2nd International Conference on Plant Synthetic Biology, Bioengineering and Biotechnology 2018

Clearwater, Florida, USA 29 November – 1 December 2018

ISBN: 978-1-5108-9679-6

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2018) by AIChE All rights reserved.

Printed with permission by Curran Associates, Inc. (2019)

For permission requests, please contact AIChE at the address below.

AIChE 120 Wall Street, FL 23 New York, NY 10005-4020

Phone: (800) 242-4363 Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400

Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

2nd International Conference on Plant Synthetic Biology, Bioengineering, and Biotechnology proceedings

General Submissions

Tissue Culture and Transformation of Recalcitrant Species

New Tools for an Old Problem 1

Kim Boutilier

Maize Transformation at Pioneer - Meeting Future Demands for Genome Modification 3

Bill Gordon-Kamm

Keith Lowe

Hoerster George

Ning Wang

Ajith Anand

Emily Wu

Maren Arling

Todd Jones

Synthetic Biology Tools and Quantitative Aspects of Gene Circuit Design

Improved Plant Synthetic Biology Using a Versatile and Robust Agrobacterium-Based Gene Stacking System 5

Roger Thilmony

Parts-Prospecting for the Methanol Economy: Yhbo and Formaldehyde Resilience 7

Jenelle A. Patterson

Hai He

Arren Bar-Even

Mark A. Wilson

Andrew D. Hanson

A Mathematical Model in Absolute Units for the Arabidopsis Circadian Oscillator 9

Uriel Urquiza-García

Andrew J. Millar

Engineering Root Architecture with New Tools for Controlling Gene Expression in Plants 11

Jennifer A.N. Brophy

Jose R. Dinneny

In silico Model for Mining the Cis-Regulatory Determinants of Tissue-Specific Gene Expression 13

Molly Megraw

Valerie N. Fraser

Mitra Ansariola

Shawn O'Neil

Sergei Filichkin

Development of Novel Optogenetic Tools By Continuous Directed Evolution of Plant Blue-Light-Dependent Interactions 15

Huachun Liu

Plant Foundry: Biopolymers, Biopharmaceuticals and Medically Effective Secondary Metabolites (Vaccines, Antibodies, and Metabolites)

Opportunities for Plant Biotechnology to Advance Plant-Based Meat and Clean Meat 17 Liz Specht

Genome Editing for Crop Improvement

Enhancing Photosynthesis, Vitamin E Production and Tolerance to Herbicides By Targeting Homogentisate Catabolism Using CRISPR/Cas9 Genome Editing System in Soybean 19

Cuong Nguyen Rebecca Cahoon Hanh Nguyen Phat Do Shirley Saito Gary Stacey Thomas Clemente Edgar Cahoon Minviluz Stacey

Engineering of the Chloroplast Genome

Engineering the Chloroplast Genome with Synthetic Biology Tools for Microcompartment Construction 21

Vishalsingh Chaudhari Maureen Hanson

Engineered RNA-Binding Protein for Gene Regulation in Non-Green Plastids 23

Qiguo Yu Alice Barkan Pal Maliga

Advances in Synthetic Biology Approaches for Production of High Value Products in Chloroplasts 25

Henry Daniell

Combining Parts: Coupling Photosynthetic Electron Transport to Metabolic Engineering 27 *Poul Erik Jensen*

Transgenic Approaches for Improving Traits and Performance of Crops

Directed Evolution of Energy-Efficient Non-Suicidal THi4s - a Next-Gen Synbio Strategy 29

Andrew D. Hanson

Jaya Joshi

Christopher R. Reisch

Synthetic Design of New Plant Oil Traits for Oilseed Crops As Sustainable and High-Quality Feedstock 31

Haejin Kim

Edgar Cahoon Thomas Clemente

The GRAIN Platform: Identification of Gene Targets for Improving Crop Yield 33

Frank A. Skraly Kristi D. Snell Madana M.R. Ambavaram Meghna R. Malik Oliver P. Peoples

Transcriptional Rewiring: Editing Plant Stess Response Networks 35 Oliver Windram

Genetic Engineering for Enhancing Abiotic Stress Tolerance in Canola (Brassica napus) 37

Aqsa Tabasum Mohan Singh Prem Bhalla

Cotton Fiber Quality Improvement By Introducing Sucrose Synthase (SuS) Gene into Gossypium hirsutum L $\,$ 39

Ahmad Ali Shahid Mukhtar Ahmed