

Engineering Biology

A Research Roadmap for the Next-Generation Bioeconomy

Technical Themes

Engineering DNA

Biomolecular Engineering

Host Engineering

Data Science

Application Sectors

Industrial Biotechnology

Health & Medicine

Food & Agriculture

Environmental Biotechnology


Energy

<https://roadmap.ebrc.org>

A Matrixed Approach

Technical Themes

	Engineering DNA	Biomolecular Engineering	Host Engineering	Data Science
Industrial Biotechnology				
Health & Medicine				
Food & Agriculture				
Environmental Biotechnology				
Energy				



Sectors

Goal	Breakthrough Capability	Milestone
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On-demand production of single-cell hosts capable of natural and non-natural biochemistry.

Routine domestication of non-model organisms through DNA delivery and genetic modification.			
Catalog and assay current methodologies and tools for carrying out DNA delivery in microbial/mammalian systems and plant systems.	Development of well-characterized and robust insertion sites in plant genomes.	Develop high-throughput, targeted editing and rapid-genome-evolution tools that couple genetic changes to phenotypic changes.	Routine genetic manipulation of any non-model host in less than one week from first isolation.
Develop high-throughput methods that can be done in parallel for DNA delivery (using standard methods) into non-model hosts.	Develop high-throughput, genome-wide editing tools for non-model organisms.		
Establish a suite of gene-editing tools for the rapid insertion and/or deletion of genetic elements in diverse primary mammalian cells.	Establish robust temporal and/or spatial control of gene expression in mammalian cells.	Develop universal approaches to transforming any plant.	
Characterize basic DNA parts for expression strength in non-model organisms.	Develop broad-host-range vectors for a variety of model and non-model organisms.		
2 Years	5 Years	10 Years	20 Years