Mann - University of Edinburgh, Royal Observatory, Edinburgh, Scotland, UK  
 The HALOGAS Collaboration