

Michael J. Erickson

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Work Address:

WPC: 5830 University Research Ct
College Park, MD 20740

Professional Experience

Research Scientist II

University of Colorado - CIRES
Science Advisor: James Nelson

Weather Prediction Center, College Park, MD
May 2019 – present

Research Scientist I

University of Colorado - CIRES
Science Advisor: James Nelson

Weather Prediction Center, College Park, MD
Feb 2016 – April 2019

Visiting Assistant Professor

University of Maryland
AOSC 470/600 (Synoptic Meteor)

College Park, MD
Department of Atmospheric and Oceanic Science
Aug 2018 – Dec 2018

Postdoctoral Associate

Stony Brook University
Advisor: Brian Colle

Stony Brook, NY
School of Marine and Atmospheric Sciences
May 2015 – Feb 2016

Adjunct Instructor

Suffolk County Community College
MET 101 (Intro. to Weather)

Selden, NY
Department of Physical Sciences
Fall 2012 – Dec 2015

Research Assistant

Stony Brook University
Advisor: Brian Colle

Stony Brook, NY
School of Marine and Atmospheric Sciences
Fall 2007- May 2015.

Research Assistant

Stony Brook University
Advisor: Sultan Hameed

Stony Brook, NY
School of Marine and Atmospheric Sciences
May 2004 – July 2007.

Teaching Assistant (TA)

Stony Brook University
ATM 102 (Weather and Climate)

Stony Brook, NY
School of Marine and Atmospheric Sciences
Full TA: Fall 2004, 2006, 2007, Spring 2005, 2007

Teaching Assistant (TA)

Stony Brook University
ATM 247 (Atmos. Structure/Analy)

Stony Brook, NY
School of Marine and Atmospheric Sciences
Full TA: Spring 2008.

Private Tutor

Integrated Algebra, Geometry, Trig.

Long Island Area, NY
Spring 2006 – Fall 2011

Research Interests

- Ensemble model verification, post-processing, and calibration
- Numerical modeling using the Weather Research and Forecasting (WRF) model and data assimilation using the Ensemble Kalman Filter (EnKF)
- Tracking heavy precipitation objects through space and time using the Model Evaluation Tools (MET) software
- Developing a flash flood climatology over the Continuous United States for the purposes of verifying Weather Prediction Center forecast products
- Verifying and displaying the performance of WPC forecast products on operational websites for forecasters
- Investigating fire weather days from an atmospheric ensemble modeling perspective
- Collaboration with many different agencies (National Weather Service, Earth System Research Laboratory, National Center for Atmospheric Research, River Forecast Centers, New York State Energy Research and Development Authority, United States Forest Service, Consolidated Edison of New York, National Severe Storms Laboratory, Oklahoma University) on research to operations projects

Education

Stony Brook University, Stony Brook, NY **August 2007 – May 2015**
Ph.D. Marine and Atmospheric Sciences
Dissertation: *Exploring Model Error through Post-processing and an Ensemble Kalman Filter on Fire Weather Days*
Advisor: Prof. Brian A. Colle

Stony Brook University, Stony Brook, NY **Fall 2004 – July 2007**
Master of Science. Marine and Atmospheric Sciences
Thesis: *The Influence of the North Atlantic Oscillation on Cod Recruitment.*
Advisor: Prof. Sultan Hameed

Western Connecticut State University, Danbury, CT **Fall 1999 – May 2003**
Bachelor of Arts. Meteorology
GPA: 3.83/4.0

Skills and Qualifications

- Computer Languages:
Python, MATLAB, Linux shell scripting, FORTRAN, GEMPAK, HTML, KMZ
- Knowledgeable with the Model Evaluation Tools (MET) software
- Knowledgeable in running/adapting the Weather Research and Forecasting (WRF) model including the WRF Preprocessing system (WPS)
- Knowledgeable with data assimilation; specifically the WRF Data Assimilation system (WRFDA), the WRF Boundary Condition (WRF_BC) and the Pennsylvania State University Ensemble Kalman Filter

