



Early Career Researcher Report on the 2026 SZ4D Science Community Meeting in Long Beach, CA

Project Leaders: Jeff Beeson, Emma Burkett, Behrooz Ferdowsi, Anaïs Férot, Tiegan Hobbs,
Kate Scholz, Hannah Shabtian, Maisy Waech

Editors: Hannah Shabtian, Kate Scholz, Tiegan Hobbs, Emma Burkett

Contact: SZ4Grads@SZ4D.org

TABLE OF CONTENT

Motivation.....	2
Summary.....	2
Report Highlights.....	2
Group A.....	3
Group B.....	5
Group C.....	6
Group D.....	9
Group E.....	11
Synthesis.....	12
Recommendations.....	14
Acknowledgements.....	15



Motivation

The goal of this report was for early career researchers (ECRs) to share their thoughts and experiences during the 2026 SZ4D Science Community Meeting in Long Beach, CA. Five working groups sought to address questions surrounding the impact of meeting structure on discussions, effectiveness of meeting organization and events, extent of participation and voices across disciplines and backgrounds, and the future directions of subduction zone and geohazards science. Participation in developing this report was entirely voluntary, and research for the report was conducted during the meeting, beginning during the Early Career Symposium on Day 0.

Summary

This exercise proved to be a great success in facilitating conversations amongst participants about how we show up in scientific meeting spaces and was mentioned as a highlight of the workshop by several participants. Beyond providing this opportunity for connection during and reflection following the meeting, we anticipate that the insights collected within this report will provide actionable steps for improving the experience of ECRs and other community members at future events. Each group worked independently to produce a summary of their research question, observations and interpretations, and some suggestions for future meetings and research. One of the most salient parts of this report writing experience was watching how common themes emerged between groups despite a lack of formal coordination in the initial phase. Below are highlights of the observations from all groups, and each group's full report can be found in the subsequent sections.

Report Highlights

- The meeting was successful in fostering interdisciplinary exchange, with many participants identifying lightning talks, poster sessions, coffee breaks, and shared meals as the most effective venues for meaningful scientific discussions and new connections.
- Breakout sessions remain a valuable component of the meeting, but participants consistently identified opportunities to improve outcomes through clearer prompts, stronger facilitation, smaller group sizes, and more explicit mechanisms for balanced participation across career stages and disciplines.
- While representation of early-career and international researchers improved substantially, participants emphasized that meaningful participation depends on



reducing barriers associated with jargon, disciplinary specialization, language differences, and meeting power dynamics.

- ECRs repeatedly highlighted the importance of connecting subduction zone science with the communities affected by geohazards, including greater involvement of social scientists, emergency management professionals, Indigenous communities, and local stakeholders throughout the research process.

Group A | How did the style of the symposium seem to influence the discussions (and discussion topics)

Contributors: Omid Asgarvand, Oliver Azevedo, Matías Carvajal, María Constanza Flores, Juan González, Tiegan Hobbs, Young Cheol Kim, Nathalie Redick, Cristhian Salas, Josué Salgado

1. Summary

The symposium’s format strongly shaped both the quality and inclusivity of discussions. Overall, its small-to-medium size and intentional design as a “working meeting” created a more interactive environment than large conferences such as the annual American Geophysical Union Fall Meeting. Participants were more able to engage directly with one another, share work, and build connections without the cognitive overload typical of large meetings. The expectation of producing tangible outputs further encouraged participation and collaboration, although questions remain about the long-term value of these deliverables, and there was some concern about the pressure placed by this expectation.

A key strength of the symposium was the integration of informal, low-pressure interaction points. Lightning talks, poster sessions, coffee breaks, and shared meals consistently emerged as the most effective venues for meaningful discussion. Lightning talks, in particular, helped participants become more familiar and made later conversations more approachable. Similarly, extended and well-timed breaks allowed for deeper, organic exchanges, especially when scheduled before discussion fatigue set in. These formats lowered barriers to entry and supported cross-disciplinary engagement more effectively than formal sessions.

