

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

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Dr. Amy McGovern, and Jennifer Warrillow

## August 2023 Edition

### Risk Communication Team



Dr. Julie Demuth



Dr. Ann Bostrom



Dr. Mariana Cains



Dr. Christopher  
Wirz



Dr. Jacob Radford



Ms. Miranda  
White

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## Risk Communication

This month, the AI2ES newsletter highlights our Risk Communication team. This team consists of researchers from the National Center for Atmospheric Research (NCAR), the University of Washington (UW), the Cooperative Institute for Research in the Atmosphere (CIRA), and Texas A&M University-Corpus Christi (TAMU-CC). The team is co-led by Dr. Julie Demuth, a Research Scientist at NCAR focusing on atmospheric science and communications, and Dr. Ann Bostrom, Weyerhaeuser Endowed Professor in Environmental Policy at UW with a background in behavioral decision making, risk perception, and risk communication. The rest of the team includes Drs. Christopher Wirz, Jacob Radford, Mariana Cains, and Ms. Miranda White. Dr. Wirz is a Research Scientist and former postdoctoral researcher at NCAR and AI2ES; his research focuses on science and risk communication related to weather and AI. Dr. Radford is a Data Visualization Researcher with AI2ES at CIRA. His research includes risk communication, atmospheric sciences, forecasters, and figuring out ways to communicate about AI and visualize output of AI models. Dr. Cains is a Research Scientist and former postdoctoral researcher at NCAR and AI2ES along with Dr. Wirz. Dr. Cains focuses on environmental risk analysis (assessment, management, communication), social vulnerability, and how information becomes useful to decision makers. Ms. White is a Coastal and Marine System Science Ph.D. student under the supervision of Drs. Philippe Tissot and Scott King at TAMU-CC. Her research is very convergent. She focuses on risk communication, AI, coastal science, and stakeholder interactions to assess the trustworthiness of a new AI ensemble model that she is designing with her team to better inform stakeholders ahead of cold-stunning events in the Laguna Madre, TX.

We asked members of the Risk Communication Team about their work at AI2ES, how risk communication benefits scientific research, AI, and how they see the field evolving.

### **How does risk communication play a role in research? And in t AI2ES?**

Risk communication has become an integral part of AI2ES and scientific research overall. When it comes to artificial intelligence (AI), Dr. Demuth emphasized that information like AI is a source of risk information for a lot of users. These users are expert professionals, who in their day-to-day work, are making decisions for the general public to protect their lives and property from harm. The users AI2ES is currently working with include National Weather Service and IBM forecasters. These users are using AI as a "source of information to determine whether that hazard will occur, how bad it will be, when it will occur, and the kinds of impacts," Dr. Demuth said. She added, "When you start to frame AI as a source of risk information, that lets us draw on risk analysis as a whole and start to really think about what we know about tech and the role of value and beliefs and heuristics and bring that into how we shape and conduct the research that we're doing." Dr. Bostrom highlighted how trust is central to AI and risk communication. She stated that "this work is kind of the glue that keeps AI2ES together. It cuts across the different working groups and is at the core of why people would use AI models and when they would use them. Are they going to trust these AI models to help make these decisions?"

In addition to the Risk Communication team's research, Dr. Cains explained that "We are consumers of risk communication whether we know it or not.

How it's communicated to you changes the lens through which you're seeing that information." She cited recent wildfires and resulting smoke in Washington State as an example of how those who are more removed from the central location of the disaster receive risk communication that affects them in different ways.

Overall, Dr. Cains thinks "risk communication is important in the AI space because it's not like only the computers are going to solve the problems. There are still humans involved. There's still nuance with AI and it's not as perfect as you think it's going to be or you want it to be." Dr. Wirz added that risk communication is also used to "convey deep theoretical research," like that conducted at AI2ES. Risk communication has also been central to Ms. White's research as a Ph.D. candidate. Ms. White explained that in her research she has been using a model to predict water temperatures in the Laguna Madre. She stated that "the current operational model has been extremely valuable to the stakeholders who have been utilizing it. However, stakeholders have communicated there is a need for uncertainty estimates of when these cold stunning events will occur and how long they'll last." Communications with the end-users have provided the collaborators with a sense of having a stake in the research being executed. Expanding on the importance of collaboration and effective communication, Dr. Radford emphasized that "What I was doing wasn't ultimately going to make any impact or difference without a better understanding of what forecasters needed and how they were perceiving the tools and things I was developing. The Risk Communication team has been improving that communication point between the users and the developers so we can ultimately have tools that will be in use.

