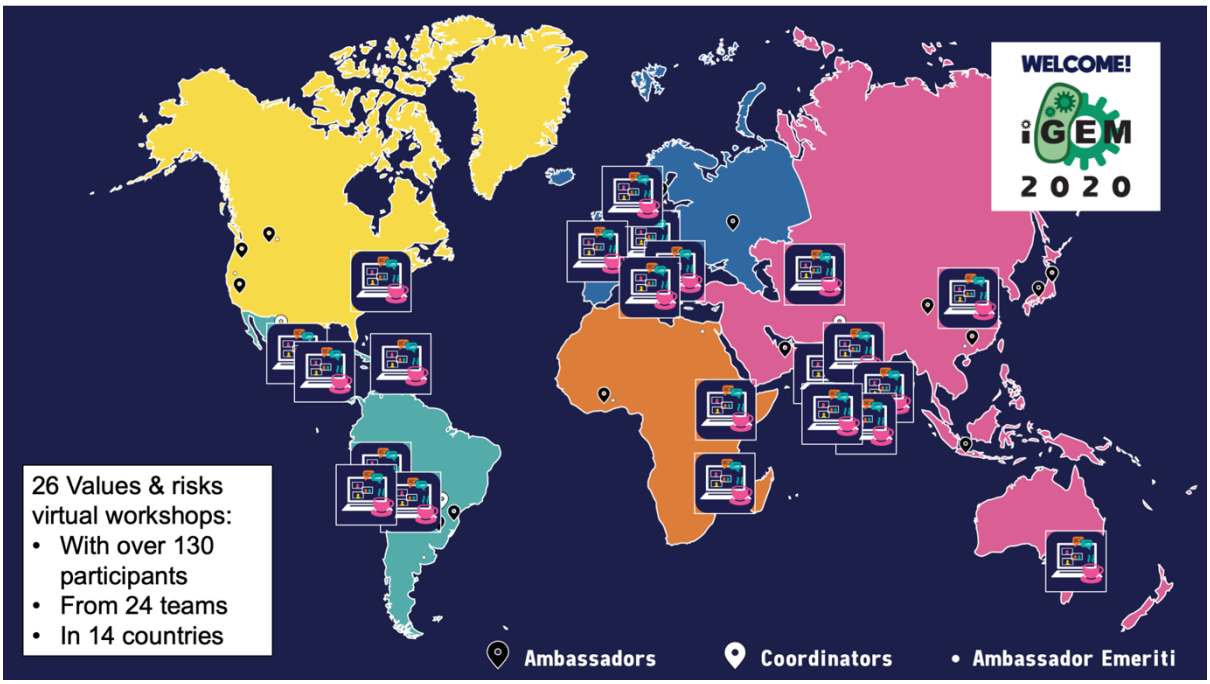
2020 Values and Risks Workshops

iGEM believes in local people solving local problems using synthetic biology. These solutions must also be pursued safely, securely, and responsibly. Like all of the life sciences and biotechnology, iGEM projects carry some risk, including potential harms to the team, their colleagues, communities, and the environment. iGEM uses various resources to manage these risks, including its Core Values, Human Practices, the Safety and Security Program, the Diversity and Inclusivity Committee, and the Responsible Conduct Committee. iGEM also provides tools, information and links to external resources to help teams identify and manage risks.

In 2020, iGEM developed and implemented a new workshop series on values and risks. These workshops: raise awareness of potential risks from iGEM projects among teams; increase the use of the Human Practices and Safety and Security Hubs; improve the content submitted in the Safety and Security form, and enable earlier identification of potentially controversial or higher risk projects.



During the first few months of 2020, iGEM's Safety and Security Program developed a presentation providing information and links to institutional support on: our values; rules of conduct; preventing harm to teams, participants, societies, and the environment (including policies on human subjects research, animal use, drug resistance, human experimentation, and do not release); human practices (including reflection, responsibility, and responsiveness); safety and security (including rules, roles, and resources); and, diversity and inclusivity (including building an open and welcoming community, and eliminating barriers to participation). The presentation was trialled with teams during the Opening Weekend of the competition (May 15-17, 2020). The presentation took place during the opening events and was showcased on the mainstage. Almost 100 participants took part and discussion and questions exceeded the available time.

The Safety and Security Program then developed an interactive hazard identification exercise to embed within the presentation. The exercise follows the misadventures of Team Example and helps participants identify possible harms from iGEM projects. It also facilitates instructor led discussion to help identify areas of uncertainty, unanswered questions, or need for additional support for teams.

In June 2020, iGEM recruited 15 of its After iGEM Ambassadors to run workshops with teams. In late June, the Safety and Security Program ran two train-the-trainer sessions with the Ambassadors. Over

the following 6 weeks, the Ambassadors ran a total of 26 values and risks workshops. These involved over 130 participants from 21 current or future teams from 14 countries[1], representing every inhabited continent on the planet.

After each workshop, the Ambassadors filled out a standardized reporting form to describe issues raised. This feedback showed show the workshops helped participants to:

- Become more familiar with iGEM's Safety and Security Rules and Policies;
- Answer important questions from teams, such as on the safe, secure, and responsible use of pathogens, parasites, insects, and environmental samples;
- Introduce, in some cases, participants to important safety and security concepts, such as the safe, secure, and responsible use of synthetic biology outside containment, or chemical safety for heavy metals; and
- Explore risks associated with their work, such as
    - The use of parts from SARS-CoV-2;
    - Potential pathogenicity gain-of-function by using virulence-related parts from one pathogen in a different chassis that also has virulence genes (but which is not generally considered to be a pathogen);
    - Potential resistance to treatment gain-of-function by using unusual resistance factors, or using resistance factors not commonly used in a particular organism;
    - Off-target and unintended effects; and
    - Environmental release.
- Identify areas for further improvement, including

As a direct result of the workshops, at least:

- One team committed to taking the iGEM values much more seriously during their participation;
- Three teams were put in contact with the Safety and Security Program for further discussion and support;
- One team was assisted in finding additional information about their national rules and regulations;
- Two teams identified a need to check in organisms, parts or activities in their project;
- One team replaced pathogen-related organisms or parts with those covered by the White List;
- One team developed and implemented biology-based containment systems within their project; and,
- Two dual use projects were identified.

Based on our experiences in 2020, iGEM will run the workshop series again next year. Workshops will be held earlier in the competition cycle to maximise the benefits of raising awareness and further facilitate the early identification of possible need for support. If feasible, online sessions will be supplemented with in-person sessions at meet-ups. As a result of the feedback received from the workshops, we will further refine the competition White List, provide additional information on project screening, explore opportunities for the provision of additional safety and security feedback to teams, and revise the workshop to make more use of polls and interactive elements.

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[1] Australia, China, Denmark, Germany, Greece, India, Kazakhstan, Mexico, Peru, Switzerland, Uganda, United Kingdom, United States, and Zimbabwe.