In contrast, breakout sessions—while central to the meeting’s goals—produced mixed outcomes. Their success depended heavily on three factors: clarity of the prompt, quality of facilitation, and group dynamics. In several cases, unclear instructions or overly abstract



framing led to confusion and limited engagement. Additionally, inconsistent moderation resulted in uneven participation, with more assertive or senior individuals dominating conversations. ECRs and quieter participants were often underrepresented unless explicitly invited to contribute. Structured interventions (e.g., turn-taking rules) showed some benefit but were not sufficient on their own.

Language and disciplinary barriers also played a significant role. Non-native English speakers reported difficulty following fast-paced or informal speech, particularly when “local” terminology was used (for example, abbreviations for universities). Participants from outside core technical disciplines sometimes felt excluded from highly specialized discussions, especially during informal settings like coffee breaks. These challenges highlight the need for more intentional inclusivity measures in both formal and informal contexts.

The sequencing and framing of content also influenced discussion quality. While individual talks were engaging, connections to the overarching framework were sometimes implicit rather than explicit, making it harder for participants to synthesize ideas across disciplines. Talks that emphasized broad perspectives, personal reflections, and cross-cutting themes were more effective at stimulating discussion than highly specialized presentations.

2. Recommended Actions

- **Improve breakout design:** Provide clearer prompts, define achievable outcomes, and train moderators to ensure balanced participation. Participants and moderators can be given or reminded of guidelines/tips for fostering productive and balanced conversations.
- **Enhance inclusivity:** Incorporate multilingual options (e.g., parallel-language breakout sessions), encourage slower, clearer communication, define abbreviations/acronyms, and explicitly invite contributions from early-career participants.
- **Prioritize informal interaction:** Maintain and expand lightning talks, poster sessions, and unstructured discussion time, as these consistently yielded the most productive exchanges.
- **Strengthen thematic framing:** More explicitly connect talks to overarching goals and prioritize integrative presentations earlier in the program.
- **Foster cross-disciplinary exchange:** Create dedicated sessions and interactive activities that encourage participants from different disciplines to learn from one another, identify shared challenges, and explore potential collaborative research areas and common scientific questions.



- **Improve thematic organization of poster sessions:** Group posters by related topics or research themes and incorporate guided networking or discussion activities that help participants connect complementary ideas, exchange perspectives, and identify opportunities for future collaboration.

Group B | Which meeting events led to the most meaningful science conversations?

Contributors: Kate Scholz, Lillian Miller, Valeria Becerra-Carreño, Sofía Vargas

1. Defining "meaningful" Science Conversations

To address which events were most impactful, we must first define what constitutes a "meaningful" conversation. Our team identified three core dimensions:

- **Validation and inspiration:** Conversations that provide organic and genuine insight, confirming research directions through dialogue with both senior scientists and ECRs.
- **Collaborative potential:** Opportunities to discuss proposals, form new partnerships, and network across different career stages, focusing on the lasting effects and follow-ups post-conference.
- **The social dimension of science:** Acknowledging that science inherently impacts communities, particularly in the hazards space. Meaningful interactions often bridge the gap between fundamental science and hazard-related questions, despite their differing timescales of impact.

2. Critical Observations and Dynamics

While the meeting fostered connection, several factors influenced the quality of these interactions:

- **Power dynamics and inclusivity:** Some discussions were influenced by the balance between established researchers and ECRs. In breakout rooms, ECRs occasionally found it challenging to participate when senior figures dominated the exchange, which hindered the formation of new scientific connections.
- **Disciplinary representation:** There was a notable imbalance in representation. While seismology was highly represented, surface processes were significantly underrepresented. This skew can lead to "echo chambers," making it difficult for those in minority disciplines to have a truly meaningful or inclusive experience.