- Strong background in statistics. Familiar with model verification, post-processing, EOF analysis, cluster analysis, and Bayesian techniques.
 - Comfortable with analyzing large ensemble model (SREF, GEFS, FNMOC, CMC) and analysis (RUC, RAP, NARR) datasets in NetCDF, GRIB, GRIB2 and ASCII
 - Familiar with writing grant proposals and project updates
 - Familiar with designing operational websites to display compact novel visualizations of ensemble model data
 - Knowledgeable with UNIX/LINUX, Windows and Mac OS
 - Familiar with Microsoft Word, Excel and Power Point
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Research to Operation Projects since February 2016

Displaying and Correcting Biases in Heavy Precipitation Objects for WPC

Forecasters

June 2018 – Current

- Track and compare observed and modeled heavy precipitation objects over a verification period to assess bias and uncertainty for a variety of models
- Display this information to WPC forecasters and bias correct model data object attributes based on a retrospective verification
- Modify current website to include dynamic mapping features for enhanced usability

Development of a First-guess Field for the WPC Excessive Rainfall Outlook

June 2018 – Current

- Develop a Practically Perfect method to be used to verify the Excessive Rainfall Outlook
- Using the practically perfect method, create a first guess field for WPC forecasters

Creating a Verification Platform for WPC Forecast Products

Apr 2017 – Current

- Verify the Excessive Rainfall Outlook using a series of metrics that assess bias and skill
- Create a continuously updating internal website displaying verification of the WPC Excessive Rainfall Outlook

Track and Display Object Attributes of Heavy Precipitation Objects

Feb 2016 – May 2018

- Track and create an operational website of high-resolution heavy precipitation object attributes from a variety of atmospheric ensembles
 - Website updates hourly with new model data when it becomes available
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Additional Development Projects since February 2016

Development of a CONUS Flash Flood Climatology

Feb 2016 – May 2018

- Develop a flash flood climatology for the Contiguous United States, using bias correction techniques, observations, and a 10-year climatology from a hydrological model

Verification of WPC Forecast Products

Feb 2017 – Feb 2018

- Perform a 3-year retrospective verification (2015 to 2017) of the Weather Prediction Center Excessive Rainfall Outlook to assess skill
- Based on this verification, the Excessive Rainfall Outlook was redefined operationally in October 2017

Coupling a Hydrologic Model to an Ensemble of Heavy Precipitation Forecasts

May 2017 – Aug 2018

- Test the utility of an ensemble of precipitation forecasts coupled to a hydrologic model for three historical flooding events
- Collaborated with the hydrologic model developers on future products for flash flood forecasting

Utilizing Object Oriented Biases in Hydrological Modeling Applications

Sept 2018 – Present

- In collaboration with hydrologic model developers, incorporate the uncertainty and bias of heavy precipitation object-based biases when simulating river streamflow

Participation in WPC's Flash Flood and Intense Rainfall (FFaIR) Experiments in 2017 and 2018

June 2017 – July 2018

- Verify and evaluate the experimental forecast products, experimental model/ensemble guidance, and operational forecast products from the experiment
- Assisted in the writing of the technical report from the 2018 FFaIR Experiment and leading efforts to publish the results

Publications (In Preparation)

Erickson, M. J., B. Albright, S. Trojniak, J. A. Nelson, R. S. Schumacher, 2020: Results and Interpretations from the 2018/19 HMT–WPC Flash Flood and Intense Rainfall Experiment. Target Journal: *Wea. Forecasting*.

Erickson, M.J. and J.A. Nelson, 2020: Object-based tracking and verification of HRRR heavy precipitation objects using the Model Evaluation Tools. Target Journal: *Wea. Forecasting*.

Publications

Erickson, M.J., B. Albright and J.A. Nelson, 2020: Verifying and Redefining the Weather Prediction Center's Excessive Rainfall Outlook Forecast Product. *Submitted to Wea. Forecasting*.

Erickson, M. J., J. S. Kastman, B. Albright, S. Perfater, J. A. Nelson, R. S. Schumacher, and G. R. Herman, 2019: Verification Results from the 2017 HMT-WPC Flash Flood and Intense Rainfall Experiment. *J. Appl. Meteor. Climatol.*, 58, 2591–2604.

