Scientists Collaboration for Science Development and Peace: USERN View

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Scientists play a crucial role in the development of science by proposing new hypotheses, conducting research, refining existing theories, and generating new knowledge. Their work forms the foundation for technological advancements, medical breakthroughs, and environmental solutions that shape modern society and improve the quality of life for humanity (1,2).

Important scientific discoveries were made by individual scientists working alone, rather than in a network. One notable example is Isaac Newton's development of the laws of motion and universal gravitation in the late 17th century. While Newton had access to the work of other scientists like Kepler and Galileo, his formulation of the fundamental principles of physics was largely done in isolation. Other examples include Albert Einstein and the theory of relativity, Marie Curie and radioactivity, Gregor Mendel and the laws of inheritance, Dmitri Mendeleev and the periodic table, and Charles Darwin and the theory of evolution (3).

It is generally better for scientists to work as part of a network rather than alone. While independent research allows for deep focus and innovation, scientific progress today increasingly depends on collaboration. Working within a network enables scientists to share expertise, resources, and data, which accelerates discovery and problem-solving. In addition, complex scientific problems, such as climate change, public health issues, and space exploration, often require the combined efforts of expert scientists from multiple disciplines.

There are important scientific discoveries that happen only through scientific networking and collaboration among scientists. One prime example is the Human Genome Project, completed in 2003. Other notable examples include CERN and the discovery of the Higgs Boson, the development of mRNA vaccines for COVID-19, research on the International Space Station (ISS), research on global climate change, the development of antiretroviral therapy for HIV/AIDS, and many others. These examples demonstrate that in many of today’s most significant scientific breakthroughs, collaboration across borders, disciplines, and institutions is essential for tackling the complexity and scale of modern scientific challenges. In line with the aim of borderless networking in science, in 2015, the first meeting for top scientists from different disciplines and nations was held to establish a network of top scientists as well as Nobel and Abel Laureates to move towards science without borders. A year after the meeting, the Universal Scientific Education and Research Network (USERN) was officially introduced and started its activities (4).

The Universal Scientific Education and Research Network (USERN) aims to foster scientific collaboration and promote education and research worldwide. Established with the concept of “Science

without Borders", USERN seeks to eliminate borders between scientific communities, countries, and nations. It encourages interdisciplinary scientific activities, and supports the development of scientific education at all levels. By creating a platform to facilitate international collaboration among early career researchers, scientists, and institutions, USERN aims to enhance global scientific capacity to address complex global problems. USERN also focuses on nurturing the next generation of scientists through educational initiatives. By promoting scientific education and research as tools for global peace and progress, USERN strives to create a world where scientific knowledge is accessible to all, regardless of geographical or socioeconomic barriers. As USERN enters its 10th year of scientific activities, a consensus on promoting science beyond borders is written and agreed by scientists from different disciplines, in which the thematic concepts of the USERN Congresses as pillars of the organization are also highlighted.

Science without borders

To promote international collaboration in science, scientists are supposed to foster partnerships across nations, bridge cultural and geographic gaps, facilitate the sharing of knowledge and innovation, and encourage interdisciplinary scientific activities. Scientists should work beyond borders; this includes geographical borders, borders between disciplines, and borders between generations. In this regard, the theme of the 1st International USERN Congress and Prize Awarding Festival, November 2016, Tehran, Iran, was "Science without Borders". USERN's main slogan is "Science without Borders". The USERN Statute was written in 9 articles, 34 sections, and 5 clauses on January 21st, 2015, then approved and signed by more than 100 top 1% scientists and officially unveiled on November 10th, 2016 (5). USERN tries to facilitate the exchange of ideas, resources, and expertise, empowering scientists, students, and researchers from different backgrounds to collaborate to find solutions to address global challenges such as climate change, public health challenges, and technological advancement. Science without borders would be able to create a more interconnected and inclusive world where the pursuit of knowledge benefits humanity (6).

