

Patrick T. Marsh

Curriculum Vitae

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Storm Prediction Center
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Education

2013 Ph.D. Meteorology University of Oklahoma
2007 M.S. Meteorology University of Oklahoma
2005 B.S. (Honors) Physics and Mathematics University of Arkansas

Professional Positions

2013– **Techniques Development Meteorologist** NOAA/NWS Storm Prediction Center
2010–2013 **Hazardous Weather Testbed Liaison** NOAA National Severe Storms Laboratory
2009 & 2011 **Adjunct Professor** Mid-America Christian University
2006–2013 **Graduate Research Assistant** University of Oklahoma
2005–2009 **Graduate Teaching Assistant** University of Oklahoma
2005 **Laboratory Instructor** University of Arkansas

Professional Experiences

- Managed, VORTEX 2 Operations Center (2009–2010)
- Convective Storms Expert, European Severe Storms Laboratory Testbed Experiment (11–15 June 2012)
- Forecaster/Nowcaster, Deep Convective Cloud Chemistry Experiment (Summer 2012)
- Lead Forecaster/Nowcaster, Collaborative Adaptive Sensing of the Atmosphere IOP 1 (2007–2008)

Honors and Awards

2012–2013 OU School of Meteorology's Cash Award for Outstanding Service to the School
2009–2010 NSSL Cash Award for Running VORTEX 2 Operations Center
2007–2008 OU School of Meteorology's Cash Award for Outstanding Teaching Assistant
2007 Outstanding service to CASA during IOP 1
2006–2007 OU School of Meteorology's Cash Award for Outstanding Service to the School
2006 American Meteorological Society Summer Policy Colloquium Fellowship
2004 European Meteorological Society Young Scientist Travel Award
2004–2005 University of Arkansas Honors College Research Fellowship
2004–2005 University of Arkansas Physics Department Robert D. Maurer Research Scholarship
2004 University of Arkansas Physics Department Faculty Scholarship
2003–2004 University of Arkansas Honors College Research Fellowship
2001–2005 University of Arkansas Chancellor's Scholarship

Research

- Interests lie in the climatology, forecasting, and verification of high-impact weather, data mining, data visualization, statistical learning, and the transition of science from research to operations.
- Current research projects include severe weather hazard and impact modeling, severe weather climatologies, and Hazardous Weather Testbed initiatives.
- Authored or co-authored 16 refereed publications, 0 either submitted or in-press, and more than 16 non-refereed publications.

Grants

2014 PI NOAA HWT: Objective probabilistic guidance for severe weather outbreaks \$51,300
2011 Co-PI Korean Meteorological Administration: Forecaster Training \$105,440
2003 PI Roland S. Boreham Grant: Proposal to Provide Free Pagers to Volunteer Emergency Responders \$20,000

Fundraising and Development

- Established the Forrest W. Johns Memorial Meteorology Scholarship at the University of Oklahoma for outstanding contributions to the Oklahoma Weather Laboratory (Spring 2006)
- Worked with Forecast Weather and Research Network (FORWARN), a not-for-profit organization, to raise money to provide severe weather alert pagers to emergency managers (February 2004)

Professional Development

- American Meteorological Society Summer Policy Colloquium (Su 2006)
- Weather and Society Integrated Studies (WAS*IS) (April 2006)

Consulting

- Taught a short course on heavy precipitation forecasting for the **Korean Meteorological Administration** (July 2011)
- Worked for **Professor Lance Leslie** to develop a method for estimating theoretical observed maximum wind speeds of tropical cyclones from coarse resolution numerical models (Fall 2006)

Select Media

22 March 2015	Guest on The Weather Channel's <i>WxGeeks</i> program
20-21 May 2013	Multiple National and International News Agencies regarding the EF-5 Moore, OK Tornado on 20 May 2013
March 2013 – Present	Various print, radio, and television interviews regarding forecast and ongoing severe weather events
September 2012	NBC Affiliate WVIT in Connecticut: Skype interview from eye of Hurricane Isaac during radar deployment
May 2010	Central OK Press Conference regarding 10 May 2010 tornado outbreak, specifically VORTEX 2's operations
February 2010	National Public Radio's All Things Considered: Snow on the ground in all 50 states simultaneously
Spring 2007	The Weather Channel: Featured as an up-and-coming meteorologist, aired during Severe Weather Awareness Week
Various	The Weather Channel: Multiple interviews regarding upcoming significant severe weather events

