

# 2023 / AIChE ANNUAL MEETING

November 5 - 10, 2023

Hyatt Regency Orlando • Orlando, FL



**LEADING**  
THE WAY TO A  
**SUSTAINABLE**  
**FUTURE**





## TECHNICAL SESSIONS 2023

### (1) Workshop: Effective Teaching for New or Prospective Faculty

Sunday, Nov 5, 9:30 AM  
Hyatt Regency Orlando, Bayhill 22

David Silverstein, Chair  
Lisa Bullard, Co-Chair  
Donald Visco Jr., Co-Chair

Sponsored by: Professional Development Committee Liaison

### (2) Meet the Faculty and Post-Doc Candidates Poster Session

Sunday, Nov 5, 1:00 PM  
Hyatt Regency Orlando, Regency Ballroom R/S

Roman Voronov, Chair  
Sundararajan Madihally, Co-Chair

Sponsored by: Meet the Candidates Poster Sessions

**Poster 2b:** Machine Learning Based Meta-Analysis of the Association between HLA-Peptide Binding Interactions and HLA-Linked Disease Susceptibility — **Hyeju Song, Christopher Kieslich**

**Poster 2c:** Sustainable Wastewater Treatment Technology: Application of Bio-Electrochemical Membrane Process — **Maryam Amouamouha**

**Poster 2d:** Designing Colloidal Particles for Complex Self-Assembly Behavior — **Hillary Pan, Julia Dshemuchadse**

**Poster 2e:** Computational Assessment of Catalytic Materials — **Alexander Hoffman**

**Poster 2f:** Tracking the Dynamics of Metal Nanomaterial to Improve Catalyst Design for Sustainable Fuel Production — **Johanna Schroeder**

**Poster 2g:** Developing Nanoscale Tools to Advance Maternal, Fetal, and Neonatal Health — **Andrea Joseph**

**Poster 2h:** A Facile Structural Engineering of Metal-Organic Frameworks for Enhanced Gas Separation Performance — **Heseong An**

**Poster 2i:** Metabolic Engineering to Produce Gene Therapies and Therapeutic Biomolecules — **Miguel Santoscoy**

**Poster 2j:** Multi-Scale Disease Profiling Using Molecularly Programmable Tools — **Shih-Ting (christine) Wang**

**Poster 2l:** High Density Soft Electronic Fibers — **Muhammad Khatib**

**Poster 2m:** Application of Quantum Materials in Dynamic Catalysis — **Richard Tran**

**Poster 2n:** Advancing Biomass As Renewable Energy: Investigating Syngas Inhibition, Reaction Rate, and Reactor Simulation for Enhanced Hydrogen Production Via Steam Gasification — **Jieun Kim**

**Poster 2o:** Nano Biomanufacturing for Medicine and the Environment — **Navid Bizmark**

**Poster 2p:** 3D Printing across Length Scales and Material Classes for Energy, Environmental, and Health Applications — **Max Saccone**

**Poster 2q:** Development of Multi-Functional Materials for a Defossilized Carbon Economy — **Chae Jeong-Potter**

**Poster 2s:** Precise Manufacturing of Advanced Materials Driven By Atomic Scale Characterization — **Prashant Kumar**

**Poster 2t:** Protein- and Virus-Based Materials for Environmental and Agricultural Applications — **Adam Caparco, Nicole F. Steinmetz**

**Poster 2u:** Engineering Diagnostics for Mental Health Monitoring — **Marjon Zamani**

**Poster 2v:** Hit the Lights: Developing Multiplex, Multichromatic Optogenetic Circuits for Cell Signaling and Tissue Engineering Applications — **James Tang**

**Poster 2w:** Development of Computational Tools for Peptoid Structure-Property Prediction — **Rakshit Jain, Carol Hall, Jacqueline Hughes-Oliver, Erik Santiso**

**Poster 2x:** Mesoscale Self-Organization of Biomolecular Condensates — **Sam Wilken**

**Poster 2y:** Enhancing the Sustainability of Produced Water Treatment: Integrated EC-MF-Mdc System for Membrane Distillation with Crystallization — **Chidambaram Thamaraiselvan, Chhabilal Regmi, Ranil Wickramasinghe**

**Poster 2z:** Sustainable Polymeric Membranes for Molecular Separation- Greener Approach Towards Net Zero Emission — **Lakshmeesha Upadhyaya**

**Poster 2aa:** Architecting Functional Colloidal Materials Via Non-Equilibrium Interfacial Assembly — **Pavel Shapturenka**

**Poster 2ab:** Belowground Carbon Farming: Engineering Genetic Circuits in Plant Roots and Rhizobacteria for Soil Carbon Sequestration — **Christopher Dundas**

**Poster 2ac:** Utilization of Renewable Energy Resources for New Energy Technologies: The Development of Cost-Effective and Stable Electro-Catalysts for Energy Conversion and Storage. — **Syed Asad Abbas**

**Poster 2ad:** Molecular Engineering of Reactive Electrochemical Interfaces — **Weilai Yu, Yi Cui, Zhenan Bao**

**Poster 2ae:** Antibody-Conjugated Polymers and Nanoparticles for Targeted Chemo- and Immuno-Therapies — **Bin Liu**

**Poster 2af:** Active Site Design That Traverses Catalytic Contexts — **Joy Zeng**

**Poster 2ag:** Advancing Materials Synthesis and Printing Technologies for Next-Generation Applications — **Shalinee Kavadiya**

**Poster 2ah:** Monitoring Boron Concentration in Qatar Seawater and Its Impact on Desalination Processes — **Mosab Subeh**

**Poster 2ai:** Engineering Biochemical Processes in Plant-Microbe Interactions for Sustainable Agriculture — **Kong Wong**

**Poster 2aj:** Sustainable Chemistry with Machine Learning and Multi-Scale Simulations — **Aditya Dilip Lele**

**Poster 2ak:** Cellular Control of Cu(I)-Catalyzed Alkyne-Azide Cycloaddition (CuAAC) Via Extracellular Electron Transfer in Complex Environments — **Gina Partipilo, Benjamin Keitz**

**Poster 2al:** Transport-Directed Electrosynthesis for Decarbonization of Chemical Manufacturing — **Justin Bui, Adam Z. Weber, Alexis T. Bell**

- Poster 2am:** Understanding Heterogenous Catalysis Via Multiscale Kinetic Simulation — **Chuhong Lin**
- Poster 2an:** Designing Membrane Systems for the Direct Separation of Multicomponent Organic Solvent Mixtures — **Hyeokjun Seo, Dong-Yeun Koh**
- Poster 2ao:** Optimal Design of Soft Matter Via Simulation, Machine Learning and Large Language Models — **Jiale Shi**
- Poster 2ap:** Biofuels, Biolubricants, and Biomaterials from Biomass and Energy-Efficient Ultrasonic Separation for the Sustainability and Decarbonization — **Junli Liu**
- Poster 2aq:** Accurate Computational Design of Programmable 3D Protein Crystals and Capsids — **Shunzhi Wang, Zhe Li, Isaac Lutz, Christoffer Norn, Una Nattermann, David Baker**
- Poster 2ar:** Understanding and Controlling the Surface Physics and Chemistry of Complex Oxides — **Abhinav S. Raman**
- Poster 2as:** Carbon Capture and Utilization Using Non-Equilibrium Plasmas — **Hongtao Zhong**
- Poster 2at:** Accelerated Materials Design and Discovery Using Self-Driving Laboratories. — **Kiran Vaddi**
- Poster 2au:** Pressing Play on Self-Assembled Biomaterials — **Shayna Hilburg**
- Poster 2av:** Understanding Nanostructured Materials for High Catalytic Activities in Biosensors, Anti-Bacterial Activity, and Batteries — **Anuja Tripathi**
- Poster 2aw:** Developing Computational Tools for *in silico* elucidation of Cancer Mechanisms, Microenvironment, and Drug Repositioning Candidates — **Wheaton Schroeder**
- Poster 2ax:** Multiscale Molecular Modeling in Porous Materials: A Comprehensive Approach Towards Accurate Predictions and Real Applications — **Filip Formalik**
- Poster 2ay:** Sustainable Catalysis for Carbon Waste Valorization: Integrating System and Molecular-Level Approaches — **Houqian Li**
- Poster 2az:** Atomically Thin Membrane for Energy-Efficient Separation — **Shiqi Huang**
- Poster 2ba:** Sustainable Chemical Manufacturing, Decarbonization, and Waste Management — **Sean Najmi**
- Poster 2bb:** Synthesis, Characterization, and Analysis of Non-Linear Polymers for Medicine — **Zixian Cui**
- Poster 2bc:** Physics-Based and AI-Driven Design of Functional Soft Materials — **Riccardo Alessandri**
- Poster 2bd:** Designing Advanced Separation Processes for Critical Materials and Discovering Porous Membrane Materials for Sustainable Energy Applications — **Xiaoyu Wang**
- Poster 2be:** Multiscale Computational Design of Polymeric Materials for Sustainability and Healthcare — **Heyi Liang**
- Poster 2bf:** Developing Workflows to Understand and Design Complex Alloy Catalysts Using Density Functional Theory, Machine Learning, and Catalysis First-Principles — **Gaurav Deshmukh**
- Poster 2bg:** Computation and Theory-Guided Materials Discovery and Design for CO<sub>2</sub> Capture, Utilization, and Storage — **Bohak Yoon**
- Poster 2bh:** Alkalide-Assisted Direct Electron Injection for the Noninvasive n-Type Doping of Graphene — **Sanghwan Park, Chang Young Lee**
- Poster 2bi:** Extremophile Stress Proteins for Engineering Novel Properties in Living Cells and Biomaterials — **Samuel Lim**
- Poster 2bk:** Solar Thermochemical Fuel Production — **Remo Schäppi**
- Poster 2bl:** Bridging the Gap between Structure & Function for Sustainable Carbonaceous Systems: An Analytical Multi-Scale Approach — **Heather LeClerc**
- Poster 2bm:** Advancements in Nanoengineering: Colloidal Soft Materials & Advanced Coatings for Energy and Bio-Applications — **Shuhao Liu**
- Poster 2bo:** A Data-Driven Approach to Materials Development for Emerging Separations Challenges — **Matthew Rivera**
- Poster 2bp:** Accelerating Transport Efficiency Via Active Motion: From Fundamentals to Practical Applications — **Haichao Wu**
- Poster 2bq:** From Molecular Design to Macroscopic Properties: Interfacing Principles of Materials Chemistry, Molecular Self-Assembly, and Polymer Science for Sustainability — **Ty Christoff-Tempesta**
- Poster 2br:** Modeling, Control and Optimization — **Paulina Quintanilla**
- Poster 2bs:** Exploiting Microbial Communities through Systems Biology and Synthetic Biology — **Yiyi Liu**
- Poster 2bt:** Penetration of Fluorescent Dye through Polymer Coatings — **Krishnaroop Chaudhuri, Riddhiman Medhi, Zhenglin Zhang, Zhuoyun Cai, Christopher K. Ober, Jonathan Pham**
- Poster 2bu:** Advanced Polymer-Derived Membranes for Pre-Combustion CO<sub>2</sub> Capture and Blue H<sub>2</sub> Production — **Leiqing Hu, Haiqing Lin**
- Poster 2bv:** Leveraging Linked Organ-on-a-Chip Platforms to Study Gut Microbiome Effects on Human Health and Disease — **Danielle Brasino**
- Poster 2bw:** Barrier-Free Paper Analytical Devices for Multiplex Colorimetric detection — **Ayushi Chauhan, Bhushan Toley**
- Poster 2bx:** Automatic Reaction Mechanism Generation for Complex Systems Using Machine Learning and Computation — **Matthew S. Johnson**
- Poster 2by:** Harvesting Cultivated Meat Grown in a Bioreactor with a Low Shear Centrifuge. Centrifuge Is Either Single Use or CIP/Sip. — **David Richardson Sr.**
- Poster 2bz:** Out-of-Equilibrium Generic Framework Predicts Concentration-Dependent Liquid Crystals — **Jonathan Salmeron-Hernandez, Pablo Zubieta, Hans Christian Öttinger, Juan J. de Pablo**
- Poster 2ca:** Enabling and Sensing Technologies for Healthcare, Environmental Monitoring, and Disease Control — **Mohammad Mofidfar**
- Poster 2cb:** Targeted Degradation of Secreted and Cell Surface Proteins through the LRP-1 Pathway — **Elise Loppinet, Harrison A. Besser, Chaitan Khosla**
- Poster 2cc:** Excipient-Based Strategy for Engineering Stable Ultraconcentrated Insulin Formulation — **Yanxian Zhang**
- Poster 2cd:** Transport of Soft Materials for Biomedical and Environmental Applications — **Jin Gyun Lee**
- Poster 2ce:** Strain-Stiffening Modular Gels with Dynamic, Secondary Cross-Linking — **Sonu Kizhakkepura, John Klier, Shelly Peyton**
- Poster 2cf:** Solid Electrolyte Interphase: Where Polymer Composites Meet Electrochemistry — **Huada Lian**
- Poster 2ch:** Postdoc Candidate: Nanoscale Self-Assembly in Block Copolymer Blends — **Rahul Kumar, Henry Ashbaugh, Julie Albert**
- Poster 2ci:** Biological Upcycling of Wastes for Sustainable Development — **Jinjin Diao, Tae Seok Moon**
- Poster 2cj:** Selective Separation and Degradation of PFAS Using Redox-Based Polymers — **Paola Baldaguez Medina, Xiao Su**
- Poster 2ck:** Guiding the Design of Energy Systems with Techno-Economic Assessment and Safety, Risk, and Reliability Analysis — **Ahmad Al-Douri**

