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, Mel Wilson, and Jennifer Warrillow

February 2024 Edition

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AI2ES @ AMS Day

Sunday, January 28th, kicked off AI2ES's presence at the 104th American Meteorological Society Annual Meeting with the AI2ES @ AMS annual gathering. This event gathered 90 in-person and 8 virtual attendees, members of AI2ES, partners and collaborators, including ExpandAI colleagues, and people interested in learning about AI2ES's work. AI2ES @ AMS was hybrid, allowing participants to engage online for those who were not in Baltimore.

AI2ES @ AMS started with a welcoming address by Dr. Amy McGovern who set the stage for the day's activities. First on the agenda was a networking activity organized and conducted by Michael Yu, William McGovern-Fagg, and Hector Marrero-Colominas. This activity, which was teased in our previous newsletter, had each table or online group of participants use a photo of an AI2ES member to remix it using AI. Tables uploaded their assigned photo to one of the provided programs to face swap the assigned person in their group with a character of their choosing. Then, tables competed against each other in a quiz to see how many of the AI face swapped photos they could recognize. You can see some of the creative pictures created during the contest, well done! At the end of the activity, table 11 won and all received an AI2ES trophy. The winning table included Eleanor Salm (University of Wisconsin-Madison), Chris Wirz (NCAR), Marina Vicens-Miquel (TAMU-CC), Kate Musgrave (CIRA/CSU), Martin Murphy (Vaisala/Xweather), Aaron Hill (University of Oklahoma), Kylie Hoffman (UMBC), Da Fan (Penn State), and Abdullah Bdeir (TAMU-CC).
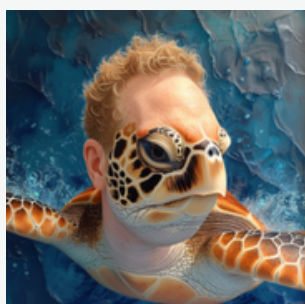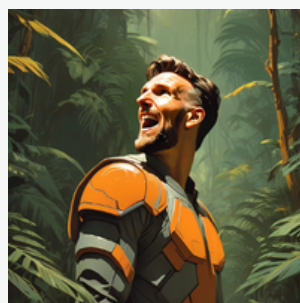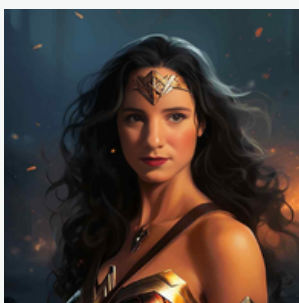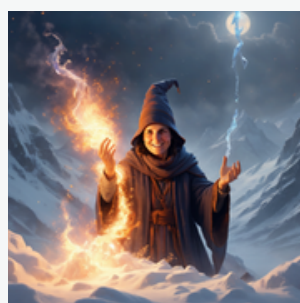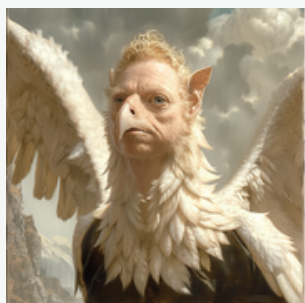
The remainder of the morning consisted of presentations from our two new Expand AI Partners and early career lightning talks. Drs. Jason Liu and Samuel Shen of Florida International University and San Diego State University introduced their research and activities in the new Expand AI Partner grants with AI2ES. These partnerships, which were highlighted in the October and November AI2ES newsletters, increase AI2ES's foundational AI research with expanded research foci and broadening participation in STEM education and workforce development. The early career lightning talks included a group of AI2ES members from various universities and institutions of AI2ES who briefly shared their research with AI2ES @ AMS participants. Presenters had approximately five minutes to quickly explain their research and how it pertains to AI2ES. Speakers of the early career lightning talks included:

- Marina Vicens-Miquel, Texas A&M University-Corpus Christi: Machine Learning for Coastal Inundation
- Dongsheng Luo, FIU: Explainable Deep Learning for Time Series Analysis
- Yoonjin Lee, CIRA/CSU: Retrieval of boundary layer precipitable water from GOES ABI using machine learning techniques
- Maria Madsen, The University of Oklahoma: Elevating Collaboration: Insights from ECMWF Research Visit
- Ryan Lagerquist, CIRA / NOAA GSL: Machine-learned uncertainty quantification is not magic: Lessons learned from emulating radiative transfer with ML
- Chris Wirz, NSF NCAR: Advancing theory and development within AI2ES: Moving toward cross-cutting research

Dongsheng Luo giving a lightning talk presentation at AI2ES @ AMS day

Top (left to right): Drs. Jason Liu, Ryan Lagerquist and Chris Wirz giving lightning talk presentations at AI2ES @ AMS day
Bottom (left to right): Marina Vicens-Miquel, Yoonjin Lee and Dr. Samuel Chen giving lightning talk presentations at AI2ES @ AMS day

