

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 Raven Reese, Dr. Amy McGovern, and Jennifer Warrillow

April 2023 Edition



Dr. Marie McGraw and Dr. Randy Chase on the AI2ES Postdoc panel (AI2ES @ AMS)

## Past AI2ES Postdocs

This month's edition of the AI2ES Newsletter is dedicated to the postdoctoral researchers who have worked with AI2ES. Whether they were hired by a private company or remain in academia, these scientists began as postdocs in their fields at AI2ES. Some of them, like those in this month's AI2ES Spotlight, traveled across the globe to share their research on behalf of NSF. Thank you to Dr. Randy Chase, Dr. Lauriana Gaudet, and Dr. Marie McGraw for sharing your experiences with us; we are very happy to keep in touch, and we look forward to sharing your future successes!

## Table of Contents

Past AI2ES Postdocs	1
Dr. Randy Chase	2
Dr. Lauriana Gaudet	3
AI2ES Spotlight	4
AI2ES "Intern"-active Map	5
Working Groups	5
Q&A	5



## **Dr. Randy Chase, PhD**

*Research Scientist I  
CIRA at CSU*

Dr. Randy Chase graduated from the University of Illinois Urbana-Champaign with a PhD in Atmospheric Science. Dr. Chase began at AI2ES in January 2021, when he started creating machine learning tutorials for operational meteorologists. “The tutorial projects were something I could start with while getting up to speed on the vast machine learning literature. The first tutorial is published and the second has just minor reviews left to address before being published,” he reported. Dr. Chase worked on a variety of machine learning projects while at AI2ES, including the development of ML tools for convective weather systems, explaining, “This culminated in a project where I built a machine learning model to estimate vertical velocity from radar data alone.” However, as all things do, his two years as a postdoctoral researcher passed quickly, leading Dr. Chase to new opportunities outside AI2ES.

Dr. Chase transitioned to the position of Research Scientist I at the Cooperative Institute for Research in the Atmosphere (CIRA) in Colorado State University (CSU) earlier this year. Under his new title as Global Cloud Retrieval Scientist, he spends “50% of my time on a project named OVERCAST, where we are working to make a realtime global 3D cloud product.” Dr. Chase also works in collaboration with his CIRA team on a new NASA mission named Investigation of Convective Updrafts (INCUS), where he aims to measure the convective mass flux of storms using data from across the world. In this new research position, Dr. Chase combines the knowledge gained through his PhD program and new ML skills obtained through his time at AI2ES. “Learning the latest machine learning methods directly alongside other researchers was an amazing resource,” provided to him by AI2ES, he explained. The main difference between his work there and the new projects he tackles at CIRA lies in the scale at which he operates. For his two current projects, Dr. Chase is a part of large teams working on a single cumulative goal, while AI2ES is more of small teams each focusing on specialized goals/tasks. This transition from AI2ES allowed Dr. Chase to master new ML tools that are now necessary for his work on large teams, better preparing him for new innovative projects such as the one initiated by NASA at CIRA.

Since leaving AI2ES, Dr. Chase’s career plans shifted with the opportunities available to him. “With my experience at AI2ES, I feel well positioned to take my skills to the private sector if I want to leave academia,” he said. Though he still works with CIRA at CSU, there are many pathways into industry not possible without the experience gained at AI2ES. For postdoctoral researchers nearing the end of their two-year term who are interested in remaining in academia, Dr. Chase recommends forming strong bonds with the AI2ES leaders and students around them. “The AI2ES group is truly unique in its blend of academics, private sector, and government scientists. Having connections in all sectors will only help you as you progress in this community.” Dr. Chase was a crucial member of the AI2ES convective ML team, and we are glad to see him remain close to many members through the CIRA research lab at CSU.



## **Dr. Lauriana Gaudet, PhD**

*Meteorological Scientist*

*The Weather Company, an IBM Business*

On the East Coast, Dr. Lauriana Gaudet is a former member of AI2ES who worked in Dr. Kara Sulia’s lab at the University at Albany. She also began with AI2ES as a postdoctoral researcher, earning her PhD in Atmospheric Science from UAlbany in 2021 and joining Dr. Sulia soon after. At AI2ES, the focus of her work shifted to analyzing and verifying numerical weather prediction model surface forecasts using meteorological surface-based observations from the New York State Mesonet (NYSM). As covered by the February edition of the AI2ES Newsletter, her analysis of numerical prediction models such as GFS, NAM, and HRRR helped to develop machine learning models to predict expected forecast errors using data from NYSM stations across the state. “Before leaving AI2ES, I created a forecast verification database for the GFS, NAM, and HRRR spanning 2018–2021,” she explained. Dr. Gaudet’s work is essential to the team under Dr. Sulia at the Atmospheric Sciences Research Center, and her research project has been passed on to PhD student Aaron Evans at UAlbany.