Professional & Honorary Society Memberships

- Member, American Geophysical Union (2013–)
- Member, National Weather Association 2013–
- Member, American Meteorological Society (2013–)
- First United States Member of the European Severe Storms Laboratory (2012–)
- Member, Society of American Baseball Researchers (2011–)
- Student Member, American Geophysical Union (2011–2013)
- Student Member, National Weather Association (2007–2013)
- Student Member, American Meteorological Society (2004–2013)
- Mortar Board (2004–2005)
- Pi Mu Epsilon (2004–2005)
- Society of Physics Students (2001–2005)

Professional Leadership & Service

- Co-Chair, NWA 2015 Annual Meeting Program Committee (2014–2015)
- Chair, NWA Publications Committee (2014–[2016])
- Member, AMS EIPT Scientific and Technological Activities Commission (2014–[2016])
- Member, NWA IT Committee (2013–)
- Student Member, AMS EIPT Scientific and Technological Activities Commission (2012–2013)

- Session Co-chair, Quasi-operational Systems: Products you can use now: 29th EIPT Conference at 93rd AMS Annual Meeting (6–10 January 2013)
- Member, AMS EIPT Program Committee (2012–)
- Member, Spotter Network Advisory Committee (2011–)
- Member, National Severe Weather Workshop Program Committee (2010-2013)
- Member, National Weather Center REU Selection Committee (2010–2013)
- Instructor & Counselor, Extreme Weather and the Environment Summer Camp, William J Clinton Presidential Library and Museum, Little Rock, Arkansas (12–17 July 2010)
- Student Member, AMS SLS Scientific and Technological Activities Commission (2008–2009)

Academic & Community Leadership & Service

- Member, Norman NEXT (2010–)
- Member, Norman Chamber of Commerce (2010–)
- Graduate Student Panelist, English Assessment for Graduate Student Instructors (2009)
- Local Manager, WxChallenge Forecast Contest (2008–2013)
- Member, OU College of Atmospheric and Geographic Sciences' Edu-Tech Committee (2007–2009)
- Elected Chair, Student Affairs Committee, OU School of Meteorology (2007–2009)
- On-site Meteorologist, US Youth Soccer Southern Regional Championships, Oklahoma City, OK (29 June - 4 July 2007)
- Event Meteorologist, Norman May Fair (3–7 May 2007)
- Elected Chief Justice, Associated Student Government Judiciary, University of Arkansas (2004–2005)
- Elected President, Society of Physics Students, University of Arkansas (2004–2005)
- Communications Expert, Weapons of Mass Destruction Drill, Western Arkansas District (February 2004)
- Bioterrorism Table Top Discussion, Western Arkansas District (Summer 2003)
- ARES / RACES / SKYWARN Volunteer, Crawford County, Arkansas (2003–2008)
- Elected President, Pomfret Hall, University of Arkansas (Fall 2001)
- Hazardous Materials Responder Level 1 (2000–2003)
- ARES / RACES / SKYWARN Volunteer, Sebastian County, Arkansas (2000–2008)
- Amateur Radio Operator KD5LKH (2000–2020)

Courses Taught, Co-Taught, or Assisted

Fa 2008, 2012	Synoptic Meteorology Laboratory (Assisted)	University of Oklahoma
Fa 2009–2011	Synoptic Meteorology Laboratory (Co-Taught)	University of Oklahoma
Sp 2009, 2011	Mathematical Modeling (Taught)	Mid-America Christian University
Sp 2009, 2011	Differential Equations (Taught)	Mid-America Christian University
Sp 2008, 2009	Introduction to Meteorology II Laboratory (Taught)	University of Oklahoma
Su 2007	Introduction to Meteorology II (Taught)	University of Oklahoma
Fa 2005, 2007	Introduction to Meteorology I Laboratory (Taught)	University of Oklahoma
Sp 2006	Severe and Unusual Weather (Taught)	University of Oklahoma
Sp 2005	Honors University Physics I Laboratory (Co-Taught)	University of Arkansas

Students Supervised

- Matthew Brothers (Primary Mentor), NOAA Hollings (Summer 2014)
- Matthew Flournoy (Co-Mentor), NOAA Hollings (Summer 2014)
- Christopher McCray (Co-Mentor), NOAA Hollings (Summer 2014)
- Felicia Guarriello (Co-Mentor), NOAA Hollings (Summer 2013)
- Joshua Crittenden (Co-Mentor), NWC REU (Summer 2013)
- Burkely Twist (Co-Mentor), NOAA Hollings (Summer 2012)
- Alicia Klees (Co-Mentor), NOAA Hollings (Summer 2011)
- Stacey Hitchcock (Primary Mentor), NWC REU (Summer 2010)
- Preston Carter (Co-Mentor), NOAA Hollings (Summer 2009)