- **The success of poster sessions:** We observed that the most productive and "low-stakes" scientific discussions occurred during poster sessions. These allowed for free-flowing, peer-to-peer exchanges and real-time feedback in a less intimidating environment.

3. Strategic Recommendations for Future Meetings

To enhance interdisciplinary synergy and ECR engagement, we suggest the following:

- **Curated small-group discussions:** Creating dedicated spaces for researchers within similar disciplines to provide technical feedback, while maintaining broader interdisciplinary sessions for high-level integration.
- **"Science matchmaking":** Prior to the meeting, attendees could submit interdisciplinary questions they are interested in exploring. Compiling and circulating these ahead of time would allow for "themed" small-group discussions, effectively matching researchers with shared interests.
- **Improving breakout dynamics:** Implementing clearer guidelines for moderators in breakout rooms to ensure ECRs are integrated into the conversation rather than being sidelined by senior-level exchanges.

Group C | Are all voices heard? How can we continue to uplift ECR voices?

Contributors: Emma Burkett, Michael Murphy, Vincent Sassard, Valeria Cortés Rivas, Chris Harper, Dawson Mooney, Dolcimascolo Alexander

Our goal was to pay attention throughout the duration of the meeting to not necessarily *what* was being said, but *who* was speaking and which voices were being left out.

1. Early Career & Seasoned Researchers

The SZ4D Science Community Meeting was well-balanced throughout the week in terms of early-career and seasoned researchers. Dedicated time and space was made to highlight new research conducted by ECRs, including keynote talks and posters, which participants could advertise with a lightning talk. There was also fairly equal representation of ECRs and seasoned researchers at the meeting (Figure 1), which was a new experience for many of the ECRs in attendance.

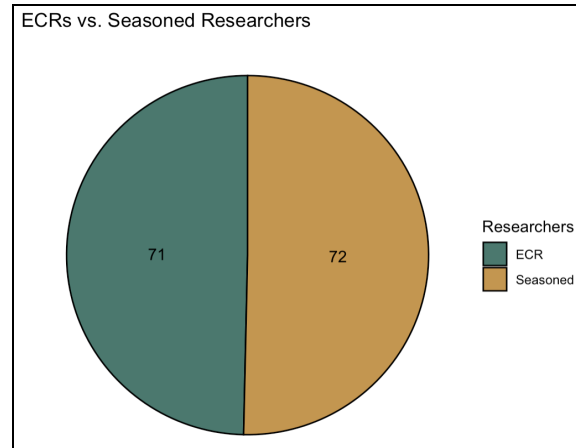


Figure 1. Pie chart distribution of 71 early-career researchers (ECRs) and 72 seasoned researchers (mid-career or senior) who attended the SZ4D Science Community meeting April 2026.

The Early Career Symposium, held the day before the community meeting officially began, was intended for ECRs to network, become physically familiar with the space, and learn more about SZ4D initiatives and goals. This symposium helped ECRs feel welcome at the meeting, built a sense of belonging, and jump-started connections which grew throughout the week.

2. International- & US-based Researchers

There was increased representation and perspectives shared from researchers based in South American countries (Chile and Argentina), along with Canada, especially when compared to the 2022 SZ4D community meeting (Figure 2). Given that the SZ4D implementation plan aims to deploy most arrays of sensors along the Chilean subduction zone, it is especially important to have the perspectives of both researchers and community members based in Chile and Argentina. In previous meetings, some researchers expressed excitement about large magnitude earthquakes occurring in Chile, with little thought or mention of how communities in those places might be affected. This meeting hosted discussions which were more contextual, and gave greater consideration to the impacts of earthquakes as they would be experienced by communities living along the subduction zone.