Erickson, M.J., J. Charney, and B. A. Colle, 2018: Evaluation and Post-Processing of Ensemble Fire Weather Predictions over the Northeast United States. *J. Appl. Meteor. Climatol.*, 57, 1135-1153.

Erickson, M.J., J. Charney, and B. A. Colle, 2016: Development of a Fire Weather Index Using Meteorological Observations within the Northeast United States. *J. Appl. Meteor. Climatol.*, 55, 389-402.

Hodrefe, C, P. Doraiswamy, B. Colle, K. Demerjian, W. Hao, **M.J. Erickson**, M. Souders, and J-Y Ku, 2014: Meteorology, Emissions, and Grid Resolution: Effects on Discrete and Probabilistic Model Performance. In: D. Steyn, P. Builtjes, R. Timmermans (eds.): Air Pollution and Modeling and Its Application XXII, NARA Science for Peace and Security Series C: Environmental Security, 493-497. Springer Netherlands.

Erickson, M.J., B. A. Colle, and J. Charney, 2012: Impact of bias correction type and conditional training on Bayesian model averaging over the northeast United States. *Wea. Forecasting*, 27, 1449-1469.

Presentations and Seminars since 2015

***Bold** indicates presenter*

Erickson, M.J., N. Yussouf, P.S. Skinner, and K.A. Wilson. "Tracking and Verifying Heavy Precipitation Objects from NSSL's Warn-on-Forecast Ensemble." 10th Conference on Transition of Research to Operations. January 2020. Boston, MA. (Oral Presentation).

Erickson, M.J., B. Albright, and J.A. Nelson. "Development of a WPC 'Practically Perfect' Verification as a Product for the Excessive Rainfall Outlook." 10th Conference on Transition of Research to Operations. January 2020. Boston, MA. (Oral Presentation).

Erickson, M.J. and J.A. Nelson "Tracking and Usage of Ensemble Model Heavy Precipitation Objects at the Weather Prediction Center." 8th NCEP Ensemble User Workshop. August 2019. College Park, MD (Oral Presentation).

Erickson, M.J. "A New Practically Perfect Technique Used in FFaIR." 2019 Flash Flood and Intense Rainfall Experiment (FFaIR) Presentation. June 2019. College Park, MD (Oral Presentation).

Erickson, M.J. "Development and Applications of a new Practically Perfect Technique for WPC." WPC Internal Seminar. May 2019. College Park, MD (Oral Presentation).

Erickson, M.J. and J.A. Nelson. "Ways to Analyze Model Object-Oriented Heavy Precipitation Biases at the Weather Prediction Center." Global Systems Division Seminar. April 2019. Boulder, CO. (Oral Presentation).

Erickson, M.J. and J.A. Nelson. "Verifying and Utilizing Seasonal Object Oriented Biases in Convection Allowing Models." 9th Conference on Transition of Research to Operations. January 2019. Phoenix, AZ. (Oral Presentation).

Erickson, M.J., B. Albright, and J.A. Nelson. "Excessive Rainfall Outlook Verification Product for WPC Forecasters." 9th Conference on Transition of Research to Operations. January 2019. Phoenix, AZ. (Oral Presentation).

Erickson, M.J., S.A. Ganetis, and J. Kastman. "METplus Usage at the Weather Prediction Center." Invited talk at the Model Evaluation Tools Plus (METplus) Tutorial. October 2018. College Park, MD (Oral Presentation).

Erickson, M.J. and J.A. Nelson. "Novel Ways To Access and Visualize Model Biases at the Weather Prediction Center." 7th Tri-State Weather Conference. September 2018. Danbury, CT. (Oral Presentation).

Erickson, M.J., J.A. Nelson, M. Klein, and D. Novak. "Calibrated Probabilistic Guidance for Flash Flood Hazards." 3rd "Probability of What?" Annual Meeting. September 2018. Norman, Oklahoma. (Oral Presentation).