- Poster 2cl:** Conversion of END-of-Life Waste Streams to Low Carbon Fuels and Materials in a Circular Economy MODEL — **Emmanuel Galiwango, P.Eng., James Butler, Ma Weiguo, Samira Lotfi**
- Poster 2cm:** Drug Delivery and Organismal Biophysics — **Pankaj Rohilla**
- Poster 2cn:** Systems Engineering for Manufacturing of Advanced Biotherapeutics — **Francesco Destro**
- Poster 2co:** Accelerated Energy Materials Discovery through Semiempirical Electronic Structure Methods — **Yeongsu Cho**
- Poster 2cq:** From Causal Discovery to Multiscale Modeling in Biological Signaling Networks — **Robert Gregg**
- Poster 2cr:** Innovating Light-Matter Coupling at the Nanoscale Interfaces — **Jingang Li**
- Poster 2cs:** Build It up and Break It Down: Synthetic Biology and Biochemical Engineering for Sustainable Chemical Production and Bioremediation — **Jeremy David Adams**
- Poster 2ct:** Molecular Engineering and Structural Design of Polymeric Materials for Energy-Water-Environment Nexus — **Youhong (Nancy) Guo**
- Poster 2cu:** Understanding Gas Transport in Novel Membranes for Energy-Efficient Gas Separations: Polymers, Carbon Molecular Sieves, and Metal-Organic Frameworks — **Hyun Jung Yu**
- Poster 2cw:** Chemical Systems Engineering for Water Solutions & Bioproducts Manufacturing — **Remil Aguda**
- Poster 2cx:** Real-Time Green CO<sub>2</sub> Tracking with Artificial Intelligence in Biomass Co-Processing — **Liang Cao, Bhushan Gopalunni, Yankai Cao**
- Poster 2cy:** Miniaturized Systems for Disease Management and Decentralized Diagnostics — **Hanie Yousefi, Shana Kelley, Jonathan Rivnay, Edward Sargent**
- Poster 2cz:** Physics-Informed Material Discovery Tools for Energy and Space Applications — **Maitreyee Sharma Priyadarshini**
- Poster 2da:** Machine Learning Solutions to Complex Problems in Health, Environment, and Materials — **Prateek Verma**
- Poster 2db:** Adaptable Self-Driving Laboratories for Material Science and Chemistry — **Robert Epps**
- Poster 2dc:** Miniaturized Systems for Disease Management and Decentralized Diagnostics — **Hanie Yousefi**
- Poster 2dd:** Microtubular Gas-Diffusion Electrodes for High-Efficiency Electrochemical CO<sub>2</sub> Reduction — **Hesamoddin Rabiee**
- Poster 2de:** Developing a Sustainable Future through Research and Education in Synthetic Biology and Metabolic Engineering of Clostridia — **Hyeongmin Seo**
- Poster 2df:** Advancing Health and Sustainability through Multiscale Computational Modeling of Soft Materials — **Zhiqiang Shen**
- Poster 2dg:** Utilization of Biomass-Based and Industrial Waste in 3D Printing Applications — **Anqi Ji**
- Poster 2dh:** Investigation of the Impact of Sidechain Comonomer in the Ion Exchange Membrane (IEM) on the Electrochemical Cell Device Performance. — **Antara Mazumder**
- Poster 2di:** Analysis and Design of Catalytic Reactions and Materials through Combined Experimental, Kinetic, and Computational Assessments — **Wenshuo Hu**
- Poster 2dj:** Transport Phenomena and Materials Design in Electrochemical Renewable Energy Storage — **Zhifei Yan, Daniel G. Nocera**
- Poster 2dk:** Unraveling Reaction Kinetics of Complex Systems for Sustainable Process Development — **SriBala Gorugantu**
- Poster 2dl:** Computational and Experimental Investigation of the Distribution of Mo-Oxide Species in Mo/H-ZSM-5 — **Fateme Molajafari, Emanuele Joy, Rachita Rana, Simon Bare, Sheima Khatib, Joshua Howe**
- Poster 2dm:** Decoding and Expanding Genome Functions for Living Technologies — **Anush Chiappino-Pepe, George M Church**
- Poster 2dn:** Towards Next-Generation Non-Invasive Epidermal Biomedical Devices for Continuous Health Monitoring — **Tamoghna Saha, Michael D. Dickey, Orlin D. Velev**
- Poster 2do:** New Classes of Materials and Automated Experimental Design into Energy Storage Research — **Juhyeon Ahn**
- Poster 2dp:** Beyond Connectomic Imaging: Building an Integrative Platform to Investigate the Brain — **Xiaotang Lu**
- Poster 2dq:** Illuminating Neurochemical Signaling in the Brain with Near Infrared Nanosensors — **Natsumi Komatsu**
- Poster 2dr:** Multiscale Modeling of Interfacial Electrocatalytic Processes — **Nitish Govindarajan**
- Poster 2dt:** The Ultra-Fast Dissolving Property of "Fenamates" Encapsulated Carbon Nanofibers (CNFs) for the Drug Delivery Application — **Rupa Kasturi Palanisamy, Suresh Manivel, Torsten Stelzer, Carmel Breslin**
- Poster 2du:** Bridging Biological Sequence and Molecular Function for Precision Diagnostics and Therapeutics — **Sevahn Vorperian**
- Poster 2dv:** Bridging Physics-Informed and Data-Driven Materials Designs for Deep Decarbonization — **Jiayu Peng**
- Poster 2dw:** New Data-Driven Modeling Paradigms in Systems Engineering Using Novel Neural Network Structures — **Angan Mukherjee**
- Poster 2dx:** Rational Design of Sustainable Chemical Solutions with Reaction Networks and Data Science — **Evan Spotte-Smith**
- Poster 2dy:** Peptide Guided Bio-Synthetic Composite Materials for Engineered Biointerfaces — **Tyler Jorgenson**
- Poster 2ea:** Autonomous Bioelectronic Systems for Multiplex Functions — **Xu Zhang, Caroline M. Ajo-Franklin**
- Poster 2ed:** Multiscale Engineering of Multiphase Polymer Composites for Soft Electronics and Robotics — **Samuel E. Root**
- Poster 2ec:** Understanding and Engineering Sustainable Catalysis — **Selin Bac**
- Poster 2ee:** Engineering Polymer Thin Films for Bio-Active and Energy Storage — **Pengyu Chen**
- Poster 2ef:** High Density Soft Bioelectronic Fibers — **Muhammad Khatib**
- Poster 2eg:** Protein Engineering for Microbial Interface Study — **Zihang Su, Julie Renner, Scott Banta**
- Poster 2eh:** Re-Engineering Plasmonic Materials and Nucleic Acid across Different Length Scales for Advanced Catalysis and Biosensing — **Yifeng Shi, Grigory Tikhomirov**
- Poster 2ei:** Design Principles and Mechanistic Understanding of Heterogeneous Catalysis Towards Sustainable Development — **Md Delowar Hossain**
- Poster 2ej:** Effect of CO<sub>2</sub>-Pretreatment on Reverse Water Gas Shift (rWGS) Using Ni-Doped CaTiO<sub>3</sub>/CaO — **Seongbin Jo, Kandis Leslie Abdul-Aziz**
- Poster 2ek:** Nano-Bio Interface Engineering with Precise Polymeric Nanostructures — **Beihang Yu**
- Poster 2el:** Advanced Porous Materials for Molecular Discrimination of Light Hydrocarbons at Sub-Angstrom Precision — **Tae-hoon Hyun, Dong-yeun Koh**

