Foundations of Systems Biology in Engineering

August 28 - 31, 2022 ◆ Royal Sonesta Hotel ◆ Cambridge Massachusetts

FINAL AGENDA

The general sessions are in the East Tower, 2nd Level ~ Riverfront Ballroom
The poster sessions are in the Parkview Room

Sunday, August 28

10:00 a.m. to	6:00 p.m.	Conference Registration *(Riverfront Foyer, East Tower 2nd level)*
1:15 p.m. to	**1:30 p.m.**	**FOSBE 2022 Welcome** *Ioannis P. Androulakis – Rutgers University, USA*
1:30 p.m. to	2:30 p.m.	**Keynote Lecture** – Cross-Species Translation of Biological Information *Douglas Lauffenburger – MIT, USA*
2:30 p.m. to	**5:00 p.m.**	**General Session 1 – Systems Biology: Past, Present and Future** Session Chair: *Maria Klapa – Foundation for Research & Technology, Greece*
2:30 p.m. to	3:00 p.m.	Past, Present and Future Perspectives on Systems Biology and its Application *Irina Leaf – Axcella Therapeutics, USA*
3:00 p.m. to	3:30 p.m.	Transitioning from Basic Towards Systems Pharmacodynamic Models: Lessons from Corticosteroids *William Jusko – University at Buffalo-SUNY, USA*
3:30 p.m. to	4:00 p.m.	Refreshment Break
4:00 p.m. to	4:30 p.m.	Some Control Theory Ideas in Systems and Synthetic Biology *Eduardo Sontag – Northeastern University, USA*
4:30 p.m. to	4:45 p.m.	Stably Accelerating Stiff Quantitative Systems Pharmacology Models: Continuous-Time Echo State Networks as Implicit Machine Learning *Ranjan Anantharaman, Anas Abdelrehim, Anand Jain, Avik Pal, Daniel Sharp, Utkarsh, Alan Edelman, Christopher Rackauckas – MIT, USA*
4:45 p.m. to	5:00 p.m.	Model-based Design of a Synthetic Oscillator Based on an Epigenetic Memory System *Viviane Klingel, Nicole Radde – University of Stuttgart, Germany*
5:30 p.m. to	**7:00 p.m.**	**Welcome Reception** *(Parkview Room)*

Monday, August 29

8:00 a.m. to	5:30 p.m.	Conference Registration (*Riverfront Foyer, East Tower 2nd level*)

8:00 a.m. to 8:30 a.m. Continental Breakfast *(Riverfront Foyer)*

8:30 a.m. to 11:30 a.m. General Session 2 – Systems Biology in the Machine Learning Era
Session Chair: *Ashlee N. Ford Versypt – University at Buffalo-SUNY, USA*

8:30 a.m. to 9:05 a.m. Towards the Development of a Diagnostic Test for Autism Spectrum Disorder: Data Science Meets Metabolomics
Juergen Hahn – Rensselaer Polytechnic Institute, USA

9:05 a.m. to 9:40 a.m. Rethinking Model-based Drug Development in the Era of A.I.: Early Lessons from Applying Machine Learning and Mechanism-based Modeling in Early Drug Discovery
Panteleimon Mavroudis – Sanofi, USA

9:40 a.m. to 10:10 a.m. Refreshment Break

10:10 a.m. to 10:30 a.m. A Simultaneous Training and Input Selection Algorithm for Classification Problems using Piece-Wise Approximations
Hasan Sildir, Sahin Sarrafi, Taskin Kavzoglu – Gebze Technical University, Turkey

10:30 a.m. to 10:50 p.m. A Machine Learning Approach to Control Gene Expression in Living Cells
Adele de Hoffer, Lorenzo Foglia, Diego di Bernardo – TIGEM, Italy

10:50 a.m. to 11:10 p.m. Reconstruction of Unintended Interactions in Synthetic Gene Circuits from Time-series Perturbation Experiments
Mirko Pasquini, Yu Wang, Elling Jacobsen – KTH, Sweden

11:10 a.m. to 11:30 a.m. Prediction of Gene Essentiality using Machine Learning and Genome-scale Metabolic Models
Diego A. Oyarzún, Lilli Freischem, Mauricio Barahona – University of Edinburg, United Kingdom