Erickson, M.J. and J.A. Nelson. "Evaluating Object-oriented Bias and Error in HRRR Heavy Precipitation Objects to Assist Weather Prediction Center forecasters." Invited talk for the NOAA/National Severe Storms Laboratory Seminar. May 2018. Norman, OK (Oral Presentation).

Erickson, M.J. "Verifying the Excessive Rainfall Outlook Over the Past Three Years." WPC Internal Seminar. April 2018 and June 2018. College Park, MD (Oral Presentation).

Erickson, M.J. and J.A. Nelson. "Verifying, Calibrating, and Redefining the Excessive Rainfall Outlook at the Weather Prediction Center." 8th Conference on Transition of Research to Operations. January 2018. Austin, TX. (Oral Presentation).

Erickson, M.J. S.A. Ganetis, H. Vergara-Arrieta, and J.A. Nelson. "Using High Resolution Ensemble Precipitation Data to Develop New Probabilistic Hazard Information at the Weather Prediction Center." 8th Conference on Transition of Research to Operations. January 2018. Austin, TX. (Oral Presentation).

Perfater, S., B. Albright, J. Kastman, and M.J. Erickson. "The 2017 Flash Flood and Intense Rainfall Experiment: Results and Findings." EMC MEG Weekly Presentation. November 2017. College Park, MD (Oral Presentation).

Erickson, M.J., S.A. Ganetis, and J. Kastman. "Usage of Model Evaluation Tools at the Weather Prediction Center." Invited talk at the Model Evaluation Tools Tutorial. October 2017. College Park, MD (Oral Presentation).

Erickson, M.J. "An Ensemble Cyclone Track Website for Conveying Uncertainty and Model Trends." WPC Internal Seminar. September 2017. College Park, MD (Oral Presentation).

Erickson, M.J., J.A. Nelson and D. Novak. "Calibrated Probabilistic Guidance for Flash Flood Hazards" 2nd "Probability of What?" Annual Meeting. September 2017. Norman, Oklahoma. (Oral Presentation).

Erickson, M.J. "Tracking and Displaying Heavy Rain Objects Using MODE Time-Domain." Student Intern Brown Bag Presentation. June 2017. College Park, MD. (Oral Presentation).

Erickson, M.J. and J.A. Nelson. "Development of a Gridded Flash Flood Climatology for Use by the Weather Prediction Center." 7th Conference on Transition of Research to Operations. January 2017. Seattle, WA. (Oral Presentation).

Erickson, M.J. and J.A. Nelson. "New Ways of Displaying Convection Allowing Ensemble Data for WPC Forecasters." 7th Conference on Transition of Research to Operations. January 2017. Seattle, WA. (Oral Presentation).

Erickson, M.J. and J.A. Nelson. "Development of New Probabilistic Hazard Information Using High Resolution Quantitative Precipitation Forecasts." 6th Tri-State Weather Conference. October 2016. Danbury, CT. (Oral Presentation).

Erickson, M.J., B.A. Colle, and B. Hertell. "Development of a Website to Diagnose Ensemble Cyclone Track Uncertainty with Additional Supporting Graphics." National Weather Service Northeast Regional Operational Workshop. November 2015. Albany, NY. (Oral Presentation).

Erickson, M.J. "Demonstration of the Operational Ensemble Cyclone Tracks Website." Invited Webinar Talk for the National Weather Service Alaska Region, Sept 2015. Fairbanks, Alaska. (Virtual Oral Presentation).

Erickson, M.J., and B.A. Colle. "Using the Ensemble Kalman Filter on Fire Weather Days to Explore Model Error over the Northeast United States." AMS 23rd Conference on Numerical Weather Prediction. July 2015. Chicago, IL (Oral presentation).

Erickson, M.J., B.A. Colle., R.D. Torn, E.K.M Chang, M. Zhang, J.J. Charney.
“Exploring Model Error through Post-processing and an Ensemble Kalman Filter on Fire Weather Days.” Ph.D Dissertation. May 2015. Stony Brook, NY (Oral presentation).

