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LATE ABSTRACTS

# 2016 World Congress on In Vitro Biology, June 11–15, San Diego, California

## Late Submission Abstracts

### PLANT SYMPOSIA ABSTRACTS

#### AUTOMATION IN TISSUE CULTURE—Sunday, June 12, 10:30 am–12:30 pm

P-3 Evolution of an Automated Synthetic Biology Portal
***Steven B. Riedmuller***, *Synthetic Genomics*

#### ALGAE BIOTECHNOLOGY—Wednesday, June 15, 10:30 am–12:30 pm

P-38 Massive Mutant Screens to Develop a Photosynthetic Bioproduction Platform
***Benjamin E. Rubin***, *University of California San Diego*

### EDUCATION POSTER ABSTRACT

E-3000 Training the Next Generation-Y Through Innovative and Experiential Science Curricula, and Professional Development
***Osagie Idehen,*** *Tuskegee University, Marceline Egnin, Gregory Bernard, Steven Samuels, Desmond Mortley, Franklin Quarcoo, Conrad Bonsi, Olga Bolden-Tiller, iBREED Students, and Craig Yencho*

### PLANT POSTER ABSTRACTS

#### BIOTECHNOLOGY

P-3000 Media Optimization for *In Vitro* Bacoside—A Production in *Bacopa monnieri* (L.) Wettst
***Mahima Bansal,*** *Thapar University, Anil Kumar, and M. S. Reddy*

P-3001 Targeted Gene Insertion Through Genome Editing
***Rachael Barron,*** *J. R. Simplot Company, Manmeet Singh, Hui Duan, and Troy Weeks*

P-3002 Alternative Splicing of a Calmodulin Gene Family Member in Tomato Generates a Novel Nuclear-targeted Isoform
***Daniel R. Bergey,*** *University of Wyoming Research and Extension Center, M. Dutt, Viji Sitther, Isaac Quarterman, and S. A. Dhekney*

P-3003 Efficient Evaluation of Physical and Molecular Plant Immune Responses to Root-knot Nematode Infection in Selected Sweetpotato Cultivars
***Gregory C. Bernard,*** *Tuskegee University, Marceline Egnin, Conrad Bonsi, Desmond Mortley, William Witola, Steven Samuels, Caroline Land, and Kathy Lawrence*

P-3004 The International Association for Plant Biotechnology
***Barbara Doyle Prestwich,*** *University College Cork*

P-3005 Application of Bean Based Transient Technology for Novel Insecticidal Protein Discovery
***Matthew J. Heckert,*** *DuPont Pioneer, Janet Rice, Natalie Stoner, Deborah Clark, Ericka Veliz, Jim English, and Jennifer Barry*

P-3006 Genetic Engineering of Tobacco with Plant Pigmentation Genes for the Development of Novel Phenotypes
***H. L. Jernigan,*** *University of Wyoming, N. Joshee, D. R. Bergey, V. Sitther,, and S. A. Dhekney*

P-3007 Phylogenetic Analysis of *Olea europaea* L. Cultivars Using LTRs (Long Term Repeats) Retrotransposon-based Marker Systems
***Ergun Kaya,*** *Mugla Sitki Kocman University, Emel Yilmaz-Gokdogan, and Muammer Ceylan*

P-3008 *In Vitro* Seed Germination of *Citrus* spp.—a Tool in Post-cryopreservation Plant Development
***Ergun Kaya,*** *Mugla Sitki Kocman University, Fernanda Vidigal Duerte Souza, Muammer Ceylan, and Maria M. Jenderek*

P-3009 Adventitious Shoot Regeneration and *Agrobacterium tumefaciens*-mediated Transient Transformation of Sweet Cherry (*Prunus avium* L.)
***Mohamed Nagaty,*** *Michigan State University, Yunyan Kang, Gregory Lang, and Guo-qing Song*

P-3010 Oxidative Stress of Mature Pistachio (*Pistacia vera* L. 'Atlı') Shoot Tips During *In Vitro* Culture
***Hülya Akdemir,*** *Gebze Technical University, Veysel Süzerer, Engin Tilkat, Ahmet Onay, and Yelda Özden Çiftçi*

P-3011 β-Carotene Bleaching and ABTS Cation Radical Scavenging Activities of the Extracts from Different Parts of *In Vivo* and *In Vitro* Raised *Pictacia lentiscus* L
**Engin Tilkat,** University of Batman, Veysel Süzerer, Ebubekir İzol, Abdulselam Ertaş, Hilal Surmuş Aşan, Mustafa Abdullah Yılmaz, and Ahmet Onay