After group photos and a quick break, a group of private industry partners and AI2ES members gathered at various tables to showcase their research to participants. Participants moved from table to table in an exhibition of AI2ES projects to learn more about the work being conducted across the organization. The exhibition style of presentations allowed speakers and participants to interact on a more personal level to be able to see research products up close and ask questions directly. The showcase highlighted seven different research products of AI2ES from different universities, institutions and private industry partners:

- Yeji Choi, SI Analytics Weather Intelligence Platform: OVISION earth!
- Jacob Radford: Visualizing Pure AI Weather Prediction Models
- Sam Shen, San Diego State Univ: Data Visualization by 4DVD and XSLICE
- David Hall, NVIDIA: NVIDIA Earth2 Updates
- Matthew Kastl, TAMU-CC: CBI Semaphore — A software to speed up R2O for Environmental AI models
- Miranda White, TAMU-CC: CBI Operational Cold Stunning Event Predictions
- David John Gagne, NCAR: MILES Machine Learning Software Tools

The afternoon sessions of AI2ES @ AMS consisted of table centered discussions on (1) how AI2ES can improve in the years to come and (2) possible blue-sky ideas for years six through ten if the grant is to be renewed. The first panel/roundtable discussion had each table talking individually on AI2ES collaborations, how the partners work together, and what could possibly be improved. Time permitting please review and further contribute to the meeting's notes (email us if you need the link). Each participant was given the opportunity to share their ideas and opinions. A spokesperson for every group then came to the front of the room to share a synopsis of their table's feedback and ideas. The second table discussion focused on ideas for years six through ten. Participants individually reflected on each question silently and then came together as a group to discuss ideas and improvements for the next phase of AI2ES. These questions and ideas had participants think about their dream collaborators, ideal research questions, and what they would like to get out of AI2ES in the years to come. AI2ES @ AMS concluded with a group dinner at the Rusty Scupper in Baltimore. AI2ES @ AMS participants shared good food and great conversations with each other while overlooking Baltimore's moonlit harbor.

Finally a big thank you to Michael Yu, William McGovern-Fagg, and Hector Marrero-Colominas for organizing the day's first activity and for taking care of the communication technology throughout the day. And a big thank you to Susan Dubbs for all the organization of the day and the Conrad Blucher Institute for sponsoring the evening's dinner.

The Rusty Scupper ready for the evening (thank you Douglas Rao
for the picture) and Dr. Philippe Tissot welcoming AI2ES and
invitees to the evening at an the Rusty Scupper.
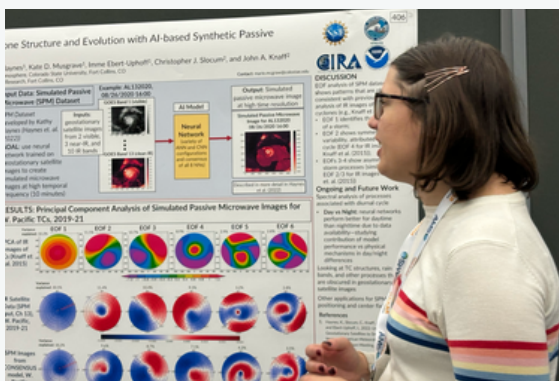
Presentations and Posters

AI2ES had 56 presentations with 42 oral presentations and 14 posters given by our members, collaborators, and industry partners. Our presence at AMS continues to grow each year. In 2023 AI2ES gave 40 presentations and posters and in 2022 AI2ES gave 33 presentations and posters. This year's sessions included talks from Dr. Amy McGovern, who gave an update on AI2ES's accomplishments, and Dr. Imme Ebhert-Uphoff, who was a core science keynote speaker. Many AI2ES undergraduate and graduate students showed off their research in the poster sessions throughout the week for attendees to walk by and ask questions about their research. The poster sessions allow for students and researchers to give quick summaries of their research with organized visuals and have time for questions one-on-one with their audience. Poster sessions also serve as a great networking opportunity for researchers to meet other scientists, share ideas, and form potential collaborations.
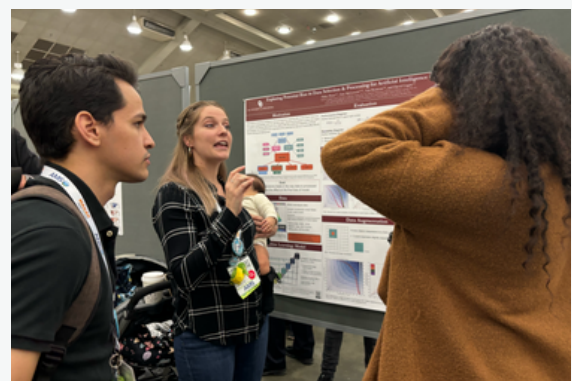

