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Joint Meeting

Genomics:GTL Contractor-Grantee Workshop IV

and

Metabolic Engineering Working Group Inter-Agency Conference on Metabolic Engineering 2006

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Welcome to GTL-MEWG Workshop

Welcome to the 2006 joint meeting of the fourth Genomics:GTL Contractor-Grantee Workshop and the sixth Metabolic Engineering Working Group Inter-Agency Conference. The vision and scope of the Genomics:GTL program continue to expand and encompass research and technology issues from diverse scientific disciplines, attracting broad interest and support from researchers at universities, DOE national laboratories, and industry. Metabolic engineering's vision is the targeted and purposeful alteration of metabolic pathways to improve the understanding and use of cellular pathways for chemical transformation, energy transduction, and supramolecular assembly. These two programs have much complementarity in both vision and technological approaches, as reflected in this joint workshop.

GTL's challenge to the scientific community remains the further development and use of a broad array of innovative technologies and computational tools to systematically leverage the knowledge and capabilities brought to us by DNA sequencing projects. The goal is to seek a broad and predictive understanding of the functioning and control of complex systems —individual microbes, microbial communities, and plants. GTL's prominent position at the interface of the physical, computational, and biological sciences is both a strength and a challenge. Microbes remain GTL's principal biological focus. In the complex "simplicity" of microbes, we find capabilities needed by DOE and the nation for clean and secure energy, cleanup of environmental contamination, and sequestration of atmospheric carbon dioxide that contributes to global warming. An ongoing challenge for the entire GTL community is to demonstrate that the fundamental science conducted in each of your research projects brings us a step closer to biology-based solutions for these important national energy and environmental needs.

This year marks an important milestone for GTL with release of the roadmap that will help guide and justify the GTL program to a broad audience of scientists, policymakers, and the public. This important document was developed through a process of broad community participation that included many of you. It traces the path from DOE mission science through systems microbiology to the promise of emerging technologies, integrated computing, and a new research infrastructure. It describes opportunities, research strategies, and solutions related to this new science as applied to microbes and the complexities of mission problems.

To make GTL science and biological research broadly tractable, timely, and affordable, GTL will institute four user facilities to deliver economies of scale and enhance performance. These facilities will provide advanced technologies and state-of-the art computing needed to better understand genomic capability, cellular responses, regulation, and community behaviors in any environment. Another important step forward for GTL is the solicitation of applications for development of the Facility for Production and Characterization of Proteins and Molecular Tags, first of the four planned.

This year's GTL-MEWG workshop provides an opportunity for all of us to discuss, listen, and learn about exciting new advances in science; identify research needs and opportunities; form research partnerships; and share the excitement of this program with the broader scientific community. We look forward to a stimulating and productive meeting and offer our sincere thanks to the organizers and to you, the scientists, whose vision and efforts will help us all to realize the promise of this exciting research program.

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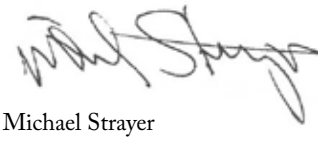

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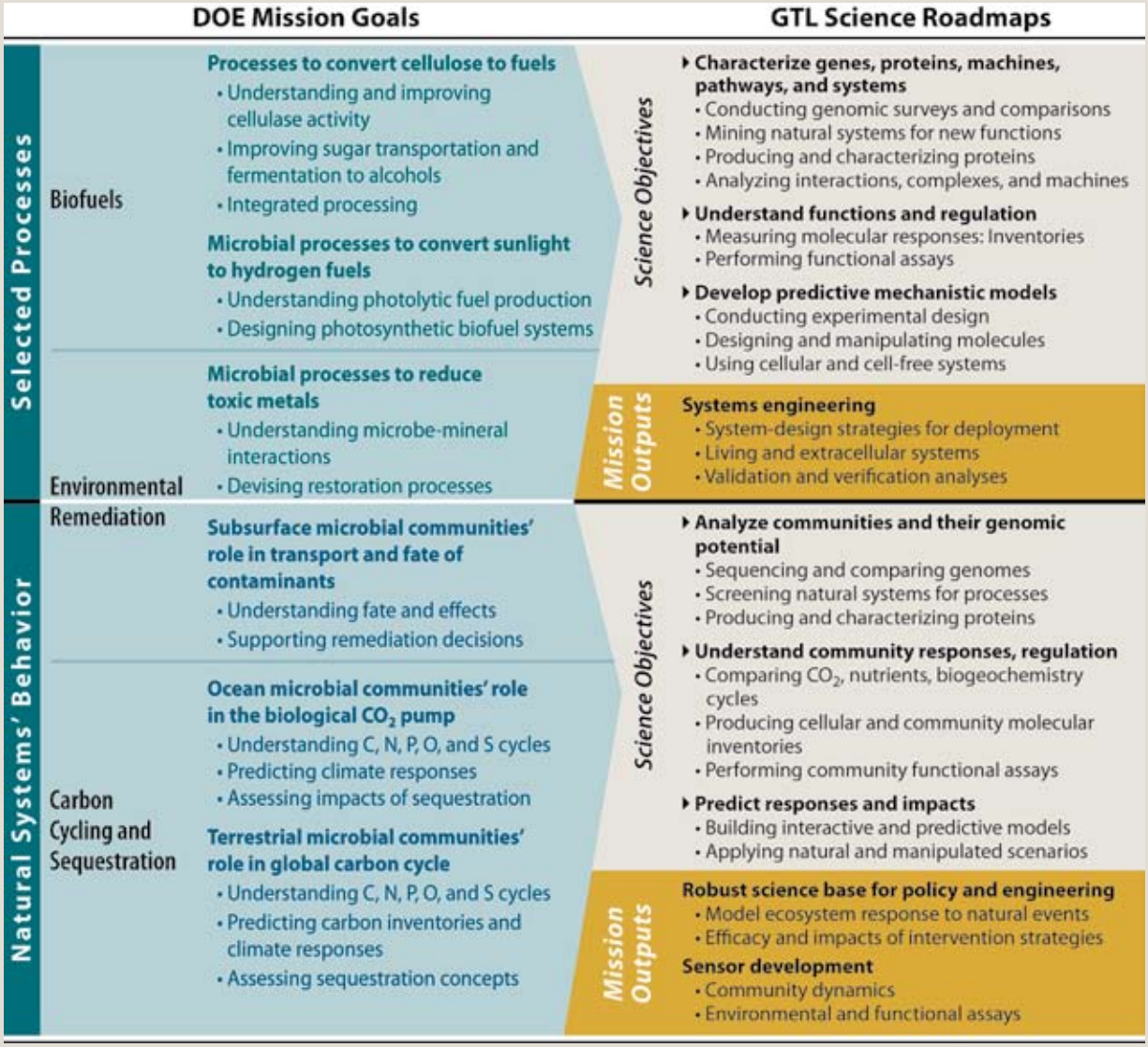
The following table is a simple summation of how GTL science and DOE missions align (GTL Roadmap p. 40).

Summary Table. GTL Science Roadmap for DOE Missions



A capsule summary of systems being studied, mission goals that drive the analysis, generalized science roadmaps, and outputs to DOE missions. To elucidate design principles, each of these goals entails the examination of thousands of natural primary and ancillary pathways, variants, and functions, as well as large numbers of experimental mutations.