Addressing Challenges of Forced Displacement through STEM Education
Workshop Summary[1]

On March 9-10, 2023, the Center on Forced Displacement (CFD) at Boston University and the Committee on Human Rights (CHR) of the U.S. National Academies of Sciences, Engineering, and Medicine gathered experts in the fields of engineering, demography, human rights, innovation, migration, forced displacement, and pedagogy to explore the creation of a course and/or modules that would prepare STEM students to help address challenges associated with forced displacement. At least three workshop participants will pilot a course on this topic next year—including two who operate on quarter systems and one who operates on a semester system—and will be seeking assistance from experts, including other workshop organizers and participants, as they design the syllabi. These pilots are meant to be a starting point for the project, which will ideally scale up to include additional courses in varied formats.

Three participants opened the workshop by providing brief presentations on recent patterns of forced displacement, the phases of forced displacement, and the value of incorporating perspectives of those with lived experience into forced displacement-related conversations. The presentation on phases and types of forced displacement provided a loose framework dividing forced displacement into four stages: initiation, movement, pause (temporary relocation), and halt (permanent stay). These presentations served to inform later discussions about how to teach on forced displacement-related challenges and possible responses. Following these presentations, the group weighed the merits of pursuing a course versus modules and decided it would be useful to design both in tandem. While a full course provides the ability to explore issues in more detail, modules lower the barrier to entry and are more easily integrated into existing curricula. Regardless of the format, curricula should be interdisciplinary, and some participants felt it would be beneficial to cross-list courses on this topic between STEM, social sciences, and humanities. Views differed concerning the feasibility of having courses co-taught by professors across departments or taught by one instructor and having guest lectures when needed. Co-teaching can be difficult to maintain and requires buy-in from multiple professors. However, instructors may not feel qualified to teach the broad range of topics addressed in an interdisciplinary course. Another option is to have one instructor incorporate content from different experts, including through pre-recorded videos and live guest lectures.

Workshop participants acknowledged that the specific content included in a course/module may vary depending on the context as well as the home department, though several points emerged as important to the core content of courses on forced displacement. Content related to forced displacement could include some combination

[1] This summary was authored by Ana Deros (Research Associate, Committee on Human Rights, National Academies of Sciences, Engineering, and Medicine) and Rana Hussein (Research Associate, Center on Forced Displacement, Boston University).

of information on changing patterns over time; historical, political, and social contexts; drivers of forced displacement; and phases and types of forced displacement. Instructors may also choose to address issues related to privacy and security, cultural competency, and professional ethics. Content related to STEM education includes technical skills, such as data representation, visualization, and analysis; systems thinking and design; forecasting and projections; and survey design. Other skills include cost-benefit analysis, stakeholder mapping, and project management. Also important is to instill an understanding of the role science/engineering has played in contributing to forced displacement-related challenges, as well as the role it can play in alleviating or resolving problems.

The group noted that engineering curricula is often quite inflexible, with very little room for introducing electives or new courses. While other STEM fields might have more flexibility in structuring curriculum, it will still be a challenge to determine where such a course might fit in permanently. The content could be taught earlier in students' academic careers through modules in introductory courses that all students are required to take or as part of upper-level technical electives. An upper-level course could allow for a more project-driven class that requires students to apply advanced technical skills and could be cross-listed as a graduate course. An introductory course, however, could be useful in motivating students to consider these issues throughout their academic career and could influence their ultimate career path more strongly than a course taken at the end of college. Participants suggested that courses on this topic might be easier to incorporate if they are designed as electives that fulfill existing curriculum requirements. This could be done, for example, by creating a course that fulfills an ethics/philosophy requirement or that teaches skills related to research methods and design. It was also suggested that the course could be a part of a certificate program.

In a discussion on pedagogy, it became clear that the use of case studies—and other materials that allow for people with lived experience to share their perspectives—will be essential to teaching these concepts responsibly. Instructors will want to dispel common misconceptions surrounding forced displacement early in the course. Implementing a pre-course questionnaire can be useful in gathering information on student misconceptions and in helping to establish a knowledge base, which is particularly useful in a course that includes students from different academic backgrounds. These questionnaires are also helpful for evaluating the success of the course. Suggestions for student projects and exercises include knowledge checks within online learning modules, stakeholder mapping exercises, data analysis, role-playing simulations, story mapping, and other creative assignments. It was noted that exams are not an ideal way to evaluate student learning in these types of courses; rather, it can be useful to give students freedom to take individualized approaches to assignments based on components of broader contexts that are of interest to them. Fieldwork should not be prescribed as an essential component of such a course, as the value and

appropriateness of fieldwork depends greatly on the context and existing community relationships.

Participants identified gaining institutional support as a key challenge to integrating the topic of forced displacement into STEM education, in addition to recruiting faculty willing to teach a course/module on this topic. Suggestions for addressing these issues include creating modules with different field focuses that can be offered at different phases of education, emphasizing the role such courses can play in improving student retention, and pursing ABET accreditation for the courses/modules. It is also important to recognize that not everyone will be convinced to teach on this topic, but there is value in making things easier for those who are willing to integrate this material. Participants similarly identified student engagement as a potential issue. Suggestions for encouraging student engagement include emphasizing the marketable skills that can be developed through such a course, using situated knowledge to make the course relatable for students (such as by focusing on local instances of forced migration), and identifying career paths that would allow students to address societal issues without struggling financially.

Scaling up the project will likely require outside funding. It was recommended that pilot courses be designed with an evaluation component that can be used to show funders their impact. Questions emerged surrounding who would "own" the developed curricula/modules given the group effort that will go into preparing them. The group felt that a body other than a university ought to store any developed materials to avoid potential competition issues that could arise if housed by an academic institution.

Following the workshop, CFD and CHR staff will outline the types of assistance that those piloting the courses are seeking and help to identify existing materials that may be useful for teaching on this topic. Other possible next steps include publishing a report regarding the meeting outcomes and current state of literature in this space, creating an internal repository of teaching materials (to include readings, case studies, slide decks, videos, etc.), and organizing panels and other events on this topic.