

JGI Plant Program and Related Initiatives:

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://bitly.com/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/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.

The 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 grasses 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 microbiomes), 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.

see
schedule
inside



Saturday January 10, 2015

Workshop:	Fruit/Nuts
Time:	8:00 AM – 12:40 PM
Room:	Pacific Salon 3
JGI Talk:	9:18 AM
Link:	W326
Title:	The Peach v2.0 Release: An Improved Genome Sequence for Bridging the Gap Between Genomics and Breeding in <i>Prunus</i>
Presenter:	Ignazio Verde, Fruit Tree Research Center, Rome, Italy
Workshop:	Functional Genomics of C4 and CAM photosynthesis
Time:	10:30 AM – 12:40 PM
Room:	Towne
JGI Talk:	11:30 AM
Link:	W345
Title:	Genome Assembly of the Obligate Crassulacean Acid Metabolism (CAM) Species <i>Kalanchoe Laxiflora</i>
Presenter:	Jerry Jenkins, DOE Joint Genome Institute
Workshop:	Grasslands (Lolium Genome Initiative)
Time:	10:30 AM – 12:40 PM
Room:	Esquire
JGI Talk:	10:30 AM
Title:	Genetic Improvement of Switchgrass: The Brave New World of Genomic Selection
Link:	W429
Presenter:	Michael Casler, USDA-ARS, Madison, WI
Workshop:	Citrus Genome
Room:	Pacific Salon 6 – 7 (2nd Floor)
Time:	1:30 – 3:40 PM
JGI Talk:	2:10 PM
Link:	W162
Title:	Citrus Genome DB Updates
Presenter:	Albert Abbott, Clemson University

Workshop:	Bioenergy Grass Genomics
Time:	4:00 – 6:00 PM
Room:	Pacific Salon 2
JGI Talk:	4:00 PM
Link:	W075
Title:	Update on Assembly and Functionality of the <i>Miscanthus</i> Genome Sequence
Presenter:	Stephen P. Moose, University of Illinois Urbana-Champaign
JGI Talk:	5:20 PM
Link:	W078
Title:	Genomics and Genetics of Switchgrass Cell Wall Quality
Presenter:	Laura Bartley, University of Oklahoma
JGI Talk:	6:00 PM
Link:	W080
Title:	Comparative Genomics of Bioenergy Grasses
Presenter:	Dan Rokhsar, DOE Joint Genome Institute
Workshop:	Non-Seed Plants
Room:	Sunrise
Time:	4:00 PM – 6:10 PM
JGI Talk:	4:40 PM
Link:	W528
Title:	The <i>Marchantia</i> Genome Project
Presenter:	Jim Haseloff, University of Cambridge
JGI Talk:	5:00 PM
Link:	W529
Title:	The <i>Sphagnum</i> Genome Project
Presenter:	David Weston, Oak Ridge National Laboratory
JGI Talk:	5:20 PM
Link:	W530
Title:	The <i>Ceratodon</i> Genome Project
Presenter:	Stuart McDaniel, University of Florida
JGI Talk:	5:40 PM
Link:	W531
Title:	The <i>Physcomitrella patens</i> Flagship Genome Revisited Based on Pseudochromosomes
Presenter:	Daniel Lang, University of Freiburg, Applied Triticeae Genomics

Sunday January 11, 2015

Workshop:	Applied Triticeae Genomics
Room:	Pacific Salon 4 – 5 (2nd Floor)
Time:	8:00 AM – 10:10 AM
JGI Talk:	8:00 AM
Link:	W029
Title:	Progress in Wheat Structural Genomics
Presenter:	Dan Rokhsar, DOE Joint Genome Institute
Workshop:	Forest Tree
Time:	8:00 AM – 6:10 PM
Room:	Sunrise
JGI Talk:	9:10 AM
Link:	W305
Title:	High-Resolution Genetic Maps of Eucalyptus Hybrids Improve <i>E. grandis</i> Genome Assembly and Give Insight into Genes Associated with Carbon Isotope Composition
Presenter:	Jérôme Bartholomé, INRA
JGI Talk:	11:30 AM
Link:	W310
Title:	Genome-Wide Discovery of Non-Coding RNAs in Willow (<i>Salix purpurea</i>)
Presenter:	Xiaohan Yang, Oak Ridge National Laboratory
Workshop:	Plant Reproductive Genomics
Time:	1:30 PM – 3:40 PM
Room:	San Diego
JGI Talk:	2:55 PM
Link:	W619
Title:	Genetic Conflict and the Evolution of Sporophyte-Specific Gene Expression in <i>Ceratodon purpureus</i>
Presenter:	Stuart McDaniel, University of Florida

