Keck Futures Initiative awards $1.25 million for 13 research projects

EurekAlert

WASHINGTON, D.C. - The National Academies Keck FUTURES INITIATIVE announced today the recipients of its latest round of FUTURES grants, awarded to support interdisciplinary research. The 13 projects chosen represent a wide range of approaches to research in synthetic biology, which was the subject of the seventh annual FUTURES conference. A summary of the conference, "Synthetic Biology: Building on Nature's Inspiration," is available online at www.keckfutures.org [1].

"We received a record number of proposals, including many bold and innovative projects, and believe that these collaborations will result in the most generative findings," said Bonnie L. Bassler, professor of molecular biology, Princeton University, and the 2009 conference chair.

These competitive seed grants aim to fill a critical gap because major federal funding programs do not typically provide support in areas considered risky or unusual. The FUTURES grants allow researchers to start recruiting students and postdoctoral fellows, purchasing equipment, and acquiring preliminary data - all of which can position the researchers to compete for larger awards from other public and private sources.

The award recipients and their grant research topics are (Public Investigator's (PI) listed first, and then co-PIs):

JOHN CUMBERS, Brown University, Providence, R.I.
LYNN ROTHSCHILD, NASA Ames Research Center and Brown University, Providence, R.I.
WHAT ARE THE POTENTIAL ROLES FOR SYNTHETIC BIOLOGY IN NASA MISSIONS? A WORKSHOP PROPOSAL - $25,000

This project consists of an interdisciplinary workshop that brings together leaders of synthetic biology with space scientists, engineers, and mission designers to discuss the role synthetic biology could play in achieving NASA's missions.

GAUTAM DANTAS, and BIN WANG, Washington University, St. Louis
ROB KNIGHT, Howard Hughes Medical Institute and University of Colorado at Boulder
FUNCTIONAL METAGENOMIC DISCOVERY OF NOVEL ENZYMATIC FUNCTIONS FROM ULTRA LOW-VOLUME SAMPLES WITH WHOLE METAGENOME AMPLIFICATION - $75,000

These researchers will aim to develop and apply experimental methods for capturing diverse biological machinery from arbitrary environments using extremely

small amounts of genetic material, and computational methods to predict how these functions evolved. This research will improve the ability to define fitness landscapes to harness the chemical processing potential of biological systems.

RATMIR DERDA and GEORGE WHITESIDES, Harvard University, Cambridge, Mass.
JULIE NORVILLE, Massachusetts Institute of Technology, Cambridge, Mass.
DOUGLAS WEIBEL, University of Wisconsin, Madison
USING LAYERS OF PAPER TO CREATE SYNTHETIC MICROBIAL COMMUNITIES:A SIMPLE APPROACH FOR INVESTIGATION OF CELLULAR COMMUNICATION, FOSTERING COLLABORATION IN BASIC RESEARCH AND BRINGING SCIENCE TO THE CLASSROOM - $50,000

The maintenance of cells in polycultures is an unsolved problem with important applications in synthetic biology, biotechnology, and biomedicine. These researchers will use layers of ordinary paper to enable the engineering of polycultures of bacteria. The technology used in this project will play dual roles in research and in science outreach.

KERWYN HUANG, Stanford University, Standford, Calif.
LIGHT-DRIVEN ORGANIZATION OF CELLULAR COMMUNITIES USING PHOTOTACTIC MOTILITY - $100,000

Complex functions often require capabilities beyond the reach of single-celled organisms. The development of synthetic multicellular communities relies on technologies for spatial control. Cyanobacteria detect the direction of incident light with high sensitivity via self-organization into communities. This researcher will exploit this phototactic pattern formation for controlling community organization.

MICHAEL JEWETT and LAURIE ZOLOTH, Northwestern University, Chicago
ANTHONY FORSTER, Vanderbilt Medical School, Nashville, Tenn.
SYNTHETIC RIBOSOMES FOR PHARMACEUTICAL DISCOVERY AND SYNTHESIZING LIFE - $75,000

These researchers aim to synthesize and engineer the ribosome - the cell's factory for protein synthesis - to better understand life and to develop new drugs. The project will also contribute new ethical and social perspectives on making life.

JOSHUA LEONARD, Northwestern University, Chicago
CYNTHIA COLLINS, Rensselaer Polytechnic Institute, Troy, N.Y.
DEVELOPMENT OF A NOVEL PLATFORM FOR ENGINEERING SYNTHETIC INTERKINGDOM COMMUNICATION - $100,000

Bacteria are an essential component of the human body, where they detect and respond to changes in physiology. This project will develop a technology allowing engineered symbiotic bacteria to communicate information directly to human cells, paving the way for biological sensors that detect and treat cancer and other gastrointestinal diseases.

