

**Advances in Design and Use of Microbial Production Systems: A Workshop for the BWC Community**  
Organized by the Biosecurity Working Group of IAP – The Global Network of Science Academies and the  
U.S. National Academies of Sciences, Engineering, and Medicine

Sunday, 9 August 2015  
Hotel N'vY, Rue de Richemont 18  
Geneva, Switzerland

Microbial systems can be used to produce therapeutic proteins, as well as chemical molecules such as drugs and biofuels. The possible applications of bio-based production continue to expand, enabled by advances in the ability to manipulate genes and metabolic pathways through synthetic biology. A recent report from the U.S. National Research Council, for example, notes that the market for industrial chemicals produced using synthetic biology is already \$1.5B and expected to expand annually by 15-25% (NRC. 2015. *Industrialization of Biology: A roadmap to Accelerate the Advanced Manufacturing of Chemicals*. Washington, DC: National Academies Press).

The symposium will explore how the design and scale-up of microbial systems is changing the nature of biological and chemical production, what factors are helping to drive this expansion, and what implications these developments may have for the implementation of the BWC. If you are interested in attending, kindly contact Dr. Katie Bowman, U.S. National Academy of Sciences (kbowman@nas.edu).

**Goals:**

1. Review the “design-build-test” paradigm in synthetic biology, basic steps in the process of developing a microorganism capable of synthesizing a desired biological or chemical product, and key technical barriers.
2. Learn about progress in the development of integrated design tools and remote platforms that can help streamline the process of creating microbes with the ability to efficiently produce biological or chemical products of interest.
3. Learn how the use of bio-based systems is affecting production models in chemical and biological industries, major drivers, and global trends.
4. Discuss how trends and developments might impact the Biological Weapons Convention.

Preliminary Agenda:

SESSION I

10:30 Welcome

Introduction to the Topic and Strategies for Reducing Barriers

*Please hold questions and discussion until the end of the panel*

10:40 Synthetic design and construction of microbial production system: Key steps in the design-built-test paradigm, technical barriers, and recent policy landscape

11:00 Developing an integrated design tool: Recent progress, remaining challenges, and implications

11:20 Platforms for engineering microorganisms and for laboratory development and testing

11:40 Discussant remarks

12:00 Q&A/discussion

12:30 Session adjourns

LUNCH (*will be provided for participants*)

SESSION II

13:45 Reconvene

Examples In Action

*Please hold questions and discussion until the end of the panel*

13:50 Industrial use of microbial production systems: Models, drivers, and challenges

14:10 Examples from several countries making use of designed microbial and bio-based production systems

15:10 Q&A/discussion

15:30 What are the Implications for the BWC?

16:30 Meeting adjourns