

(e.g., metabolic and transcriptional regulatory networks) to generate more realistic, predictive models of the “stable states” of organisms. Enhanced modeling of these states would allow prediction of organism behavior in response to environment, support a new generation of hypotheses, and reveal novel insights for systems design and engineering. Furthermore, the dynamic modeling of transitions between stable states—resolved for space and time—would contribute to multiscale exploration and prediction of the behavior of systems. Critical to such research is the modeling of microbial communities (i.e., prokaryotic or eukaryotic organisms such as protozoans, bacteria, archaea, algae, and fungi) and ecosystems, which includes representing associations among biota, such as plants and microbes, and their interactions with the environment. Together, the modeling of stable states, communities, and ecosystems will enable

system investigation spanning all scales—from molecular to global. To achieve advanced modeling and predictive capabilities, Phase III of the knowledgebase must include acquisition of the experimental data needed to validate physiological and functional predictions.

In summary, the long-range goals of the GTL Knowledgebase are twofold: (1) enabling and providing support for progressively more inclusive, predictive modeling of various cellular processes, organisms, and communities and (2) facilitating the use of these capabilities to inform ecosystem-level models and engineering applications. Attaining these goals would require a knowledgebase framework that precisely and comprehensively integrates data and information critical to DOE missions.

Access Complete Genomics:GTL Knowledgebase Workshop Report (Download PDF or order print copies at genomicsgtl.energy.gov/compbio/)

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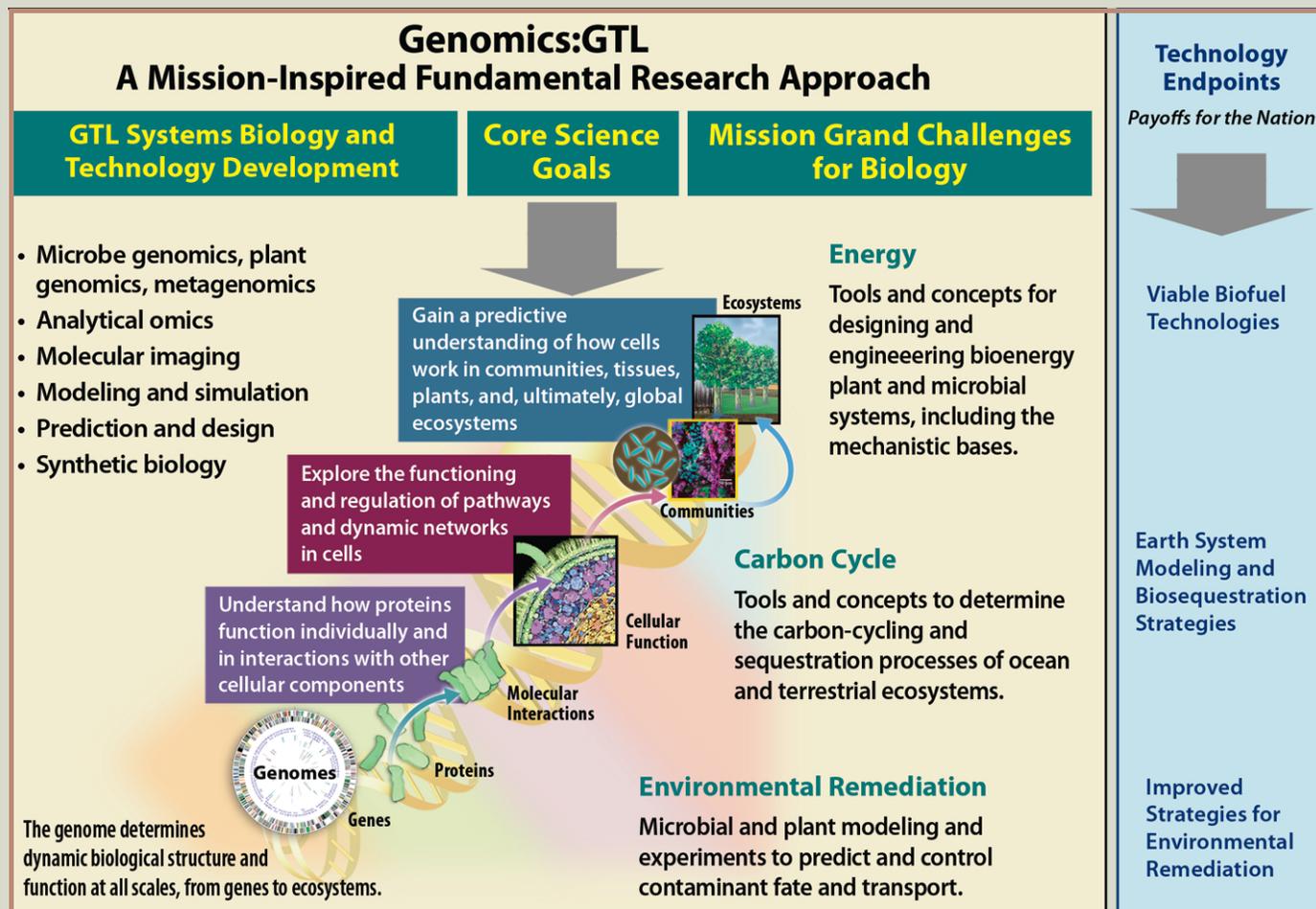
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Genomics:GTL Program

Goal and Objectives

Achieve a predictive, system-level understanding of plants, microbes, and biological communities, via integration of fundamental science and technology development, to enable biological solutions to DOE mission challenges in energy, environment, and climate.

- **Objective 1:** Determine the genomic properties, molecular and regulatory mechanisms, and resulting functional potential of microbes, plants, and biological communities central to DOE missions.
- **Objective 2:** Develop the experimental capabilities and enabling technologies needed to achieve a genome-based, dynamic system-level understanding of organism and community functions.
- **Objective 3:** Develop the knowledgebase, computational infrastructure, and modeling capabilities to advance the understanding, prediction, and manipulation of complex biological systems.



Websites for More Information

DOE Genomics:GTL Program

- www.sc.doe.gov/ober/BSSD/genomicsgtl.html
- genomicsgtl.energy.gov

GTL Strategic Plan genomicsgtl.energy.gov/strategicplan/

DOE Mission Focus: Biofuels genomicsgtl.energy.gov/biofuels/

DOE Bioenergy Research Centers genomicsgtl.energy.gov/centers/

Breaking the Biological Barriers to Cellulosic Ethanol: A Joint Research Agenda

- genomicsgtl.energy.gov/biofuels/b2bworkshop.shtml

DOE Carbon Cycling and Biosequestration Workshop

- genomicsgtl.energy.gov/carboncycle/

DOE Systems Biology Knowledgebase Workshop

- genomicsgtl.energy.gov/compbio/

DOE–USDA Plant Feedstock Genomics for Bioenergy

- genomicsgtl.energy.gov/research/DOEUSDA/

DOE–USDA Sustainability of Biofuels Workshop

- genomicsgtl.energy.gov/biofuels/sustainability/

DOE Joint Genome Institute jgi.doe.gov

DOE Environmental Molecular Sciences Laboratory

- www.emsl.pnl.gov/emslweb/

GTL Image Gallery genomics.energy.gov/gallery/

GTL Information and Data Sharing Policy

- genomicsgtl.energy.gov/datasharing/

DOE Office of Biological and Environmental Research

- science.doe.gov/ober/

DOE Office of Science science.doe.gov