**Poster 2em:** Overcoming Transport Barriers in Fluid-Solid Physical and Chemical Processes  
— **Anthony Wallace**

**Poster 2en:** Non-Equilibrium Dissipation As an Organizing Principle in Driven Soft Materials: From Polymers to Active Drops  
— **Kailasham Ramalingam**

**Poster 2eo:** Advancing Sustainable Chemistry through Experimental and Computational Approaches to Multi-Phase Chemical Reaction Processes  
— **Ari Fischer**

**Poster 2ep:** Charged Polymers and Granular Biomaterials for Biomedical Applications  
— **Gabriel Rodriguez**

**Poster 2eq:** Artificial Neural Network Model for Capturing the Effect of Local Atomic Environment on Surface Diffusion in Metals and Theirs Alloys  
— **Sandip Sawarkar**

**Poster 2er:** Decarbonization of Fine Chemicals: Development of Alternative Pathways to Close the Carbon Cycle  
— **Juan Jimenez**

**Poster 2et:** Development and Application of Surface-Active Nanoparticles  
— **Rong Ma**

**Poster 2eu:** Tailoring Therapeutic Peptides to Enable Reversible Encapsulation into Different Drug Carriers  
— **Mark Bannon**

**Poster 2ew:** Flow Chemistry-Enabled Sustainable Reaction Engineering  
— **Suyong Han**

**Poster 2ex:** Engineering Polypeptides through Molecular Simulations, Machine Learning and Optimization Methods for Biological and Clean Energy Applications  
— **Yiming Wang**

**Poster 2ey:** Building Nanomaterials for Energy Conversion and Energy Storage  
— **Dr. Aniket Sandip Mule**

**Poster 2ez:** Next-Generation Bioelectronics Enabled By Single-Crystalline Inorganic Semiconductor Membranes  
— **Jiho Shin, Jeehwan Kim, John A. Rogers**

**Poster 2fb:** Engineering Hierarchical Materials for Structural Composites and Advanced Textiles  
— **Lauren W. Taylor**

**Poster 2fc:** Hydrogel and Polymer Composite Materials for Water Treatment Technologies & Monitoring of Emerging Contaminants to Further the Understanding of the Environmental Exposome  
— **Angela Gutierrez**

**Poster 2fd:** Synthesis and Computational Investigation of Novel Antioxidants Prepared By Oxidative Depolymerization of Lignin and Aldol Condensation of Aromatic Aldehydes  
— **Daihong GAO, Xuebing Zhao**

**Poster 2fe:** Selective Recovery of Pd<sup>2+</sup> from Spent e-Wastes Via Thermo-Responsive Poly(NIPAM-co-14TCE-4)@PS Nanoparticles.  
— **Hiluf Tekle Fissaha**

**Poster 2ff:** Laccase-Mediated Oxygen Reduction in Liquid Flow Fuel Cells for Efficient Oxidation of Biomass Derived Aldehydes with Co-Generation of Electricity  
— **Nan Liu, Xuebing Zhao**

**Poster 2fg:** Immunoengineering in Gut-Lung Axis  
— **Mohammad Aminul Islam**

**Poster 2fh:** Advanced Material Systems That Harness Inhomogeneity and Multi-Scale Phenomena  
— **Tetsu Ouchi**

**Poster 2fi:** The inside-out Lab: Engineering Microbial Communities from the inside-out  
— **Jenna Ott**

**Poster 2fj:** Thermochemical Processing of Biomass, Plastics and Waste Feedstocks  
— **Harisankar S**

**Poster 2fk:** High-Throughput Characterization of Transport Phenomena through Dynamic Membrane Systems  
— **Jonathan Quimet**

**Poster 2fl:** Jonathan Soucy: The Nerv Lab Will Excite Learning  
— **Jonathan Soucy**

**Poster 2fm:** Programming Nanoparticles: Inverse Design for Next-Generation Materials  
— **Timothy C. Moore**

**Poster 2fn:** Developing Materials-Based Biointeractive Therapeutics and Technologies  
— **Sohyung Lee**

**Poster 2fo:** Dynamic Catalysts: Machine Learning Assisted Operando Characterization.  
— **Prahlad Kumar Routh**

**Poster 2fp:** Quick-Release Antifouling Hydrogels for Solar-Driven Water Purification  
— **Xiaohui Xu, Rodney Priestley, Sujit Datta**

**Poster 2fq:** Advancing PFAS Elimination through Catalytic Supercritical Water Reactors and AI-Enhanced Process Intensification  
— **Wenjia Wang**

**Poster 2fr:** Microgel Surface Engineering to Enhance Cell Adhesion and Porosity of Injectable Granular Hydrogel Tissue Scaffolds  
— **Jing Liu, Katie Li-Oakey, John Oakey**

**Poster 2fs:** Towards Machine Learning Prediction of Kinetic Properties of Enzyme Variants  
— **Veda Sheers Sh Boorla, Costas D. Maranas**

**Poster 2ft:** Stimuli-Responsive Complex Fluids and Anisotropic Materials  
— **Tadej Emersic**

**Poster 2fu:** Bridging Thermal and Electrochemical Catalysis: Rational Catalyst Design at Atomic Scales through Physical and Machine Learning Based Insights  
— **Shyam Deo**

**Poster 2fw:** Research and Teaching Interests of Andrew J. Fox - Modeling Multiphase Fluid Dynamics in the Inertial to Turbulent Regime  
— **Andrew Fox**

**Poster 2fx:** Design and Engineering of Molecules Using Molecular Simulations and Machine Learning  
— **Siva Dasetty**

**Poster 2fy:** Engineering Tissue Physicochemical Properties for Multi-Omic Characterization  
— **Seo Woo Choi, Kwanghun Chung**

**Poster 2fz:** Leveraging Immunoengineering for Vaccine and Therapeutics Design  
— **Duo Xu**

**Poster 2ga:** Active Matter and Liquid Crystals Under External Fields: Basic Science and Applications  
— **Antonio Tavera Vazquez**

**Poster 2gb:** Inverse Design of Complex Flow Systems Using Theory and Differentiable Direct Numerical Simulations  
— **Mohammed Alhashim**

**Poster 2gc:** Elasticity Induced Dynamics of Complex Fluids and Filaments  
— **Manish Kumar**

**Poster 2gd:** Atomic and Molecular Design of Materials for Sustainable Energy Storage Solutions  
— **Julia Yang**

**Poster 2ge:** Multi-Fidelity Computer-Aided Molecular Design  
— **Kevin P. Greenman**

**Poster 2gf:** Probabilistic Prediction Model-Based High-Throughput Screening for Discovering Feasible and Effective Catalysts for Dry Reforming of Methane  
— **Hyundo Park, Jiwon Roh, Hyungtae Cho, Insoo Ro, Junghwan Kim**

**Poster 2gg:** Heterogenization of Metallocene Catalysts over Surfactant Modified Layered Double Hydroxide Sheets for Efficient Olefine Copolymerization.  
— **Hassam Mazhar, Mamdouh A. Al-Harhi**

**Poster 2gh:** Exploring the Frontiers of Molecular Diffusion through Machine Learning-Based Forcefields and Electron Density Predictors  
— **Siddarth Achar, Karl Johnson**

**Poster 2gi:** The Signal in the Noise: Fluctuations in Interfacial Chemistry, Quantum Molecular Machines and Photosynthesis  
— **Amro Dodin**

**Poster 2gj:** Simulation-Aided Energy and Economic Evaluation for Amine-Based CO<sub>2</sub> Capture Matching Existing Power and Industrial Processes  
— **Koki Yagihara, Kazuki Fukushima, Jialing Ni, Hajime Ohno, Yasuhiro Fukushima**

**Poster 2gk:** Exploring the Potential Applications of Advanced Porous Nanomaterials for Real World Challenges: Molecular Simulations and Experiments  
— **Mahdi Niknam**

