

Key Points:

- Diversity, Equity, and Inclusion are keys to enhanced science communication and community connections
- Lean-in to experimenting with novel meeting tools and options for improved virtual meetings
- Story telling as a means of effective science communication and engagement

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Once Upon a Time, in AmeriFlux

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Abstract In October 2020, under COVID-19 quarantine, AmeriFlux held its largest and one of its most successful annual meetings. Historically, ~100 scientists attend; this meeting had over 400 registrants and participants. Participants expressed that this was among the best virtual meetings that they had ever attended, and 100% of post-meeting survey respondents stated that they would attend again. Feedback revealed the meeting fostered a strong sense of connection to the AmeriFlux community, especially among early career and international scientists. How did a feeling of strong connection to the community arise from the seemingly cold and isolated structures of virtual meetings?

The meeting emphasized Diversity, Equity, and Inclusion (DEI), which resulted in an unexpected enhancement of science communication and community connections. Additionally, the meeting experimented with an online virtual gaming-like world (Gather.town), where users controlled video/audio-enabled avatars in a conference center and poster hall environment to create spontaneous conversations and discussions. In lieu of a social-bonding field trip, participants showed videos of their field sites accompanied by informal banter, which were watched in group settings in Gather. Social mixers were structured over Zoom breakout rooms that were limited in size to promote participation with accessible games. Science talks were selected based on appeal to a demographically diverse organizing committee, which enhanced appeal to a broad meeting audience. Finally, breakout reports were given not in the format of bullet point slides, but instead as creatively improvised fairytales, which dramatically enhanced engagement. Here, we describe some of the process that went into the AmeriFlux 2020 meeting. Keeping with the theme of experimenting and fairytales, we present this narrative in the form of a fairytale; and, without further ado...

1. Chapter 1. The King and the Knights

Once upon a time, a long, long time ago (or, what felt like a long time, as time seemed blurred under quarantine [Ogden, 2020]), the land of AmeriFlux fell under the cruel rule of the powerful King Covid the 19th. The people of AmeriFlux were forbidden from congregating in their annual meeting under fear of penalty by death. This presented a significant disturbance in the exchange of new ideas and results of the latest potions and spells, hindering new collaborations for future elixirs and analyses. It was indeed a dark time.

Trapped high in a tower was Prince Trevor of the royal AmeriFlux family. Actually, it was a flux tower, and it was more that he felt figuratively trapped in the sense that he was unsure of how to host the annual meeting. Pacing in his working/sleeping/eating/teaching/parenting chambers, Prince Trevor lamented, “How can I bring us together, when King Covid’s Army of Social Distancing keeps us apart?” Prince Trevor’s lead commander, General Christin, replied, “We cannot do this alone: we need reinforcements.”

General Christin and Prince Trevor immediately began recruiting key strategic allies from throughout the land of AmeriFlux. They were joined by Baron Ben of Arkanselot, who was an intrepid field mercenary, and

Lady Gabriela of Michigania, a young and fearless revolutionary. Next came a critical ally in Queen Sara of the Northern Lands, a relatively new queen learning to balance leadership and political stability of her tenure-tracked lands. Prince Trevor received the commitments of Grandmaster Gil of Ohiobury, a wise and powerful wizard, and Sir John, a creature of the forests and skilled inventor. Last, Prince Trevor enlisted the services of Lord Josh of Nasashire, commander of a mighty fire-wielding flying dragon (used primarily for thermal remote sensing).

Although pleased with his newly formed alliance, it troubled Prince Trevor that the energy was not quite balanced, and he had difficulty finding closure to this issue. Like a net of radiant light on these latent feelings fluxing through him, he realized, “Gee, you star, the solution is rather sensible!” To unite the AmeriFlux lands fully against King Covid, Prince Trevor humbly requested the assistance of King Jorge of the Southern Lands, thus bridging a region that had been historically disconnected from the northern lands of AmeriFlux. King Jorge wasted no time uniting with Prince Trevor against King Covid. The team was finally complete—a diverse set of knights from North, South, East, and West—and Prince Trevor proclaimed, “I shall dub thee: The Knights of the Zoom Table!”