Though her pathway into AI2ES is somewhat similar to Dr. Randy Chase, Dr. Gaudet was hesitant to remain in academia after the completion of her PhD. “I was unsure if I wanted to stay in academia after graduation, as my primary post-grad career goal was to work in private industry,” she said. However, the appeal of new machine learning tools led Dr. Gaudet to view the postdoc position at AI2ES as “an incredible opportunity to learn how machine learning can be applied to atmospheric sciences data while being connected to experts” across several fields in STEM. After her time at AI2ES, Dr. Gaudet knew she was more than prepared to emerge into industry with a skill set unparalleled by many other researchers in the atmospheric sciences. “As I was wrapping up my AI2ES research, I felt incredibly grateful to have learned many new skills with the support of my research group and the broader AI2ES organization,” Dr. Gaudet stated.

Dr. Gaudet now works for The Weather Company, an IBM Business, as a Meteorological Scientist specializing in Forecast Sciences. She works across a variety of projects, including forecast verification for both consumers and customers of The Weather Company’s forecast products, leading the development of science-based weather-impact consumer insights, and supporting forecast improvement through research to operations efforts for her team at IBM. Though her research is similar to the projects developed under Dr. Sulia, Gaudet now works under the fast-paced pressure of an industry with high stakes and consumer investment in an operational end-product. In this environment, Dr. Gaudet emphasizes the need for people to remain engaged and ready to learn new skills when needed. “Like me, you may be scared to fail at something that is new to you, but with the mentorship of people who were once in your shoes, you may find yourself running toward exciting opportunities instead of shying away.” Dr. Gaudet’s postdoctoral experience provided the necessary mentorship that guided her to a fruitful career with IBM, and we are excited to watch her progress in the meteorological sciences as a close industry partner to AI2ES.





## AI2ES Spotlight

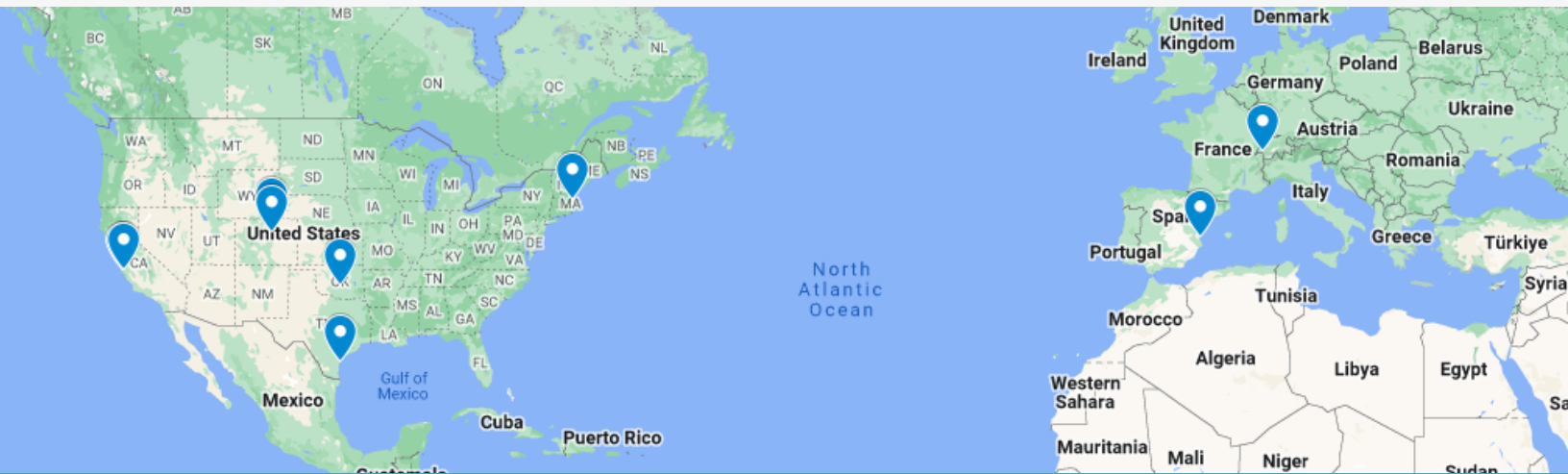
This month's spotlight shines on AI2ES member Dr. Marie McGraw, Research Scientist I at the Cooperative Institute for Research in the Atmosphere (CIRA) in Fort Collins, CO. Dr. McGraw began her journey with AI2ES about two years ago as she finished her postdoctoral position at the University of Washington in Seattle. By the end of postdoc, she knew that she wanted to return to Colorado; luckily, AI2ES Co-PI Dr. Imme Ebert-Uphoff opened a position at Colorado State University's CIRA lab just as her time at UW ended. "I was always on the edge of diving into machine learning, but never quite got there," Dr. McGraw said. When Dr. McGraw discovered this opportunity to work with AI2ES, she knew "this job will take me all in." She now works primarily with ML, hurricanes, and tropical weather across several research projects, one of which recently brought her to the University of Lausanne in Switzerland.