Workshop:	Sequencing Complex Genomes
Time:	4:00 PM – 6:10 PM
Room:	Golden Ballroom
JGI Talk:	5:00 PM
Link:	W713
Title:	In Favor of a Whole-Genome Shotgun: Assembling and Anchoring the Hexaploid Bread Wheat Genome
Presenter:	Martin Mascher, Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)
Workshop:	Sex Chromosomes and sex determination
Time:	4:00 PM – 6:10 PM
Room:	Royal Palm Salon 5 – 6
JGI Talk:	5:20 PM
Link:	W720
Title:	Contrasting Mechanisms of Sex Determination in the Salicaceae
Presenter:	Stephen DiFazio, West Virginia University

Monday January 12, 2015

Workshop:	<i>Brachypodium</i> Community Organizational Meeting
Time:	4:30 PM – 6:30 PM
Room:	Sheffield
Presenter:	John Vogel, DOE Joint Genome Institute

Tuesday January 13, 2015

Workshop:	<i>Brachypodium</i> Genomics
Time:	10:30 AM – 12:10 PM
Room:	Pacific Salon 2
JGI Talk:	12:10 PM
Link:	W099
Title:	The <i>Brachypodium-Puccinia graminis</i> System: Solving a Puzzle to Uncover the Underlying Mechanisms of Non-Host Resistance and Plant Immunity
Presenter:	Melania Figueroa, University of Minnesota

Workshop:	Lucigen – Closing and Finishing Genomes and BACs with Long Span NGS Reads
Time:	1:30 PM – 3:40 PM
Room:	Pacific Salon 1
JGI Talk:	2:10
Title:	Construction and analysis of a <i>Miscanthus sinensis</i> gene space assembly
Presenter:	Kankshita Swaminathan, Energy Biosciences Institute
Workshop:	Cassava Genomics
Time:	4:00 PM – 6:10 PM
Room:	Sunrise
JGI Talk:	4:00 PM
Link:	W121
Title:	Genome Sequence and Genetic Diversity of Cassava and Its Wild Relatives
Presenter:	Jessen V. Bredeson, UC Berkeley

Workshop:	Perennial Grasses
Time:	4:00 – 6:00 PM
Room:	Pacific Salon 2
JGI Talk:	5:00 PM
Link:	W567
Title:	Detecting Genetic Associations with Phenology in Switchgrass Using Exome-Capture
Presenter:	Paul Grabowski, USDA-ARS, Madison, WI

Workshop:	The Resurgence of Reference Quality Genome Sequence
Time:	4:00 PM – 6:10 PM
Room:	Pacific Salon 1
JGI Talk:	5:40 PM
Link:	W864
Title:	Reference Quality Genome Assembly
Presenter:	Dan Rokhsar, DOE Joint Genome Institute

Workshop:	Plant Science at the JGI and KBase
Time:	4:00 PM – 6:10 PM
Link:	bit.ly/JGI-PAG-2015
Room:	San Diego
JGI Talk:	4:00 PM
Link:	W780
Title:	Joint Genome Institute Plant Science Program
Presenter:	Jeremy Schmutz, DOE Joint Genome Institute
JGI Talk:	4:20 PM
Link:	W781
Title:	Plant Science in KBase
Presenter:	Dave Weston, Oak Ridge National Laboratory
JGI Talk:	4:35 PM
Link:	W782
Title:	<i>Panicum hallii</i> : Genomics Enabled Perennial Grass Model
Presenter:	Thomas Juenger, University of Texas at Austin
JGI Talk:	4:55 PM
Link:	W783
Title:	Highly Efficient Discovery of Novel Genes in the Complex Perennial <i>Populus</i> Using GWAS and Coexpression Analyses in KBase
Presenter:	Wellington Muchero, Oak Ridge National Laboratory
JGI Talk:	5:15 PM
Link:	W784
Title:	KBase Metabolic Modeling with Sphagnum
Presenter:	Samuel M. D. Seaver, Argonne National Laboratory
JGI Talk:	5:35 PM
Link:	W785
Title:	How to Work with the JGI and KBase
Presenters:	John Vogel, DOE Joint Genome Institute and Doreen Ware, Cold Spring Harbor Laboratory/ USDA-ARS