2. Chapter 2. The Bridge of Meeting Theme

The Knights set out on their quest, but were soon blocked at a bridge guarded by a huge, hideous monster. The monster was fearsome, noxious, and despised throughout the land, and it went by the name, Reviewer 2. The monster snarled and bared its horrible teeth, hissing, “Sssso, you want to cross The Bridge of Meeting Theme, do you? There are three boats to cross this river, but you must first correctly answer a riddle about unity under isolation.” Prince Trevor was worried, but seeing the confident expressions of his Knights, he faced the monster and shouted, “We accept the challenge!”

“Each of your Knights commands powerful but different armies,” said the monster. “However, the first boat is big enough for only one army, and will only cross the river once. The first question is thus: which army do you choose to fill the boat to fight at Speakers Battle, and which do you choose to leave behind for the Siege of Posters?” Prince Trevor consulted with the Knights, then faced the monster. “We shall not send the army of any single Knight in the boat; rather, we shall select members from each of the armies to fill the boat!” The monster considered Prince Trevor’s answer for a moment, then smiled. “Ah you are wise, for no single army is strong enough to unite the AmeriFlux lands. A diverse army will prove to have greater power and reach in connecting to broad audiences at Speakers Battle!”

The monster continued, “The second boat can be commanded only by one who informs policy-makers, and must contain four such experts, yet not even one of your Knights has battled in this arena. How will you find the proper commanders?” Again, Prince Trevor consulted with the Knights. This time, Baron Ben spoke up, “In my interdisciplinary journeys, my path has crossed with three of these policy-informing sages. Allow me to send word to them seeking their assistance.” Prince Trevor was relieved, but noted, “Alas, we are still one policy-informing sage short, and time is running out. What shall we do?” Lord Josh stepped forward to add, “I shall send my dragon, ECOSTRESS, to Nasaville to request help from one of our great policy-informing sages.”

Satisfied with this response, the monster stated, “Very well. Now for the final and most difficult question. The third boat must still be made. It must be constructed from rare and special materials, but the knowledge of how to use each part is known only to small regions throughout the land of AmeriFlux. How do you propose to build this final boat?” Prince Trevor was at a loss, and the fate of the meeting seemed to hang in the balance. Then wise Grandmaster Gil spoke up, “Sometimes we may find our way without directions. Let the people build it themselves, and you will find that a sea-worthy meeting theme boat may be made.” The monster sneered at the Knights, but appeared to consider the wizard’s response. After some anxious moments, the monster stepped to the side and bellowed, “You may pass!”

3. Chapter 3. Battle Preparations

As the Knights of the Zoom Table continued with their journey onward, they witnessed the devastation of land burning around them, and noted the importance of AmeriFlux measurements to capture the chaos.

Air quality was abysmal, and people were forced indoors. A social-bonding field trip, often a highlight of annual meetings, would have been challenging even in the absence of King Covid's reign. Sir John, a creature of the forests, grieved the loudest, "How are we to prepare for battle in different landscapes if we cannot take directly to the field?" Lord Josh said, "Aye, this is indeed distressing. Shall we ask the site Potion Inventors (site PIs) throughout the lands to send in videos of their sites that we could put on Ye Olde Youtube?" Sir John's eyes lit up and he exclaimed, "This may be just the spell we need! I shall assemble these missives to show at the Final Battle!"

Indeed, the Final Battle was fast approaching. Prince Trevor, aware of the rapidly falling sands of the hourglass of time, appointed three Knights to lead the Final Battle—Lady Gabriela, Queen Sara, and King Jorge—and charged General Christin with the execution of battle plans. Lady Gabriela addressed the Knights, "Fort Zoom may not be able to withstand King Covid's mighty Army of Social Distancing. We need a custom-built castle." Agreeing, Queen Sara added, "The castle must support our battalions of posters and Sir John's collection of site videos, as well as enable social interactions." King Jorge, skeptical of how the people of his Southern Lands would embrace this castle, asked, "How can such a castle be built?" Lord Josh cleared his throat and said, "I have heard tales from witches and wizards of a magical virtual environment called Gather. In this magical world, Knights control avatars that they can move around and interact with posters, other items, and each other." General Christin immediately sprang into action, "I will construct this castle of avatars—I shall not let you down!"