P-3012 Developing the Thermally-tolerant Pectin Methylesterase for Improved Sugar Beet Biomass Processing
***Jose C. Tovar,*** *Arkansas State University, Megan Cease, Jianfeng (Jay) Xu, and Brett J. Savary*

P-3013 Transgenic Banana Expressing *NH1* Gene Can Provide Resistance to Bacterial and Fungal Diseases
***Jaindra Nath Tripathi,*** *International Institute of Tropical Agriculture, Richard O. Oduor, Pamela C. Ronald, and Leena Tripathi*

P-3014 Engineering Plant Cell Wall with Designer Glycopeptide-tagged E1 Endoglucanase for Improved Biomass Digestibility
***Jianfeng Xu,*** *Arkansas State University, Hong Fang, Ningning Zhang, Gregory Phillips, and Brett Savary*

P-3040 Extensive Variation in Rate of Callus and Shoot Regeneration, and *Agrobacterium*-mediation Transformation, Among Wild Black Cottonwood Genotypes *(Populus trichocarpa)*
***Cathleen Ma,*** Oregon State University, and Steve Strauss

P-3042 Agrobacterium-mediated Transformation Novel Process
***Ronald Cuie II,*** *Salixae*

## CELL BIOLOGY

P-3015 Plant Transformation Services
***Hyeyoung Lee,*** *University of Missouri, Hien T. Bui, Yanjiao Zou, Neng Wan, Joann R. De Tar, Hanbing Li, Muruganantham Mookkan, Kaixuan Duan, Hua Liu, Michelle Folta, Phat Do, Christopher Willig, and Zhanyuan J. Zhang*

## CELL AND TISSUE MODELS

P-3016 Purification of Plant Produced Asialo-rhuEPO and the Study of its Cytoprotective Effects on the Pancreatic Beta Cell Line RIN-m5F
***Elena Arthur,*** *North Carolina Central University, Farooqahmed Kittur, Chiu-Yueh Hung, and Jiahua (Jay) Xie*

P-3017 Decellularized Hairy Roots as Potential Scaffolds for Mammalian Stem Cell Culture
***Najwa Lee,*** *Arkansas State University, Tianhong Yang, and Fabricio Medina-Bolivar*

## CELLULAR PATHOLOGY

P-3018 Characterization of Markers Linked to Resistance Motifs against Maize Lethal Necrosis Disease in Tanzanian Maize Germplasms
***Inocent Ritte,*** *Sokoine University of Agriculture and Tuskegee University, M. Egnin, P. M. Kusolwa, G. He, O. Idehen, G. C. Bernard, and S. Samuels*

## DEVELOPMENT BIOLOGY

P-3019 Screening Elite Cannabis for *In Vitro* Conservation
***Suman Chandra,*** *University of Mississippi, Hemant Lata, Zlatko Mehmedic, Ikhlas A. Khan, and Mahmoud A. ElSohly*

P-3020 *Eucalyptus* Microgametogenesis Stages as a Tool for Biotechnological Studies
***A. P. Martinelli,*** *University of São Paulo, S. Santa-Rosa, M. L. Rossi, and F. R. Muniz*

P-15 – Algae Biotechnology

# Massive Mutant Screens to Develop a Photosynthetic Bioproduction Platform

Wednesday, June 15

11:50 AM - 12:20 PM

Room: Harbor Island 2

Speaker(s):
Benjamin Emery Rubin
*Graduate Student, UCSD, del mar, California*

***Synechococcus elongatus*** PCC 7942 is a model photosynthetic organism and a potential platform for the production of fuel and fossil fuel based chemicals. To identify the comprehensive set of genes and intergenic regions that impact fitness in *S. elongatus*, we created a pooled library of approximately 250,000 transposon mutants and used sequencing to identify the insertion locations. By analyzing the distribution and survival of these mutants under control conditions we identified 718 of the organism's 2,723 genes as essential for survival. The validity of the essential gene set is supported by its tight overlap with well-conserved genes and its enrichment for core biological processes. The differences noted between our dataset and these predictors of essentiality, however, have led to surprising biological conclusions. One such finding is that genes in the second half of the tricarboxylic acid (TCA) cycle are dispensable, suggesting that *S. elongatus* can survive with a non-cyclic and highly abridged TCA process.

The library is also a powerful tool for identifying genes that are beneficial or detrimental under different growth conditions. With a focus on environments relevant to the use of *S. elongatus* as a bioproduction platform we have studied 42 conditions. These screens have resulted in the identification of hundreds of key genes involved in biofilm formation, predator resistance, and dark survival. This genome wide dataset of the essential and conditionally relevant loci of *S. elongatus* both improves our understanding of the organisms' basic physiology and will aid efforts to develop *S. elongatus* as abioproduction platform.