Ultimately you can have a great tool but it's not going to do anything if you're not communicating it and getting feedback with your target user base."

### What first interested you in risk communication?

Each member of the team entered the field of risk communication at different times of their careers and have all been connected through their passion for this research. Dr. Demuth recalled her experience as a Masters student in atmospheric sciences researching risk communication for the first time. Throughout her life, Dr. Demuth wanted to be a meteorologist, and during her graduate studies she became interested in climate change and public perceptions of climate change. She stated, "I read Dr. Ann Bostrom's paper on people's mental models of climate change. Before that, I didn't know what social sciences were or how you could study these things." Dr. Demuth then went on to do her PhD in communication and do risk communication and related research. Her interest in this field has led her to become an interdisciplinary Research Scientist at NCAR and co-leading the team at AI2ES with Dr. Bostrom.



PhD student, Miranda White, posing with a picture of fellow Risk Communications team member, Dr. Julie Demuth, at the 2023 AMS Conference in Denver, CO.



Dr. Bostrom, who has a background in risk communication and analysis, decision making, business, and English, became interested in risk communication while studying at the Stockholm School of Economics. Dr. Bostrom got extremely interested in how people make decisions about important things, such as how far to travel for a new job, when there's uncertainty. Dr. Bostrom completed her PhD at Carnegie Mellon University, where she was a part of a group looking at mental models and decision making under uncertainty, and received funding to study risk perception and communication.

Dr. Wirz found risk communication while he was an undergraduate student studying biology, environmental science, and communications. Dr. Wirz took a risk communication class which was open to undergraduate and graduate students. "I really got into it and I was reading papers and thinking, 'How did you do this? How did you come to that claim?'...I was dissecting it," he explained. During his senior year as an undergraduate, Ebola became a topic of great concern across the United States. Dr. Wirz was interested in the public's perspective of the disease and thought, "Why are people freaking out about Ebola?" Through risk communication studies, he recognized the theories for what was happening. This led him to his position as a Research Scientist and postdoctoral researcher at NCAR working on risk and scientific communication along with weather and interviewing forecasters.

Dr. Cains discovered risk communication as a graduate student when she took a risk communication course. Dr. Cains explored multiple fields of study, including environmental chemistry and environmental toxicology. She explained that her "winding road brought her to ask, "What does risk comm mean in a practitioner sense?"

Dr. Cains has conversations with her emergency manager uncle about how communicating science is important to integrate research into our own knowledge base. She has continued her work in risk communication and environmental risk analysis at NCAR and AI2ES.

During his Ph.D. program at North Carolina State University, Dr. Radford had an idea with his advisor "to start developing visualizations for ensemble weather models." The literature review process led him to realize that many papers on these models fell into a graveyard; he did not want the visualizations he developed to have the same fate. When he thought more about how to improve these visualizations, he knew that "the way to do that was to involve forecasters from the get-go. We brought on a science communication person at NC State and that helped me in the rest of my Ph.D. and got me into risk communication."

For Ms. White, her Living Shoreline project got her interested in stakeholder engagement and understanding stakeholder perceptions of natural solutions used for coastal systems. "I graduated from a small HBCU and an even smaller Integrated Environmental Science program, with many diverse research opportunities." The Living Shoreline project allowed her to integrate different scientific components in her research, while leading educational engagement with waterfront citizens. Ms. White added, "I think Dr. Tissot was most interested in my integrated background for his cold stunning project. I'm very glad I have the resources at TAMU-CC and AI2ES to get involved in this type of research. Collaborating with the AI2ES Risk Communication team has jumpstarted my journey into Risk Communication research."





## **How does convergent science strengthen your research?**

Convergence and interdisciplinarity have become increasingly popular among science researchers. Convergent science can be used to strengthen research and solve world problems in new ways. Dr. Cains recollected that for her dissertation, she did not realize that her work was considered convergent science. She noted that "I had multiple sources of info, but it wasn't just me going through 45 different data sets, it was me working with experts and practitioners across disciplines." Dr. Cains described convergent science as taking multiple people not just sitting at a table together but having their boots on the ground doing the research; her Jenga metaphor emphasized the importance of all scientists and researchers: if one is pulled out, it can all crumble. Dr. Wirz echoed Dr. Cains's statement. "The importance of convergence is that you can find those problems. You can find those papers that no one else can write."