WENDELL LIM and PAULA GOMES, University of California, San Francisco

IGEM PROGRAM: HARNESSING THE POWER OF SYNTHETIC BIOLOGY TO EXPAND THE REACH OF BIOLOGY EDUCATION - $25,000

Synthetic biology provides a motivating and appealing investigative framework for young students to learn about biological mechanisms. This project will harness this power to expand the excitement of biological inquiry and discovery to students from grades 6-12, by creating innovative curricula and providing exciting research experiences at UCSF.

QING LIN, State University of New York, Buffalo
MIGUEL FUENTES-CABRERA, Oak Ridge National Laboratory,Oak Ridge, Tenn.
SYNTHESIS OF PROTEIN-BASED ORGANELLES FOR BIOFUELS PRODUCTION - $100,000

The proposed study aims to construct a robust yeast strain capable of producing renewable biofuels with greatly improved yields. This yeast strain is engineered to genetically encode protein-based intracellular nano-reactors that segregate the fuel-producing enzymes from the endogenous enzymes and perform the dedicated task of the biofuels production.

RICHARD MURRAY, and DAVID SPRINZAK, California Institute of Technology, Pasadena
BARRY CANTON, Ginkgo BioWorks Boston
PETER CARR, Massachusetts Institute of Technology, Cambridge
ERIC KLAVINS, University of Washington, St. Louis
CAGEN: COMPETITIVE ASSESSMENT OF GENETICALLY ENGINEERED NETWORKS - $100,000

The Competitive Assessment for Genetically Engineered Networks (CAGEN) is a proposed competition intended to drive new approaches to designing robust, synthetic biological circuits. The competition involves teams of established researchers designing circuits that implement a given function and the assessment of their circuit's performance across a set of multiple operating environments.

DEBOLEENA ROY and ICHIRO MATSUMURA, Emory University, Atlanta
SARA GIORDANO, Centers for Disease Control and Prevention, Atlanta
ARRI EISEN, Center for Ethics, Emory University, Atlanta
LAURA DRESS, CEO B.R.I.D.G.E.™, LLC, San Francisco
DEVELOPING A BENCH-SIDE ETHICS AND COMMUNITY-BASED PARTICIPATORY RESEARCH TRAINING PROGRAM IN SYNTHETIC BIOLOGY - $75,000

This project will develop a research and education training program that instructs graduate students in biomedicine, bioengineering, and bioethics on the ethical and social implications of synthetic biology research. The program will also develop participatory research practices in synthetic biology to address the need for critical engagement with nontraditional stakeholders.

ALANNA SCHEPARTZ, Yale University, New Haven, Conn.
NOAH MALMSTADT, University of Southern California, Los Angeles

SEPARATE BUT EQUAL: DESIGN OF ORTHOGONAL, FUNCTIONAL ENVIRONMENTS WITHIN LIVING MAMMALIAN CELLS - $100,000

This project includes the development of orthogonal compartments that function independently within a living cell. These researchers will synthesize a series of fluorolipids --fatty acid-like molecules with fluorocarbon chains -- and evaluate their ability to both self-organize into fluoro-lipid domains and liposomes and direct the localization of proteins modified with fluorocarbon lipid appendages.

HANG (HUBERT) YIN and DEANNE SAMMOND, University of Colorado at Boulder
JOSHUA FERREIRA and CLIFFORD WANG, Stanford University, Stanford, Calif.
ENGINEERING MEMBRANE PROTEIN INHIBITORS THROUGH RATIONAL DESIGN AND DIRECTED EVOLUTION - $100,000

These researchers will combine rational design and directed evolution to generate inhibitors of membrane proteins. They aim to develop a new method to design membrane protein inhibitors for Bax and a genetically engineered system where targeted mutagenesis and selection of activity are performed in a single cell line.

HUIMIN ZHAO and ZENGYI SHAO, University of Illinois, Urbana-Champaign
GENOME MINING OF NOVEL NATURAL PRODUCTS VIA SYNTHETIC BIOLOGY - $100,000

Microorganisms are a major source of new therapeutic agents. These researchers aim to develop a new synthetic biology strategy to discover novel natural products from sequenced genomes and metagenomes. Such studies may lead to the discovery and development of new drugs for treatment of infectious diseases and cancers.

SOURCE [2]

Source URL (retrieved on *12/19/2013 - 10:13pm*):
http://www.chem.info/news/2010/05/keck-futures-initiative-awards-125-million-13-research-projects

Links:
[1] http://www.keckfutures.org
[2] http://www.eurekalert.org/pub_releases/2010-05/naos-kfi050310.php