# A brainstorming session about the future of scientific meetings: what will EGU 2024 look like?

On Thursday 1 May, the Young Hydrologic Society (YHS) organised a <u>public-brainstorming session</u> at the EGU General Assembly to get attendees to think about how the meetings' scientific sessions should look like in 2024. Together with representatives from EGU and Copernicus, some 20 (mainly young) scientists evaluated the current formats of the oral, poster and PICO presentations and came up with some suggestions for improvement that could help bring the conference to the next level. The main conclusions were that oral sessions might benefit from more interaction and that PICOs could be more effective.

The mission statement of the EGU General Assembly is to provide a forum where scientists can present and discuss their research. The 2012 and 2013 EGU surveys found that the main points people would like to see improved are the sessions, orals, posters and PICO presentations. Although EGU and Copernicus have efficient mechanisms to improve the meeting year on year, YHS proposed a brainstorming session to involve young scientists in this process and provide extra input from the bottom up. Given today's mindset and technology, aren't there ways to achieve EGU's goal more effectively? By collecting ideas, suggestions and comments, and combining them into a shared effort, the goal of this session was to use the attendees' input to provide new ideas that can potentially improve the General Assembly. Here we present selected comments and ideas regarding the oral and PICO presentations. Many more suggestions and comments were collected during the brainstorming session, which will be made available soon on the YHS website (youngHS.com).

Judging from the results of the EGU surveys, scientists would like to see the setup of oral sessions improved. One of the main suggestions is to increase the degree of interaction, by either including today's technology or changing the setup. It was suggested to install a live Twitter feed, where people from the audience can post their comments or questions based on the presentation. Conveners would then select a few of these queries to ask the presenter. An easy-to-implement change of setup is to decrease the number of presentations in an oral slot from 6 to 5. The last 15 minutes can then be used to have a (hopefully converging) wrap-up discussion, with the presenters making up an expert panel. An oral block can be used to genuinely discuss a specific topic in detail and close it with a general statement about the discipline's current state of the art, identifying the challenges for the future.

PICO presentations are generally well received. The concept combines the best of both (oral and poster) worlds into an intense, highinteraction session. At our brainstorming meeting, participants made several suggestions to increase the effectiveness of PICOs, including the relocation of PICO screens for sessions organised by larger programme groups. The Hydrological Sciences Division,



Things participants would like to see improved, according to the EGU 2013 Survey.



Impression of the brainstorming session. (Credit: Tim van Emmerik)

for example, has all oral and poster sessions concentrated on one floor. It would be more attractive to have a location available there for PICOs too, so more scientists could attend a PICO session. Also, PICOs are relatively new and it was suggested that it would be beneficial to collect good PICO presentations together in a 'best practice' guide. By selecting innovative or well-attended PICOs, the EGU could show future presenters what is possible with this presentation format, and how the 2-minute pitching and follow-up discussion could be improved. This could be supported by introducing an Outstanding PICO Award.

The new generation of scientists believes that there is great potential to make the scientific sessions of the EGU General Assembly even more interesting and effective. To achieve this, future meetings should consider more interaction during oral sessions and increase the effectiveness of PICO presentations. In addition, the attendees of the brainstorming session unanimously agreed that it would be useful to organise similar discussion events in the future. We hope that our effort will contribute to new ideas for the EGU meeting and we look forward to hearing your visions next year!

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### Collaborate, share and learn how to develop sustainable scientific software

Nowadays, software and research go hand-in-hand. To advance their research, scientists not only use but also develop their own software packages. This, supporting scientific software development is essential and needs to focus on helping scientists produce robust, reliable and maintainable software. As data policies are increasingly considering software produced for research purposes as 'data', (e.g. the <u>AGU's data policy</u>), this is a topic relevant to Earth and space sciences community. The EGU journal Geoscientific Model Development in particular has taken a lead by requiring that authors make code available and accessible to potential users.

Researchers are not left alone with the problems they may face with software in their research. There are organisations specialising in supporting them, such as the UK-based <u>Software Sustainability Institute</u>. The Institute is based at the universities of Edinburgh, Manchester, Oxford and Southampton, and draws on a team of experts with a breadth of experience in software development, project and programme management, research facilitation, publicity and community engagement.

The Institute is a national facility for cultivating world-class research through software. For example, it provides <u>software engineering consultancy</u> for research projects that develop research code. Community outreach activities include the annual <u>Collaborations</u> Workshop and the <u>Fellowship Programme</u>. The Workshop brings together researchers, software developers, managers, funders and more to explore important ideas in software and research and to plant the seeds of interdisciplinary collaboration. The Fellowship Programme funds researchers to organise or attend events or meetings in exchange for their expertise and advice. The Software Sustainability Institute also delivers training in software skills for researchers and runs a variety of campaigns to support software in research, such as the Research Software Engineer campaign.

At the 2013 AGU Fall Meeting, four Institute fellows (Allen Pope, Melody Sandells, Kayla Iacovino, and Robin Wilson) proposed and convened a townhall meeting to discuss topics related to software in research. The session had about 50 attendees ranging from scientists developing their own code to software engineers working alongside researchers. Marco Tedesco, Program Director at the US National Science Foundation's Polar Cyberinfrastructure Program, kicked off the meeting by highlighting the three main topics for the session: collaboration strategies and technologies, software training for researchers, and code reuse, sharing and publishing.

The diverse audience allowed for exploration of the topic of software in research from different perspectives. The outcomes of the discussion further echoed many of the experiences that the Institute has had so far. Undoubtedly, these topics and issues are familiar to a number of researchers in the geophysical sciences.

#### Collaboration strategies and technologies

A wide variety of tools are used for collaboration: Google Drive, Dropbox, Skype and the old-school email. In general, collaboration

on the same resources works well, but many kinks are still in the works. Some institutions don't allow using certain popular tools among scientists (e.g. Skype), some tools don't scale up well (e.g. large Google Hangouts), and some researchers don't have the budget in place for video teleconferencing. A common problem shared was transferring terabytes of input data to collaborators: as someone commented: "We mail the hard drives."

## Software training for researchers

All agreed that software training is essential for anyone doing research and should begin as early as possible in a researcher's career. Software engineering skills must be taught, otherwise researchers are set up to write code that is unstable, difficult to maintain and has security gaps. Training should not be limited only to a programming language. Students should be taught good practices on structuring, commenting and testing code. There are many training materials available online, but without basic training in software development, students will not be able to make good use of them. It was suggested this was a ripe area for a workshop at future conferences.

#### Code reuse, sharing and publishing

Version control for managing code turned out to be a familiar solution with the session's attendees. Many used <u>GitHub</u>, but some noted that version control can be a bit of a headache. The time you spend figuring it out is usually precious time taken off research. The attendees also discussed the benefits of code review and different ways it could be done: from pair programming, to group meetings where the code is analysed line by line. Everyone was in favour of source code being published alongside the papers it was used for, following the example of journals such as <u>Computer Physics</u> <u>Communications</u>.

The session showed that exchanging ideas and sharing experiences helps to learn how to address the issues related to software and research. A lot has been done but there is still a lot to do. There are a number of initiatives helping scientists in getting trained up to develop sustainable software (such as Software Carpentry).

To continue and broaden this discussion, the Software Sustainability Institute is conducting a follow-on survey. We encourage all EGU members to please take five minutes to participate at <u>http://tinyurl.</u> com/AGU13software.

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