Evolution in science

The ongoing process of scientific discovery and refinement through constant testing of ideas, obtaining a deeper understanding of natural phenomena, and designing more accurate models of the world has always been important for scientists. Scientific communities aim for evolution in science, which drives them to move forward by advancing science through continuous learning, innovation, and collaboration. By encouraging critical thinking and facilitating interdisciplinary collaborations, USERN aims to drive progress in understanding complex global issues. Pursuing evolution in science ultimately contributes to a more informed, innovative, and sustainable future for all. The drastic evolution in science is inevitable. It is important to guide it along the desired path to serve humanity. For example, the development of artificial intelligence has captured the attention of the scientific community and concerned groups of scientists regarding the safety of rapid progress in artificial intelligence for humanity. In this regard, the theme of the 2nd International USERN Congress and Prize Awarding Festival, November 2017, Kharkiv, Ukraine, was "Evolution in Science". USERN Advisory Board consists of more than 630 top 1% scientists, including 22 Nobel and Abel laureates, from all 21 fields of science. From each field, one representative is selected through voting among the board members, creating the USERN Policy-Making Council. The USERN Policy-Making Council and USERN Advisory Board members are responsible for leading major scientific activities within USERN (7,8).

Interdisciplinary science for life and peace

The power of collaboration across different scientific fields to address the most pressing challenges facing humanity is undeniable. Through interdisciplinary research and education, it would be possible to set targets to create a world where science not only advances human well-being but also contributes to lasting peace and harmony on a global scale. By delving more in depth into complex problems, the role of multidisciplinary and interdisciplinary collaborations comes to light, as complex problems cannot be tackled by one single discipline. In this regard, the theme of the 3rd International USERN Congress and Prize Awarding Festival, November 2018, Reggio Calabria, Italy, was "Interdisciplinary Science for Life and Peace". Similarly, the USERN Prize is annually bestowed upon young scientists who have made important contributions to the advancement of science in their field, in five different fields of science, namely Formal Sciences, Physical and Chemical Sciences, Biological Sciences, Medical Sciences, and Social Sciences. To receive their prize, the young scientists selected as the USERN Prize Laureates attend the

USERN Congress and Prize Awarding Festival, which is a friendly interdisciplinary scientific meeting to collaborate with peers from different fields (9).

Applied science

Applied science is the practical application of scientific knowledge to bridge the gap between theoretical understanding and practical implementation of science and facilitate achieving real-world advancements. It is important to facilitate translating cutting-edge research into real-world applications that benefit industries, communities, and individuals. Although it is important to support all research, those which move on the edge of science and will be applied into practice could be the priorities. In this regard, the theme of the 4th International USERN Congress and Prize Awarding Festival, November 2019, Budapest, Hungary, was “Applied Science”. The USERN annual congress is a place for sharing the newest findings in different fields of science, where expert scientists and early-career researchers gather to discuss science development. USERN emphasizes the importance of using scientific discoveries to tackle urgent global issues, such as climate change, disease prevention, and resource management, leading to a more sustainable and equitable world (10).

Science to society

Scientists emphasize the importance of translating complex scientific knowledge into accessible information, enabling informed decision-making on issues such as public health. During the COVID-19 pandemic, countries-imposed travel restrictions and close borders to prevent the spread of the virus. However, is it reasonable to define borders while fighting against a virus that knows no borders? Keeping in mind the goal of “Science to Society” would help to continue scientific networking while staying safe from fatal threats like COVID-19, enabling the finding of proper solutions for complex problems during such complicated periods. In November 2020, USERN held the 5th International USERN Congress and Prize Awarding Festival, November 2020, Tehran, Iran, as a hybrid event (simultaneous in-person and virtual event) with the theme of "Science to Society", which emphasizes the vital connection between scientific research and the communities it serves (11). Coronavirus Disease (COVID)-19 book was written with the contribution of USERN advisory board, USERN junior ambassadors, and USERN partners in the early months of the pandemic emphasizing the necessity of borderless collaboration to combat COVID-19 (12-14). To continue the scientific exchange during the pandemic, USERN organized the first hybrid congress in the world.

The elephant in the dark room

Rumi’s poem "The Elephant in the Dark Room" is a powerful metaphor about perception and understanding. In the poem, a group of people, each blindfolded, are asked to describe an elephant by touching only one part of its body. One touches the trunk, another the tusks, another the ears, and each comes away with a vastly different interpretation of the animal, none of which fully captures its true nature. This metaphor illustrates how limited perspectives can mislead our understanding of a larger truth. In other words, in the context of science, this metaphor highlights the importance of interdisciplinary studies, collaboration of different fields of science, and dialogue between scientists from different backgrounds in uncovering the complete picture of complex phenomena. In this regard, the theme of the 6th International USERN Congress and Prize Awarding Festival, November 2021, Istanbul, Turkey, was “The Elephant in the Dark Room”. USERN established a book series, being published by Springer Nature, named “Integrated Science”, in which the integration of different fields of science and interdisciplinary collaborations are encouraged. So far, more than 30 volumes of this book series have been published (15,16).