The chance to travel internationally is an opportunity that AI2ES encouraged for Dr. McGraw. After a two-year suspension on international travel by NSF, AI2ES leaders began looking for projects where U.S.-based scientists would meet and work with people overseas last year. Dr. McGraw jumped at the call for proposals by contacting Professor Tom Beucler at the University of Lausanne through their prior connection. "I kind of cold-emailed him, which is very out-of-character for me!" This gamble paid off last summer, when the pair's proposal was funded and travel arrangements were prepared. Dr. McGraw left for Switzerland in February of 2023 for her two-month visit, during which she and Prof. Beucler began their work with physics-based AI models. Their goal was to use prior knowledge of physics to constrain an AI model created to predict the intensity of extreme hurricane weather.

In searching for new paths to working with ML, Dr. McGraw discovered a whole new plane of research while nestled among the snowy Swiss mountains. "I was in the Institute of Earth System Dynamics, and most of the scientists in that group are geologists or hydrologists," she explained. In Colorado, the majority of scientists in her CIRA office were atmospheric scientists, so she was excited to hear what the Swiss students and postdocs were working on in parallel with her research. Prof. Beucler also offered Dr. McGraw the opportunity to discuss their research on tropical meteorology for the United Nations AI For Good online [seminar series](#). This two-month trip to Lausanne is an experience that Dr. McGraw did not anticipate, but one that she encourages any interested member of AI2ES to leap at when available. "The most useful thing you can do is tell your supervisor, tell your friends, mention it to your committee that 'Hey, I'm interested in this opportunity!'" she advises. It may not pay off I, but all it takes in one person, such as Professor Beucler or Dr. Ebert-Uphoff, to launch a researcher to places never imagined before AI2ES. And if you aren't already, Dr. McGraw reminds you to read your email!



## AI2ES "Intern"-active Map



The AI2ES "Intern"-active Map is a new tool created to share where members of AI2ES will travel this year for research! Simply add a marker to your destination, title the marker with your name/ AI2ES affiliation, and in the description, let everyone know:

- place of origin
  - destination of trip
  - internship/REU/research opportunity you will be attending
- Take a moment to look at the different places AI2ES will reach this year!

## Working Groups

We will be highlighting reports from different working groups in future newsletters. For this newsletter, we highlight two groups and list all the groups. If you are interested in joining one of the groups, please contact Susan Dubbs ([susan.dubbs@ou.edu](mailto:susan.dubbs@ou.edu)).

### Learning Journeys

The 2023 Summer School Group is creating an online series of learning journeys, or paths, that one can take to learn more about specific topics on AI and trust and their applications for environmental sciences. This will all be available online for asynchronous learning. If you are interested in joining this effort, contact Amy McGovern [amcgovern@ou.edu](mailto:amcgovern@ou.edu)

### AI2ES @ AMS

The initial AI2ES @ AMS was a huge hit! We are going to meet again at the American Meteorological Association (AMS) 2024 meeting. This one will be a mixture of a science day and a networking day, and we need help organizing and ensuring we are meeting the needs of all participants in AI2ES! Please contact Amy McGovern [amcgovern@ou.edu](mailto:amcgovern@ou.edu) to help with this fabulous event! **This group is in need of more participants!**

Active Working Groups at AI2ES: AI2ES @ AMS 2024, R2O, Learning Journeys, and Forecast Sharpness, winter precipitation type, winter camera visibility, tropical cyclones, convective weather, S2S predictions, robust AI, ethical and responsible AI, fog prediction, sea turtle predictions, harmful algal blooms, visualizing uncertainty, risk communication and more!  
New working groups are planned for the fall, so check next month's newsletter for further updates!

## Q&A

If you could travel anywhere for a research project, where would you go and why?

Submit answers, resources, and questions for next month in the AI2ES Slack #general channel!