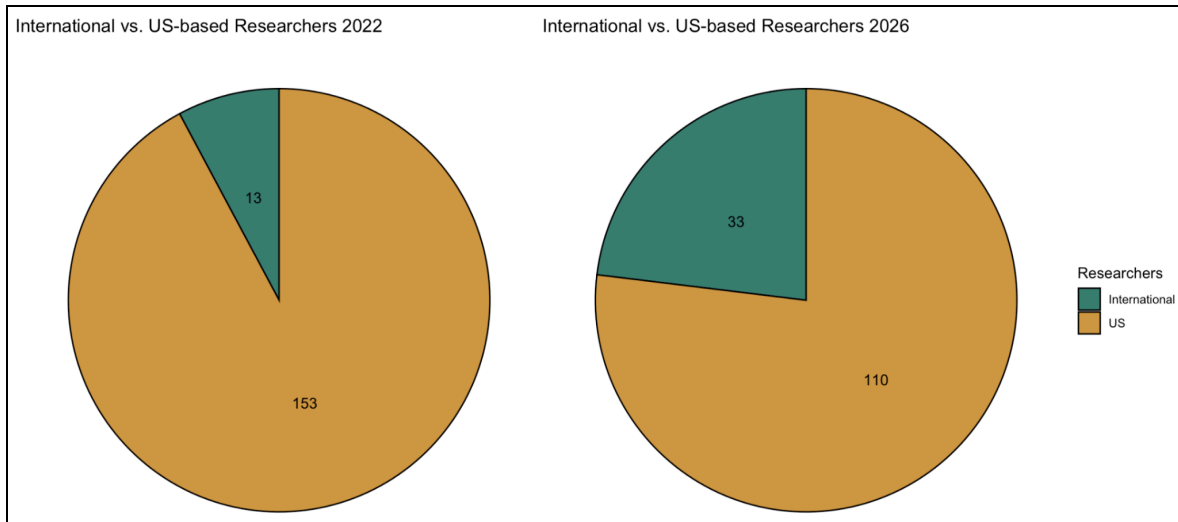


Figure 2. Pie chart distribution of International and US-based researchers, compared in 2022 and in 2026 for the SZ4D Community meetings.

Suggestions for improving the engagement of international collaborations

Breaking down language barriers by including more text and points of emphasis in presentations, having text written out in both English and Spanish, and for English speakers to speak slower. Many scientists and researchers have been trained that the less text there is on your slides the better, but this creates a challenge in communicating with those whose preferred language is not English, and therefore have expressed difficulty in following along, especially in short-format presentations like lightning talks.

3. Missing Voices

SZ4D has grown significantly as a research community, however there are still large areas for improvement, especially with consistently missing voices at these meetings—where were the social scientists and the communities actually impacted by geohazards?

It seems intuitive that best practices for hazard plans are co-developed with local communities. Community input is crucial for realistic, helpful hazard plans. Also, as we build interdisciplinary teams of scientists, many communities, especially those indigenous to a given region, will not collaborate with scientists unless there is a social scientist on the team, some participants noted from experience. As a research network, we need to consciously make an effort to include social scientists and community members in proposal development and implementation—not tacking them on as an afterthought. This includes encouraging social scientists and community members to come to SZ4D science meetings and engage with geoscientists to find the most impactful paths forward in geohazards research.



Also missing from these meetings includes those working in emergency management and response. One goal of SZ4D is to develop improved hazard maps and enhanced communication about geohazards, which necessitates working with emergency managers and response agencies. Communication between hazards scientists and emergency management should be a top priority; it gives us an avenue to know the specific needs of these teams that are critical for the planning and facilitation of life-saving measures. Beyond this, their presence at community meetings can help us both direct our science in ways that directly impact hazard response (for example, how to communicate hazard maps in ways that are productive and useful), but also can be used as a resource for us as we motivate and organize our research proposals around community needs.

Group D | Which meeting events were most successful at bringing together scientists from different fields?

