

The vision of AI2ES is to create trustworthy Artificial Intelligence (AI) methods for diverse environmental science (ES) users that will revolutionize our understanding and prediction of high-impact atmospheric and ocean science phenomena and create new educational pathways to develop a more diverse AI and environmental science workforce.



AI2ES News

Edited by Jayne-Marie Linguist, Dr. Amy McGovern,
Dr. Philippe Tissot, and Jennifer Warrillow

January 2024 Edition

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In Preparation for AMS 2024

AI2ES is on the road (and in the sky) headed to the 2024 American Meteorological Society Conference in Baltimore, Maryland! To prepare for the conference, the January 2024 AI2ES newsletter is focusing on conference presentations, AI2ES Day, and things to do and know while in the Charm City.

American Meteorological Society (AMS) Annual Meeting Background

This year is the 104th Annual Meeting of the American Meteorological Society (AMS). AMS was founded in 1919 by Charles Franklin Brooks, who was a member of the Blue Hill Observatory in Milton, Massachusetts. When the organization first began, members included both weather enthusiasts and meteorology professionals. By 1922, AMS membership consisted mostly of professionals in the field. The organization started out with one publication, the Bulletin of the American Meteorological Society, and grew to publish its first scientific journal called the Journal of Meteorology in the 1940s. This journal eventually split into the two current AMS publications, the Journal of Applied Meteorology and the Journal of the Atmospheric Sciences (ametsoc.org).

Since the inception of AMS, the Annual Meeting has become a way for members to connect with others, share their passion for meteorology, and inspire the next generation of scientists. According to the AMS website, "AMS hosts the world's largest annual gathering for the weather, water, and climate community, bringing together great minds across scientific disciplines. You'll make career-long professional contacts and lifelong friends at the AMS Annual Meeting. All Annual Meetings are in hybrid format, providing both a much-loved in-person

experience and the global accessibility of remote participation. Attendees can participate in over 600 sessions with cutting-edge science from atmospheric scientists, oceanographers, hydrologists, and many more. However you attend, the Annual Meeting is a useful and unique experience for all."

The AMS AI Conference and AI2ES

This will be the 23rd edition of the AMS Artificial Intelligence for Environmental Science Conference. The first AMS AI conference took place in January 1998 in Phoenix Arizona and consisted of 8 sessions and 47 presentations with topics that are not that different from the 2024 conference. Before the AMS AI conferences, some of the same researchers had organized AI Workshops starting in 1985. Although during these early years, expert systems were the main AI method used to work on environmental science problems and neural networks were rarely mentioned. The AMS AI conference continued to provide a very important gathering place to help the progression of our field for two decades. But how things have grown lately! While there was an average of about 30-35 talks per conference until 2016, the conference has taken off and we understand that there will be close to 400 presentations this year. A big thank you to all the organizers and volunteers. And if you have not volunteered yet, judges are usually needed and it is likely not too late. There is also a close relationship between the AMS AI Committee and AI2ES as the present chair of the AMS AI committee, Christina Kumler, and the other lead conference organizers, Kyle Hilburn and Aaron Hill, have ties with AI2ES. And looking back in time John Williams, Amy McGovern, Philippe Tissot, and David John Gagne were all AMS AI committee chairs and conference and workshop organizers with many



others at AI2ES contributing. Thank you to all the past but especially the present AMS AI organizers (they have a much bigger conference to manage!). The field of AI for the environmental sciences would likely not be the same without the AMS AI committee and conferences.

AI2ES at AMS

AI2ES at AMS this year will be held on January 28th, 2024 at the Baltimore Convention Center. The event, which is in-person and hybrid, will begin at 9 AM with a warm welcome from AI2ES Principal Investigator, Dr. Amy McGovern. AI2ES at AMS will include presentations and panels from AI2ES investigators, personnel, students, and partners. This year we will have a total of six presentations and panels, an icebreaker activity, and a think-pair-as-a-table-share activity. The structure of AI2ES at AMS serves as a mini conference to showcase the hard work AI2ES members and students have accomplished in the past year. Students William, Michael, and Hector have also organized an ice breaker and networking activity for AI2ES at AMS attendees. During the planning process for this activity, the group wanted to incorporate AI with networking. While the specifics of the activity are a surprise for AI2ES at AMS, William, Michael, and Hector did share that there are miniature trophies for the winners of this activity. As for the rest of AI2ES at AMS, the itinerary can be found below as well as the AI2ES [website](#).