**Poster 2gl:** Bio Soft Materials for Advance Applications  
— **Diego Gomez-Maldonado**

- Poster 2gm:** Spatial and Temporal Control of Immunobiologics for Disease Treatment — **Parisa Yousefpour**
- Poster 2gn:** Improving Biological Molecule Delivery through Understanding the Endomembrane System — **Ryan Splichal**
- Poster 2go:** Rational Sustainable Polymer Materials Design Using Multiscale Simulation and Theory — **Pierre Kawak, David S. Simmons, Douglas Tree**
- Poster 2gp:** Driving Electron and Photon Induced Chemistries to Enable a Sustainable Economy — **Samji Samira**
- Poster 2gq:** Machine Learning-Assisted Multiscale Modeling for Materials Design — **Fangxi Wang**
- Poster 2gr:** Cracking the Code: Engineering Extracellular RNA and Nanoparticle Trafficking to Control Host-Microbe Interactions — **Angela Chen**
- Poster 2gs:** Unleashing the Therapeutic Potential of Cells: Cellular Reprogramming and Tissue Engineering for Enhanced Function and Healing — **Pihu Mehrotra**
- Poster 2gt:** Enabling Microscale Processing for Structured Healthcare Materials — **Zehao Pan**
- Poster 2gu:** Revolutionizing Tissue Repair with Advanced Functional Adhesives — **Aishwarya Menon**
- Poster 2gv:** Engineering Complex Fluid-Fluid and Fluid-Solid Interfaces for Drug Delivery — **Vineeth 'Vinny' Chandran Suja**
- Poster 2gw:** Catalyst Design for Water Treatment Using *Ab Initio* Simulation — **Yu Chen, Thomas Senftle**
- Poster 2gx:** New Dimensions in the Human Command of Matter Toward Sustainability — **Saman Moniri**
- Poster 2gy:** Spectroscopic and Computational Study of Catalytic Nickel Nitride Structures for Plasma-Assisted Ammonia Synthesis — **Yiteng Zheng**
- Poster 2gz:** Computational Studies of the Structure and Dynamics of Biomolecules at Interfaces — **Faramarz Joodaki**
- Poster 2ha:** Spectroscopic Imaging and Computational Chemistry at the Intersection of Biology and Material Science — **Matthew Confer**
- Poster 2hb:** Investigation of Breast Cancer Recurrence Mechanisms Following Radiotherapy of Mammary Gland Adipose Tissue: Evaluating Cellular Metabolism & 3D In Vitro Models — **Kevin Corn, Marjan Rafat**
- Poster 2hc:** DFT and Classical MD: A Computational Toolkit to Study Electrocatalysis and the Electrode-Electrolyte Interface — **Andrew Wong, Michael Janik**
- Poster 2hd:** Upcycling of Plastics and Bio-Polymers: Design of Catalysts and Reactions — **Jaeheon Kim**
- Poster 2he:** Faculty and Post-Doc Candidate: Dr. Yaprak Ozbakir — **Yaprak Ozbakir**
- Poster 2hf:** Cellulose Based Anti-Fouling Coatings for Application in Medical Devices. — **Eric Walker**
- Poster 2hg:** Model-Based Pharmaceutical Process Design — **Ayse Eren**
- Poster 2hh:** Big Data Analytics for Disease Systems Biology and Bioprocess Engineering — **Saratram Gopalakrishnan**
- Poster 2hi:** Sustainable Chemical Manufacturing — **Arthur Shih**
- Poster 2hj:** Bioinspired Soft Separation Materials and 2D Polymers — **Yu-Ming Tu**
- Poster 2hk:** Multi-Scale Processing of Architecturally Complex Polymer Materials — **Michael Burroughs**
- Poster 2hl:** Radiation Therapy Enhances Breast Cancer Cell Proliferation and Invasion in Extracellular Matrix Hydrogels — **Tian Zhu, Kevin Corn, Marjan Rafat**
- Poster 2hm:** Non-Invasive Sensing and Actuation inside Biological Systems with Functional Soft Materials — **Yuxing Yao**
- Poster 2hn:** Translational Research for Auditory and Sensory Systems. — **Parveen Bazard**
- Poster 2ho:** Scalable Ionic Polymer Thin Films for Iontronic Device Applications — **Kwang-Won Park**
- Poster 2hp:** A Computationally Assisted Approach for Designing Wearable Biosensors Toward Non-Invasive Personalized Molecular Analysis — **Daniel Mukasa, Minqiang Wang, Jihong Min, Yiran Yang, Samuel Solomon, Hong Han, Cui Ye, Wei Gao**
- Poster 2hq:** Rational Design of Polymers for Sustainable Water, Energy, and Environmental Separations — **Rahul Sujanani**
- Poster 2hr:** Beyond Adsorbates: Tracking Dynamic Catalyst Reshaping to Uncover Hidden Structure-Function Relationships — **Griffin A. Canning**
- Poster 2hs:** Fabrication of Polymeric Systems for Biomaterials — **Keturah Bethel, Eric M. Davis**
- Poster 2ht:** Rigorous Statistical Mechanics and Rare Events Tools to Model Catalyst Site Ensembles — **Salman A. Khan**
- Poster 2hu:** Carbon Capture and Aerosol Technology for Carbon Dioxide Utilization — **Onochie Okonkwo**
- Poster 2hv:** Computational Living Matter through the Lens of Biomolecular Condensates, Active Systems, and Data-Driven Learning — **Hongbo Zhao**
- Poster 2hw:** Computational Modeling of Cellular Metabolism across Spatiotemporal Scales for Health and Biotechnology Applications. — **Tracy Kuper**
- Poster 2hx:** Combined Synthetic and Kinetic Approaches for Understanding Catalytic Processes — **Gregory Tate**
- Poster 2hy:** NON-Oxidative Catalytic Conversion of Methane into Benzene over Hierarchical Mo/HZSM-5 Catalyst — **Deepti Mishra, Kamal Pant, Muxina Konarova**
- Poster 2hz:** Materials for a Sustainable Future: Understanding Electronic Structure & Engineering Electron Transfer to Design Materials for Sustainability — **Subhajoti Chaudhuri**
- Poster 2ia:** Electrochemical Systems with Flowable Suspension Electrolytes for Sustainable Future — **Madhu Venkata Rama Krishna Majji**
- Poster 2ib:** Rheological (Structural) and Interfacial Properties of Emulsions and Foams for Environmental Applications — **Muchu Zhou, Reza Foudazi**
- Poster 2ic:** Adhesion of Wet, Compliant and Rough Soft Materials — **Preetika Karnal**
- Poster 2id:** Applications of Genome-Scale Modeling on Quantifying Metabolism and Strain Design — **Patrick Suthers**
- Poster 2ie:** Electronic Waste Derived Three-Dimensional Carbon Aerogel for the Adsorption of Phenol from Wastewater — **Marut Jain**
- Poster 2if:** Chemical Conjugation Strategies for Functional Intracellular Delivery of Protein Therapeutics — **Azmain Alamgir**
- Poster 2ig:** Efficient, Scalable, and Sustainable Manufacturing of Polymer Composites and Applications in Fire Safety — **Yufeng Quan, Qingsheng Wang**
- Poster 2ih:** Harnessing Water Entropy and Electric Field to Design Aqueous Polymer Systems for Sustainability and Bioengineering — **Shensheng Chen**
- Poster 2ii:** Materials for CO<sub>2</sub> Capture, Conversion and Storage — **Nabankur Dasgupta, Tuan Ho, Adri C.T van Duin**
- Poster 2ij:** Innovating Pharmaceutical Technology through Prototyping, Process Analytics and Modeling — **Ajinkya Pandit**
- Poster 2ik:** Single-Step Aerosol Method for Scalable and Sustainable Valorization of Lignin — **Sujit Modi, Pratim Biswas**

- Poster 2il:** Deep Learning-Enabled Design of Protein-Nucleic Acid Assemblies for Gene Regulation and Gene Therapy — **Cameron Glasscock**
- Poster 2im:** Biomaterials of Tomorrow: Feedstock's Variability a Materials Challenge for Renewable Resources Engineering. — **Diana Ramirez Gutierrez**
- Poster 2in:** Hydrogen Transfer-Mediated Chemical Transformation and the Coupled Physical Effects — **Gang Wan**
- Poster 2io:** Ultra-Flexible Endovascular Probes for Brain Recording through Micron-Scale Vasculature — **Anqi Zhang**
- Poster 2ip:** Engineering Biomaterials for Women's Health — **Aida López Ruiz, Catherine Fromen, April Kloxin, Kathleen McEnnis**
- Poster 2iq:** Integrated Functional Polymer Engineering Pipeline for Next-Generation Biotechnologies — **Juhyuk Park, Kwanghun Chung**
- Poster 2is:** Effect of the Concentration of Brønsted and Lewis Acidic Sites on the Main Reaction Pathways during the Conversion of Fructose over Sn-KIT-6-PrSO<sub>3</sub>h Bifunctional Catalyst — **Edgar Tututi, Horacio González, Gutiérrez-Alejandre Aída, Jose L. Rico**
- Poster 2it:** Immunoengineering Strategies for Neurological Diseases — **Rick Liao, Elizabeth Nance, Samir Mitragotri**
- Poster 2iu:** Theoretical and Computational Approaches for Upscaling Nanoengineered Materials to Design High Strength Polymeric Structural Materials — **Nitant Gupta**
- Poster 2iv:** Computational Design of Materials for Energy Conversion and Storage — **Alexandra Zagalskaya**
- Poster 2iw:** Energy System Decarbonization: Leveraging Optimization-Based Techniques for a Sustainable Future — **Kaiyu Cao**
- Poster 2ix:** A Microfluidic Chip Structure with Ultra-High Liquid-Liquid Mass Transfer Performance — **Jing Song**
- Poster 2iy:** Liquid Flow Fuel Cell with Modified Anode for Efficient Oxidation of 5-Hydroxymethylfurfural to Produce 2, 5-Furandicarboxylic Acid with Co-Generation of Electricity — **Ye Qiang, Xuebing Zhao**
- Poster 2iz:** Catalytic Microwave-Assisted Pyrolysis of Waste Plastics for Circular Economy Development — **Roger Ruan Sr., Leilei Dai Sr.**
- Poster 2ja:** Hierarchical Structuring of Biopolymers for Environmental Nanotechnologies — **Muchun Liu**
- Poster 2jb:** Integrating Molecular Modeling and Machine Learning for Insight into Bulk and Interfacial Phenomena — **Alejandro Gallegos**
- Poster 2jc:** Effect of PZT Loading and Surfactant Concentration on Cure Depth of PZT Ceramic Ink — **Hrudaya Biswal, Janice Lucon, Cristina Stefanescu, Peter Lucon**
- Poster 2jd:** Surface Nano-Structuring for Membranes Synthesis and Sustainable Separation Processes Development — **Yian Chen**
- Poster 2je:** Permeability, Energetics and Kinetics of Photosynthetic Metabolites across Synthetic Microcompartments — **Daipayan Sarkar, Christopher Maffeo, Markus Sutter, Aleksei Aksimentiev, Cheryl A. Kerfeld, Josh V. Vermaas**
- Poster 2jf:** Computational Tools for the Discovery and Redesign of Natural and Synthetic Biological Systems — **Mohammad Mazharul Islam**
- Poster 2jg:** Hybrid Materials for Clean Energy and Sustainability — **Hsinhan Tsai**
- Poster 2jh:** Computational and Experimental Study of Solvent-Based Brine Desalination. — **Gabriel Barbosa**
- Poster 2ji:** Improving Gene Therapy Manufacturing and Vector Transduction Efficiency through Capsid Engineering — **Jing Guo**
- Poster 2jj:** Programming Dynamic States for Directed Active Materials for Tunable Structure, Rheology, and Mechanics — **Hojin Kim**
- Poster 2jk:** Sulfonated Ionomer Composite Membranes for Use in Vanadium Redox Flow Batteries — **Xueting Wang, Eric M. Davis**
- Poster 2jl:** Teaching-Focused Faculty Candidate: Using Computational Tools in Chemical Engineering Classrooms — **Anukriti Shrestha**
- Poster 2jm:** Predictive Electrolyte Thermodynamics based on openCOSMO-RS from Infinite Dilution to Ionic Liquids — **Simon Müller, Andrés González de Castilla, Irina Smirnova**
- Poster 2jn:** Creating a Toolbox for Studying Soft Material Self-Assembly and Dynamics — **Joshua Mysona**
- Poster 2jo:** Integrating Molecular Science with Systems Engineering to Drive Sustainable and Circular Economy — **Pooja Bhalode**
- Poster 2jp:** Multi-Level Simulation Driven Discovery of Correlated Materials for Carbon Capture, Biomimetic Catalysis, and Quantum Information Science — **Jan Niklas Boyn**
- Poster 2jq:** High-Throughput Machine-Guided Hybrid Materials Exploration Via Combinatorial Resonant Infrared Matrix Assisted Pulsed Laser Evaporation — **Wiley Dunlap-Shohl**
- Poster 2jr:** Ion and Polymer Containing Systems: From Nanoscale Physics to Engineering Applications — **Harnoor Singh Sachar**
- Poster 2js:** Bring First Principles Towards Continuum: Multiscale Computational Chemistry in Fluids and Materials for Future Sustainable Energy Landscape — **Rui Xu**
- Poster 2jt:** Fundamentals of Active Transport Phenomena in Disordered Materials. — **Tingtao Zhou**
- Poster 2ju:** On Improving the Inadequacies in Moment Inversion Algorithm for the Extended Quadrature Method of Moments (EQMOM) — **Meltem Turan, Abhishek Dutta**
- Poster 2jv:** Optimised Integrated Processes for Carbon Capture: From Direct Air Capture to Concentrated Point Sources — **Marina Micari**
- Poster 2jw:** Upcycling of Plastic Waste into Value-Added Chemicals through Oxidation and Hydrogenation Reactions — **Hyunjin Moon**
- Poster 2jx:** Monocytes Use Protrusive Forces to Generate Migration Paths in Viscoelastic Collagen-Based Extracellular Matrices — **Kolade Adebawale, Byunghang Ha, Aashrith Saraswathibhatla, Dhiraj Indana, Medeea Popescu, Sally Demirdjian, Jin Yang, Michael Bassik, Christian Franck, Paul Bollyky, Ovijit Chaudhuri**
- Poster 2jy:** Rational Design Strategies for Engineering Hierarchical Soft Matter — **Shravan Pradeep**
- Poster 2jz:** Toward Efficient Electricity-Powered CO<sub>2</sub> Fixation Systems with Synthetic Biology — **Shanshan Luo**
- Poster 2ka:** Unraveling the Chemistry on Metal/Metal Oxide Catalysts with Automated Mechanism Generation and Multiscale Modeling — **Bjarne Kreitz**
- Poster 2kb:** Unraveling the Multi-Scale Dynamics of Soft Materials: A Path to Sustainable Engineering and Environmental Applications — **Rishabh V. More**
- Poster 2kc:** Realizing the Untapped Potential of Solar-Driven Catalysis — **Aisulu Aitbekova**
- Poster 2kd:** Exploring the Intersection of Heterogeneous Catalysis and Carbon Capture — **Karoline Hebisch**
- Poster 2ke:** Designer Polymers for Intracellular Organellar Engineering — **Amal Narayanan**

