Statement of Principles on the Development of the Science and Technology Workforce Development

Preamble

Nations recognize that the accelerating pace of science and engineering discoveries and technological innovations; national science, technology, engineering, and mathematics (STEM) workforce and demographic trends; and the growing globalization of science and engineering present both challenges and opportunities for national economics and funding agencies. A diverse and scientifically literate workforce is critical to the transition to a knowledge and information-based society.

There are global and national imperatives for investing in the development of the STEM workforce. Although the needs and priorities of countries differ based on their individual contexts, there are principles that broadly apply to their common goals. All research ecosystems strive to develop a robust and sustainable workforce by attracting, training, retaining, and further supporting talented scientists, students, technicians, and skilled STEM workforce professionals that are instrumental to high quality research and innovation.

The research and innovation landscape is rapidly evolving, and stakeholders must reassess the skills, knowledge, and competencies that the STEM workforce of the future will need to pursue a range of careers. The identification of new skills must consider the demands of research disciplines as well as technical and transferable professional skills for a range of research and research-related careers within and outside academia. The novel coronavirus pandemic has also taught nations that new audiences can be reached through innovative approaches, such as the use of virtual platforms. The ability to reach new audiences presents an opportunity to foster a more diverse, inclusive, and larger STEM workforce capable of transformative scientific advancements.

Societal challenges, e.g., climate change, and the constant evolution of technologies such as Artificial Intelligence, robotics, digital revolution, etc. should also be taken into consideration. Nations recognize the importance of fostering transdisciplinary research that integrates physical, natural, and social sciences as well as the humanities to address these complex societal challenges. Skills deriving from all scientific fields should be fully integrated in reflections on how to prepare the STEM workforce of the future.

International cooperation and partnerships promote the development of the STEM workforce by building the research and innovation capacity of local workforces. They also expose researchers to different research cultures and environments, advance their careers, and build research networks. A well-distributed circulation of the STEM workforce should be developed in all regions of the world.

Principles

GRC Participants agree that:

1. A broad, vibrant, diverse, and inclusive STEM workforce across skill levels is critical to national and global research ecosystems, as well as national and global economies. Research funding councils should prioritize broad participation of researchers and STEM professionals, including early career researchers, women, and members of other groups underrepresented in STEM. Research funding councils should also embed diversity and inclusivity (including a strong focus on gender and intersectionality) into the development of the STEM workforce through collaborative efforts aimed at enhancing the preparation, increasing the participation, and ensuring the contributions of individuals from groups that have been historically underrepresented and underserved in the STEM enterprise.
2. Research funding councils should adapt to a changing research and innovation landscape by catalyzing innovation and advising key stakeholders across sectors to develop a multi-level STEM workforce that has technical and transferable professional skills.
3. Basic and applied STEM education research and training are essential to responding to rapid technological changes. Research funding councils should promote novel, creative, and transformative approaches to generating and using new knowledge about STEM teaching and learning to improve STEM education.
4. Mobility in careers both domestically and internationally contributes to development of skills in research and innovation and better cooperation among research organisations, private industry, non-governmental organizations, informal science centers, and other organisations. Research funding councils should support a variety of STEM career pathways and the development of transferable technical and professional skills to enable career moves, such as through reskilling and upskilling, and promotion of stronger relationships among common research foci and disciplines across sectors.
5. Building effective research teams and leveraging skills and knowledge are key to performing transformative research. Research funding councils should pursue mechanisms to fund interdisciplinary research and support international teams to catalyze scientific discovery and innovation.

Considerations

The Global Research Council recognizes that nations' interests in addressing national needs and challenges must be recognized while pursuing the global interest in building a robust and diverse STEM workforce. Learning is a long-term process that continually evolves over a lifetime and extends beyond academia to include informal, experiential, and technical training. (Re-) skilling and (up) skilling will be key to ensuring the STEM workforce remains inclusive and competitive on the global landscape. Moreover, new research assessment processes and methodologies are called for to identify and support the best research(ers) while encouraging a broader diversity of research profiles and careers. They should reward a broader range of skills (entrepreneurship, education, communication, etc.,) and consider the specific demands of research practices across disciplines and types of research.