AI2ES at AMS Itinerary

Who: All members of AI2ES, our partners and collaborators, and people interested in learning more

What: Annual AI2ES gathering (in-person and hybrid)

When: January 28, 2024 (Sunday before AMS)

Where: Baltimore Convention Center (room to be announced by Friday before AMS)

Note, you need to have an AMS name tag to enter – please email Amy & Susan if you are attending AI2ES@AMS but not AMS and we can get you a name tag.

Time	Topic	Presenter/Organizer
9:00 - 9:15 AM	Welcome and stage setting	Amy MCGovern
9:15 - 9:30 AM	Networking Activities	Michael Yu, William McGovern-Fagg, Hector Marrero-Colominas
9:30 - 9:45 AM	Expand AI Partner: FIU	Jason Liu
9:45 – 10:00 AM	Expand AI Partner: SDSU	Samuel Shen



AI2ES at AMS Itinerary (continued)

Time	Topic	Presenter/Organizer
10:15 – 10:45 AM	<p>Early career lightning talks</p> <p><i>Marina Vicens-Miquel, Texas A&M University-Corpus Christi Machine Learning for Coastal Inundation</i></p> <p><i>Dongsheng Luo @ FIU Explainable Deep Learning for Time Series Analysis</i></p> <p><i>Yoonjin Lee; CIRA/CSU Retrieval of boundary layer precipitable water from GOES ABI using machine learning techniques</i></p> <p><i>Maria Madsen (The University of Oklahoma) Elevating Collaboration: Insights from ECMWF Research Visit</i></p> <p><i>Ryan Lagerquist, CIRA / NOAA GSL Machine-learned uncertainty quantification is not magic: Lessons learned from emulating radiative transfer with ML</i></p> <p><i>Chris Wirz – NSF NCAR Advancing theory and development within AI2ES: Moving toward cross-cutting research</i></p>	Julie Demuth, moderator
10:45 – 11:00 AM	Break and a group photo	EVERYONE
11:15 – 12:00 PM	<p>Showcase of current AI2ES research products as well as private industry partners</p> <p><i>Yeji Choi, SI Analytics Weather Intelligence Platform, OVISION earth!</i></p> <p><i>Jacob Radford Visualizing Pure AI Weather Prediction Models</i></p>	David Gagne, moderator



AI2ES at AMS Itinerary (continued)

Time	Topic	Presenter/Organizer
11:15 – 12:00 PM	Showcase of current AI2ES research products as well as private industry partners (continued) <u>Jacob Radford</u> Visualizing Pure AI Weather Prediction Models <u>Sam Shen</u> , San Diego State Univ Data Visualization by 4DVD and XSLICE <u>David Hall</u> , NVIDIA NVIDIA Earth2 Updates <u>Matthew Kastl</u> , TAMU-CC CBI Semaphore – A software to speed up R2O for Environmental AI models <u>Miranda White</u> , TAMU-CC CBI Operational Cold Stunning Event Predictions <u>David John Gagne</u> NCAR MILES Machine Learning Software Tools	David Gagne, moderator
12:00 – 1:30 PM	Lunch and discussions	Lunch is on your own near the convention center
1:30 – 2:15 PM	Panel/Roundtable discussion on what we've learned about AI2ES research collaborations, how we work together, how we could improve	Julie and Imme are organizing, EVERYONE is participating and welcome!
2:15- 2:30 PM	Break	
2:30 – 3:25 PM	Think-pair-as-a-table-share activity on blue-sky ideas for years 6-10	Amy and DJ are organizing, EVERYONE is participating and welcome!



AI2ES at AMS Itinerary (continued)

Time	Topic	Presenter/Organizer
3:25 – 3:30 PM	Closing session	Amy McGovern
4:00 – 5:15PM	AMS Presidential Forum	AMS 2024
6:00 PM	Group dinner reservations at the Rusty Scupper	Meet outside the convention center and we will do a group walk.