Dr. Demuth described how NCAR is working towards doing more convergent science and realizing they need a more focused, intentional, systematic approach to it. One way to work toward this is establishing a culture that values the importance of convergent science. Dr. Demuth used Dr. Tissot and AI2ES as an example of where a space has been created for people to value convergent science and prioritize it with students and collaborators.

## **How do you see risk communication moving forward in the scientific community? What is the future of risk communication?**

Dr. Cains illustrated how risk communication will continue to thrive in ways people may not realize. "I think, as one example,

with the continued growing use of social media and being able to have info at your fingertips, risk communication as a whole is still going through this frontier phase." This frontier phase will see risk communication start to bleed into other areas of research where, Dr. Wirz added, we are starting to see an increase in recognition of how important communication research is. Additionally, AI will require a lot of theoretical development to be integrated. He stated, "We've got to work on moving the fast-moving AI [discussions] with the actual work that's being done on some of these things. How are we understanding this unique decision space?"

Dr. Bostrom pointed out that risk communication is still a relatively new field, which overlaps with science communication. "Risk communication brings in two aspects: levels of uncertainty and the potential of adverse effects. Jacob is right at the center of the technological interface. You have to work with people, you can't just tell them what to do...There is still a big integration step with risk comm and other sciences." Risk communication will always be around, Ms. White said. "I think we are approaching a point where more and more people are acknowledging that the knowledge transfer and exchange process between scientists and end-users needs to be analyzed further, especially when dealing with AI. Risk communication research is a great tool for that." With hard work and collaboration, risk communication will evolve into a successful tool to ensure knowledge exchange and transfer between scientists and the general public.



## Student Spotlight: Raven Reese

Raven Reese started with AI2ES as an Undergraduate Research Assistant in April 2022 as the first Social Media Manager after Dr. Philippe Tissot sent out an open call for the position. She was recommended by a fellow employee. Raven began her job by creating social media pages and a routine for posting. Her first assignment was Earth Day Bay Day where she took photos, connected with others at AI2ES in Corpus Christi, and saw what an AI2ES event was like. Raven's goal for this new position was to create more outreach opportunities and collaborate with various organizations like the Coastal Bend Bays Foundation and Dr. Donna Shaver at the Padre Island National Seashore. Her work with Dr. Shaver led Raven to create the Texas Sea Turtle Collaborative Facebook page to reach out to the public about the work AI2ES and Dr. Shaver are doing for Texas sea turtles.



Raven Reese enjoying her free time and ice skating while in Denver, CO for the 2023 AMS Conference.

During her time here, Raven headed the initiative to start a monthly newsletter for AI2ES. While at the 2023 American Meteorological Conference, Raven had a chance to talk to Dr. Tissot and Dr. Amy McGovern about ideas for a newsletter. At the conference, Raven was able to connect with other AI2ES students and survey what they would like to see in the newsletter, saying, "On the flight home from AMS, Katie Colburn, Christian Duff, me, and others were having lunch. They said they would like to see what other students were doing. We literally sat there and drafted what the newsletter would look like." The first AI2ES newsletter highlighted the many adventures and achievements that took place while in Colorado, including projects, presentations, and the infamous ice skating incident. Raven said, "From there it became structured. It was a really intense project and I had never worked on something like that."

One of Raven's favorite memories of her time with AI2ES is the AMS conference, "It was my first time outside of Texas and getting that opportunity to travel with them was really nice. I think my favorite memory was getting closer to the other students there. My goal for outreach was getting people more interconnected." Raven added, "One of my other favorite memories was the ice skating incident with Evan. It was really intense and I got to write a spotlight about it. It was cool how a tragedy was turned around."

Since starting her graduate program at Texas State University, Raven has realized how her time at AI2ES transfers into her new role as an MFA in Creative Writing student. She explained that "A lot of the soft skills and strategies have been really applicable to grad school, like being able to be versatile and adapt to the newsletter. That was changing a lot and we had to adapt to some strategies. That's kept me on my toes and not stay complacent in my grad school timeline."



Additionally, working interdisciplinarily at AI2ES has given Raven a different perspective on how graduate students operate, especially liberal arts and science students. Raven has secured a Graduate Research Assistant position in the Texas State University Creative Writing department. She will be working with other graduate students "doing social media work and working with stakeholders and donors, which is similar to my work there. I'm sure that bullet on my resume got me this job," Raven added.