Dr. Imme Ebert-Uphoff giving a science keynote presentation at AMS

Dr. Imme Ebert-Uphoff giving a science keynote presentation at AMS

Marie McGraw giving a poster presentation at AMS

Haley Perez giving a poster presentation at AMS

Baltimore Memories

During some downtime during the conference, Jayne-Marie Linguist, Anointiyae Beasley, and Elisa Flores traveled to the Edgar Allan Poe House and gravesite. The house and gravesite reside near the University of Maryland, Baltimore about a 15-minute walk from each other. Edgar Allan Poe lived at his house in Baltimore for only a couple of years in the 1830s with his aunt Maria Poe Clemm, grandmother Elizabeth Cairnes Poe, and cousin Virginia Clemm, who would eventually become his wife. Although Poe lived in Baltimore for a short time, Poe Baltimore, the organization that oversees the Edgar Allan Poe House, emphasizes the importance of Baltimore in Poe's early career as a writer and his mysterious death. At the Edgar Allan Poe House Jayne-Marie, Anointiyae, and Elisa learned about Poe's life in and out of Baltimore, the house that he lived in, and the works he wrote while living in Baltimore. The Edgar Allan Poe House gave the group a glimpse into what Poe's life would have been like in 19th century Baltimore with steep fragile staircases, tiny rooms, and an ambience rich with history.

After visiting the house Jayne-Marie, Anointiyae, and Elisa made their way to the Westminster Presbyterian Church where Edgar Allan Poe, Virginia Clemm Poe, and Maria Poe Clemm are buried. When Edgar Allan Poe was 40 years old he mysteriously died in the streets of Baltimore, the circumstances of which are still debated today by scholars and Poe enthusiasts. Poe was originally buried near the back of the cemetery before being moved to a place of honor where he rests today with his wife and mother-in-law. The cemetery includes grave markings for Poe's original burial spot and the honorific monument with placards of information on his life and legacy.

Plaque at Edgar Allan Poe House

Edgar Allan Poe gravesite markers

AMS AI Conference Student Award Winners

Every year, the AMS AI conference chooses first, second, and third place award winners from student talks and posters. This year, the conference judged from a total of 33 oral presentations and 29 posters. Out of the six winners from both categories, three AI2ES members placed for oral presentations and posters. These AI2ES student researchers were Miranda White, a PhD student at TAMU-CC, who placed first in oral presentations; Michael Yu, an undergraduate student at the University of Oklahoma, who placed first in the poster competition; and Hector Marrero-Colominas, an undergraduate student from Del Mar College, who placed third in poster presentations. Thank you to Dr. Maria Molina (University of Maryland) and all the judges who made the contest possible.

| Place	Name	School	Title
Oral Presentations			
1st Place	Miranda White	Texas A&M University-Corpus Christi	<u>Uncertainty Quantifications of the Onset and Offset of Cold-Stunning Events Using AI Ensemble Methods</u>
Poster Presentations			
1st Place	Michael Yu	University of Oklahoma	<u>Improving the Sharpness of Deep Learning Generated Weather Predictions</u>
3rd Place	Hector Marrero-Colominas	Texas A&M University-Corpus Christi	<u>Estimating Uncertainty of Water Temperature Predictions for Cold-Stunning Events in the Laguna Madre</u>