Baltimore, MD Background

Baltimore, Maryland is known by many names such as the Charm City and the city that reads. The city was established in 1729 through a group of Marylanders who received a town charter from the state legislature to begin the construction of what would become Baltimore today. Since its establishment, Baltimore has had many significant milestones in American history. A few accomplishments that stand out include that the first research university, Johns Hopkins, was founded in 1876 in Baltimore. If you're a fan of board games, you may recognize the Baltimore and Ohio railroad (B&O railroad) from Monopoly which features the railroad as one of the spaces in the game. The B&O railroad began in Baltimore and was the first carrier of passengers and freight in the United States (Stanford University). Additionally, Francis Scott Key wrote the Star-Spangled Banner while in Baltimore during the war of 1812 (National Museum of American History) which was officially made our national anthem in the 1930s. Throughout Baltimore's history, many famous and influential people have called Baltimore home including baseball player Babe Ruth, Supreme Court Justice Thurgood Marshall, and poet Edgar Allan Poe who inspired the mascot for Baltimore's National Football League Team, the Baltimore Ravens.

Lastly, Baltimore has many amazing sites and activities to explore the city such as the National Aquarium, the George Peabody Library, the National Electronic Museum, and Baltimore's historic ships. For more information about things to do in Baltimore, baltimore.org has comprehensive lists of things to do based on interests of visitors and must-see sites. Before arriving in Baltimore, make sure to check the weather, bring winter clothing and any other travel essentials for flights to and from Baltimore and hotel stays.

Conference and Travel Tips

When interviewed about organizing the networking and icebreaker activity for AI2ES at AMS, William McGovern-Fagg, Michael Yu, and Hector Marrero-Colominas gave tips on networking and presenting at conferences to prepare for AMS 2024. William shared that for him, one of the most important things when preparing for a conference is to “look over the schedule beforehand and make a plan for what talk you are going to try to go to.” Hector seconded William’s statement and added that he is going to try to go to as many AI2ES talks to show support for other students and AI2ES members. When it comes to answering questions after giving a presentation, Hector noted that one tip is to repeat the question asked to confirm it and ensure that it is heard by the audience and “it also gives you more time to think” before answering.

For packing and traveling to conferences, especially in colder climates, William, Michael, and Hector suggested packing warm clothing like a beanie and lots of layers and additionally arriving early to the airport as William noted “no matter how long you think it’s going to take, it’s always going to take a little bit more.”



