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| CONTACT<br>INFORMATION               | <i>Address:</i>  |   |
|                                      | University of Washington, Dept of Astronomy<br>Box 351580, Seattle, WA 98195   | <i>E-mail:</i> <a href="mailto:mtpatter@uw.edu">mtpatter@uw.edu</a><br><i>Web:</i> <a href="http://mtpatter.github.io">mtpatter.github.io</a> |
| EDUCATION                            | New Mexico State University (NMSU)   | Las Cruces, NM  |
|                                      | <b>Ph.D., with Honors, Astronomy</b>   | May 2013  |
|                                      | • Thesis Title: <i>Properties of Star Formation and the Interstellar Medium in Galaxy Outskirts</i>  |   |
|                                      | <b>M.S., with Honors, Astronomy</b>  | May 2011  |
|                                      | University of Chicago  | Chicago, IL   |
|                                      | <b>B.A., with Honors, Physics with Specialization in Astrophysics</b>  | June 2007   |
|                                      | • Thesis Title: <i>Direct Cherenkov Detection with the Very Energetic Radiation Imaging Telescope Array System (VERITAS)</i>   |   |
|                                      |  |   |
| RESEARCH AND<br>WORK<br>APPOINTMENTS | Department of Astronomy, University of Washington  | Seattle, WA   |
|                                      | <b>Research Scientist, LSST Data Management group</b>  | August 2016 - present   |
|                                      | • Building the next generation algorithms and software tools for the Large Synoptic Survey Telescope (LSST).   |   |
|                                      | Center for Data Intensive Science, University of Chicago   | Chicago, IL   |
|                                      | <b>Research Professional</b>   | September 2013 - July 2016  |
|                                      | <ul style="list-style-type: none"> <li>Developed computational algorithms for detecting spatial patterns in geo-coded medical records.</li> <li>Scientific Lead for the <a href="#">Open Science Data Cloud (OSDC)</a>, a petabyte scale community science cloud.</li> <li>Developed and maintained an analytic pipeline of daily automated machine learning algorithms for cloud processing and analysis of NASA satellite data using Python, Hadoop, Accumulo, and Storm.</li> <li>Modeled the distribution of data stored on distributed file storage systems using Monte Carlo methods to analyze hardware performance issues.</li> <li>Technical Lead for the <a href="#">Open Commons Consortium's (OCC)</a> cooperative research and development partnership with NOAA through the NOAA Big Data Project, coordinating the establishment of a community science cloud of environmental data for the academic and research community.</li> <li>Planned and organized OSDC NSF Partnerships for International Research and Education (PIRE) data intensive science and computing fellowship and workshop program for graduate students.</li> <li>Directly supervised data science projects for three undergraduate students.</li> </ul> |   |
|                                      | Royal Observatory / School of Informatics, University of Edinburgh   | Edinburgh, Scotland   |
|                                      | <b>Open Science Data Cloud (OSDC) NSF PIRE Summer Fellow</b>   | June - August 2013  |
|                                      | • Developed a Python tool to test query speeds and compare system utilization in row-oriented vs. column-oriented database implementations of the astronomical database for the VISTA Variables in the Via Lactea (VVV) Survey.  |   |
|                                      | Sapling Learning Inc., Macmillan   | (Remote/Online)   |
|                                      | <b>Astronomy Content Author and Reviewer</b>   | April 2013 - November 2013  |
|                                      | <ul style="list-style-type: none"> <li>Created questions and solutions of varying difficulty to test students' understanding of astronomical concepts in an online interactive system for higher education course homework.</li> <li>Reviewed and edited questions and solutions written by others for subject matter content and clarity and for proper software module functionality.</li> </ul>   |   |
|                                      | Department of Astronomy, New Mexico State University   | Las Cruces, NM  |
|                                      | <b>Graduate Research Assistant</b>   | August 2007 - May 2013  |
|                                      | <ul style="list-style-type: none"> <li>Modeled the density and rotation of gas in galaxies to identify anomalous features in <a href="#">HALOGAS (Hydrogen Accretion in LOcal GALaxieS)</a> Survey observation data.</li> <li>Collected and analyzed 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.</li> <li>Organized a 5-day scientific workshop of presentations, breakout sessions, and evening activities for the <a href="#">HALOGAS</a> collaboration of twenty internationally-based scientists.</li> </ul>  |   |

- Reduced and analyzed spectroscopic data to study the abundances of metals in star forming regions.

#### Head Teaching Assistant

January 2010 - May 2010

- Prepared laboratory equipment for all teaching assistants, led weekly meetings to plan exercises, and operated the campus observatory telescopes for students twice weekly.

