

# **Crops *in silico* Symposium & Hackathon**

**May 1-3, 2019**

**National Center for Supercomputing Applications (NCSA), University of Illinois at  
Urbana-Champaign**

**Wednesday, May 1**

**4:30 p.m. – Registration and poster setup (NCSA Lobby)**

**5:00 p.m. – Reception (NCSA Lobby)**

**6:00 p.m. – Welcome (NCSA Auditorium)**

Stephen Long, University of Illinois at Urbana-Champaign

**6:15 p.m. — Opening Keynote**

Graeme Hammer, Crop Science Professor and Director of the Centre for Crop Science in the Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland, Australia: “Biological Reality and Parsimony in Crop Models – Why We Need Both in Crop Improvement!”

**Thursday, May 2**

**8:00 a.m. — Registration and poster setup (NCSA Lobby)**

**8:30 a.m. – Introduction to the Symposium (Room 1040) – Amy Marshall-Colón**

**8:35 – Welcome**

Evan H. DeLucia, Baum Family Director of iSEE, University of Illinois at Urbana-Champaign

Bill Gropp, Director, National Center for Supercomputing Applications

**8:55 a.m. – Facilitation and House Rules – Traci Quigg Thomas**

**9:00 a.m. – Current Status of the Crops *in silico* Framework – Meagan Lang**

**9:15 a.m. – Session 1: Structural Analysis**

James Schnable, University of Nebraska at Lincoln: “Sharing Data between Maize and Sorghum”

Bedrich Benes, Purdue University: “Modeling Plant Life in Computer Graphics”

Mao Li, Donald Danforth Plant Science Center: “3D Plant Structure Quantification Using X-ray Imaging and Advanced Morphometrics”

Introduce Discussion Groups

Break

Discussion in three groups

**11:20 a.m. – Poster Session Introduction**

**11:25 a.m. – Poster Session (Lobby)**

**12:10 p.m. – Lunch (Lobby)**

**1:10 p.m. – Lightning Talks, Round 1**

Ivone de Bem Oliveira, University of Florida: “Genomic Prediction of Polyploids; The Impact of Continuous Genotyping Calls in Phenotype Prediction

Jiangyan Feng, University of Illinois Urbana-Champaign: “Improving Nitrogen Use Efficiency of Crops”

AJ Christensen, National Center for Supercomputing Applications: “Advanced Visualization of Geometric Crop Data”

Alex Wu, The University of Queensland: “A Cross-scale Modelling Framework for Quantifying Impacts of Enhancing Photosynthesis to Support Crop Improvement”

Lightning talk panel Q&A

**1:50 p.m. – Session 2: Genes to Crop Growth**

Lee Sweetlove, University of Oxford “Using Flux Balance Analysis to Model Plant Metabolic Networks”

Longyun Guo, Purdue University: “Gene Regulatory Network Reconstruction and Kinetic Modeling of Lignin Biosynthesis in Arabidopsis”

Addie Thompson, Michigan State University: “Estimating Parameters for Genotype-Specific Crop Growth Model”

Break

Discussion in three groups

**3:50 p.m. – Matt Hudson, Co-Director, Center for Digital Agriculture**

**4:05 p.m. – Workshop: Forming Research Collaborations**

**5:10 p.m. – Wrap-up, goals for next day**

**5:30 p.m. – Dinner (5602 Beckman)**

Stephen Long, University of Illinois: “Mathematically guided improvements of photosynthetic efficiency for sustainable increase in crop productivity.”

## Friday, May 3

**8:30 a.m. – Recap of Day 1, Introduction of goals of day 2 – Matt Turk**

**8:45 a.m. – Session 3: Development & Growth**

Christopher Hwang, University of Florida: “Predicting Flowering Time with Nonlinear G X E Responses in Common Bean”

Diane Wang, The State University of New York-Buffalo: “Can Genomics Inform Physiological Complexity in Plant Process-based Models?”

Xiyu Yang, Pennsylvania State University “OpenSimRoot: Opportunities in Exploring Crop Root Growth *in silico*”

Break

Discussion in three groups

Group Photo

**10:55 a.m. – Challenge/Offer Matches**

**11:35 p.m. – Lightning Talks, Round 2**

Nathaniel Schleif, University of Wisconsin – Madison: “Finding Intermediates in Gene Regulatory”

MD Rahman, Howard University: “Rice Receptor for Activated C Kinase1B (OsRACK1B) Negatively Regulates Chlorophyll Degradation and Salinity Induced Senescence through Interaction with Stay-green (SGR) in Rice”

Kathryn Michel, University of Wisconsin: “Per se Yield Components in the Stiff Stalk Heterotic Group Dissected Using New Genome Assemblies combined with Exome-capture Genotyping of a Multi-parent Population

Chirag Gupta, University of Arkansas: “Predicting Genes Important for Drought Tolerance Using a Genome-wide Gene Regulatory Network and Machine Learning in Rice”

Lightning talk panel Q&A

**12:15 p.m. – Lunch (Lobby)**

**1:15 p.m. – Hackathon**