George Peabody Library



From Baltimore Magazine

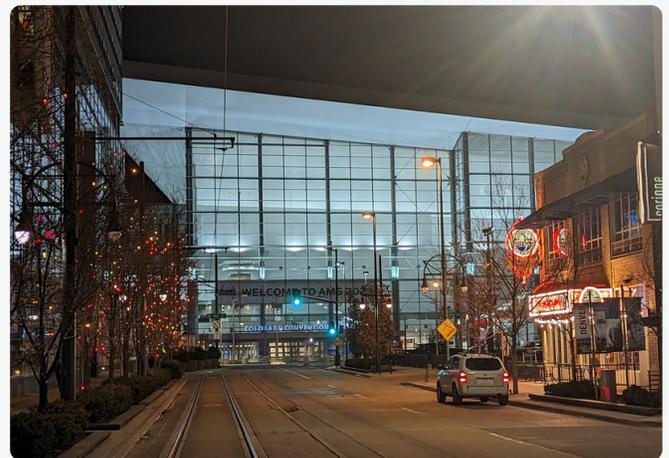
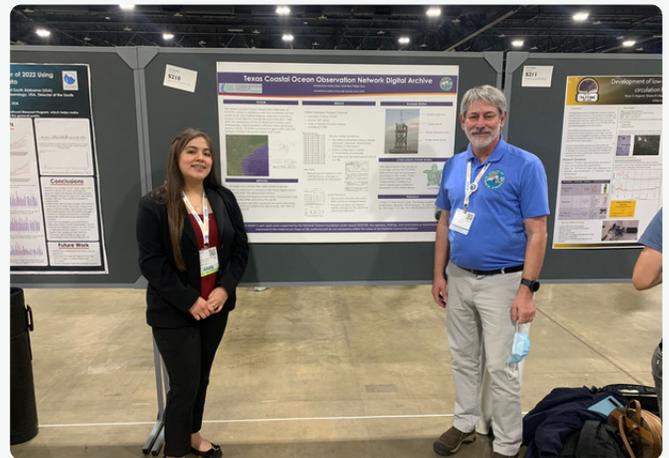
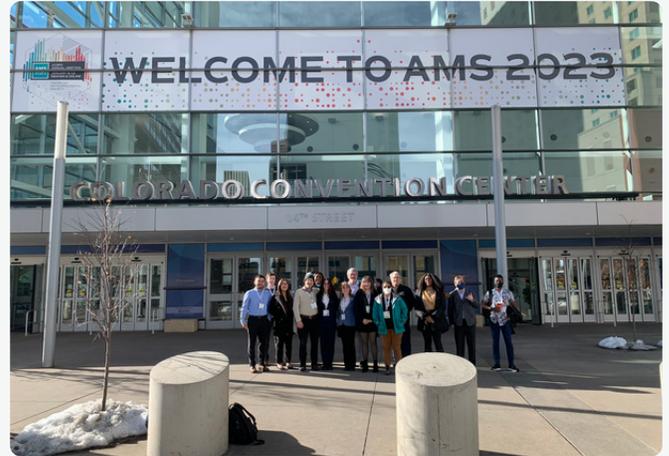


National Aquarium



Baltimore Inner Harbor

AMS 2023 Memory Lane





AMS 2024 AI2ES Sessions

Time	Room	Author(s)	Title	Abstract
Sunday, January 29				
6:30 PM - 8:30 PM	Hall E (Poster)	Eleanor Salm	Using Machine Learning Methods to Predict and Understand Severe Weather Over the United States	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/440476
Monday, January 30				
9:30 - 9:45 am	345/346	Dale Durran (NVIDIA)	Improving Deep Learning Weather Prediction Using the HEALPix Mesh	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436370
9:45 - 10:00 am	345/346	Bill Collins, Yair Cohen (NVIDIA),	Huge Ensembles (HENS) of Weather Extremes using the Fourier Forecasting Neural Network (FourCastNet)	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/431224
10:45- 11:00 AM	345/346	Amy McGovern	2A.1 - Update on the NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography (AI2ES)	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436440

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Time	Room	Author(s)	Title	Abstract
10:45- 11:00 AM	338	Ryan A. Lagerquist, D. D. Turner, J. Q. Stewart, and I. Ebert-Uphoff	Machine-Learned Uncertainty Quantification Is Not Magic: Lessons Learned from Emulating Radiative Transfer with ML	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436073
11:00 - 11:15 AM	345/346	David John Gagne	Using Machine Learning Methods to Predict and Understand Severe Weather Over the United States	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/440476
11:00 - 11:15 AM	338	Gabrielle Gantos	2B.2 - Evidential Deep Learning: Enhancing Predictive Uncertainty Estimation for Earth System Science Applications	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/439080
11:15 - 11:30 AM	338	Charlie Becker	2B.3 - Explaining the Sources of Uncertainty in Machine Learning Winter Precipitation-Type Predictions	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/439865
11:45 AM - 12:00 PM	338	Miranda White	Uncertainty Quantifications of the Onset and Offset of Cold-Stunning Events Using AI Ensemble Methods	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436611

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Time	Room	Author(s)	Title	Abstract
1:45 - 2:00 PM	345/346	Waylon Collins	Meteorological Interpretation of XAI Output Applied to a 3D Convolutional Neural Network Fog Prediction Model	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/434441
2:00 PM - 2:15 PM	329	Beto Estrada	AEROSOL Are NASA Land Information System (LIS) Data Useful for Predicting Dust Storms?	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/430231
3:00 - 3:40 PM	Hall E (ePoster)	David Hall (NVIDIA)	AI's Next Wave: Foundation Models, Generative Models, and Large Language Models for Weather and Climate Prediction	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/439403
3:00 - 4:30 pm	Hall E (Poster)	Jeff Adie (NVIDIA)	GAIA-Chem: A Global AI- Accelerated Atmospheric Chemistry Framework	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/433671
3:00 - 4:30 PM	Hall E (Poster)	Marina Vicens- Miquel	Empowering Coastal Resilience: A Multi-Layer Perceptron Approach for Subseasonal-to-Seasonal Sea Level Predictions in the Gulf of Mexico	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436008