- Poster 2kf:** Engineering of Transport Processes out of Equilibrium: Environmental Applications Driven By Fundamental Science — **Fernando Temprano Coletto**
- Poster 2kg:** Extending Automatic Reaction Mechanism Generation to Complex Systems Using Machine Learning and Computation — **Matthew S. Johnson**
- Poster 2kh:** Advancing Catalyst Design through Insights from Computational Modeling — **Shyama Charan Mandal**
- Poster 2ki:** Sustainable Material Design through Machine Learning and Computer Simulations — **Ludwig Schneider**
- Poster 2kj:** Dynamic, Remote-Controllable Electroactive Hydrogel Waveguide Architectures — **Oscar Alejandro Herrera Cortes Sr.**
- Poster 2kk:** Rational Design Approaches and Engineering Effective and Stable Targeted Delivery Systems and Formulations for RNA Therapeutics — **Talia Shmool**
- Poster 2kl:** Multi-Phase Ge(GeO<sub>x</sub>)/T-Nb<sub>2</sub>O<sub>5-x</sub>/C Composite with Synergistically Improved Electrochemical Performance Toward Lithium Storage — **Wei Tao, Byungchan Han**
- Poster 2km:** Developing Approaches for Polymer Upcycling and Designing Sustainable Polymers — **Divya Iyer**
- Poster 2kn:** Catalyzing the Future: Creating a Confined Environment for the Production of Sustainable Chemicals — **Honghong Shi**
- Poster 2ko:** Numerical Simulations of Multiphase Flows — **Ricardo Constante-Amores**
- Poster 2kp:** Electrochemical Upgrading of Small Molecules Via Catalytic Microenvironment and Active Site Tuning — **Sunmoon Yu**
- Poster 2kq:** Modeling of Eicosanoid Class Switch during Arachidonic Acid Metabolism in Mouse Macrophage Cells Using the Cybernetic Framework — **Sana Khanum, Shakti Gupta, Mano Maurya, Shankar Subramaniam, Doraiswami Ramkrishna**
- Poster 2ks:** Direct Electrosynthesis of Ammonia from Nitrate Reduction Reaction Via Catalyst Design and Electrolyzer Engineering — **Feng-Yang Chen, Haotian Wang**
- Poster 2ku:** A Systems Approach Towards Reconciling Single-Cell Heterogeneity and Cell Phenotype in Health and Disease — **James Park**
- Poster 2kv:** Electrifying the Chemical Industry Towards a Sustainable Future — **Rong Xia**
- Poster 2kw:** Migrating Solvation Structures in Li-Ion Battery Electrolytes Revealed By Electrophoretic NMR — **David Halat, Julia Im, Chao Fang, Aashutosh Mistry, Saheli Chakraborty, Darby Hickson, Venkat Srinivasan, Rui Wang, Nitash P. Balsara, Jeffrey A. Reimer**
- Poster 2kx:** Metabolic Engineering Produce Robust Gene Therapies and Therapeutics — **Miguel Santoscoy**
- Poster 2ky:** Atomic-Level Design of Sustainable Nanomaterials for Greenhouse Gas-Energy-Climate Nexus — **Haiyan (Christina) Mao**
- Poster 2kz:** Exploring the Frontiers of Biotherapeutic Production: Harnessing the Power of Host Diversity, Coculture for Advancing Live Biotherapeutic Development, and Biocatalysis — **Priyanka Nain, Anurag Rathore, James Gomes, Aditya Kunjapur**
- Poster 2la:** Structure-Performance Relationship of Fe-Based Catalysts for CO<sub>2</sub> Directly Hydrogenation to Linear  $\alpha$ -Olefins — **Chao Zhang**
- Poster 2lb:** Influence of Neutral Comonomer Side Chain Length on Transport and Co-Transport of Carboxylates and Alcohols in PEGDA-Based Membranes — **Antara Mazumder**
- Poster 2lc:** Accelerating the Advancement of Functional Nanomaterials for Clean Energy Applications — **Chaochao Dun, Jeffrey J. Urban, Mark Swihart**
- Poster 2ld:** Catalyst Optimisation and Design for Heterogeneous Reaction Systems — **Shambhawi Shambhawi**
- Poster 2le:** Complex Modeling in Biology: Studying Intracellular Entry in the Past and Aging in the Future — **Xinxin Wang**
- Poster 2lf:** Quantifying Exosomes, Supermeres and Lipoproteins Subfractions for Early Detection of Cancer and Cardiovascular Disease — **Sonu Kumar, John Sinclair, Nalin Maniya, Satyajyoti Senapati, Hsueh-Chia Chang**
- Poster 2lh:** Nanoscale Thermodynamics in Liquids and Soft Materials — **Xingfei Wei**
- Poster 2li:** Utilizing Microbial Communities for Valorization of Waste Carbon — **Bradley Biggs, Manoshi Datta, Isra Raza, Markus de Raad, Hans K. Carlson, Morgan Price, Trent Northen, Adam P. Arkin**
- Poster 2lk:** Processing-Structure-Property Relationships for Anisotropic Soft Materials — **Kushal Bagchi**
- Poster 2ll:** Meet the Candidate: Yoorae Noh – Sustainable Eco-Friendly Plastic Manufacture, Recovery, and Management — **Yoorae Noh**
- Poster 2lm:** Rapidly Ordered Block Copolymer Membranes with Tunable Pore Sizes for Wastewater Treatment — **Kshitij Sharma, Maninderjeet Singh, Chenhui Zhu, Mohammad Hassan, Alamgir Karim**
- Poster 2ln:** Redox Gel Polymer Electrolyte with Radical Molecules for Fibrous Energy Storage Devices — **Jeong-Gil Kim, Jaehyoung Ko, Yongho Joo, Nam Dong Kim**
- Poster 2lo:** Boost up the Electrical Property of CNT Fibers By Governing Impurities on the Surface of CNT with Microwave-Assisted Purification — **Min Ji Kim, Dongju Lee, Ki-Hyun Ryu, Seo Gyun Kim, Jun Yeon Hwang, Dae-Yoon Kim, Bon-Cheol Ku, Nam Dong Kim**
- Poster 2lp:** An Optimized Miniaturized Annular Rotating Flow Reactor for Controllable Continuous Preparation of Functionalized Polysilsesquioxane Microspheres — **Tianyao Tang**
- Poster 2lq:** Design of Fast-Charging Anode Interphase Based on the Understanding of Ion and Electron Transport — **Shuo Jin, Lynden A. Archer**
- Poster 2lr:** Exploring API Impregnation Technology with a Case Study on Carbamazepine — **Mehrdad Khakbiz, Fernando Muzzio Sr., Gerardo Callegari**
- Poster 2ls:** Circular Engineering Applied to Technological Processes — **Andrea Landazuri**
- Poster 2lt:** Synthetic Ru/K<sub>2</sub>CO<sub>3</sub>-MgO Dual Function Materials for Integrated CO<sub>2</sub> Capture and Conversion Via Methanation at Low Temperatures — **Tae-Young Kim, Jin Hyeok Woo, Jae Chang Kim, Soo Chool Lee**
- Poster 2lu:** Iron-Based Catalyst for Production of Hydrogen and CNTs through the Catalytic Decomposition of Methane. — **Shashank Shekhar, Kamal Pant, Shantanu Roy**
- Poster 2lv:** Engineering and Adaptive Laboratory Evolution of *Escherichia coli* for Improving Methanol Assimilation Based on a Hybrid Xump Pathway — **Qing SUN**
- Poster 2lw:** Mathematical Model of the Dezincification Behavior for the Commercial-Scale Rotary Hearth Furnace — **Jinsu Kim, Moon-Kyung Cho, Myungwon Jung, Jeeun Kim, Young-Seek Yoon**
- Poster 2lx:** Meet the Post-Doc Candidates Session: Process Intensification for Industrial Crystallizations Via Process Control and Design Strategies — **Montgomery Smith**
- Poster 2ly:** Energy and Charge Transport and Forces in Novel Chemical Environments — **Mohammadhasan Dinpajoo**
- Poster 2lz:** Spatial Systems Biology for Translational Cancer Immunotherapy — **Alexander Xu**