Select Invited Seminars and Presentations

- “Severe Weather Warnings: Past, Present, Future”. North Texas Chapter of the AMS/NWA. Fort Worth, TX, United States (22 October 2013)
- “Developing Your Skill Set”. 93rd AMS Annual Meeting. 1st Conference for Young Professionals. Austin, TX, United States (6-10 January 2013)
- “Mesoscale Convective Systems”. Week 4 Expert Lecture, First Annual European Severe Storms Laboratory Testbed. Wiener Neustadt, Austria (June 2012)
- “Severe Weather Forecasting: With Emphasis on Tornado Forecasting”. Week 2 Expert Lecture, First Annual European Severe Storms Laboratory Testbed. Wiener Neustadt, Austria (June 2012)
- “Heavy Precipitation Forecasting: Large Scale Patterns & Ingredients”. Week 2 Expert Lecture, First Annual European Severe Storms Laboratory Testbed. Wiener Neustadt, Austria (June 2012)
- “Tornado Warnings: Past, Present, and Future”. Atmospheric Science Department, University of Alabama—Huntsville (05 April 2012)
- “A Review of NWS Tornado Emergencies”. 2012 National Severe Weather Workshop, Norman, OK (2–3 March 2012)
- “The Future of Severe Weather Information Collection”. 2011 National Severe Weather Workshop, Norman, OK (5 March 2012)
- “Social Media, VORTEX 2, and Bringing the Two Together: Fundamental Shifts in the Way We Communicate”. American Meteorological Society’s Education Resource Associates Annual Meeting, Norman, OK (30 June 2010)
- Roundtable Discussion on the Future of Warnings. National Weather Service Next Generation Warning Services Workshop (4 December 2008)
- “What the Hail?!?: Severe Thunderstorms and Climate Change”. Science Cafe Norman (4 December 2008)
- “Assessment of the Severe Weather Environment of North America Simulated by a Global Climate Model”. ECE Weekly Seminar, National Center for Atmospheric Research (Fall 2007)
- “Winter Weather Forecasting: Pretending to Know What We’re Talking About”. Oklahoma Weather Laboratory (Fall 2007 and 2008)

Publications

Theses

1. **Marsh, Patrick T.**, 2013: *A method of calibrating probabilistic forecasts*. Doctoral Thesis. University of Oklahoma.
2. **Marsh, Patrick T.**, 2007: *An assessment of the severe weather environment of North America simulated by a climate model*. Masters Thesis. University of Oklahoma.
3. **Marsh, Patrick T.**, 2005: *Modern technology and its application in severe weather information dissemination*. Undergraduate Honors Thesis. University of Arkansas.

Lead Authored Refereed Papers

1. **Marsh, Patrick T.** and H. E. Brooks, 2012: Comments on “Tornado Risk Analysis: Is Dixie Alley an Extension of Tornado Alley?” *Bulletin of the American Meteorological Society*, **93**, 405–407.
2. **Marsh, Patrick T.**, J. S. Kain, V. Lakshmanan, A. J. Clark, N. M. Hitchens, and J. Hardy, 2012: A method for calibrating deterministic forecasts of rare events. *Weather and Forecasting*, **27**, 531–538.
3. **Marsh, Patrick T.**, H. E. Brooks, and D. J. Karoly, 2009: Preliminary investigation into the severe thunderstorm environment of Europe simulated by the Community Climate System Model 3. *Atmospheric Research*, **93**, 607–618.
4. **Marsh, Patrick T.**, H. E. Brooks, and D. J. Karoly, 2007: Assessment of the severe weather environment in North America simulated by a global climate model. *Atmospheric Science Letters*, **8**, 100–106.

Co-Authored Refereed Papers

1. Smith, B. T., R. L. Thompson, A. R. Dean, and **P. T. Marsh**, 2015: Diagnosing the conditional probability of tornado damage rating using environmental and radar attributes. *Weather and Forecasting*, **30**, 914–932.