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Time	Room	Author(s)	Title	Abstract
3:00 - 4:30 PM	Hall E (Poster)	Mona Hajiesmaeeli	Digital Elevation Model Generation using Highly Oblique Stereo Imagery via Structure from Motion in a Coastal Area	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/429752
3:00 - 4:30 PM	Hall E (Poster)	Katie Colburn	The Use of Oblique Imagery and Ground Elevation Surveys to Generate a Time Series of Wet/Dry Shoreline Elevations	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/429702
3:00 - 3:40 PM	Hall E (Poster)	Savannah Stephenson	Integrating Web Cameras into NOAA's Coastal Inundation Dashboard	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/434208
3:00 - 4:30 pm	Hall E (Poster)	Cliff Ehrke	Estimation of Wave Height from Standard Deviation of Water Level Measured by a Low-Cost Water Level Sensor	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/433763

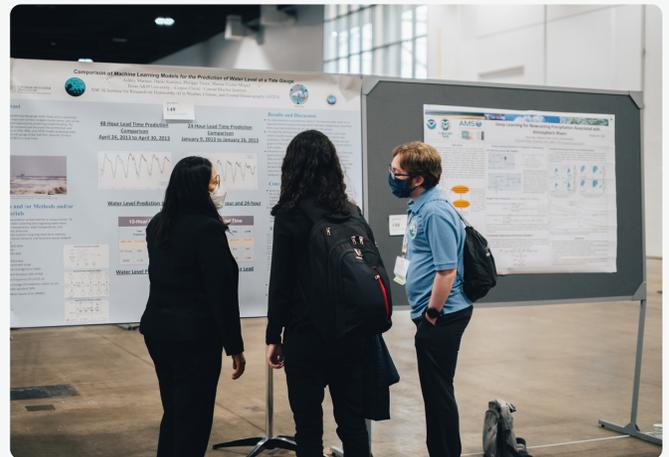
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Time	Room	Author(s)	Title	Abstract
4:30 - 5:00 PM	345/346	Imme Ebert-Uphoff, J. Q. Stewart, K. A. Hilburn, J. T. Radford, R. T. DeMaria, R. Chase, R. A. Lagerquist, C. White, Y. Lee, J. Apke, K. D. Musgrave, L. Ver Hoef, C. E. Kumler, M. S. Wandishin, J. Duda, I. Jankov, and D. D. Turner	A Research Agenda for the Evaluation of AI-Based Weather Forecasting Models (Core Science Keynote)	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436971
4:45 - 5:00 PM	338	Charles White, I. Ebert-Uphoff, J. M. Haynes, and Y. J. Noh	Super-Resolution of GOES-16 ABI Channels to a Common High Resolution with a Convolutional Neural Network	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/430972

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Time	Room	Author(s)	Title	Abstract
5:00 PM - 5:15 PM	345/346	Robert T. DeMaria, M. DeMaria, G. Chirokova, K. Musgrave, J. T. Radford, and I. Ebert-Uphoff	Evaluation of Tropical Cyclone Track and Intensity Forecasts from Purely ML-based Weather Prediction Models, Illustrated with FourCastNet	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436711
5:30 - 5:45 PM	345/346	Jaideep Pathak (NVIDIA)	Towards Comprehensive Evaluation of Data-Driven Numerical Weather Prediction Models	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/435878



Photos of AI2ES members attending the AMS 2023 Conference in Denver, CO.