**Poster 2ma:** Integrating Simulations and Experiments to Elucidate Ion and Small Molecule Transport in Polymeric Materials — **Everett Zofchak**

**Poster 2mb:** Programmable Synthetic Circuits for Smart Therapeutics — **Alexander Vlahos**

**Poster 2mc:** Engineering and stabilizing cell aggregates for synthetic multicellularity — **Heidi Klumpe**

**Poster 2md:** Conjugated polymers based bioelectronic sensors for living-nonliving interfaces — **Sujitkumar Bontapalle**

**Poster 2me:** Utilizing Computational Methods for the Design and Enhancement of Energy Storage Systems — **Yiling Nan**

**Poster 2mf:** Machine-Learning Driven Exploration of Catalytic Reaction Networks — **Hyunwook Jung**

**Poster 2mg:** Transforming cell therapy manufacturing and cancer management with large-volume microfluidics — **Avanish Mishra**

**Poster 2mh:** Empowering Health through Engineering: Utilization of Drug Delivery and Nanotechnology Towards Improved Health Equity — **Olivia Lanier**

**Poster 2mi:** Advancing Switchable Solvents for the Sustainable Water Reuse and Desalination Applications — **Kinnari Shah**

**Poster 2mj:** Extending a Microfluidic Platform to Elucidate Bacterial Communication in humans its impact on disease — **Corine Jackman Burden**

**Poster 2mk:** Electrochemistry Nano Laboratory (Echem NanoLab): Wearable sensing platforms for continuous health monitoring — **Farnaz Lorestani**

**Poster 2ml:** Creating Advanced Therapeutics and Applications in Enzyme-Controlled Spatiotemporal Technologies — **Zhimin Huang, Jerzy Szablowski**

**Poster 2mm:** Interfacial Engineering for Plasmon-Enhanced Nanomaterials for Energy Conversion and Biosensing applications — **Lemma Tufa, Jaebeom Lee**

**Poster 2mn:** Cell-Free Synthetic Biology by Design for Precision Medicine — **Yan Zhang**

**Poster 2mo:** Design of Advanced Functional Materials for Cardiovascular engineering — **Renato Navarro**

**Poster 2mp:** Bio- and Art-inspired Bioelectronics for Next-generation Brain-machine Interface — **Xiao Yang**

**Poster 2mq:** 2D Materials for Applications in Optoelectronics, Energy Harvesting and Beyond — **Debjit Ghoshal**

**Poster 2mr:** Multiscale Modelling Framework to Understand the Effect of Site Heterogeneity on Activity in Paramagnetic Single Atom Catalysts — **Sanjana Srinivas**

**(3) Area Plenary: Bionanotechnology (Invited Talks)**

**Sunday, Nov 5, 3:30 PM**  
**Hyatt Regency Orlando, Bayhill 29**

**Lorraine Leon, Co-Chair**  
**Elizabeth Nance, Co-Chair**  
**Catherine Fromen, Co-Chair**

**Sponsored by:**  
Bionanotechnology

**3:30 Paper 3a:** Micro/Nanoengineered Adhesive Biomaterials for Regenerative Medicine and Drug Delivery — **Nasim Annabi**

**4:20 Paper 3b:** Harnessing Chaos: Rational Design of Nanoscale Surfaces for Cavitation-Based Imaging Agents, Nanomotors, and Protein Therapeutics. — **Andrew Goodwin**

**5:10 Paper 3c:** Building Bioactivity and Nanostructure into Slippery Liquid-Infused Porous Surfaces — **David M. Lynn**

**(4) 3D Printing Fundamentals and Applications**

**Sunday, Nov 5, 3:30 PM**  
**Hyatt Regency Orlando, Bayhill 33**

**William Phillip, Chair**  
**Monirosadat Sadati, Co-Chair**

**Sponsored by:** 3D Printing and Advanced Manufacturing

**3:30 Paper 4a:** Additive Manufacturing of Functional Medical Devices for Use in the Clinic — **Matthew Becker**

**4:00 Paper 4b:** Single and Multiphase Flows in Well-Defined Periodic 3D-Printed Lattices — **Ian Woodward, Yinkui Yu, Catherine Fromen**

**4:30 Paper 4c:** Printing 3D Structures with Controlled Chiral Self-Assembly — **Mohsen Esmaeili, Kyle George, Nader Taheri-Qazvini, Monirosadat Sadati**

**4:48 Paper 4d:** Developing Blood-Mimicking Fluid Formulations to Match Refractive Index of Compliant SLA 3D-Printed Vascular Model — **Elnaz Hosseinzadeh, Beatriz Alejandra Bosques Palomo, José Antonio Lorenzo Oliver, Alan Aguirre Soto**

**5:06 Paper 4e:** Multi-Order Combinatorial Lattices for Spatial Control of Transport Phenomena — **Ian Woodward, Catherine Fromen**

**5:24 Paper 4f:** A Novel Means of Measuring Key Thermophysical Properties Needed for Additive Manufacturing in Space — **Jason Livesay, Ranga Narayanan, Robert Singiser, Zachary Karpinski, Linnea Helenius, Joshua Fosen**

**5:42 Paper 4g:** Fundamental Study on Processing-Structure-Properties Relationships of Acrylonitrile-Butadiene-Styrene (ABS) for Material Extrusion Additive Manufacturing (MatEx AM) — **Juhyeong Lee, Jay Park**

**(5) New Faculty Forum (Invited Talks)**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Bayhill 30**

**Jerrod Henderson, Chair**  
**Marissa Wechsler, Co-Chair**

**Sponsored by:** Young Faculty Forum

**8:00 Paper 5a:** Becoming an Assistant Professor — **Sophia Orbach**

**8:25 Paper 5b:** Transition in Progress — **Damilola Daramola**

**8:50 Paper 5c:** Learning on the Job: Launching an Academic Career — **Karthish Manthiram**

**9:15 Paper 5d:** Making Your Research Matter: Strategies for Successful Broader Impacts Statements — **Sindia M. Rivera-Jimenez, Sarah Wilson**

**9:55:** Panel Discussion

**(6) High Pressure Phase Equilibria and Modeling**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Orlando Ballroom M**

**Aaron Rowane, Chair**  
**Steven Saunders, Co-Chair**

**Sponsored by:** High Pressure

**8:00 Paper 6a:** Phase Behaviour of Isobutane + CO<sub>2</sub> and Isobutane + H<sub>2</sub> at Temperatures between 190 and 400 K and at Pressures up to 20 MPa — **Riley Latcham, Martin Trusler**

**8:20 Paper 6b:** Application of a Synthetic Method for Calculations of Solubilities and Diffusion Coefficients of Carbon Dioxide and Nitrogen in Polystyrene — **Hossein Abedsoltan**

**8:40 Paper 6c:** Evaluating the Effect of Water Fractions on Methane Hydrate Formation and Inhibition Performance of Amino Acid L-Proline in Gas-Dominated System for Offshore Flow Assurance. — **M Fahed Qureshi, Majeda Khraisheh**

**9:00 Paper 6d:** Solubility of Light Gases in Water and NaCl Brines at High Pressures — **Qiaoyun Chen**, *Geraldine A. Torin-Ollarves, Martin Trusler*

**9:20 Paper 6e:** Phase Behavior of H<sub>2</sub>+Gas+Brine Systems and H<sub>2</sub> Dissolution Kinetics Under Subsurface Storage Conditions: Experiments and Thermodynamic Modeling — **Salaheddine Chabab**, *Halla Kerkache, Marie Poulain, Guillaume Galliero, Pierre Cezac*

**9:40 Paper 6f:** The Effects of Polymeric Additives on the High-Pressure Thermodynamic and Rheological Properties of Mineral Lubricant Base Oils — **Katrina Avery**, *Erdogan Kiran, Mark Devlin, John C. Hassler*

**10:00 Paper 6g:** Development of a Custom High-Temperature, High-Pressure Phase Behavior Apparatus — **Aaron Rowane**

#### **(7) New Frontiers of Molecular Thermodynamics (Invited Talks)**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Plaza International Ballroom I**

**Shikha Nangia, Chair**  
**Sumit Sharma, Co-Chair**

**Sponsored by:** Thermodynamics and Transport Properties

**8:00 Paper 7a:** Accomplishments, challenges and outlook for accelerating and optimizing materials and processing discovery using machine learning — **Paulette Clancy**

**8:30 Paper 7b:** Applications of Machine Learning and Bayesian Statistics in Coarse-Grained Molecular Dynamics — **Sanket Deshmukh**

**9:00 Paper 7c:** Coarse-grained simulations of side chain liquid crystal polymers with different types of attachments — **Diego Becerra, Lisa Hall**

**9:30 Paper 7d:** Achieving Quantum Mechanical Accuracy for Modeling Reaction-diffusion Process in Liquid-phase Heterogeneous Catalysis — **Neeraj Rai**

#### **(8) Environmental Division Awards and Honors (Invited Talks)**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Blue Spring I/II**

**Kerry Kelly, Chair**  
**Alexander Orlov, Co-Chair**

**Sponsored by:** Environmental Division

**8:00 Paper 8a:** Lowering the Barriers to Clean Water through Catalysis — **Michael Wong**

**8:45 Paper :** Electrochemical Wastewater Refining: Reactive Separations to Convert Pollutants into Products — **William Tarpeh**

#### **(9) Environmentally Friendly Product and Process Development for Sustainability**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Bayhill 28**

