



American Society for Microbiology Response to



Addressing the varied aspects of the bioeconomy will require the federal government to launch a long-term, large scale, multi-disciplinary effort to ensure that the U.S. is **the** leader in this field in the next decade. Such an endeavor should include a robust federal investment in fundamental microbial research and its applications across multiple agencies to develop and refine the use of microbes to support a 21st century bioeconomy. If we are to capitalize on this investment, fundamental advances are needed, but these must also be translated to industrial scales. Thus achieving a strong bioeconomy will require continued refinement of inventions, collaboration with economists, social and political scientists, as well as policies that support the commercialization and global protection of these technologies. Perhaps most importantly, it will require a sustained financial investment from the federal government now and in the years to come.

The potential benefits of this investment are enormous. They range from training of blue collar, white collar and technical experts who will form the workforce for this new bioeconomy, to development of knowledge that forms the technologies that support existing industries or create whole new economic sectors. Benefits also include the underpinnings of integrated supply chains that will generate revenue and jobs for rural sectors that have not traditionally benefitted from the 20th century industrial revolution.

As a global society with a presence in 112 countries, ASM is particularly attuned to the need for international collaboration to grow the bioeconomy. As countries around the world face grand challenges like climate change, antimicrobial resistance, food and water shortages and renewable energy, ensuring that the scientific knowledge and new technologies reach areas most in need is essential. As part of its leadership role in building this bioeconomy, the U.S. federal government must ensure that experts both inside and outside government entities are consulted about the scientific underpinnings, and that all available evidence is used to guide decisions.

Likewise, to protect the bioeconomy from threats associated with infectious disease and pathogens, vaccine development and deployment and clinical laboratory infrastructure have important roles to play. The network of academic biocontainment laboratories has a global role to play in advancing our understanding of the most dangerous pathogens, and the development of products needed for their prevention and control.

Challenges to implementing change

The traditional organizational structures of academia, industry, and the government often make cross-collaboration difficult. However, federal leadership of and investment in grand challenges such as sending a man to the moon, sequencing the human genome, and creating the internet illustrate how a major endeavor can transform the daily life of citizens and position

the U.S. to be the global leader in paradigm-shifting technologies. By analogy to these examples, ASM proposes that t

For more than a decade, federal government research grant pay-lines have been so low that young scientists have been turning away from academic research as a career goal. The problem has been compounded by the targeting of funds to more translationally-focused initiatives. This has the effect of discouraging people from pursuing research in basic science, which is the foundation for most of the advances in clinical-translational research. Agency priorities should include training of the next generation of scientists. We must ensure that sufficient funding is appropriated so agencies can allocate resources toward trainees and early career scientists to encourage their development as independent scientists in academic settings, especially for those who are dedicated to basic research.

To fully realize the potential of the bioeconomy, it is also essential that this robust support focus on building an inclusive and diverse scientific workforce. Moreover, federal support is needed for the development of infrastructural resources, such as training programs at the undergraduate and graduate levels for new leaders in this growing field. With strong public support, multidisciplinary teams can be assembled at the institutional level that include scientists, engineers, economists and policy experts to develop the learning systems needed to grow a beneficial bioeconomy.

With respect to biodefense

grow a balanced portfolio of research and development efforts.

With respect to biodefense and its role in the bioeconomy, we must ensure that biocontainment laboratories are safe and secure, particularly as these entities proliferate around the globe. For example, today there are more than 50 BSL4 laboratories in operation or under construction around the world.

The U.S. should re-establish a program to support international engagement with foreign biocontainment laboratories to ensure safety and security of these facilities by providing training in best practices and conducting collaborative research activities to enhance transparency and reduce the risk of intentional misuse of dangerous pathogens.

Funding is no longer available to ensure that the U.S., which has always been a global leader in research and development involving especially dangerous pathogens, can assist new facilities in foreign countries with the establishment of best practices for safe and secure operations of their facilities. This leaves a massive gap in global security because without safeguards and training in place, the risk of accidental release of dangerous pathogens and misuse by nefarious actors greatly increases. Funding is needed to resume these critical educational activities.

Conclusion

Advancing the bioeconomy is dependent upon the advancement of the microbial sciences and their application in the world. The American Society for Microbiology thanks the White House Office of Science and Technology for its attention to this important and rapidly growing dimension to the U.S. economy, and for making research and development a key priority. ASM and its members look forward to next steps in this endeavor and stand ready to assist you. For more information, please contact Allen Segal, ASM Director of Public Policy and Advocacy, at asegal@asmusa.org or 202-942-9294.

Sincerely,

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