

**Comments Submitted by  
the Synthetic Biology Engineering Research Center (Synberc)  
to the National Academy of Sciences Forum on Synthetic Biology  
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**Overview**

Synthetic biology is contributing sustainable and innovative solutions to many human needs and global challenges. Technical advances continue to open up new possibilities in health care, agriculture, chemicals, materials, energy, and bioremediation. With an expected global market of \$10.8 billion by 2016, synthetic biology will play an important role in the bioeconomy, and has increasing implications for future US competitiveness and employment.

By combining insights from biology, computation, engineering, ethics and other disciplines, we can create new biotechnologies that provide social and economic value on a tremendous scale. That premise is at the heart of synthetic biology. How far we can go with this technology depends on our ability to bring together diverse researchers and stakeholders with vision, smart plans, and the support to carry it through. The frontier of engineering biology is still just beginning to be explored, and there is much to be done to fulfill the promise of synthetic biology safely and responsibly.

**The Opportunity of Synthetic Biology and Cost of Inaction**

Synberc (the Synthetic Biology Engineering Research Center, [www.synberc.org](http://www.synberc.org)) was established in 2006 with support from the NSF as an early US endeavor to develop the foundational understanding and technologies needed to build biological solutions as an engineering practice. Over the years, Synberc has helped to shape the research agenda of the field, developed numerous foundational technology advances, served as an important venue for convening academic and industrial researchers, and helped train many of today's synthetic biology leaders and investigators. Synberc's Practices program stands as a model for enabling dialogue, research and education to explore and align biotechnology goals and activities with public values and needs.

With the foundation laid by Synberc and others, synthetic biology has established itself as an important new discipline, with the US leading the world in intellectual conception, research, and commercial development. Many new research centers and programs have been launched in the US, resulting in fundamental advances such as highly multiplexed genome engineering, rational design tools, standardized parts and registries, and engineered cell traits. Such advances have led to the tripling of companies in this emerging industry in the last four years. Many of these companies have established products or products in development, including specialty chemicals, enzymes, synthetic genes and other DNA parts, pharmaceuticals, biofuels, and chassis microorganisms. Early commercial successes will likely include microbially produced malaria drugs, biofuels from non-food biomass, and rapid vaccine production.

Will the US capitalize on its early lead in synthetic biology by developing a coordinated national research strategy that pushes the research frontier in direct response to the needs and concerns of industry and the public? Other countries – China and the UK in particular – also understand the field's potential and have clear national strategies and large coordinated investments. As NSF support for Synberc ramps down, new funding sources and a new approach will be needed to organize, fund and propel this growing community in over the next ten years. The US thus must act quickly or risk falling behind in an industry and research sector we have pioneered. The time is now to bring public and private actors together to create a new national organization to lead synthetic biology in strategic directions that are consistent with national priorities and values.

**The Path Forward, and a Call for Participation**

Synberc, with support from The Alfred P. Sloan Foundation, is conducting a one-year sustainability initiative to develop a strategic action plan to extend the efforts begun by Synberc and advance the field of synthetic biology in the US. The preliminary findings were shared with nearly 300 members of the synthetic biology community at Synberc's Fall 2013 Symposium. Nationally, more than 90 researchers already are involved in Synberc-organized working groups to define our shared vision as well as the field's key needs and priorities. The final recommendations and strategic plan will be completed in December 2013 and implemented in 2014. We invite you to participate in this process by participating in one or more of our working groups. The working groups are focused on the following areas:

**1. Research**

- a. **Development of a Research Agenda** with both short- and long-term goals and a shared vision for achieving outcomes consistent with public values and priorities.

