Phytozome facilitates comparative genomic studies among green plants. Families of genes that represent the modern descendants of ancestral gene sets are constructed at key phylogenetic nodes. These families allow easy access to clade-specific relationships as well as clade-specific genes and gene expansions. http://phytozome.jgi.doe.gov

Plant Flagship Genomes are the most important set of plant genomes to DOE’s mission and to plant science. They have been selected to focus our computational and experimental efforts in order to move beyond sequence and function and to provide the most direct benefit for enabling world-class science. http://bit.ly/JGI-Plants

Plant Gene Atlas is a major initiative to develop gene expression catalogs for five species, sampling a wide variety of relevant developmental and experimental conditions (uniform nitrogen application and metabolism, etc.) using deep-coverage RNA-seq methods and small RNA sequencing. In addition to facilitating direct comparisons of gene expression patterns within a species of interest, these data will enable broad inferences of shared gene function across phyla, focusing on applications to address mission-oriented research within DOE-relevant plants. http://bit.ly/JGI-PGA

KBase, DOE’s Systems Biology Knowledgebase, is an emerging software and data environment designed to enable researchers to collaboratively generate, test, and share new hypotheses about gene and protein functions; perform large-scale analyses on a scalable computing infrastructure; and model interactions in microbes, plants, and their communities. http://kbase.us

JGI Plant Program and Related Initiatives:

JGI Plant Program @ DOE Joint Genome Institute

The Plant Program focuses on fundamental biology of photosynthesis, conversion of solar to chemical energy. Other areas of interest include characterizing:

- Ecosystems and the role of terrestrial plants and oceanic phytoplankton in carbon sequestration.
- The role of plants in coping with toxic pollutants in soils by hyper-accumulation and detoxification.
- Feedstocks for biofuels, e.g., next-generation cellulosic biofuels from perennial grasess and forest plantation trees.
- The ability to respond to environmental change (e.g., loss of diversity from monoculture produces vulnerabilities; nitrogen-fixing nodules in legumes reduce fertilizer need).
- The generation of useful secondary metabolites (produced largely for disease resistance) for positive/negative control in agriculture, with attendant influence on the global carbon cycle.

The Plant Program accomplishes the above through the following activities:

1. **Sequence**: Produce genome sequences of key plant (and algal) species to accelerate biofuel development and understand response to climate change.
2. **Function**: Develop data sets (and synthetic biology tools) to elucidate functional elements in plant genomes, with special focus on handful of “flagship” genomes.
3. **Variation**: Characterize natural genomic variation in plants (and their associated microorganisms), and relate to biofuel sustainability and adaptation to climate change.
4. **Integration**: Provide a centralized hub for the retrieval and deep integrated analysis of plant genome data sets.

JGI/KBase Project-Related Presentations

International Plant & Animal Genome XXIII Conference

January 10–14, 2015 San Diego, CA, USA

The Department of Energy Office of Science supports both a large-scale genomics user facility at the DOE Joint Genome Institute (JGI: http://jgi.doe.gov/) and a large-scale computational resource for comparative functional genomics and systems biology of microbes, plants and their communities called the DOE Systems Biology Knowledgebase (KBase: http://kbase.us/). The core mission of both of these endeavors is to help scientists carry out experiments and analyses in areas such as improving biofuel development, understanding plant model systems, advancing plant comparative science and investigating global carbon cycling. In the JGI/KBase Workshop, Tuesday, January 13 (see details inside), we will present current and ongoing developments from both the Plant Program at JGI and KBase toward integrative biology. We will also hear from researchers who are applying genomic sequence information from JGI to elucidate functions of plant systems and from users who are working to apply KBase computational infrastructure to plant biological inquiries. Finally, we will describe how to apply for a project with the JGI Community Science Program and how you can use the KBase system to accelerate your plant genomics research.

http://kbase.us

http://jgi.doe.gov
Saturday January 10, 2015

Workshop: Grasslands (Lolium Genome Initiative)
Room: W345
Time: 10:30 AM – 12:40 PM
Link:
Title: The Peach v2.0 Release: An Improved Genome
Presenter: Albert Abbott, Clemson University

Workshop: Fruit/Nuts
Room: W326
Time: 10:30 AM – 12:40 PM
Link:
Title: Non-Seed Plants
Presenter: Daan Robhuis, DOE Joint Genome Institute

Room: Pacific Salon 2
Time: 4:00 – 6:10 PM
Link:
Title: Citrus Genome DB Updates
Presenter: Laura Bartley, University of Oklahoma

Sunday January 11, 2015

Workshop: Applied Triazine Genomics
Room: Pacific Salon 2
Time: 8:00 AM – 10:10 AM
Link:
Title: Functional Genomics of C4 and CAM photosynthesis
Presenter: Dan Robhuis, DOE Joint Genome Institute

Workshop: Sequencing Complex Genomes
Room: Pacific Salon 2
Time: 4:00 PM – 6:10 PM
Link:
Title: Golden Bolloon
Presenter: Samir M. Seaver, Argonne National Laboratory

Monday January 12, 2015

Workshop: Bionergy Moss Genomics
Room: W528
Time: 1:30 PM – 3:40 PM
Link:
Title: The Sphagnum Genome Project
Presenter: David Weston, Oak Ridge National Laboratory

Workshop: Grasslands (Lolium Genome Initiative)
Room: W529
Time: 1:30 PM – 3:40 PM
Link:
Title: Plant Reproductive Genomics
Presenter: San Diego

Workshop: Plant Science in KBase
Room: W530
Time: 2:55 PM
Link:
Title: Genetic Conflict and the Evolution of Spermatophyte-Specific Gene Expression in Gymnospermous
Presenter: Stuart McDaniell, University of Florida

Workshop: The Bionergy Community Organizational Meeting
Room: W531
Time: 2:10 PM
Link:
Title: The Phylogenetic Pathway Flagship-Genome
Presenter: Daniel Lang, University of Florida, Applied Triazine Genomics

Tuesday January 13, 2015

Workshop: Brachypodium-Genomics
Room: W532
Time: 10:30 AM – 12:30 PM
Link:
Title: How to Work with the JGI and KBase
Presenter: Samson M. D. Seaver, Kbase National Laboratory

Workshop: Plant Science at the JGI and KBase
Room: W533
Time: 4:00 PM – 6:10 PM
Link:
Title: How to Work with the JGI and KBase
Presenter: John Vogel, DOE Joint Genome Institute