**Jing Luo, Chair**  
**Kakasaheb Nandiwale, Co-Chair**  
**Madhav Ghanta, Co-Chair**

**Sponsored by:** Process Research and Innovation

**8:00 Paper 9a:** Development and Optimization of a Continuous API Manufacturing Process — **Cameron Armstrong**, *Katharina Grohowski, Kakasaheb Y. Nandiwale, David Bernhardson, Pablo Jose Cabrera Ventura, Sergei Tcyrulnikov, Alexander Hesketh, David Limburg, Steven M. Guinness*

**8:25 Paper 9b:** Composition-Property Relationships of BP-1 Lunar Regolith Binders for in-Situ Resource Utilization As Geopolymers & Planetopolymers — **Thaddeus Egnaczyk, Quent Hartt, Jennifer Mills, Norman J. Wagner**

**8:50 Paper 9c:** Sustainable Manufacturing and Life Cycle Assessment of MOF-Polymer Composites By Reactive Extrusion — **Yufeng Quan, Harold Escobar Hernandez, Qingsheng Wang**

**9:15 Paper 9d:** Demonstration of a Sustainable Pathway for Producing Fully Bio-Based Polyethylene Terephthalate (bio-PET) — **Parikshit Sarda, Sridhar Viamajala, Joseph Lawrence**

**9:40 Paper 9e:** Sustainable One-Pot Production of Diformylxylose from Agricultural Biomass: Process Development, Scaling-up, and Life-Cycle Assessment — **Anastasiia Komarova**, *Zezhong Li, Jeremy Luterbacher*

**10:05 Paper 9f:** Selection of Greener Solvents Using Computer-Aided Molecular Design (CAMD) to Extract Octacosanol from Filter Press Mud of Sugarcane — **Nistala Venkata Subrahmanyam**, *Sharad Bhartiya, Urmila Diwekar*

#### **(10) Regenerative Engineering Society**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Regency Ballroom P**

**Johnna Temenoff, Co-Chair**  
**Yupeng Chen, Co-Chair**

**Sponsored by:** Regenerative Engineering Society

**8:00:** Introductory Remarks

**8:20 Paper 10a:** Delivery of Biologics for Muscle Healing after Rotator Cuff Injury — **Johnna Temenoff**

**8:50 Paper 10b:** Bioengineered perfused human brain microvasculature for brain tumor and neural stem cell research — **Guohao Dai**

**9:20 Paper 10c:** Tailoring Intelligent Protein Engineered Biomaterials for Regenerative Medicine — **Jin Kim Montclare**

**9:50 Paper 10d:** Engineer Off-the-Shelf CAR-Neutrophils for Targeted Chemoimmunotherapy Against Glioma — **Xiaoping Bao**

**10:10 Paper 10e:** Immunobioengineering of a Three-Dimensional Polymeric Scaffold-Based Implantable Thymic Organoid — **Manpreet Bariana, Elena Cassella, Shaina Anuncio, Jakub Erben, Andrea Tuckett, Michael Poulos, Jason Butler, Johannes Zakrzewski**

#### **(11) Division Plenary: Gerhold and Kunesh Awards on Separations (Invited Talks)**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Barrel Spring I**

**Seth Huggins, Chair**  
**Isaac Gamwo, Co-Chair**  
**Marina Tsianou, Co-Chair**

**Sponsored by:** Separations Division

**8:00:** Welcoming Remarks

**8:05 Paper 11a:** Fundamental Membrane Science Research Addressing the Water-Energy Nexus — **Benny D. Freeman**

**8:32 Paper 11b:** Purification of Circular RNA By Ultrafiltration — **Scott Husson**

**8:59 Paper 11c:** Polymer Membranes with Engineered Microporosity for Gas Separations — **Ruilan Guo**

**9:26 Paper 11d:** Redox-Mediated Electrochemical Separations: From Fundamentals to Applications — **Xiao Su**

**9:53 Paper 11e:** Development of Membrane Based Operations for Emerging Separations Challenges — **Ranil Wickramasinghe**

**10:20:** Concluding Remarks

#### **(12) Sustainable Pathways to Clean Hydrogen and Synthetic Fuels I**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Columbia 36**

**William Gibbons, Chair**  
**Eric Miller, Co-Chair**

**Sponsored by:** Sustainable Pathways Toward Hydrogen and Synthetic Fuels

**8:00 Paper 12a:** US Department of Energy Hydrogen Program Overview — **Eric Miller, William Gibbons**

**8:25 Paper 12b:** H2NEW Lab Consortium: Increasing the Performance and Durability of Electrolysis for Clean, Competitive Production of Hydrogen — **Richard Boardman, Bryan S. Pivovar, David Peterson, William Gibbons, Mark Ruth, Daniel Wendt, Olga Marina, Rangachary Mukundan**

**8:50 Paper 12c:** Doe Thermal Conversion with Carbon Capture and Storage R&D — **Eva Rodezno**

**9:15 Paper 12d:** U.S. Doe Overview - Supporting Clean Hydrogen through Supply Chain and Recycling Research and Development Efforts — **Julie Fornaciari**

**9:40 Paper 12e:** Renewable to Liquid Fuels Beyond the Grid — **James Seaba**

### **(13) MAC Eminent Engineers Awards Poster Session**

**Monday, Nov 6, 11:00 AM Hyatt Regency Orlando, Regency Ballroom R/S**

**Ingrid J. Paredes, Co-Chair  
Deisy Cristina Carvalho Fernandes, Co-Chair  
Jorge Almodovar, Co-Chair**

**Sponsored by:** Minority Affairs Community (MAC)

**Poster :** Assessing the Production and Cytocompatibility of *Plodia interpunctella* silks as Polymeric Biomaterials — **Jasmine McTyer, Bryce Shirk, Lauren Eccles, Isabella Torres-Duarte, Andrea Orozco, Paul Shirk, Whitney Stoppel**

**Poster :** Assessing the Feasibility of Coal As an Eco-Friendly Filler in Phenolic Resin Composites: A Study of Thermal and Structural Properties — **Chiderah Chukwuka, Damilola Daramola, Sophia Almanza**

**Poster :** Exploring the Economic and Environmental Benefits of Solvent-Based Recycling Processes of Multi-Layer Plastic Films — **Aurora Del Carmen Munguia Lopez, Dilara Goreke, Kevin Sanchez-Rivera, Horacio Aguirre-Villegas, Styliani Avramidou, George Huber, Victor Zavala**

**Poster :** Confirming the Extent and Mechanisms of the Immunosuppressive Enhancement of hMSCs Initiated By Col/Hep Layer By Layer Polyelectrolyte Coatings — **Justin Putman, Roaa Hadi, Jorge Almodovar**

**Poster :** *Unraveling the Enhancing Effect in Proliferation of Human Mesenchymal Stem Cells Cultured on Biopolymeric Coatings.* — **Roaa Hadi, Jorge Almodovar, Justin Putman, Luis Carlos Pinzon-Herrera**

**Poster :** Exploring the Impact of Coinfections Involving Epstein-Barr Virus (EBV) and Malaria on the Development of Autoimmune Diseases in Patients. — **Charlene Chung**

**Poster :** Enhancing Magnetic Particle Imaging (MPI) Performance: Probing Post-Synthesis Oxidation and Correlations to Nanoparticle Properties — **Ambar Velazquez Albino, Aniela Nozka, Andrii Melnyk, Hayden Good, Carlos Rinaldi-Ramos**

**Poster :** Electrified Lixiviation of Rare Earth Elements from Coal Mining Waste - MAC — **Lawrence Ajayi, Damilola Daramola**

**Poster :** Extraction and Characterization of Cellulose Nanocrystals from Corn Husk Waste and Its Application in Bioplastic Preparation — **Sergio Mayta Paucara, Maria Quintana Caceda, Ronny G. Huamani Palomino, Bryan M. Córdova**

**Poster :** Demonstration of a Batch Electrochemical System for Phosphorus Recovery from a Real Municipal Wastewater Recycle Stream - MAC Session — **Sana Heydarian, Syed Asad Abbas, Lawrence Ajayi, Jason Trembly, Damilola Daramola**

**Poster :** Hydrophobic Collapse of Long Alkane Chains in Water and Water/Ethanol Mixtures — **Rahul Kumar, David Abadie, Nicole Korinetz, Henry Ashbaugh**

**Poster :** MAC Poster: Mathematical Modeling of Drug Release from Bi-Layered Drug Delivery Systems in the Eye — **Eduardo A. Chacin Ruiz, Jabia M. Chowdhury, Katelyn E. Swindle-Reilly, Ashlee N. Ford Versypt**

**Poster :** Biorefrineries for a Sustainable Plastic Value Chain — **Efrain Rodriguez-Ocasio, Mark Blenner, Laura R. Jarboe**

**Poster :** Tri-Component Microneedle Patch for Enhanced Veterinary Meloxicam Delivery: PVA, Collagen, and Chitosan Synergies — **Jorge Almodovar**

**Poster :** *Dielectrophoresis-Based Breast Cancer Study: Characterization and Separation of Peripheral Blood Mononuclear Cells from Pymt and WT Mouse Model* — **Raphael Oladokun, Christopher Smith, Timothy Eubank, Soumya Srivastava**

### **(14) Featured MPC Session: Sustainability and the Circular Economy Panel Discussion**

**Monday, Nov 6, 11:00 AM Hyatt Regency Orlando, Plaza International Ballroom G/H**

**Yu Shi, Chair  
Martha Grover, Co-Chair**

**Sponsored by:** Miscellaneous

### **(15) CAST Director's Student Presentation Award Finalists (Invited Talks)**

**Monday, Nov 6, 12:30 PM Hyatt Regency Orlando, Bayhill 23**

**Fani Boukouvala, Chair  
Chrysanthos Gounaris, Co-Chair**

**Sponsored by:** Computing Systems and Technology Division

**12:30 Paper 15a:** Designing a Sustainable Supply Chain for Polyolefins Waste Management: A Multi-Objective Optimization Approach — **Oluwadare Badejo, Borja Hernández Blázquez, Marianthi Ierapetritou**

**12:45 Paper 15b:** A Bayesian Optimization Framework for Interconnected Systems — **Leonardo Gonzalez, Victor Zavala**

**1:00 Paper 15c:** Inverse Mixed-Integer Optimization for Learning Interpretable Decision Rules — **Rishabh Gupta, JOHN Wassick, Qi Zhang**