#### Laboratory Instructor

August 2007 - December 2009

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

#### PUBLICATIONS AND RESEARCH PRESENTATIONS

##### Paper Publications

*The Case for Data Commons: Towards Data Science as a Service*

R.L. Grossman, A. Heath, M. Murphy, **M.T. Patterson**, W. Wells, Computing in Science Engineering special issue on Science as a Service, September 2016, Volume 18, Issue 5, pages 10-20

*The Matsu Wheel: A Cloud-based Framework for Efficient Analysis and Reanalysis of Earth Satellite Imagery*

**M.T. Patterson**, N. Anderson, C. Bennett, J. Bruggemann, R.L. Grossman, M. Handy, V. Ly, D.J. Mandl, S. Pederson, J. Pivarski, R. Powell, J. Spring, W. Wells, J. Xia

IEEE Second International Conference on Big Data Computing Service and Applications (Big-DataService), March 2016, pages 155-165

*HALOGAS observations of NGC 4414: fountains, interaction, and ram pressure*

W.J.G. de Blok, G.I.G. Jozsa, **M.T. Patterson**, 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.

*HALOGAS observations of NGC 5023 and UGC 2082: Modeling of non-cylindrically symmetric gas distributions in edge-on galaxies*

P. Kamphuis, R.J. Rand, G.I.G. Jozsa, L.K. Zschaechner, G.H. Heald, **M.T. Patterson**, 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

*HALOGAS: Extraplanar gas in NGC 3198*

G. Gentile, G.I.G. Jozsa, P. Serra, G.H. Heald, W.J.G. de Blok, F. Fraternali, **M.T. Patterson**, R.A.M. Walterbos, T. Oosterloo

Astronomy & Astrophysics, June 2013, Volume 554, id.A125, 10 pp.

*An oxygen abundance gradient into the outer disc of M81*

**M.T. Patterson**, 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

##### Oral Presentations

*Cloud-based Scanning Analytics for Large Volumes of Hyperspectral Data*

June 2014: [HyspIRI Product Symposium](#), NASA Goddard Space Flight Center, Greenbelt, MD

*Reproducible Research and Collaborative Tools with the Open Science Data Cloud*

June 2014: [OSDC PIRE Big Data and Cloud Computing Workshop](#), University of Amsterdam, Science Park, Netherlands

