

Foundations of Systems Biology in Engineering

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

FINAL AGENDA

Sunday, August 28

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| 10:00 a.m. to | 6:00 p.m. | Conference Registration |
| 1:15 p.m. to | 1:30 p.m. | FOSBE 2022 Welcome
<i>Ioannis P. Androulakis – Rutgers University, USA</i> |
| 1:30 p.m. to | 2:30 p.m. | Keynote Lecture – Cross-Species Translation of Biological Information
<i>Douglas Lauffenburger – MIT, USA</i> |
| 2:30 p.m. to | 5:30 p.m. | General Session 1 – Systems Biology: Past, Present and Future
Session Chair: <i>Maria Klapa – Foundation for Research & Technology, Greece</i> |
| 2:30 p.m. to | 3:00 p.m. | Past, Present and Future Perspectives on Systems Biology and its Application
<i>Karim Azer – Axcella, USA</i> |
| 3:00 p.m. to | 3:30 p.m. | Transitioning from Basic Towards Systems Pharmacodynamic Models:
Lessons from Corticosteroids
<i>William Jusko – University at Buffalo-SUNY, USA</i> |
| 3:30 p.m. to | 4:00 p.m. | Some Control Theory Ideas in Systems and Synthetic Biology
<i>Eduardo Sontag – Northeastern University, USA</i> |
| 4:00 p.m. to | 4:30 p.m. | Refreshment Break |
| 4:30 p.m. to | 5:00 p.m. | Systems Biology of Metabolism: Past Accomplishments and Future
Challenges and Opportunities
<i>Vassily Hatzimanikatis – EPFL, Switzerland</i> |
| 5:00 p.m. to | 5:15 p.m. | Stably Accelerating Stiff Quantitative Systems Pharmacology Models: Continuous-
Time Echo State Networks as Implicit Machine Learning
<i>Ranjan Anantharaman, Anas Abdelrehim, Anand Jain, Avik Pal,
Daniel Sharp, Utkarsh, Alan Edelman, Christopher Rackauckas – MIT, USA</i> |
| 5:15 p.m. to | 5:30 p.m. | Model-based Design of a Synthetic Oscillator Based on an Epigenetic
Memory System
<i>Viviane Klingel, Nicole Radde – University of Stuttgart, Germany</i> |
| 6:00 p.m. to | 8:00 p.m. | Welcome Reception |

Monday, August 29

- 8:00 a.m. to 5:30 p.m. Conference Registration
- 8:00 a.m. to 8:30 a.m. Continental Breakfast**
- 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
Lorenzo Foglia, Diego di Bernardo, Adele de Hoffer – TIGEM, Italy
- 10:50 a.m. to 11:10 p.m. Reconstruction of Unintended Interactions in Synthetic Gene Circuits from Time-series Perturbation Experiments
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
Lilli Freischem, Mauricio Barahona, Diego A. Oyarzun – University of Edinburg, United Kingdom
- 11:30 a.m. to 1:15 p.m. Poster Session 1 (with boxed lunch)**
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*
Maria Klapa, FORTH
Suzana Patanceska, 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? <i>Session Chair: Juergen Hahn – Rensselaer Polytechnic Institute, USA</i>
2:30 p.m. to	3:00 p.m.	Deconstructing and Reconstructing the Patient <i>Linda Griffith – MIT, USA</i>
3:00 p.m. to	3:30 p.m.	Systems Biology Meets Systems Pharmacology: A Tale of Two Molecules <i>Carolyn Cho – Merck, USA</i>
3:30 p.m. to	4:00 p.m.	Integrating Systems Modeling & Analytics Approaches in Drug Development <i>Saroja Ramanujan – Genentech, USA</i>
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 <i>Yu Zhang, Yuhao Qiang, He Li, Ming Dao, George Karniadakis, Chen Zhao, Aleksander Popel – Johns Hopkins University, USA</i>
4:50 p.m. to	5:10 p.m.	High-content Imaging and Network Modeling Maps Drug-induced Regulation of Cardiac Fibroblast Phenotype <i>Anders Nelson, Steven Christiansen, Jeffrey Saucerman – University of Virginia, USA</i>
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 <i>Emily Krass, Tianhua Zhai, Zuyi Huang – Villanova University, USA</i>
5:30 p.m.		Free Evening

Tuesday, August 30

- 8:00 a.m. to 8:30 a.m. Continental Breakfast**
- 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)**
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: *Jeff Barrett, Critical Path Institute*
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: <i>Panagiota Foteinou – Bristol Myers Squibb, USA</i>
2:30 p.m. to	3:00 p.m.	It's About Time: Sleep and Daily Rhythms <i>Elizabeth Klerman – Harvard University, USA</i>
3:00 p.m. to	3:30 p.m.	Lessons from Longitudinal Multi-omic Health Monitoring of Thousands of People <i>Nathan Price – Thorne Health Tech, USA</i>
3:30 p.m. to	4:00 p.m.	Systems Biology Data Mining for Synthetic Biology Practice in <i>Zymomonas mobilis</i> <i>Shihui Yang – Hubei, China</i>
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 <i>Marielle Péré, Diego A. Oyarzún, Jérémie Roux, Madalena Chaves – INRIA, France</i>
4:50 p.m. to	5:10 p.m.	Differential Flatness and Liouvillian Character of Two HPA Axis Models <i>Florentina Nicolau, Hugues Mounier – University of Paris-Sud, France</i>
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 <i>Siyu He, Elham Azizi – Columbia University, USA</i>
6:00 p.m. to	7:00 p.m.	Reception
7:00 p.m. to	7:30 p.m.	Foundation Award Presentation Natural and Artificial Control Systems in Biology <i>Frank Doyle – Harvard University, USA</i> Introduction by <i>Ioannis P. Androulakis</i>
7:30 p.m. to	9:30 p.m.	Banquet

Wednesday, August 31

8:00 a.m. to	8:30 a.m.	Continental Breakfast
8:30 a.m. to	11:45 a.m.	General Session 6 – Systems Biology: What, Why, Who, and How? Session Chair: <i>Daniel Howsmon – University of Texas at Austin, USA</i>
8:30 a.m. to	8:50 a.m.	A Whole-body Multi-scale Mathematical Model for Dynamic Simulation of the Metabolism in Man <i>Peter Emil Carstensen, Jacob Bendtsen, Asbjørn Thode Reenberg, Tobias K. S. Ritschel, John Bagterp Jorgensen – DTU, Denmark</i>
8:50 a.m. to	9:10 a.m.	Consensus Clustering Approaches in the Analysis of Wearables and Biosensors <i>Vanja Vlajnic, Steve Simske – Colorado State University, USA</i>
9:10 a.m. to	9:30 a.m.	Introducing Computational Systems Biology Using R <i>Chris Kieslich – Auburn University, USA</i>
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 <i>Yoram Vodovotz – University of Pittsburgh School of Medicine, USA</i>
10:15 a.m. to	10:45 a.m.	It's a Matter of Time: From Systems Biology to Quantitative Systems Pharmacology <i>Cynthia Musante – Pfizer, USA</i>
10:45 a.m. to	11:15 a.m.	What Next? <i>Eberhard Voit – Georgia Institute of Technology, USA</i>
11:15 a.m. to	11:45 a.m.	Closing Remarks <i>Ioannis P. Androulakis – Rutgers University, USA</i>