

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, the DOE 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 XXVI Conference

January 13 – 17, 2018 San Diego, CA, USA

The Department of Energy (DOE) 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 element cycling. In the BER Plant Genomic Science Workshop (#4850), Monday, January 15, from 6:20 PM – 8:30 PM (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 understanding how plant genes function in the context of the whole organism and how these genes drive the interaction with a plant's environment. Focus areas include:

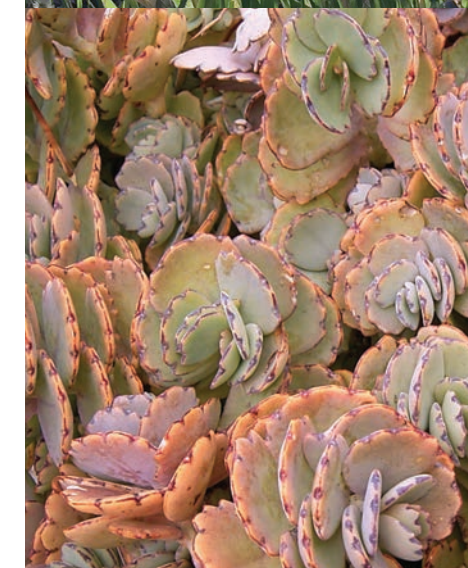
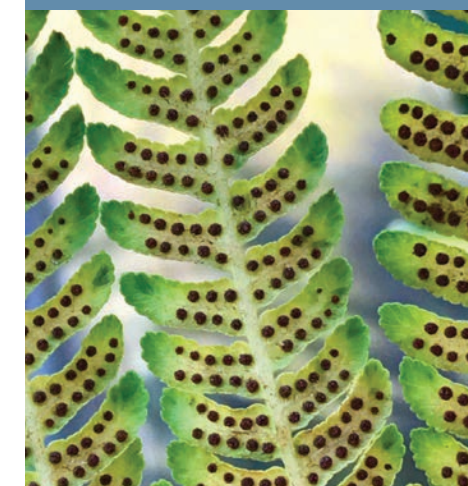
- Feedstocks for biofuels, e.g., next-generation cellulosic biofuels from perennial grasses and forest plantation trees.
- Ecosystems and the role of terrestrial plants and oceanic phytoplankton in carbon sequestration.
- The role of plants in coping with toxic pollutants in soils by hyper-accumulation and detoxification.
- 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.

visit us
at Booth
204

see talks
schedule
inside



Join us in San Francisco...

FOR THE 13TH ANNUAL
Genomics of Energy & Environment Meeting

Hilton San Francisco Union Square

MARCH 13–16, 2018

REGISTRATION NOW OPEN!

usermeeting.jgi.doe.gov

HOSTED BY THE
U.S. Department of Energy
Joint Genome Institute

The Meeting will feature talks by leading researchers applying the latest strategies to advance innovative plant, algal, fungal, microbial and metagenomics science enabled by access to JGI's capabilities. Workshops held Tuesday, March 13 and Wednesday, March 14 include Phytozome, KBase Community Analysis, Functional Analysis and How to Integrate Your Tools into KBase Using the Software Development Kit (SDK). Short talks will be selected from submitted abstracts, due February 1, 2018.



Saturday, January 13, 2018

Systems Biology and Ontologies

Time: 9:05 AM – 9:25 AM
 Room: Pacific Salon 2
 Title: Data-Driven Plant Breeding – Getting the Most from Your Resources: Strategies for Leveraging Big Data for the Genetic Improvement of Rice and Sorghum
 Presenter: **Jennifer Spindel**, DOE Joint Genome Institute

Analysis of Complex Genomes

Time: 1:30 PM – 1:50 PM
 Room: Golden Ballroom
 Title: Snapshots of Genome Evolution in Allopolyploid Grasses
 Presenter: **Sean Gordon**, DOE Joint Genome Institute

Citrus Genome

Time: 2:10 PM – 2:30 PM
 Room: Pacific Salon 6-7 (2nd Floor)
 Title: Identification of *Citrus* Species and the Genetic Heterogeneity of Mandarins
 Presenter: **Albert Wu**, DOE Joint Genome Institute

