

Foundations of Systems Biology in Engineering

August 5-8, 2018 ♦ Oak Brook Hills Resort ♦ Oak Brook, Illinois

DRAFT AGENDA

Sunday, August 5

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|---------------------|-------------------|--|
| 12:00 p.m. to | 6:00 p.m. | Conference Registration |
| 1:00 p.m. to | 5:00 p.m. | Training Workshops
(Separate registration required) |
| 1:00 p.m. to | 1:45 p.m. | Title
<i>Josh Leonard, Northwestern University</i> |
| 1:45 p.m. to | 2:30 p.m. | Title
<i>Marc Birtwistle, Clemson University</i> |
| 2:30 p.m. to | 2:45 p.m. | Refreshment Break (complimentary for workshop registrants) |
| 2:45 p.m. to | 3:30 p.m. | Title
<i>Chris Rao, University of Illinois - Urbana-Champaign</i> |
| 3:30 p.m. to | 4:15 p.m. | Title
<i>Casim Sarkar, University of Minnesota</i> |
| 4:15 p.m. to | 5:00 p.m. | Title
<i>Jennifer Reed, University of Wisconsin - Madison</i> |
| 6:00 p.m. to | 7:45 p.m. | Welcome Reception |
| 7:45 p.m. to | 8:00 p.m. | Introductory Remarks
<i>Juergen Hahn, Rensselaer Polytechnic Institute</i> |
| 8:00 p.m. to | 9:00 p.m. | Keynote Lecture
Mining Personal, Dense, Dynamic Data Clouds to Enhance Health
and Drive Discovery
<i>Nathan Price, Systems Biology Institute - Seattle</i> |
| 9:00 p.m. to | 10:30 p.m. | Hospitality |

Monday, August 6

8:00 a.m. to	5:00 p.m.	Conference Registration
8:00 a.m. to	9:00 a.m.	Continental Breakfast
9:00 a.m. to	10:45 p.m.	General Session 1 – Modeling of Complex Biological Systems
9:00 a.m. to	9:40 a.m.	Achieving XAI by Merging Big Data Analytics and Genome-scale Models <i>Bernhard Palsson, University of California - San Diego</i>
9:40 a.m. to	10:20 a.m.	Metabolic Regulation During Growth on Complex Mixtures of Nutrients <i>Chris Rao, University of Illinois - Urbana-Champaign</i>
10:20 a.m. to	10:45 a.m.	Sufficiently Exciting Inputs for Structurally Identifiable Systems Biology Models <i>Alejandro Fernández Villaverde, Neil Evans, Michael Chappell, Julio Banga</i>
10:45 a.m. to	11:00 a.m.	Refreshment Break
11:00 a.m. to	12:45 p.m.	General Session 2 – Industrial Applications of Systems and Synthetic Biology
11:00 a.m. to	11:35 a.m.	Commercial-scale Production of Fuels and Chemicals from Low Cost Feedstocks via an Integrated, Multi-scale Anaerobic Gas Fermentation Platform <i>Steve Brown, LanzaTech</i>
11:35 a.m. to	12:10 p.m.	Integrated Quantitative Systems Pharmacology (QSP) and Systems Biology Modeling to Accelerate Drug Development: Examples from Immuno-inflammation and Dermatology <i>Loveleena Bansal, GlaxoSmithKline</i>
12:10 p.m. to	12:45 p.m.	Biology by Design <i>Will Cao, Ginkgo Bioworks</i>
12:45 p.m. to	2:10 p.m.	Poster Session A (with boxed lunch)

Monday, August 6 (continued)

2:10 p.m. to	3:55 p.m.	General Session 3 – Multi-scale and Multi-omics Experimentation, Data Integration and Modeling
2:10 p.m. to	2:50 p.m.	Metabolic Coordination Through Metabolite-protein Interactions <i>Uwe Sauer, ETH-Zurich</i>
2:50 p.m. to	3:30 p.m.	Elucidating Binding Dynamics in Multivalent Protein-Protein Interactions <i>Casim Sarkar, University of Minnesota</i>
3:30 p.m. to	3:55 p.m.	Dynamic Transcriptomic Data Analysis by Integrating Data-driven and Model-guided Approaches <i>Matthew Hilliard, Qinghua (Peter) He, Jin Wang</i>
3:55 p.m. to	4:10 p.m.	Refreshment Break
4:10 p.m. to	5:55 p.m.	General Session 4 – Network Inference and Modeling
4:10 p.m. to	4:50 p.m.	Using Models to Link Chemistry to Biology in Microbiome Systems <i>Chris Henry, Argonne National Laboratory</i>
4:50 p.m. to	5:30 p.m.	One-Stage vs. Two-Stage Bioprocesses: Comparative Computational and Experimental Studies and Consequences for Strain Design <i>Steffen Klamt, Max Planck Institute - Madgeburg</i>
5:30 p.m. to	5:55 p.m.	Network Inference Performance: A Consequence of Topological, Experimental, and Algorithmic Determinants <i>Joseph J. Muldoon, Jessica Yu, Mohammad-Kasim Fassia, Neda Bagheri</i>