4. Chapter 4. The Final Battle (the Actual Meeting)

The day of the Final Battle arrived. Hundreds of scientist townspeople from all over the land of AmeriFlux congregated to join the battle, creating the largest army AmeriFlux had ever seen. The people were galvanized, but also wary of King Covid's formidable forces. Lady Gabriela, Queen Sara, and King Jorge spoke to the assembly, laying out the battle plans. General Christin's Castle Gather was operating beautifully; however, King Jorge learned from an informant that King Covid had a secret weapon: Weapons of Mass Technical Difficulties (WMTDs). King Covid was aiming to bring down Castle Gather by pillaging microphones, sending a plague upon webcams, and ruthlessly crashing web browsers and computers. Unwavering, the Knights of the Zoom Table held their ground and summoned their avatars. On October 6, 2020, the great AmeriFlux battle commenced!

Immediately, the elite cavalry of speakers moved into position and held their ground flawlessly, their efficacy in connecting with the large and diverse audience enhanced by their own respective diversities. They employed engaging spells and summoned real-time questionnaires and results. Lady Gabriela bestowed upon her legion of early career soldiers the magical power of lightning (talks), and they teamed up with mid-career wizards and witches to execute key collaborative training maneuvers. King Covid's Army of Social Distancing was foiled by a well-executed Zoom social mixer with semi-structured games and prompts including, "Tell a funny/interesting story from your adventures in the field or with science," and, "Describe what's in your webcam background," with breakout rooms limited to <6 people per room to encourage participation. More than a dozen breakout brigades were stocked with ample numbers of recruits. Reports from breakout sessions were given as fairytales to a vividly engaged audience, which helped avoid the heavy casualties often associated with traditional breakout reports. Examples of these breakout stories include as follows: (i) Goldilocks and the Three Potential AmeriFlux Meeting Themes for Next Year; (ii) Swamp Thing Washington, DC, 5220: Beyond the Year of Methane; and, (iii) the Quest for the Holy Grail (of High-Quality Flux Data and Metadata).

The virtual environment of Castle Gather proved to be a worthy and successful arena, and King Covid's WMTDs were kept largely at bay with the help of technical support mercenaries. The avatars browsed the posters, were happy to bump into colleagues and friends, gathered for discussions and to watch the highly engaging and beautiful site videos, broke off into side conversations, introduced colleagues to one another, networked for jobs, and fostered new ideas for science and collaborations (Figure 1). Gather interactions were so "real" that they also included those classic awkward in-person conference moments such as: (a) I really want to introduce myself to that person but I'm a bit shy and socially awkward; (b) oh no I better avoid that person because I owe them a review/paper/feedback/etc.; and, (c) this person is really talkative how do I extract myself gracefully from this conversation. The Final Battle waged for three half-days, and, at the end, the people of AmeriFlux emerged victorious!