Contributors: Ian Wynn, Joshua Church, Angikar Roy, Omar Hernández, Pablo León-Ibáñez

Our group sought to break down this question into three, smaller guiding questions to better evaluate the session programming:

1. Effective or ineffective usage of jargon
2. Ability to create a unifying question -'consensus question'
3. Effective action towards said questions

1. Use of Jargon

Across both days, jargon was used appropriately, but inconsistently managed. In several sessions, particularly the disciplinary keynote talks, specialized language and depth occasionally limited accessibility and made it harder to identify connections across fields or linguistic backgrounds. This created a barrier to immediate interdisciplinary integration, especially for participants outside the speaker's domain. In contrast, the most effective sessions *deliberately minimized jargon* or framed concepts in broadly accessible ways. Early-career keynote talks stood out in this regard: they were concise, forward-looking, and more successful at communicating shared challenges across disciplines. Similarly, cross-cutting theme sessions reduced barriers by encouraging dialogue in smaller groups, where participants could clarify terminology and align perspectives in real time. This extends to presentation format and design as well. Often, slides were crowded or carried information that was not used or defined, which made following the content of the talk more challenging for broader audiences. Talks and sessions that explicitly aimed to bridge disciplines, either by



simplifying language or clearly defining shared problems, generally were effective in doing so. However, this goal did not appear to be uniformly communicated or enforced across all speakers and session formats.

2. Ability to Create Consensus Questions

The workshop structure, which aimed to combine cross-cutting presentations, breakout discussions, and synthesis sessions, proved effective in principle for identifying shared research priorities. By Day 2, debrief sessions demonstrated that participants were able to converge on several themes, suggesting that the format can successfully “break down disciplinary silos.” However, this success was uneven at smaller scales. Breakout sessions often struggled to translate initial interdisciplinary interest into clearly defined, consensus-driven questions. Conversations sometimes drifted back toward participants’ primary disciplines or personal interests, resulting in some loss of interdisciplinary footing in the discussion. In many cases, prompts were too broad or inefficiently moderated, making it difficult for groups to converge on actionable outcomes within the allotted time.

Group dynamics also played a role. The format heavily relied on breakout leaders to guide wide-ranging discussions and synthesize the discussions after the fact, making it difficult for them to maintain focus on enforcing structure in real time. Additionally, random group composition did not always ensure a productive mix of expertise and career stages, which may have limited the ability to synthesize perspectives effectively. Overall, while consensus themes emerged at the meeting level, as was the intention of these breakout discussions, the process for generating them within breakout groups could be more structured and intentional in service of more consistent outcomes.

3. Action Toward Addressing Identified Questions

While the meeting was successful in surfacing key questions and thematic priorities, translating these into actionable steps remained a challenge. During breakout discussion, many conversations stalled at the level of identifying broad interdisciplinary interests or personal fixations rather than defining specific paths forward. Directed approaches appeared to be more effective - for instance, sessions that framed problems with clear objectives or implicitly guided participants toward tractable questions led to more productive outcomes. This suggests that stronger scaffolding, such as narrower prompts, framed by explicit enforced expectations, could better distill workable plans out of what ended up being a somewhat free-flowing discussion. This left a lot of work up to the moderators, who then had to synthesize out of such a discussion a concrete ‘plan’ - especially on the second day’s breakout discussion.

Several potential improvements emerged: Structuring breakout groups with a deliberate mix of senior and early-career researchers, or tailoring groups around shared interests, rather than relying solely on random assignment, may help generate more focused and impactful questions. Likewise, a more goal-oriented framework, such as identifying key questions gleaned from the first day's discussion, and then working toward shared study systems or collaborative targets, could help bridge the gap between discussion and implementation. Shorter, more tightly structured breakout sessions, greater in number, with clearer facilitation guidelines would further support this transition.

In sum, the workshop effectively generated interdisciplinary dialogue and consensus themes by way of breakout discussion and extensive networking time. However, a more explicitly enforced structure and guidance among those targeted discussion sessions would more efficiently promote actionable plans towards addressing consensus questions.