2. Brooks, H. E., G. W. Carbin, and **P. T. Marsh**, 2014: Increased variability of tornado occurrence in the United States. *Science*, **346**, 349–352.
3. Knupp, K., T. A. Murphy, T. A. Coleman, R. A. Wade, S. A. Mullins, C. J. Schultz, E. V. Schultz, L. Carey, A. Sherrer, E. W. McCaul Jr., B. Carcione, S. Latimer, A. Kula, K. Laws, **P. T. Marsh**, and K. Klockow, 2014: The devastating 27 April 2011 tornado outbreak: Initial scientific assessment. *Bulletin of the American Meteorological Society*, **95**, 1041–1062.
4. Clark, A. J., J. Gao, **P. T. Marsh**, T. Smith, J. S. Kain, J. Correia Jr., M. Xue, and F. Kong, 2013: Tornado path length forecasts from 2010–2011 using ensemble updraft helicity. *Weather and Forecasting*, **28**, 387–407.
5. Coniglio, M. C., J. Correia Jr., **P. T. Marsh**, and F. Kong, 2013: Verification of convection-allowing WRF model forecasts of the planetary boundary layer using sounding observations. *Weather and Forecasting*, **28**, 842–862.
6. Kain, J. S., M. C. Coniglio, J. Correia Jr., A. J. Clark, **P. T. Marsh**, C. Z. Ziegler, V. Lakshmanan, S. D. Miller, S. R. Dembek, S. J. Weiss, F. Kong, M. Xue, R. A. Sobash, A. R. Dean, I. L. Jirak, and C. J. Melick, 2013: A feasibility study for probabilistic convection initiation forecasts based on explicit numerical guidance. *Bulletin of the American Meteorological Society*, **94**, 1213–1225.
7. Thompson, R. L., B. T. Smith, A. R. Dean, and **P. T. Marsh**, 2013: Spatial distributions of tornadic near-storm environments by convective mode. *Electronic Journal of Severe Storms Meteorology*, **8**, 1–22.
8. Clark, A. J., J. S. Kain, **P. T. Marsh**, J. Correia Jr., M. Xue, and F. Kong, 2012: Forecasting tornado path lengths using a three-dimensional object identification algorithm applied to convection-allowing forecasts. *Weather and Forecasting*, **27**, 1090–1113.
9. Clark, A. J., S. J. Weiss, J. S. Kain, I. L. Jirak, M. C. Coniglio, C. J. Melick, C. Siewert, R. A. Sobash, **P. T. Marsh**, A. R. Dean, et al., 2012: An overview of the 2010 hazardous weather testbed experimental forecast program spring experiment. *Bulletin of the American Meteorological Society*, **93**, 55–74.
10. Purpura, J. K., S. Cobb, **P. T. Marsh**, and M. J. Hudson, 2012: The NWS and VORTEX2: Facilitating real-time communication between research and warning operations. *Electronic Journal of Operational Meteorology*, **13**, 108–119.
11. Brooks, H. E., **P. T. Marsh**, A. M. Kowaleski, P. Groenemeijer, T. E. Thompson, C. S. Schwartz, C. M. Shafer, A. Kolodziej, N. Dahl, and D. Buckley, 2011: Evaluation of European Storm Forecast Experiment (ESTOFEX) forecasts. *Atmospheric Research*, **100**, 538–546.

Refereed Conference Proceedings

1. Bass, E. J., B. Hogan, D. Rude, B. Phillips, D. Westbrook, C. League, J. Brotzge, **P. T. Marsh**, R. R., and L. Lemon, 2011: A method for investigating real-time distributed weather forecaster-emergency manager interaction. *2011 IEEE International Conference on Systems, Man, and Cybernetics*. 9–12 October 2011, Anchorage, AK, USA.

Assessments

1. Woodall, G., J. Mullikin, V. Brown, G. Carrasco, K. Harding, C. Hayes, J. Ladue, J. Levan, M. Ocana, K. Scharfenberg, C. Smallcomb, D. Sugerman, J. Trainor, D. B. Caldwell, D. C. Young, S. Romano, M. Magnus, **P. T. Marsh**, and W. Lerner, 2011: *The historic tornadoes of April 2011*. Service Assessment. National Oceanic and Atmospheric Administration's National Weather Service.