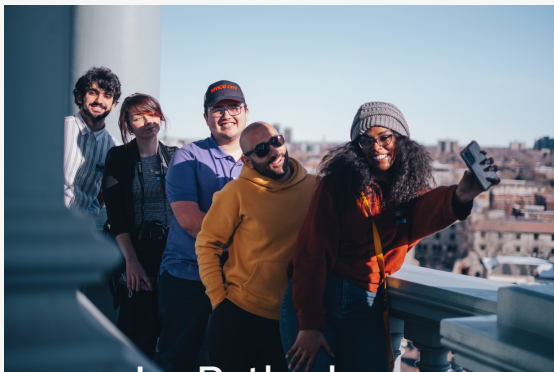
For the future of AI2ES's social media, Raven "would like more interaction from the public generally. I want to be able to see AI2ES social media become more accessible to the public." One example of this is the Texas Sea Turtle Collaborative page that Raven created and ran. As Raven moves onto bigger adventures, she says, "This has been the best job I'm sure I will ever have. The community that is fostered here is unlike any scientific research organization. I'm really glad I got to be a part of it." Raven will truly be missed at AI2ES and her contributions to the team have not gone unnoticed. We give Raven our best wishes as she begins her new adventure!



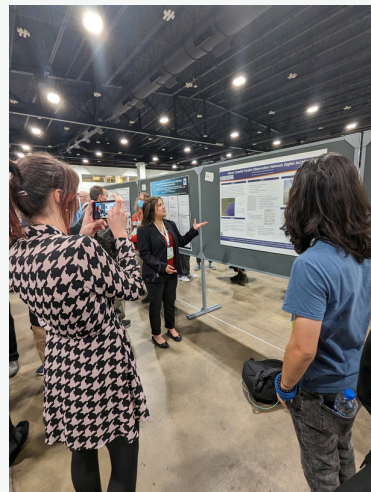
Raven Reese (far right) and other AI2ES undergraduate researchers at the 2023 AMS Conference in Denver, CO.



Raven Reese posing for the camera during the 2023 AMS Conference



Raven Reese (second from the left) taking a selfie with other AI2ES student researchers at the 2023 AMS Conference



Raven Reese (far left) taking a photo of a student presenting their research at the 2023 AMS Conference.



## July Poll Results

This month, we polled members of AI2ES on their comfortability with AI. These results were then compared to public data from a CNBC news broadcast. When it comes to comfortability with AI, members of AI2ES are fairly comfortable with the technology. Eight out of 10 respondents stated that they believe AI will help make their job easier compared to 21% from CNBC and 90% of AI2ES respondents said they are generally comfortable with AI. As for comfortability with AI before 2016, in CNBC's poll, 36% of people were comfortable with AI and 59% were not comfortable with it. AI2ES's opinions are actually the opposite of this with 60% of respondents that were comfortable with AI at the time and 40% that were not. Keep in mind the low number of AI2ES respondents for this poll, but the comparison between the two is interesting. Hopefully for future polls, our pool of respondents is larger.

To learn more about the "CNBC All-America Economic Survey finds Americans getting more uncomfortable about A.I." survey, visit [https://www.youtube.com/watch?v=Qf7v9KSYB\\_Y](https://www.youtube.com/watch?v=Qf7v9KSYB_Y).

Will AI (please choose one of the following):

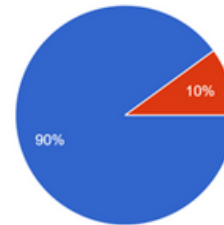
10 responses



- Make your job easier?
- Make your job more difficult?
- Replace you in your job?
- Have no effect on your job?

When thinking about AI broadly, are you:

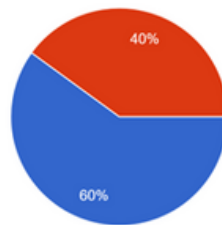
10 responses



- Comfortable with AI?
- Uncomfortable with AI?

Thinking back at an earlier time when AI was not as prevalent in society (circa 2016), were you:

10 responses



- Comfortable with AI?
- Uncomfortable with AI?

## Poll

[Click on the link here to take a quick poll over your favorite AI2ES memories!](#)

Check back next month for results and a trip down AI2ES memory lane!