Group E | What research direction do ECRs see as being the most critical/impactful for the study of subduction zones and geohazards?

Contributors: Hannah Shabtian, Daniel Lee, Luke Gezovich, Ryan Stoner, Amiel Nieto-Torres

Early career and senior researchers had differing perspectives on future directions of subduction zone science. On the surface level, there was agreement that geohazard forecasting should be a major future direction for SZ4D. Where opinions diverged was how we get there as a scientific community, and what concrete steps are important in the process.

One of the primary themes from the SZ4D Science Community Meeting was promoting interdisciplinary collaboration as a necessary step toward geohazard forecasting. From the perspective of ECRs, this includes the connection between scientists and the public. ECRs defined "critical" research directions in subduction zones and geohazards as being necessarily linked to society. Senior researchers generally drew attention to more in-field focus (understanding processes at increasingly complex levels), and typically did not mention or address impacts of our work as subduction zone scientists on communities affected by subduction zone geohazards. Throughout the meeting, we heard presentations that touched on important advances in subduction zone science, and how we as a scientific community can collaboratively work towards earthquake, eruption, and tsunami forecasting. Many ECR conversations circled around not only how to share these science advances with the public, but



also involving the public in the science from the start. Asking local communities that are affected by geohazards what information they need to know, and developing science questions and grant proposals around their needs (rather than scientific interest, which often diverge) was identified as one of the ways we can bring the public into the scientific process. Local and indigenous knowledge like long-term observations and history specific to the area should also be folded into our understanding of geohazards at the community scale, and are essential to building practical perspectives and useful science. We further discussed that indigenous and community involvement in research not only improve the relevance and utility of geohazard research, but also foster trust and increase the likelihood that scientific insights are acted on. Also emphasized was that this engagement must be sustained and reciprocal, rather than one-off consultation, in order to avoid extractive practices and ensure that community priorities meaningfully shape research directions.

Several presentations during the meeting highlighted tools and systems we can start to implement moving forward. We heard from scientists who brought K-12 students on (local) field trips to use low-cost seismometers on volcanos, and other partnerships that led to geoscience books for public audiences. ECRs supported moving toward making science low-cost and publicly accessible. Not only will it increase our data coverage, but will also give us an opportunity to involve local communities in instrument deployment and monitoring, as well as data communication and visualization (leveraging others' areas of expertise).

Another important idea that came out of ECR discussions this meeting was how we communicate science with other scientists. Producing cross-discipline science requires us to be able to translate across fields. Some ways we might be able to do this include unifying the language we use (e.g. coming up with a community dictionary), unifying how we store and share data, and promoting more community-driven geodynamic models. Establishing these shared frameworks will also improve data accessibility and usability across institutions and communities, helping to close gaps in monitoring coverage.

Synthesis

This report demonstrates the value of creating dedicated, ECR-led opportunities within the SZ4D community. Providing a space for ECRs to reflect on the meeting, discuss their experiences, and identify common challenges and opportunities generated insights beyond individual perspectives that can help inform the design of future community meetings. Even though all groups worked in parallel, and on different guiding questions, observations and recommendations tended to converge on several overarching themes. These include how



meeting structure shaped discussions, the distinction between representation and meaningful participation, and the importance of communication across disciplines, career stages, linguistic backgrounds, and communities. Collectively, working groups found that the meeting was successful in fostering interdisciplinary exchange and increasing ECR participation, and identified ways to make future meetings more inclusive, actionable, and connected to broader communities affected by subduction zone geohazards.

The SZ4D Science Community Meeting was effective in bringing together scientists across disciplinary and international boundaries. There were many opportunities for cross-disciplinary interaction—the most successful being informal, unstructured time for discussion. Providing ample time for discussion during coffee breaks, shared meals, and poster sessions were all identified as successful ways of encouraging networking and exchange of ideas.