Miranda White presenting her research.
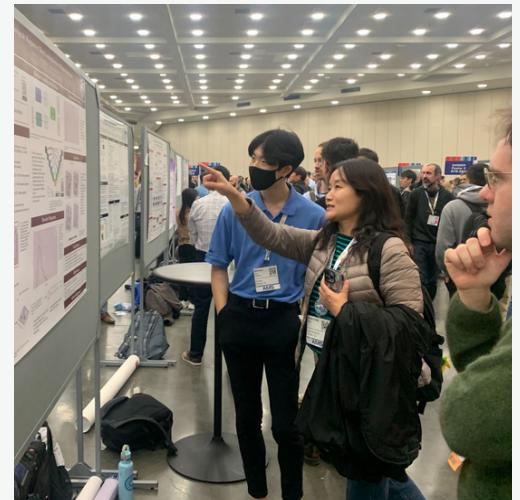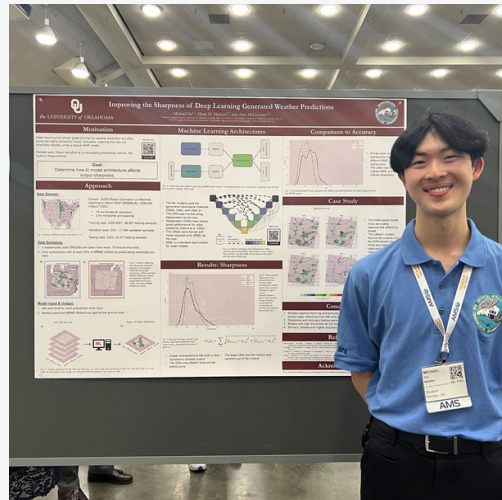
Michael Yu presenting his research.
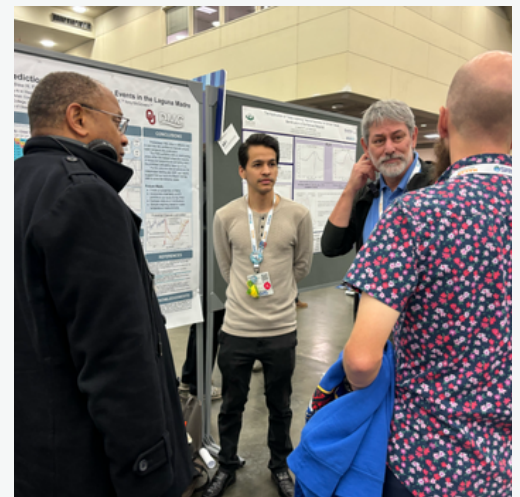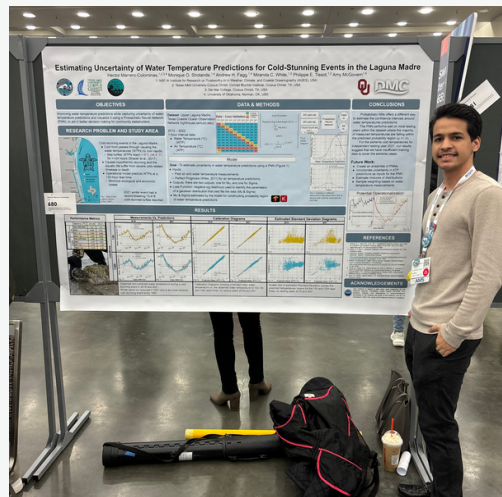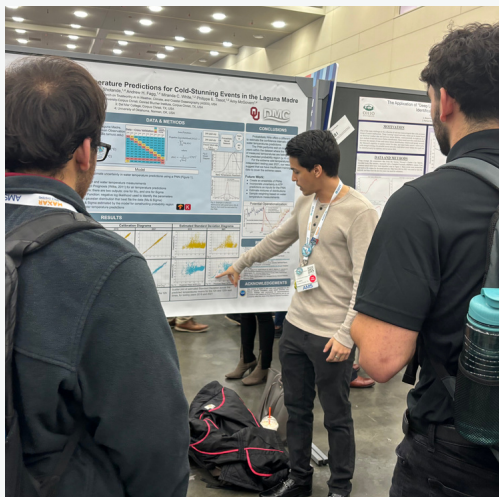
Hector Marrero-Colominas presenting his research.

We finish this newsletter by sharing our deepest gratitude to Drs. Christina Kumler, Aaron Hill, and Kyle Hilburn, as well as all the volunteers who made possible the 23rd Conference on Artificial Intelligence for Environmental Science. This was a huge endeavor and we all enjoyed it immensely. Thank you!!!
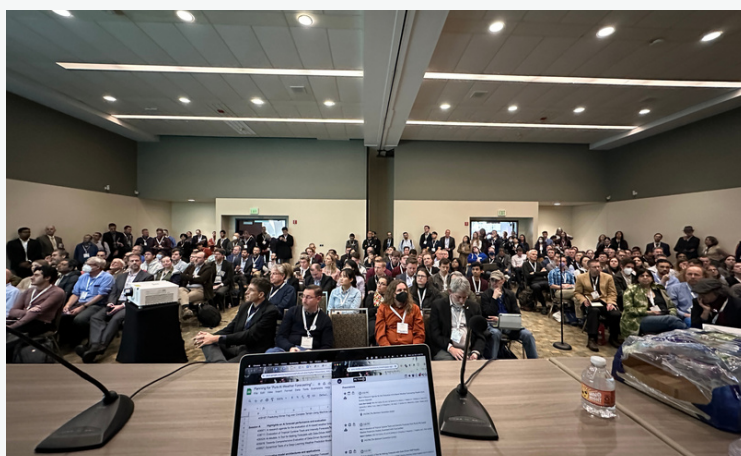
Check out the AI2ES Google Photos folder and see many other pictures from AI2ES day at AMS and AI2ES scientists during the AMS annual meeting: https://bit.ly/ai2esams24