Time: 3:10 PM – 3:30 PM
 Room: Pacific Salon 6-7 (2nd Floor)
 Title: A New Evolutionary Framework for the Genus *Citrus*: Its Origin, Evolution and Dispersal
 Presenter: **Manuel Talon**, Instituto Valenciano de Investigaciones Agrarias, IVIA

Bioenergy Grass Genomics

Time: 4:00 PM – 4:30 PM
 Room: Pacific Salon 2
 Title: A Chromosome-Scale *Miscanthus sinensis* Genome
 Presenter: **Therese Mitros**, UC Berkeley

Time: 5:20 PM – 5:45 PM
 Room: Pacific Salon 2
 Title: Utilizing the Sorghum Pan-Genome to Accelerate Candidate Gene Discovery and Breeding Approaches
 Presenter: **Scott Lee**, Donald Danforth Plant Science Center

Non-Seed Plants

Time: 5:20 PM – 5:40 PM
 Room: Towne – Meeting House
 Title: The *Sphagnum* Microbiome: Describing the Complex Interactions between *Sphagnum* and their Symbiotic Bacteria
 Presenter: **Adam Healey**, HudsonAlpha

Sunday, January 14, 2018

Comparative Genomics

Time: 9:40 AM – 10:00 AM
 Room: Golden West
 Title: The Pan-Genome of the Diploid Grass *Brachypodium distachyon* and its Implications for Polyploid Genome Evolution
 Presenter: **Sean Gordon**, DOE Joint Genome Institute

Sorghum/Millet

Time: 9:24 AM – 9:45 AM
 Room: Pacific Salon 6-7 (2nd Floor)
 Title: Gene Discovery in *Setaria viridis*: A Gateway to Maize and Sorghum Crop Improvement
 Presenter: **Pu Huang**, Donald Danforth Plant Science Center

Sugar Cane (ICSB)

Time: 8:00 AM – 8:30 AM
 Room: Royal Palm Salon 1-2
 Title: A Reference Sequence of the Monoploid Genome of Sugarcane
 Presenter: **Olivier Garsmeur**, CIRAD

Forest Tree

Time: 3:20 PM – 3:40 PM
 Room: Sunrise – Meeting House
 Title: GCMS-Based Metabolomics of *Populus deltoides* Plants with Modified Gene Activity Prior to and within the Lignin Pathway Reveals Alterations in Carbon Flux to Secondary Metabolism and the Underlying Basis of Altered Biomass Recalcitrance
 Presenter: **Timothy J. Tschaplinski**, ORNL

Time: 4:05 PM – 4:25 PM
 Room: Sunrise – Meeting House
 Title: Identification of *Populus* Small RNAs Responsive to Symbiosis with Mycorrhizal Fungi *Laccaria bicolor* and *Rhizophagus irregularis*
 Presenter: **Xiaohan Yang**, ORNL

Sugar Cane Sequencing Initiative

Time: 2:50 PM – 3:10 PM
 Room: Royal Palm Salon 1-2
 Title: Whole Genome Sequencing of Sugarcane: Building Off the Foundation of the Single Haplotype Path
 Presenter: **Jeremy Schmutz**, DOE Joint Genome Institute/HudsonAlpha

Monday, January 15, 2018

Brachypodium Community

Time: 4:00 PM – 6:10 PM
 Room: Sheffield
 Title: *Brachypodium* Community Organizational Meeting

Rice Functional Genomics

Time: 5:40 PM – 6:00 PM
 Room: Pacific Salon 3
 Title: Genome Sequencing and Comparative Analysis of the Early Flowering Rice Variety Kitaake
 Presenter: **Rashmi Jain**, UC Davis/JBEI



Monday, January 15, 2018

DOE Office of Biological and Environmental Research (BER)

Time: 6:20 PM – 8:30 PM
 Room: Royal Palm Salon 3-4
 Organizers: **Doreen Ware**, Cold Spring Harbor Laboratory
Jeremy Schmutz, DOE Joint Genome Institute