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Time	Room	Author(s)	Title	Abstract
Tuesday, January 30				
8:30 - 8:45 AM	338	Brian Colburn	A Variational Autoencoder for Coastal Visibility Predictions: Architecture, Performance and R2X Potential	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/433933
12:15 - 1:15 PM	Holiday 6	<p>Speaker: Thomas M. Hamill, IBM/Weather Company, Boulder, CO.</p> <p>Organizer: Mike Eilts, Weather and Nature, LLC, Norman, OK.</p> <p>Panelists: Sergey Frolov, NOAA, Boulder, CO; Matthew Chantry, ECMWF, Reading, OXF, United kingdom;</p>	Town Hall Meeting - Forecasting Trends: The Balance between NWP and AI and How It Will Evolve in the Near or Distant Future	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Session/66096

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Time	Room	Author(s)	Title	Abstract
12:15 - 1:15 PM	Holiday 6	David M. Hall, NVIDIA, Boulder, CO and Imme Ebert-Uphoff, CIRA, Fort Collins, CO. Facilitator: Luke T. Peffers, Longmont, CO.	Town Hall Meeting - Forecasting Trends: The Balance between NWP and AI and How It Will Evolve in the Near or Distant Future (continued)	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Session/66096
3:00 - 4:30 PM	Hall E (Poster)	Chuyen Nguyen	Toward Prediction of Pyrocumulonimbus with Machine Learning	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/434484
3:00 - 4:30 PM	Hall E (Poster)	Andrew DeSimone and Anointiyae Beasley	Utilizing Neural Networks to Predict Water Temperatures in a Thermal Refuge	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/438719
3:00 - 4:30 PM	Hall E (Poster)	Evan Krell	Using Grouped Features to Improve Explainable AI Results for Atmospheric AI Models that use Gridded Spatial Data and Complex Machine Learning Techniques	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Session/66096

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Time	Room	Author(s)	Title	Abstract
3:00 - 4:30 PM	Hall E (Poster)	Marie McGraw, K. Haynes, K. D. Musgrave, I. Ebert-Uphoff, C. Slocum, and J. Knaff	Exploring Tropical Cyclone Structure and Evolution with AI-based Synthetic Passive Microwave Data	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/432633
4:30 - 4:45 PM	Johnson AB (First Floor, Hilton Baltimore Inner Harbor)	Amy McGovern	J8.1 - The Key Role of AI in the Future of Weather Forecasting	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/437297
4:30 - 4:45 PM	338	Philippe Tissot	An Update on Coastal Artificial Intelligence and the AI2ES NSF AI Institute	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/440240
4:45 - 5:00 PM	345/346 (The Baltimore Convention Center)	Bethany Earnest	Exploring the Role of Weather Forecasts in Predicting Wildfire Occurrence for CONUS Using the Unet3+ Deep Learning Model	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/433338
5:00 - 5:15 PM	338	Marina Vicens-Miquel	Performance and Comparison of Seq2Seq and Transformer Model Architectures for the Prediction of Water Levels from Hours to Days	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436055

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Time	Room	Author(s)	Title	Abstract
5:30 - 5:45 PM	338	Jacob Alonzo and Elisa Flores	Machine Learning Water Level Predictions for an Intermediate Location Using Connected Bodies of Water	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/438712
5:45 - 6:00 PM	338	Lindsay Abrams	AI for Quality Control of Water Level Observations	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/429579
5:45 - 6:00 PM	Johnson AB	Hamid Kamangir	FogNet-V2: Multi-view Tensorized Transformer for Coastal Fog Forecasting	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/431416
Wednesday, January 31				
8:30 - 8:45 AM	345/346	Maria Molina	9A.1 - When machine learning objectives compete for improved subseasonal bias correction, who wins?	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/440143
11:15 - 11:30 PM	338	Carly Sutter	J10B.3 - Improving Generalizability of Road Condition Classification Models for Department of Transportation Camera Images	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/438154