Erickson, M.J., and B.A. Colle. “Exploring Ensemble Kalman Filter Performance on Fire Weather Days over the Northeast United States.” 11th Symposium on Fire and Forest Meteorology. May 2015. Minneapolis, MN. (Oral Presentation).

Current and Pending Funding

(1) Title: Development and NWS Forecaster Evaluation of a Convective-scale Ensemble System for Probabilistic Heavy Rainfall and Severe Weather Forecasts

Supporting Agency: Joint Training Transformation Initiative

Investigator months: 3 months/year

Total Project Amount: \$80,365 (Awarded).

Duration: Oct 1, 2018 – Sept 30, 2020.

(2) Title: Accelerate Improvements in Prediction of Extreme Precipitation

Supporting Agency: National Oceanic and Atmospheric Administration

Investigator months: 7.8 months/year

Total Project Amount: \$716,231 (Total; Awarded).

Duration: August 1, 2019 – July 31, 2022.

(3) Title: Evaluation and Development Guide for Tropical Cyclone Rainfall in High Terrain

Supporting Agency: National Oceanic and Atmospheric Administration

Investigator months: 0.6 months/year

Total Project Amount: \$239,683 (Total; Awarded).

Duration: Sept 1, 2019 – Aug 31, 2022.

(4) Title: Develop national capability for PQPF guidance to create HTI flooding rain threat grids

Supporting Agency: National Oceanic and Atmospheric Administration

Investigator months: 0.4 months/year

Total Project Amount: \$129,621 (Total; Awarded).

Duration: August 1, 2019 – Dec. 31, 2021.

(5) Title: Intelligent Probabilistic Flash Flood and Intense Rainfall Guidance Products for Improved Real-Time Decision-making at WPC Met Watch Desk

Supporting Agency: Joint Training Transformation Initiative

Investigator months: 3 months/year

Total Project Amount: \$87,776 (Pending).

Duration: Sept 1, 2020 – Aug 31, 2022.

Community/Professional Service

Supervisor

University of Colorado at CIRES

High School Research Project

Elizabeth Van Loon and Abby Cuomo – 2014 to 2015
"The Implementation and Verification of a Forest Fire Index for the Northeast United States."

Semifinalists in the Siemen's Foundation for Math and Science (2015)

Student Member of the Graduate Program Committee (GPC) 2008-2010

Recommends policy and provides guidance for graduate student academic affairs.

School of Marine and Atmospheric Science, Stony Brook University, Stony Brook, NY.

President of the Hera Group 2009-2010

Club organized scientific lectures of interest to the campus community.

Graduate Student Club, Stony Brook University, Stony Brook, NY

President of the Meteorology Club 2001-2003

Organize meetings, club events, and fund raisers. Promote a sense of community.

Undergraduate Student Club, Western Connecticut State University, Danbury CT

Professional Affiliations

Member of the American Meteorological Society. 1999-present

Member of the Hera Group. Student Club. 2007-2010

Member of the Meteorology Club. Student Club. 1999-2003

Awards and Honors

Best New Organization Award: The Hera Group. 2008
Stony Brook University, Stony Brook, NY.

B.A. Magna Cum Laude with Honors. 2003

Dean's Choice Award 2003
Western Connecticut State University, Danbury, CT.

Jonathan Mottley Memorial Scholarship 2002
Western Connecticut State University, Danbury, CT.

Meserve Memorial Scholarship
Western Connecticut State University, Danbury, CT.

1999-2003

References

James A. Nelson: Development and Training Branch Chief
Weather Prediction Center, College Park, MD
(301) 683-1493
james.a.nelson@noaa.gov

Dr. Brian A. Colle: Professor and ITPA Director
School of Marine and Atmospheric Sciences
Stony Brook University, Stony Brook, NY
(631) 632-3174
colle@cyclone.msfc.sunysb.edu

Dr. Joseph J. Charney: Research Meteorologist
Northern Research Station, East Lansing, MI
(517) 355-7740; ext. 105
jcharney@fs.fed.us

Scott A. Mandia: Assistant Chair and Professor
Suffolk County Community College (SCCC) –
Ammerman Campus, Selden, NY
(631) 451-4104
mandias@sunysuffolk.edu