*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

Poster Presentations

*Key Lessons in Building Data Commons: The Open Science Data Cloud Ecosystem*

December 2015: 2015 American Geophysical Union Fall Meeting, San Francisco, CA

**M.T. Patterson**, M. Murphy, R.L. Grossman, A. Heath, W. Wells

*Counter-Rotating and Lagging Extra-planar HI in NGC 4559*

January 2015: 225th Meeting of the American Astronomical Society, Seattle, WA

C.J. Vargas, G. Heald, R.A.M. Walterbos, F. Fraternali, **M.T. Patterson**

*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

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| SUCCESSFUL PROPOSALS AS PRINCIPAL INVESTIGATOR | “Continuing Observations of Stellar Streams and Star Formation in the Outskirts of HALOGAS Spiral Galaxies”  |  |
|  | <ul style="list-style-type: none"> <li>Telescope observing proposal to National Optical Astronomy Observatory (NOAO) Proposal ID: 2012A-0185</li> <li>4 full nights granted on the Kitt Peak National Observatory (KPNO) Mayall 4-meter Telescope Mosaic 1.1 Wide Field Imager</li> </ul>  |  |
|  | “Stellar Streams and Star Formation in the Outskirts of HALOGAS Spiral Galaxies“ <ul style="list-style-type: none"> <li>Telescope observing proposal to NOAO Proposal ID: 2011B-0355</li> <li>4 full nights granted on the KPNO Mayall 4-meter Telescope Mosaic 1.1 Wide Field Imager</li> </ul>   |  |
|  | “Star Formation and Chemical Abundances in the Outer Disks and Haloes of Galaxies“ <ul style="list-style-type: none"> <li>New Mexico Space Grant Consortium Graduate Research Fellowships 2010</li> <li>\$10,000 over two semesters</li> </ul>   |  |
| AWARDS AND GRANTS                              | “Interstellar Gas and Massive Stars in External Galaxies“ <ul style="list-style-type: none"> <li>New Mexico Space Grant Consortium Graduate Research Fellowships 2009</li> <li>\$5,000 over two semesters</li> </ul>   |  |
|  | Academic Fellowships and Awards  |  |
|  | <ul style="list-style-type: none"> <li>Outstanding Paper Award, BigDataService Conference</li> <li>Insight Data Science Program Fellowship (declined)</li> <li>Open Science Data Cloud NSF PIRE Fellowship</li> <li>OSDC-PIRE Challenge, 3rd Place Paper</li> <li>Murrell Award for Professional Development and Research Accomplishment</li> <li>NMSU Outstanding Graduate Assistant Award (awarded twice)</li> <li>Pegasus Award for Excellence in Teaching</li> <li>New Mexico Higher Education Department Fellowship</li> <li>NMSU Merit-Based Enhancement Fellowship</li> </ul>   | March 2016<br>Summer 2016<br>Summer 2013<br>June 2013<br>2013<br>2008-2009 & 2012-2013<br>2010<br>2008 - 2011<br>2009 - 2010   |
|  | Conference and Travel Grants   |  |
| PROFESSIONAL DEVELOPMENT                       | <ul style="list-style-type: none"> <li><i>Grace Hopper Celebration of Women in Computing</i> Scholar</li> <li><i>NM Celebration of Women in Computing</i> Conference Scholarship</li> <li>NMSU College of Arts and Sciences Graduate Student Travel Award</li> <li><i>Gas Flows in Galaxies May Symposium</i></li> <li>American Astronomical Society International Travel Grant</li> <li><i>HALOGAS Collaboration Workshop</i></li> <li><i>Women in Astronomy and Space Science</i> Conference Travel Grant</li> <li><i>The Evolution of Galaxies Through the Neutral Hydrogen Window</i> Conference Travel Grant</li> </ul>   | Phoenix, AZ, 2014<br>Las Cruces, NM, 2012<br>Baltimore, MD, 2012<br>Bochum, Germany, 2011<br>College Park, MD, 2009<br>Puerto Rico, 2008   |
|  | <b>Technological Conferences and Workshops</b>   |  |
|  | <ul style="list-style-type: none"> <li>Richard Tapia Celebration of Diversity in Computing (big data panelist), Austin, TX, 2016</li> <li>Supercomputing, Austin, TX, (data commons panelist); New Orleans, LA, 2014 (scientific data panelist)</li> <li>OSDC Partnerships for International Research and Education, Big Data and Cloud Computing Workshops, University of Amsterdam, June 8–12, 2015 (lecturer); June 16–20, 2014 (lecturer); University of Edinburgh, June 17–21, 2013 (participant)</li> <li>Grace Hopper Celebration of Women in Computing, Phoenix, AZ, October 7–10, 2014</li> <li>Summer School in Statistics for Astronomers IX, Penn State, June 3–7, 2013</li> <li>New Mexico Celebration of Women in Computing, Las Cruces, NM, November 8–9, 2012</li> </ul> |  |
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| EXTRA-CURRICULAR AND VOLUNTEER EXPERIENCE      | <b>Editor</b> , AASWomen Newsletter  |  |
|  | <b>Competitions participant</b> , Kaggle data science competitions   |  |
|  | <b>Distance runner</b> , 14 races including 5 Half Marathons and 4 10-milers   |  |
|  | <b>Contributor</b> , Open Science Café blog  |  |
|  |  | August 2016 - present<br><a href="https://kaggle.com/mtpatter">kaggle.com/mtpatter</a><br><a href="https://runningaverage.com">runningaverage.com</a><br><a href="https://opensciencecafe.org">opensciencecafe.org</a> |

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| University of Chicago  | Chicago IL                 |
| <b>Volunteer, UChicago Alumni Schools Committee</b>  | August 2009 - present      |
| • Interviewing prospective undergraduates for possible admission to the University of Chicago.   |                            |
| <b>Committee Member, UChicago Class of 2007 Council</b>  | August 2007 - present      |
| • Responsible for planning class reunions, raising funds for the University, and acting as a liaison for the University to alumnae.                    |                            |
| <b>Panel Moderator, Taking the Next Step</b>   | January 10, 2015           |
| • Moderator of Research Sciences career panel at College Programming Office event for sophomores and juniors.  |                            |
| <b>Treasurer, Samahan Filipino Cultural Association</b>  | August 2005 - May 2007     |
| • Maintained account records, processed reimbursements, and prepared annual allocations budget proposal for Student Government Fund Committee approval |                            |
| <br>New Mexico State University  | <br>Las Cruces, NM         |
| <b>Colloquium Committee Member</b>   | August 2011 - May 2013     |
| • Organized scheduling of visiting colloquium speakers to the Astronomy Department.  |                            |
| <b>Astronomy Team Captain, ACS Relay for Life</b>  | December 2010 - April 2011 |
| • Led Astronomy Team to raise over \$2000 for American Cancer Society.   |                            |
| <b>Committee Member, NMSU Relay for Life</b>   | October 2008 - April 2009  |
| • Organized NMSU's American Cancer Society all-night walk-a-thon fundraiser.   |                            |
| <b>Secretary, NMSU Astronomy GSO</b>   | August 2008 - May 2009     |
| • Responsible for re-chartering Astronomy Graduate Student Organization.   |                            |

COLLABORATORS Dr. Robert Grossman - (Advisor) University of Chicago, Chicago, IL  
 Dr. Daniel Mandl - NASA Goddard Space Flight Center, Greenbelt, MD  
 Dr. Rene Walterbos - (Thesis Advisor) New Mexico State University, Las Cruces, NM  
 Dr. George Heald - HALOGAS Principal Investigator, ASTRON, Dwingeloo, Netherlands  
 Dr. David Thilker - Johns Hopkins University, Baltimore, MD  
 The HALOGAS Collaboration