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Time	Room	Author(s)	Title	Abstract
11:15 - 11:30 PM	345/346	Maria Madsen	10A.3 - A Deep Learning Approach to Severe Weather Subseasonal Forecasting over the United States	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/439218
11:30 - 11:45 PM	338	Chris Wirz	J10B.4 - NWS Forecaster Perceptions of New AI Guidance for Coastal Fog Prediction	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/437150
11:45 - 12:00 PM	338	Mariana Cains	J10B.5 Forecaster Perceptions of Trustworthiness, Explainability, and Interpretability in the Context of AI-Derived Guidance	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/432425
2:00 - 2:15 PM	345/346	D. Aaron Evans	11A.2 - Predicting Forecast Error of Numerical Weather Prediction Models using an LSTM	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436416
2:30 - 2:45 PM	338	Waylon Collins	The Utility of Domain Knowledge When Developing Deep Learning Models to Predict Coastal Fog	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/434354

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Time	Room	Author(s)	Title	Abstract
3:00 - 4:30 PM	Hall E (Poster)	Hector Marrero-Colominas	Estimating Uncertainty of Water Temperature Predictions for Cold-Stunning Events in the Laguna Madre	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/433139
Thursday, February 1				
8:30 - 10:00 AM	308	Amy McGovern, Maria Molina. Robin Tanamachi, J. S. Perez-Carrasquilla	Joint Panel Discussion J13 - Using AI Creatively In the Classroom: Lessons Learned	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Session/67137
9:00 - 9:15 AM	338	Kristina Moen, N. J. Mitchell, Y. Lee, L. Ver Hoef, E. J. King, I. Ebert-Uphoff, K. A. Hilburn, and W. Line	Exploring Texture Analysis to Aid Classification of Meteorological Phenomena in Satellite Imagery	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/434656

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Time	Room	Author(s)	Title	Abstract
9:45 - 10:00 AM	327	Jacob T. Radford, I. Ebert-Uphoff, J. Q. Stewart, R. T. DeMaria, T. Wilson, J. L. Demuth, M. S. Wandishin, J. Duda, A. McGovern, C. D. Wirz, and M. G. Cains	Visualizing Data-Driven AI Models to Engage Operational Forecasters	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/437407
2:00 - 2:15 PM	338	Jay Rothenberger, Eric Gritmit, Martin Murphy, Robinson Wallace	Explaining the Role of Lightning Data in Hail Nowcasting	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/437201
2:15 - 2:30 PM	316	Lynn Montogomert, John Stone(NVIDIA), Tom Kaye (NVIDIA)	AI-Based Earth and Space Observing Digital Twin Prototype	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/432894

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Time	Room	Author(s)	Title	Abstract
2:30 - 2:45 PM	327	Ashley Williamson (The Weather Company)	J15C.4 - Using AI Generated Fronts to Improve Forecasting Efficiency	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/438877
3:00 PM - 4:30 PM	Hall E (Poster)	Jarett Woodall	Exploring Cross-Validation Techniques for ML Predictions of Rare Cold-Stunning Events	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436577
4:30 - 4:45 PM	327	David John Gagne	J16C.1 - Lessons Learned from Building Real-Time Machine Learning Testbeds for AI2ES	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/439848
5:00 - 5:15 PM	327	Andrew Justin	J16C.3 - An Improved Deep Learning Algorithm for Operational Detection of Frontal Boundaries	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/440124
5:00 - 5:15 PM	338	Melissa Wilson Reyes	16B.3 - Generalized Visibility Estimation from Camera Images Using Deep Learning	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/439749

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Time	Room	Author(s)	Title	Abstract
5:15 - 5:30 PM	327	Matthew Kastl	Semi-Automating Research-to-Operation of AI Models with Python	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/434255
5:30-5:45 pm	345/346	Noah Brenowitz (NVIDIA)	Regional Down-Scaling with Generative Diffusion Models	https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/439937

Session Highlights

Dr. Amy McGovern, Principal Investigator of the NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography (AI2ES) will be presenting updates on recent achievements in research, broader impacts, and workforce development from Year 3 of the program. These updates include, but are not limited to: foundation work in AI, coastal oceanography, risk communication, and weather and climate; forecaster trust in AI; and educational outreach

1. Amy McGovern, 2A.1 - Update on the NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography (AI2ES), <https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436440>

Dr. Noah Brenowitz from NVIDIA will be presenting research on the development of large generative diffusion models trained with regional analysis data from the Central Weather Bureau of Taiwan to provide high-resolution forecasts and atmospheric states. This research aims to produce an efficient and computationally cheaper alternative to traditional physics-based regional models in producing high-resolution weather forecasts.

