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Award Abstract #0946510

SynBERC BioFAB Facility

NSF Org:	EEC Div Of Engineering Education and Centers
Initial Amendment Date:	November 30, 2009
Latest Amendment Date:	November 30, 2009
Award Number:	0946510
Award Instrument:	Standard Grant
Program Manager:	Lynn Preston EEC Div Of Engineering Education and Centers ENG Directorate For Engineering
Start Date:	December 1, 2009
End Date:	May 31, 2012 (Estimated)
Awarded Amount to Date:	$1,400,000.00
Investigator(s):	Adam Arkin aparkin@lbl.gov (Principal Investigator) Drew Endy (Co-Principal Investigator) Jay Keasling (Co-Principal Investigator)
Sponsor:	University of California-Berkeley Sponsored Projects Office BERKELEY, CA 94710-1749 (510)643-3891
NSF Program(s):	EEC Innovation Awards
Program Reference Code(s):	7960
Program Element Code(s):	7960

ABSTRACT

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0946510, Arkin, University of California-Berkeley

The primary purpose of this bio-fabrication facility (BioFab) is to ensure that all of the driving testbed applications of the Synthetic Biology Engineering Research Center (SynBERC) that are both existing and future have rapid access to high-quality standard biological parts as well as DNA synthesis and part assembly services. Two critical secondary purposes are: (1) the development and testing of the best organizational architecture for operating and scaling a production facility that is capable of producing many standard biological parts and that supports broader community participation across

both academia and industry, and (2) ensuring that all foundational SynBERC-developed technologies, from rapid genome-scale reengineering of chassis to function composition standards for devices are broadly accessible and rapidly translated into SynBERC testbeds and to industry. Practically, the facility will pursue three specific projects at launch. Specifically, the BioFab staff will 1) rapidly prototype SynBERC-specified engineered genetic systems to achieve testbed-driven objectives, 2) design, construct, and test a collection of 6,000 new BioBrick parts for controlling replication, transcription, RNA processing and degradation, translation, and protein degradation in E.coli and S. cerevisiae, and 3) work in partnership with industrial and academic partners to develop improved tools for supporting the design, construction, and characterization/testing of engineered genetic systems assembled from standard biological parts.

Intellectual merit: The successful development, launch, and operation of the world?s first design and build facility for making high-quality standard biological parts will mark an important transition in the development of biology as a substrate for engineering. Within academia and industry, the BioFab will mark a transition from individual ?crafts? based production of genetic reagents to a more mature engineering technology platform. In turn, this will make the engineering of biology easier and more predictable, with potential applications in energy, human health, information processing, and more.

Broader impacts: This first-of-its-kind facility has significant broader impacts for academic research, education, industry, and globally. The BioFab facility will accelerate the adoption and development of biological standards while extending the SynBERC?s cutting-edge research to the broader industrial and academic communities. This professionally staffed and operated parts engineering facility will serve as an important resource for industry and academia for defining and promulgating standards, from technical to professional practice. Within education, engineering students will have access for the first time to improved collections of biological parts for controlling basic but essential cellular processes, allowing them to focus less on technical issues and more on identifying ways to engineer biology to solve the world?s problems.

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