11:30 a.m. to 1:15 p.m. Poster Session 1 (with boxed lunch) *(Parkview Room)*
Session Chair: *Daniel Howsmon – University of Texas at Austin, USA*

1:15 p.m. to 2:15 p.m. Panel Discussion: Diversity
Panelists: *Linda Griffith, MIT*
Suzana Petanceska, NIH
Panagiota Foteinou, BMS
Cynthia Musante, Pfizer

2:30 p.m. to	**5:30 p.m.**	**General Session 3 – Systems Biology Meets Systems Pharmacology: More of the Same or Something New?** Session Chair: *Juergen Hahn – Rensselaer Polytechnic Institute, USA*
2:30 p.m. to	3:00 p.m.	Deconstructing and Reconstructing the Patient *Linda Griffith – MIT, USA*
3:00 p.m. to	3:30 p.m.	Systems Biology Meets Systems Pharmacology: A Tale of Two Molecules *Carolyn Cho – Merck, USA*
3:30 p.m. to	4:00 p.m.	Integrating Systems Modeling & Analytics Approaches in Drug Development *Saroja Ramanujan – Genentech, USA*
4:00 p.m. to	4:30 p.m.	Refreshment Break
4:30 p.m. to	4:50 p.m.	Systems Biology Modeling of the Interaction between Red Blood Cells and Splenic Macrophages during Erythrophagocytosis *Yu Zhang, Yuhao Qiang, He Li, Ming Dao, George Karniadakis, Chen Zhao, Aleksander Popel – Johns Hopkins University, USA*
4:50 p.m. to	5:10 p.m.	High-content Imaging and Network Modeling Maps Drug-induced Regulation of Cardiac Fibroblast Phenotype *Anders Nelson, Steven Christiansen, Jeffrey Saucerman – University of Virginia, USA*
5:10 p.m. to	5:30 p.m.	Identification of Apolipoprotein E4 inhibitors for Alzheimer's Disease Therapy through a Large-Scale Virtual Screening *Zuyi Huang, Emily Krass, Tianhua Zhai – Villanova University, USA*
5:30 p.m.		**Free Evening**

Tuesday, August 30

8:00 a.m. to	**8:30 a.m.**	**Continental Breakfast** *(Riverfront Foyer)*
8:30 a.m. to	**11:30 a.m.**	**General Session 4 – Systems Biology in a Clinical Setting: From Laptop to Bedtop** Session Chair: Zuyi (Jacky) Huang – *Villanova University, USA*
8:30 a.m. to	9:00 a.m.	Towards the Development of a Multi-scale QSP Framework for Novel IL2 Agonist Applications *Panagiota Foteinou – Bristol Myers Squibb, USA*
9:00 a.m. to	9:30 a.m.	Applications of Quantitative Systems Modeling in Model Informed Drug Development *Holly Kimko – AstraZeneca, USA*
9:30 a.m. to	10:00 a.m.	Mathematical Modeling of the Gut-bone Axis and Implications of Butyrate Treatment on Osteoimmunology *Ashlee N. Ford Versypt – University at Buffalo-SUNY, USA*
10:00 a.m. to	10:30 a.m.	Refreshment Break
10:30 a.m. to	10:50 a.m.	Modeling Organ Failure Under Hypoxic Stress *Stefanos Papadopoulos, Gilles Clermont, Robert S. Parker – University of Pittsburgh, USA*
10:50 a.m. to	11:10 a.m.	Optimal Temperature Protocols for Liver Machine Perfusion Using a Monte Carlo Method *Angelo Lucia, Uygun Korkut – University of Rhode Island & Massachusetts General, USA*
11:10 a.m. to	11:30 a.m.	Effect of Metabolic Rates in the Modeling of the Cardio-Respiratory System in COPD Patients *Varghese Kurian, Navid Ghadipasha, Antony Beris, Babatunde A. Ogunnaike – University of Delaware, USA*
11:30 a.m. to	**1:15 p.m.**	**Poster Session 2 (with boxed lunch)** *(Parkview Room)* Session Chair: *Maria Klapa – Foundation for Research & Technology, Greece*
1:15 p.m. to	**2:15 p.m.**	**Panel Discussion: Funding and Future Directions** Panelists: *Hao Zhu, FDA* *Suzana Petanceska, NIH* *Yoram Vodovotz, Frontiers in Systems Biology* *Maria Klapa, ELIXIR Systems Biology*