1. Noah Brenowitz (NVIDIA), Regional Down-Scaling with Generative Diffusion Models, <https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/439937>

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Session Highlights (continued)

AI-based models for global weather forecasting have been in the news recently for their potential to improve weather forecasting. However, these models have not yet been rigorously evaluated by the meteorological community. Many questions remain, such as: Do they represent meteorological features well, such as tropical cyclones? What is the value of these models to forecasters? What are the failure modes of these AI-based models? AI2ES researchers from CSU and NOAA (utilizing funding from other sources) touch on many of these questions in the following AMS activities:

1. Imme Ebert-Uphoff, J. Q. Stewart, K. A. Hilburn, J. T. Radford, R. T. DeMaria, R. Chase, R. A. Lagerquist, C. White, Y. Lee, J. Apke, K. D. Musgrave, L. Ver Hoef, C. E. Kumler, M. S. Wandishin, J. Duda, I. Jankov, and D. D. Turner, A Research Agenda for the Evaluation of AI-Based Weather Forecasting Models (Core Science Keynote)
 - a. <https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436971>
2. Jacob T. Radford, I. Ebert-Uphoff, J. Q. Stewart, R. T. DeMaria, T. Wilson, J. L. Demuth, M. S. Wandishin, J. Duda, A. McGovern, C. D. Wirz, and M. G. Cains, Visualizing Data-Driven AI Models to Engage Operational Forecasters
 - a. <https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/437407>
3. Robert T. DeMaria, M. DeMaria, G. Chirokova, K. Musgrave, J. T. Radford, and I. Ebert-Uphoff, Evaluation of Tropical Cyclone Track and Intensity Forecasts from Purely ML-based Weather Prediction Models, Illustrated with FourCastNet
 - a. <https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/436711>
4. Thomas M. Hamill, IBM/Weather Company, Boulder, CO. Organizer: Mike Eilts, Weather and Nature, LLC, Norman, OK. Panelists: Sergey Frolov, NOAA, Boulder, CO; Matthew Chantry, ECMWF, Reading, OXF, United kingdom; David M. Hall, NVIDIA, Boulder, CO and Imme Ebert-Uphoff, CIRA, Fort Collins, CO. Facilitator: Luke T. Peffers, Longmont, CO. Town Hall Meeting - Forecasting Trends: The Balance between NWP and AI and How It Will Evolve in the Near or Distant Future
 - a. <https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Session/66096>

Each year, AI2ES continues to grow its presence at AMS conferences. In 2022, AI2ES presented 33 presentations and one panel in Houston, Texas and in 2023, AI2ES gave 40 presentations and one panel in Denver, Colorado. At AMS 2024 in Baltimore, Maryland, AI2ES will be presenting 55 presentations, posters, and panels from senior personnel, undergraduate and graduate students, and industry partners.



Upcoming Risk Communication Workshop

On February 5, 2024, the National Academies of Science, Engineering, and Medicine will be facilitating a workshop on “Advancing Risk Communication with Decision-Makers for Extreme Tropical Cyclones: Learning from Extreme and Unprecedented Weather Events” chaired by Dr. Ann Bostrom. According to their website, “The goal of the workshop is to identify opportunities and challenges for communicating about extreme tropical cyclones as well as lessons that can be drawn from community engagement and communication concerning other extreme weather events. The workshop will be designed to include a variety of perspectives across stages of the communication and decision process.” For more information about this workshop, visit the National Academies of Science, Engineering, and Medicine’s [event page](#).



Ann Bostrom

References

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- https://www.baltimorecity.gov/sites/default/files/5_History.pdf
- <https://www.ametsoc.org/index.cfm/ams/about-ams/ams-history/history-of-the-house-at-45-beacon-street/>
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To know more about the 2024 AMS Annual Meeting, visit

<https://annual.ametsoc.org/index.cfm/2024/>

To learn more about AI2ES, visit <https://www.ai2es.org/>