Contemplate the universe, discover science

The phrase “Contemplate in the Universe, Discover Science” can be found in philosophical and religious sources. Reflecting the idea that the vastness of the universe serves as both a source of wonder and a catalyst for scientific discovery. This approach inspires curiosity and triggers scientific exploration. It is important for humans to observe, think, learn, and take action during their lifetime. Individuals need to empower their wings before they can fly in the endless sky of science. Additionally, flying with a group (scientific collaborations) can provide a safer and more successful experience. Contemplating the universe to deepen one’s understanding of science is a helpful step in scientific development. The theme of the 7th International USERN Congress and Prize Awarding Festival, November 2022, Muscat, Oman, was “Contemplate the Universe, Discover Science”. USERN aims to empower the wings of students and young scholars by organizing educational events to guide them through their future career paths. USERN has officially launched

USERNversity, an initiative that offers extra-curricular programs. So far, four internships (research internship, laboratory techniques internship, presentation skills internship, and internship at the executive committee) and three programs (e-learning program, InnoWeek, AI and Python school) have been established under USERNversity's name (17). To assess the educational and administrative activities of students and young researchers, USERN introduced the Universal Accreditation System (UAS) credits (18). Additionally, after a thorough study of available scientometric indicators, USERN developed the Universal Research Index (UR-Index) as a better representation for researcher's scientific profile (19).

United science and art: the power for peace

"United Science and Art: The Power for Peace" highlights the potential that emerges when the rationality of science and the creativity of art come together to address global challenges. Through scientific innovations, such as sustainable technologies or medical advancements, and artistic expressions, such as music, literature, or visual art, we can address shared human concerns, encourage dialogue, heal divisions, and promote global peace. In this regard, the theme of the 8th International USERN Congress and Prize Awarding Festival, November 2023, Yerevan, Armenia, was "United Science and Art: The Power for Peace". Also, following the same concept of the "united science and art", USERN & Companions House and Museum was officially inaugurated on January 1st, 2024, as place for the integration of science and art (20).

Bringing science to life

Following the goal of "Bringing Science to Life", it is important to focus on making scientific knowledge accessible, engaging, and relevant to people of all ages and backgrounds. Scientists believe that science is not confined to labs or textbooks but is integrated into daily life. It is important to help individuals understand how science shapes the world around them and empowers them to make informed decisions about the future. The United Nations defined 17 global objectives as the Sustainable Development Goals (SDGs). The slogan "Bringing Science to Life" is directly tied to the SDGs, which aim to address a wide range of global issues, including poverty, gender inequality, climate change, environmental degradation, and peace and justice. The SDGs include no poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry and innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace and justice and strong institutions, and partnerships for the goals. The awarding ceremony of the 10th International Festival of Paintings for Pediatric Patients was held during the 9th International USERN Congress and Prize Awarding Festival, November 2024, Plovdiv, Bulgaria, with the theme of "Bringing Science to Life". To encourage progress toward achieving the SDGs, a book entitled "Sustainable Development Goals" was published with the contribution of USERN members (21).

Intelligence in health: from formal to psychoMedical sciences

"Intelligence in Health: From Formal to PsychoMedical Sciences" highlights the transformation of understanding mental health, in addition to physical health, through a multidisciplinary lens. The complexity of health extends beyond the physical realm, emphasizing the importance of a broader view that incorporates social sciences. Incorporating social science into health intelligence provides critical insights into the behaviors, policies, and societal structures that impact health, implying a deeper understanding of the social determinants of health, such as access to healthcare, socioeconomic status, and community support systems. This perspective highlights the importance of both personal and community responsibilities in improving public health and underscores the need for policies and practices that address health disparities, promote health equity, and foster a healthier society overall. In this regard, the theme of the 10th International USERN Congress and Prize Awarding Festival that will be held on November 2025, in Sao Paulo, Brazil, is "Integrative System in Health: From Formal and Natural to Social Sciences". The Health and Art (HEART) group, affiliated with USERN, aims to improve mental health in pediatric patients, as psychological well-being is inseparable from physical health. For this purpose, the HEART group organizes the International Festival of Paintings for Pediatric Patients (IFPPP) and the Football Mini World Cup (22,23).

Organizing continuous meetings for scientists from different disciplines to discuss developments in science and create a perspective for future research would be helpful in tackling complex problems and moving toward global peace. Single stars in the dark sky are

shiny; however, they can keep the sky brighter when shining together.

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