Cover Memo: Volume 20, Issue 2, Special Issue on STEM Education and Workforce Development

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On behalf of Sigma Xi, The Scientific Research Honor Society, it is my pleasure to introduce Volume 20, Issue 2, of the *Journal of Science Policy & Governance (JSPG),* which focuses on **Re-envisioning STEM Education and Workforce Development for the 21st Century**. This special issue, sponsored by Sigma Xi, stems from discussions on the effects of the COVID-19 pandemic on future generations in terms of educational opportunities, learning formats, as well as STEM workforce structure and development.

It has been said that in the midst of every crisis lies great opportunity. The COVID-19 pandemic represents one of the greatest global crises in recent memory. The disruptions caused by the pandemic exposed and exacerbated social and economic disparities across the globe. Lower-income and minority populations experienced disproportionate impacts as educational systems and employers have struggled to adapt to rapidly changing health and safety conditions. The lasting effects of this crisis on the U.S. effort to recruit domestic and international STEM talent will become clearer and more important in the future, especially as the nation emerges from this pandemic.

In its 2005 report, *Rising Above the Gathering Storm*, the National Academies of Sciences, Engineering, and Medicine (NASEM) proposed a comprehensive and coordinated federal effort to create high-quality jobs and advance new science and technology initiatives to meet the nation's needs. The report emphasized the importance of increasing America's science and technology talent pool; strengthening the nation's commitment to long-term basic research; developing, recruiting, and retaining top students, scientists, and engineers; and ensuring that the U.S. is the premier place in the world for innovation. The federal government responded in a variety of ways, including through passage of the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act of 2007 (America COMPETES Act), which invested in education programs and innovation through research and development to improve U.S. competitiveness. The America COMPETES Act has been reauthorized multiple times since 2007 and Congress is currently working to renew it, as well as to enact additional bills that boost U.S. competitiveness.

Subsequent NASEM reports have provided additional guidance on the future of education research and explored how the graduate education system might best respond to new teaching practices which address the needs of students and society. Despite adjustments by federal and state governments to strengthen and broaden participation in STEM education and training programs, the overall effort to build a competitive science and technology workforce proved to be inadequate during the COVID-19 pandemic. Remote education programs exacerbated the technology divide between students in rural and urban communities, as well as between countries. A lack of general understanding of the scientific process and how it relates to the

pandemic response highlighted the need for integration of the STEM curriculum at all educational levels and in all geographical areas. Communication failures and policy missteps exposed the urgency for developing civic awareness and engagement competencies within the scientific enterprise. These deficiencies and many others present opportunities for policy interventions that can not only improve the response to future crises, but could also build a scientific enterprise that better serves the social and economic needs of the nation and the world. The innovative early career authors featured in this issue have identified systemic changes that could improve educational and workforce development outcomes for future generations, and their published work has the potential to greatly improve the landscape of the field for all.

Sigma Xi extends its deepest gratitude to the individuals who submitted articles for consideration in this special volume, and we would like to congratulate all published authors. We are collectively inspired by the visions of the future that you have all so eloquently put forth in your articles. These ideas will allow us to re-envision the landscape of STEM education and workforce development in the light of the COVID-19 pandemic, and to build forward a future that is focused on equity and inclusion, access to technology, and aligning training opportunities with workforce demands across the globe. We look forward to working with you to make this future a reality in the years to come, and are grateful for collaborating with *JSPG* on this special issue that exemplifies our common vision for the future.

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Dr. Jamie Vernon is executive director and CEO at Sigma Xi and publisher of *American Scientist*. From 2014 to 2017, he served as Sigma Xi's director of science communications and publications and editor-in-chief of *American Scientist*. He was also Sigma Xi's co-director of operations from 2014 to 2015. A molecular biologist by training, he transitioned from research in 2011 to serve as an American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellow and an Oak Ridge Institute for Science and Education (ORISE) Fellow in the U.S. Department of Energy. For more than a decade, he has been an advocate for the use of science in decision making at all levels of government, business, and in our personal lives. He holds a B.S. in zoology from North Carolina State University, an M.S. in biotechnology from East Carolina University, and a Ph.D. in cell and molecular biology from The University of Texas at Austin. Connect with Jamie on Twitter at @SigmaXiCEO and @JLVernonPhD.