Lead Authored Informal Publications

1. **Marsh, Patrick T.**, J. S. Kain, S. J. Weiss, I. L. Jirak, R. A. Sobash, F. Kong, K. W. Thomas, and M. Xue, 2010: Investigating a fundamental component of a Warn-on-Forecast system in a collaborative real-time experiment. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.
2. **Marsh, Patrick T.**, H. E. Brooks, and D. J. Karoly, 2007: An assessment of the severe weather environment of North America simulated by a global climate model. *Preprints, 87th Annual Meeting of the American Meteorological Society*. 13–18 January 2007, San Antonio, TX, USA.
3. **Marsh, Patrick T.**, H. E. Brooks, and D. J. Karoly, 2007: Assessment of the European severe weather environment simulated by the CCSM3. *Preprints, 4th European Conference on Severe Storms*. 10–14 September 2007, The International Centre for Theoretical Physics, Trieste, Italy.
4. **Marsh, Patrick T.**, 2005: *History of tornado forecasting*. European Meteorological Society's 2005 Weather Calendar
5. **Marsh, Patrick T.**, 2003: *A journey into the heart of mother nature*. KFSM TV-5 Almanac

6. **Marsh, Patrick T.**, 2000: *The makings of a 21st century weatherman*. KFSM TV-5 Almanac

Select Co-Authored Informal Publications

1. Rogers, J. W., R. L. Thompson, and **P. T. Marsh**, 2014: Potential applications of a CONUS sounding climatology developed at the Storm Prediction Center. *Preprints, 27th Conference on Severe Local Storms*. 3–7 November 2014, Madison, Wisconsin, USA.
2. Smith, B. T., R. L. Thompson, A. R. Dean, **P. T. Marsh**, R. Wagenmaker, G. Mann, M. J. Hudson, and J. T. Ferree, 2014: Demonstrating the utility of conditional probabilities of tornado damage rating in the impact-based warning era. *Preprints, 27th Conference on Severe Local Storms*. 3–7 November 2014, Madison, Wisconsin, USA.
3. Harrold, M., T. L. Jensen, B. G. Brown, S. J. Weiss, **P. T. Marsh**, M. Xue, F. Kong, A. J. Clark, K. W. Thomas, J. S. Kain, M. C. Coniglio, and R. S. Schneider, 2011: Spatial verification of convective systems during the 2010 NOAA Hazardous Weather Testbed Spring Experiment. *Preprints, 91st American Meteorological Society Annual Meeting*. 23–27 January 2011, Seattle, Washington, USA.
4. Jenson, T. L., M. Harrold, S. J. Weiss, M. Xue, **P. T. Marsh**, F. E. Barthold, J. J. Levit, F. Kong, A. J. Clark, B. G. Brown, D. R. Novak, J. S. Kain, R. S. Schneider, and M. C. Coniglio, 2011: The Developmental Testbed Center objective evaluation performed during the 2010 NOAA Hazardous Weather Testbed Spring Experiment. *Preprints, 91st American Meteorological Society Annual Meeting*. 23–27 January 2011, Seattle, Washington, USA.
5. Jirak, I. L., S. J. Weiss, C. J. Melick, **P. T. Marsh**, J. S. Kain, A. J. Clark, M. Xue, F. Kong, and K. W. Thomas, 2010: Evaluation of the performance and distribution of hourly maximum fields from storm-scale ensemble forecasts. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.
6. Melick, C. J., I. L. Jirak, S. J. Weiss, **P. T. Marsh**, J. S. Kain, M. Xue, F. Kong, and K. W. Thomas, 2010: An environmental climatology of the CAPS storm-scale ensemble forecast system during the 2010 HWT spring experiment. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.
7. Scharfenberg, K. A., D. L. Andra Jr., **P. T. Marsh**, K. L. Ortega, and J. Brotzge, 2010: Evaluation of ESTOFEX forecasts. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.
8. Weiss, S. J., A. J. Clark, I. L. Jirak, C. Siewert, R. A. Sobash, **P. T. Marsh**, A. R. Dean, J. S. Kain, M. C. Coniglio, M. Xue, F. Kong, K. W. Thomas, J. Du, D. R. Novak, F. E. Barthold, M. J. Bodner, J. J. Levit, C. B. Entwistle, R. S. Schneider, and T. L. Jensen, 2010: An overview of the 2010 NOAA Hazardous Weather Testbed spring forecast experiment. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.
9. Brooks, H. E., **P. T. Marsh**, A. M. Kowaleski, P. Groenemeijer, T. E. Thompson, C. S. Schwartz, C. M. Shafer, A. Kolodziej, N. Dahl, and D. Buckley, 2009: Evaluation of ESTOFEX forecasts. *Preprints, 5th European Conference on Severe Storms*. 12–16 October 2009, Landshut, Germany.