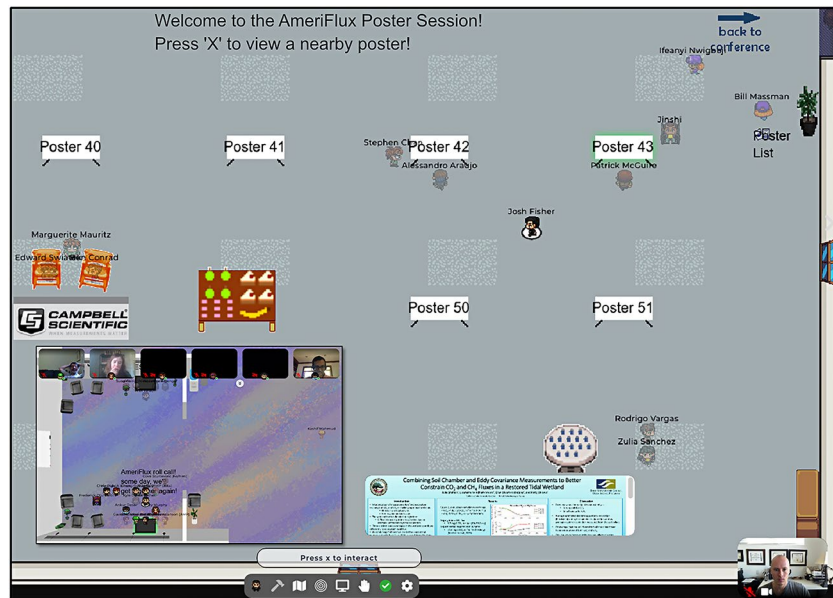


Figure 1. The virtual gaming environment of Gather for the AmeriFlux 2020 annual meeting facilitated scientific interactions, conversations, and side discussions important to in-person meetings, but that are often missing in virtual meetings. Here, a screenshot shows user-controlled avatars browsing and discussing the posters. The bottom-left inset shows scientists watching field site videos as a group.

5. Chapter 5. Dénouement and of Future Battles

Post-battle/meeting feedback was overwhelmingly positive, with participants commenting that it was among the best virtual meetings they had attended, and 100% of survey respondents ($n = 59$) stating that they would attend again. There was consistent appreciation for all the elements of the meeting—talks, posters, breakouts, mixers, and social events. Coming out of quarantine in the future, the success of some of these virtual meeting elements is strong support, yet also raises questions, for subsequent meetings.



Figure 2. The most common word used to describe the AmeriFlux 2020 meeting in a post-meeting survey was the word “fun.” This word cloud was produced in real time from a quick questionnaire completed by participants on mentimeter.com.



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Figure 3. The AmeriFlux 2020 annual meeting was like no other, set in a virtual world that achieved success through Diversity, Equity, and Inclusion (DEI), and leaning in to experimenting with novel meeting tools and storytelling.

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Elements that work well in all-virtual formats may not work well for in-person or hybrid meetings, and participants were interested in future alternating events between virtual and in-person. As expected, the virtual format enabled increased participation from international and resource-limited scientists, and it also reduced the travel carbon footprint (Clery, 2020). Fifty percent of the participants had never attended an AmeriFlux annual meeting before, and 35% joined from 32 countries outside the US.

We hypothesize that some of the meeting's success was a direct or indirect result of the focus on Diversity, Equity, and Inclusion (DEI). The diversity of gender, age, discipline, and geography of the organizing committee increased the probability that the selected talks and themes would have broad appeal. The intentional actions to include and integrate early career and international scientists were well-noted and also appreciated by mid/late-career and US-based scientists alike. Overall, we received comments about the warmth and inclusive nature of the AmeriFlux community, which contrasted observations from past meetings that had become dominated by US senior scientists. The structured virtual meeting appeared to democratize knowledge, making for a whole community that was stronger than the sum of its parts. In a time of isolation, we were able to find unity.

Although the battle was won, the war continues. Pandemics will evolve and re-emerge, as will other environmental and political disasters that keep us apart. As scientists, we experimented, though in this case with meeting elements. Our null hypothesis was that our experiments would fail, but we were pleasantly surprised to see how many of them were successful. We had not anticipated the success (nor had time to anticipate it), so we did not set up a proper protocol to test success, and we caveat our observations as mostly qualitative. Still, we hope that the experience that we have shared may be useful to other science communities. We also experimented with storytelling both in the meeting as well as in this write-up. If you are still reading, then we might consider this successful, particularly in contrast to what could have been a traditionally dull meeting recap. These storytelling elements were done initially for fun, though they resulted in increased science communication efficacy and community engagement (Ettinger, 2020). This sentiment too was not lost on the community, and “fun” was the most commonly used word to describe the meeting in our post-meeting survey (Figures 2 and 3). As COVID-19 continues to remind us that life is short, we need to enjoy life to the fullest. And with that, we hope that we will all live happily ever after.

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