Time: 6:20 PM
 Room: Royal Palm Salon 3-4
 Title: W083 Overview and Joint Genome Institute Plant Program Update
 Presenters: **Jeremy Schmutz**¹, **Kerrie W. Barry**¹, **David M. Goodstein**¹, **Jane Grimwood**², **Jerry Jenkins**², **Ronan O'Malley**¹, **John Vogel**¹ and **Daniel S. Rokhsar**¹
¹DOE Joint Genome Institute, Walnut Creek, CA, ²HudsonAlpha Institute for Biotechnology, Huntsville, AL

Time: 6:40 PM
 Room: Royal Palm Salon 3-4
 Title: W084 New Capabilities and Technologies in Plant Functional Genomics at the Joint Genome Institute
 Presenter: **Juna Lee**, Joint Genome Institute, Walnut Creek, CA

Time: 7:00 PM
 Room: Royal Palm Salon 3-4
 Title: W085 *Brachypodium* ENCODE — Deciphering the Regulation of Drought Control
 Presenters: **Sarit Weissmann**¹, **Madeline A. Wiechert**¹, **John Gierer**¹, **Philip J. Ozersky**¹, **Michael J. Mohan**¹, **Kerrie W. Barry**², **Jeremy Schmutz**^{2/3} and **Todd Mockler**¹
¹Donald Danforth Plant Science Center, St. Louis, MO, ²DOE Joint Genome Institute, Walnut Creek, CA, ³HudsonAlpha Institute for Biotechnology, Huntsville, AL



Tuesday, January 16, 2018

Brachypodium Genomics

Time: 11:45 AM – 12:10 PM
 Room: Pacific Salon 2
 Title: Molecular Response to Varying Drought Conditions in *Brachypodium distachyon*
 Presenter: **Sarit Weissmann**, Donald Danforth Center

Time: 12:10 PM – 12:35 PM
 Room: Pacific Salon 2
 Title: New *Brachypodium* Resources to Study Polyploidy, Perenniality and Gene Function: Four New Reference Genomes and Nearly One Million Mutations
 Presenter: **John Vogel**, DOE Joint Genome Institute

Developing and Executing Successful Broader Impact Programs for Current and Future Grants

Time: 11:00 AM – 11:20 AM
 Room: Esquire – Meeting House
 Title: MutantMillets: A Platform for Gene Discovery in the Classroom
 Presenter: **Tom Brutnell**, Donald Danforth Plant Science Center

Genomics of Phytoremediators, Metal Accumulators and Relatives

Time: 11:10 AM – 11:30 AM
 Room: Pacific Salon 1
 Title: Genomics of Rapid Adaptation to Cu Mine in *Mimulus guttatus*
 Presenter: **John Willis**, Duke

Components of Apomixis

Time: 5:40 PM – 6:00 PM
 Room: Esquire – Meeting House
 Title: *Boechnera* Species: *de novo* Assembly of Genomes of Sexual and Apomictic Accessions and Apomixis Associated Genes Analysis
 Presenter: **Vladimir Brukhin**, St. Petersburg State University

Perennial Grasses

Time: 5:20 PM – 5:40 PM
 Room: Pacific Salon 2
 Title: Comparative Genomics of the Perennial Model Grass *Brachypodium sylvaticum* and its Annual Relative *B. distachyon*
 Presenter: **Sean Gordon**, DOE Joint Genome Institute
 Time: 5:40 PM – 6:00 PM
 Room: Pacific Salon 2
 Title: Leaf Epicuticular Wax Load Segregation in the *Panicum virgatum* 4WCR Population
 Presenter: **Jennifer Bragg**, USDA-ARS, WRRC

Wednesday, January 17, 2018

Genomics of Crop Ecosystem Services

Time: 1:50 PM – 2:10 PM
 Room: Pacific Salon 1
 Title: Accelerating the Domestication and Improvement of the Perennial Grain Crop *Thinopyrum intermedium* with Genomics
 Presenter: **Kevin Dorn**, Kansas State University