2:30 p.m. to	**5:30 p.m.**	**General Session 5 – Personalized Systems Biology: Bridging Lifestyle and Environment with Genetics** Session Chair: *Panagiota Foteinou – Bristol Myers Squibb, USA*
2:30 p.m. to	3:00 p.m.	It's About Time: Sleep and Daily Rhythms *Elizabeth Klerman – Harvard University, USA*
3:00 p.m. to	3:30 p.m.	Lessons from Longitudinal Multi-omic Health Monitoring of Thousands of People *Nathan Price – Thorne Health Tech, USA*
3:30 p.m. to	4:00 p.m.	Systems Biology Data Mining for Synthetic Biology Practice in Zymomonas mobilis *Peng Xu – Guangdong Technion-Israel Institute of Technology, China*
4:00 p.m. to	4:30 p.m.	Refreshment Break
4:30 p.m. to	4:50 p.m.	Modeling Isogenic Cancer Cell Response upon Varying TRAIL Stimulations to Decipher the Kinetic Determinants of Cell Fate Decision *Marielle Péré, Diego A. Oyarzún, Jérémie Roux, Madalena Chaves – INRIA, France*
4:50 p.m. to	5:10 p.m.	Differential Flatness and Liouvillian Character of Two HPA Axis Models *Hugues Mounier, Florentina Nicolau – University of Paris-Sud, France*
5:10 p.m. to	5:30 p.m.	STARFYSH: Spatial Transcriptomic Analysis using Reference-Free auxiliarY Deep Generative Modeling and Shared Histology Reveals Unique Inflammation Pattern in Metaplastic Breast Cancer *Siyu He, Elham Azizi – Columbia University, USA*
6:00 p.m. to	**7:00 p.m.**	**Reception** *(Parkview Room)*
7:00 p.m. to	**7:30 p.m.**	**Foundation Award Presentation** *(Parkview Room)* Natural and Artificial Control Systems in Biology *Frank Doyle – Harvard University, USA* Introduction by *Ioannis P. Androulakis*
7:30 p.m. to	**9:30 p.m.**	**Banquet**

Wednesday, August 31

8:00 a.m. to   **8:30 a.m.**   **Continental Breakfast** *(Grand Ballroom Foyer)*

8:30 a.m. to   **11:45 a.m.**   **General Session 6 – Systems Biology: What, Why, Who, and How?**
Session Chair: *Daniel Howsmon – University of Texas at Austin, USA*

8:30 a.m. to   8:50 a.m.   A Whole-body Multi-scale Mathematical Model for Dynamic Simulation of the Metabolism in Man
Peter Emil Carstensen, Jacob Bendsen, Asbjørn Thode Reenberg, Tobias K. S. Ritschel, John Bagterp Jorgensen – DTU, Denmark

8:50 a.m. to   9:10 a.m.   Consensus Clustering Approaches in the Analysis of Wearables and Biosensors
Vanja Vlajnic, Steve Simske – Colorado State University, USA

9:10 a.m. to   9:30 a.m.   Introducing Computational Systems Biology Using R
Chris Kieslich – Auburn University, USA

9:30 a.m. to   9:45 a.m.   Refreshment Break

9:45 a.m. to   10:15 a.m.   Systems Biology 3.0: Integrating Datasets, Toolsets, …and Mindsets
Yoram Vodovotz – University of Pittsburgh School of Medicine, USA

10:15 a.m. to   10:45 a.m.   It's a Matter of Time: From Systems Biology to Quantitative Systems Pharmacology
Cynthia Musante – Pfizer, USA

10:45 a.m. to   11:15 a.m.   What Next?
Eberhard Voit – Georgia Institute of Technology, USA

11:15 a.m. to   **11:45 a.m.**   **Closing Remarks**
Ioannis P. Androulakis – Rutgers University, USA