Tuesday, August 7

8:00 a.m. to	5:00 p.m.	Conference Registration
8:00 a.m. to	9:00 a.m.	Continental Breakfast
9:00 a.m. to	10:45 p.m.	General Session 5 – Synthetic Biology
9:00 a.m. to	9:40 a.m.	Genome-scale Modeling and Engineering of Yeasts for Production of Chemicals and Fuels <i>Huimin Zhao, University of Illinois - Urbana-Champaign</i>
9:40 a.m. to	10:20 a.m.	Enabling Design-driven Medicine with Synthetic Biology: Engineering Programmable Cell-based Therapies <i>Josh Leonard, Northwestern University</i>
10:20 a.m. to	10:45 a.m.	Engineering Microbes to Modulate Opportunistic Pathogens <i>In Young Hwang, Elvin Koh, Matthew Chang</i>
10:45 a.m. to	11:00 a.m.	Refreshment Break
11:00 a.m. to	12:45 p.m.	General Session 6 – Next Generation Networks and Tools
11:00 a.m. to	11:40 a.m.	Phenotypic Diversity Reduces Fitness Trade-offs in Motile Bacterial Populations <i>Yann Dufour, Michigan State University</i>
11:40 a.m. to	12:20 p.m.	Biological Control: The Versatile Ways in Which Cells Use Feedback Loops <i>Hana El-Samad, University of California - San Francisco</i>
12:20 p.m. to	12:45 p.m.	Evaluation of Derivative-Free Optimizers for Parameter Estimation in Systems Biology <i>Yannik Schälte, Paul Stapor, Jan Hasenauer</i>
12:45 p.m. to	2:15 p.m.	Poster Session B (with boxed lunch)

Tuesday, August 7 (continued)

2:15 p.m. to	3:45 p.m.	Panel Discussion: Future Funding Directions David Babson, DOE Haluk Resat, NIH Panelist – to be determined
3:45 p.m. to	4:00 p.m.	Refreshment Break
4:00 p.m. to	5:40 p.m.	General Session 7 – Systems Biology of Cellular Functions
4:00 p.m. to	4:40 p.m.	A Metabolic Oscillator and the Cell Cycle Oscillators Jointly Control the Cell Division Process as a System of Coupled Oscillators <i>Matthias Heinemann, University of Groningen</i>
4:40 p.m. to	5:10 p.m.	Comparator-based Gene Regulatory Network Designs for Control of Expression <i>Jafar Kazemi, Sadjad Ozgoli, Brian Ingalls</i>
5:10 p.m. to	5:40 p.m.	Toward Multi-Input Control: A Dual-Feedback Loop Model of the Mammalian Circadian Clock <i>Lindsey Brown, Francis Doyle III</i>
6:00 p.m. to	7:00 p.m.	Reception
7:00 p.m. to	7:30 p.m.	Foundation Award Presentation Need Title <i>Hans Westerhoff, University of Amsterdam / University of Manchester</i>
7:30 p.m. to	9:30 p.m.	Banquet

Wednesday, August 8

8:00 a.m. to	9:00 a.m.	Continental Breakfast
9:00 a.m. to	10:45 p.m.	General Session 8 – Systems and Synthetic Biology for Biotechnology
9:00 a.m. to	9:40 a.m.	Orthogonality based Dynamic Control of Metabolism <i>Krishna Mahadevan University of Toronto</i>
9:40 a.m. to	10:20 a.m.	Systems Approaches for Engineering Microbial Biocatalysts <i>Jennifer Reed, University of Wisconsin - Madison</i>
10:20 a.m. to	10:45 a.m.	Mathematical Modeling as a Tool to Improve Influenza Vaccine Production Processes <i>Stefanie Duvigneau, Robert Dürr, Tanja Laske, Mandy Bachmann, Melanie Dostert, Udo Reichl, Achim Kienle</i>
10:45 a.m. to	11:00 a.m.	Refreshment Break
11:00 a.m. to	12:45 p.m.	General Session 9 – Systems Medicine
11:00 a.m. to	11:40 a.m.	Agent-Based Modeling of Biological Systems – Applications in Tissue Engineering, Bioreactors and Beta Cell Destruction <i>Ali Cinar, Illinois Institute of Technology</i>
11:40 a.m. to	12:20 p.m.	A Mechanistic Pan-cancer Pathway Model Informed by Multi-omics Data Interprets Stochastic Cell Fate Responses to Drugs and Mitogens <i>Marc Birtwistle, Clemson University</i>
12:20 p.m. to	12:45 p.m.	A Dynamic Model of Cystic Fibrosis Airway Epithelium Electrophysiology <i>Florencio Serrano Castillo, Carol Bertand, Timothy Corcoran, Monica Shapiro, Robert Parker</i>
12:45 p.m. to	1:00 p.m.	Closing Remarks <i>Juergen Hahn, Rensselaer Polytechnic Institute</i>