Working groups noted that while this meeting was effective in starting interdisciplinary conversations, it left room for improvement in how these interactions were facilitated, particularly in the “structured” breakout sessions. The suggestions that came up most frequently were giving breakout leaders guidelines and/or training on facilitation (to promote more inclusive practices during discussions) and increasing structure of breakout sessions to ensure balanced participation at all career stages and scientific disciplines.

Another great aspect of this meeting was representation; there was excellent representation from ECRs, as well as international researchers. However, working groups noted that representation alone does not guarantee participation—we need to deliberately restructure our discussions to encourage participation from all disciplines, career stages, and backgrounds. Limiting use of jargon/highly specialized language during presentations, implementing guidelines for speaking in turns in breakout sessions, and emphasizing main points in presentations are ways we can encourage participation during future meetings.

Regarding representation, working groups observed that SZ4D is missing connections to communities directly affected by geohazards, emergency response agencies, and ties to organizations that communicate geohazard science to the public. ECRs noted that geohazards science is inherently tied to the public, and that we should be working towards involving impacted communities in the scientific process. A good place to start would be inviting local scientists or community representatives and emergency response management to SZ4D Science Community Meetings to bring these important perspectives and skillsets into our conversations moving forward with geohazards forecasting.



This report highlighted that effective, productive geohazards science requires communication across many communities—translating languages, jargon from different disciplinary silos, choice of model for a particular scenario or locality, and effectively communicating science to the public (or public-facing entities). Because SZ4D’s implementation plan aims to bridge so many different groups, it is important that we work together to build unified language and models to describe geohazards, and work with groups who will use our science products from the beginning. The co-production of knowledge is one of the main points discussed in the implementation plan, our goal now should be to build it into our scientific process.

Recommendations

Below is a collection of recommendations to improve future meetings and geohazards research, based on the findings in this report:

- **For improving international and cross-disciplinary interaction:**
 - More text, highlight key points and potential interdisciplinary connections in slideshow presentations
 - Limit jargon, define abbreviations or shorthand before use, conscious effort to speak slower, check that everyone is following the conversation
 - Making an effort to use a unified language (building a collection of community-driven glossaries, models, resources)
- **For improving meeting structure (to better encourage cross-disciplinary communication):**
 - Add structure to breakout rooms to make sure there is adequate representation of each discipline and career stage in each group
 - Give more specific prompts (goal-oriented) and deliverables to help direct breakout group discussions
 - Provide breakout group leaders with guidelines or adequate training for moderating group discussions
 - Breakout group discussions could start with individual reflection (could also be done pre-meeting), then move to small discussions, then larger discussions (similar to Think-Pair-Share). This would encourage participation from those whose voices might be lost in larger groups with more dominant participants, as well as provide more opportunities for exchange of science ideas.
 - Prior to the meeting, attendees could submit interdisciplinary questions they are interested in exploring. Compiling and circulating these ahead of time would allow

- for "themed" small-group discussions, effectively matching researchers with shared interests.
- Consult IMPACTS/CEWD, or other social scientists in meeting design and organization. We suggest having at least one member on the organizing committee whose responsibility is addressing accessibility and inclusivity of the meeting.
 - Continue to schedule “unstructured” time for organic conversations, like those that occurred during coffee breaks, long lunches, and poster sessions
 - **For bridging the gap between scientists studying geohazards, and the communities affected by geohazards:**
 - Inviting community representatives, emergency response agencies, and social scientists to Community Meetings
 - Involving indigenous and local communities in the science from proposal writing through implementation.
 - Submit proposals with co-developed research questions. These could include local communities, and/or hazard and emergency management agencies.
 - Utilize low-cost sensors where possible, and work with local communities for implementation and/or deployment

Acknowledgements

We gratefully acknowledge ECR participants for their engagement and involvement in producing this report. We also thank the ECR Symposium and SZ4D Meeting organizers for building time in the SZ4D Community Meeting for developing and sharing the preliminary results of this project. We also thank CEWD for their input on the formatting of the final report.