**1:15 Paper 15d:** Efficient Numerical Strategies for Multidimensional Population Balance Models and Transport Equations — **Pavan Inguva, Francesco Destro, Richard Braatz**

**1:30 Paper 15e:** Accelerating Drug Discovery and Development Using an Ontology-Based Machine Learning Framework — **Vipul Mann, Shekhar Viswanath, Shankar Vaidyaraman, Venkat Venkatasubramanian**

**1:45 Paper 15f:** Taking the Human out of the Decomposition-Based Optimization Loop Via Artificial Intelligence and Network Science — **Ilias Mitrai, Prodomos Daoutidis**

**2:00 Paper 15g:** Enabling Cyberattack Detection in Process Control Systems Via Randomized Controller Switching — **Shilpa Narasimhan, Nael El-Farra, Matthew Ellis**

**2:15 Paper 15h:** High-Dimensional Bayesian Optimization of Molecular Properties Using Quantitative Structure-Property Relationships on Sparse Axis-Aligned Subspaces — **Farshud Sorourifar, Thomas Banker, Joel Paulson**

### **(16) Introduction to NSF's CBET Division and Proposal Writing Strategies**

**Monday, Nov 6, 12:30 PM Hyatt Regency Orlando, Bayhill 29**

**Carole Read, Chair  
Ram Gupta, Co-Chair**

**Sponsored by:** Career Guidance Committee Liaison

**12:30 Paper 16a:** Division Director Update on the Chemical, Bioengineering, Environmental, and Transport Systems Division of NSF: Programs and Opportunities — **Jeanne VanBriesen**

**1:20 Paper 16b:** Proposal Writing Strategies for Fundamental Research Proposals for NSF — **Gregory L. Rorrer**

---

**(17) Plenary Session on Novel Flows (Invited Talks)**

**Monday, Nov 6, 12:30 PM**  
**Hyatt Regency Orlando, Plaza International Ballroom K**

**Simon Rogers, Chair**

**Sponsored by:** Fluid Mechanics

**12:30 Paper 17a:** The Role of Rolling Resistance in the Rheology of Wizarding Quidditch Ball Suspensions — **Sarah Hormozi, Donald L. Koch, Enzo d'Ambrosio**

**1:05 Paper 17b:** Influence of Charge Fraction and Sequence on Polyelectrolyte Solution and Brush Properties — **Amanda B. Marciel**

**1:40 Paper 17c:** Tailoring Anisotropic Nanomaterial Liquid Crystal Dispersions: From Fiber Spinning to Direct Ink Writing — **Virginia Davis**

**2:15 Paper 17d:** Rheological Characterization and Design of Highly-Filled Inks for Direct-Ink Write Additive Manufacturing — **Jessica Kopatz, Derek Reinholtz, James Griebler, Jonathan Leonard, Alexander Tappan, Adam Cook, Anne Grillet**

---

**(18) Design and Analysis of Carbon Capture and Negative Emissions Technologies - Experimental**

**Monday, Nov 6, 12:30 PM**  
**Hyatt Regency Orlando, Blue Spring I/II**

**Dora Lopez De Alonzo, Chair**  
**Omar Guerra, Co-Chair**  
**Toufiq Reza, Co-Chair**  
**Monday Okoronkwo, Co-Chair**

**Sponsored by:** Climate Change

**12:30 Paper 18a:** Screening of Ionic Liquids for CO<sub>2</sub> Capture at Ambient Conditions — **Rohit Chauhan, Rohan Sartape, Meenesh R Singh**

**12:47 Paper 18b:** Controlled Morphology, Post-Synthetic Modification, and Scale-up of MOFs for Direct Air Capture of Carbon Dioxide — **Xakin Ramirez Isunza, Brittany Bonnett, Connor Farrell, Amanda J. Morris, Stephen Martin**

**1:04 Paper 18c:** Energy-Efficient and Stable Amine Structures Supported by Mesoporous Silica for Direct Air Capture — **Joo-Youp Lee, Soumitra Payra**

**1:21 Paper 18d:** CO<sub>2</sub> Capture Using Phase-Changing Bis-Iminoguanidines (BIGs) with Amino Acids; Analysis of a Direct Air Capture Process — **Abishek Kasturi, Gyoung Gug Jang, Diana Stamberga, Radu Custelcean, Sotira Yiacoymi, Costas Tsouris**

**1:38 Paper 18e:** Investigating Oxidative Degradation Products and Mechanisms of Aminopolymer Sorbents for Direct Air Capture (DAC) — **Yoseph Guta, Tianchang (Athena) Xu, Juliana Carneiro, Giada Innocenti, Simon H. Pang, Miles Sakwa-Novak, Nga Lee Ng, Carsten Sievers, Christopher Jones**

**1:55 Paper 18f:** Direct Air Capture with Amino Acid Solvent: Operational Optimization Using a Crossflow Air-Liquid Contactor — **Keju An**

**2:12 Paper 18g:** Amino Acid-Based Functionalized Deep Eutectic Solvents As a Promising Alternative for Efficient CO<sub>2</sub> Capture and Consideration of Its Application — **Jaehan Jo, Minseok Park, Seokho Kwon, Dongwoo Kang**

**2:29 Paper 18h:** Ultra-Functional CO<sub>2</sub> Capture Sorbent Development Via One-Pot Deep Eutectic Solvent Based Thermochemical Conversion — **Al Ibtida Sultana, Md Tahmid Islam, Josh Calhoun, Robert Cheatham, Toufiq Reza**

**2:46:** Carbon Capture Networking and Informing New Sessions in the AIChE ENV Division

---

**(19) Area Plenary: Leaders in Biomaterials (Invited Talks)**

**Monday, Nov 6, 12:30 PM**  
**Hyatt Regency Orlando, Celebration 9**

**Matthew Webber, Chair**  
**Amol Janorkar, Co-Chair**  
**Yifan Cheng, Co-Chair**

**Sponsored by:** Biomaterials

**12:30 Paper 19a:** Recent Advances in Zwitterionic Materials for Biomedical and Engineering Applications — **Shaoyi Jiang**

**1:20 Paper 19b:** Multiscale Control of Biomaterials for Engineered Extracellular Matrices — **Adrianne Rosales**

**2:10 Paper 19c:** Rational Design of Antifouling Topographies to Control Biomaterial-Associated Infections — **Dacheng Ren**

---

**(20) Advances in Fluid Particle Separations**

**Monday, Nov 6, 12:30 PM**  
**Hyatt Regency Orlando, Barrel Spring II**

**Jenifer Gomez Pastora, Chair**  
**Seyi Oduyungbo, Co-Chair**

**Sponsored by:** Fluid-Particle Separations

**12:30 Paper 20a:** Development of Electrospun PCL Aerosol Filter Media for Respiratory PPE Applications — **Nathan Ewell, Gregory Rutledge**

**12:55 Paper 20b:** Refinement of the Relationship between Brownian Force and Magnetic Force on Superparamagnetic Iron Oxide Nanoparticles — **Xian Wu, Hyeon Choe, Jacob Strayer, Jenifer Gomez Pastora, Barbara E. Wyslouzil, Jeffrey Chalmers**

**1:20 Paper 20c:** Dynamic Modeling of Solid Bowl Centrifuges As a Tool for Better Process Design: Advantages of Adaptive Hybrid Models — **Marco Gleiss**

**1:45 Paper 20d:** Development of Regenerable Fine Particulate Air Filters — **Andrew L. Wagner, Matthew Emmons, Matthew Haggerty**

**2:10 Paper 20e:** Effect of a Recirculation System in an Industrial Cyclone Separator — **Praveen Kumar Nedumaran, Praveen Kumar Nedumaran, Dzmitry Misiulia, Sergiy Antonyuk**

---

**(21) Area Plenary: Adsorption and Ion Exchange - In Honor of Prof James A Ritter (Invited Talks)**

**Monday, Nov 6, 12:30 PM**  
**Hyatt Regency Orlando, Manatee Spring I**

**F Handan Tezel, Chair**  
**Daniel Siderius, Co-Chair**

**Sponsored by:** Adsorption and Ion Exchange

---

**(22) Honorary Session for Prof. Rich Noble**

**Monday, Nov 6, 12:30 PM**  
**Hyatt Regency Orlando, Barrel Spring I**

**Alexander Lopez, Chair**  
**Jason Bara, Co-Chair**  
**Isabel Escobar, Co-Chair**

**Sponsored by:** Membrane-Based Separations

**12:30 Paper 22a:** Development of a Membrane Process to Capture CO<sub>2</sub> Emissions from Industrial Processes. — **Richard Baker**

**1:00 Paper 22b:** Sterile Filtration of mRNA-Lipid Nanoparticle Vaccines – New Challenges for an Old Technology — **Andrew Zydney**

**1:30 Paper 22c:** Prof Rich Noble and the Membrane Science, Engineering and Technology Center — **Ranil Wickramasinghe**

**2:00 Paper 22d:** Transformational Membranes for Carbon Capture and Utilization — **Shiguang Li, Miao Yu, Xinhua Liang, Fan Wang, Dinesh Behera, Qiaobei Dong, Weiwei Xu, Howard Meyer**

**2:30 Paper 22f:** Electrochemically facilitated transport of CO<sub>2</sub> between gas diffusion electrodes in flat and hollow fiber geometries — **Kyle M. Diederichsen, Younghun Lee, Michael Massen-Hane, T Alan Hatton**

---

**(23) Plenary Session: Crystallization and Evaporation - Area 2B (Invited Talks)**

**Monday, Nov 6, 12:30 PM**  
**Hyatt Regency Orlando, Manatee Spring II**

**Christopher Burcham, Chair**  
**Gerard Capellades, Co-Chair**

**Sponsored by:** Crystallization and Evaporation

**12:30:** Welcoming Remarks

**12:35 Paper 23f:** Solid-State Deracemization of Conglomerate-Forming Chiral Compounds, Simple and Ubiquitous — **Marco Mazzotti**

**1:20:** Discussion

**1:30 Paper 23a:** Creatine Citric Acid Cocrystals or Creatine Citrate Salts, That Is the Question? — **Greg York**

**1:48 Paper 23b:** Optimization of a Commercial-Scale Agrochemical Crystallization Prone to Oiling and Agglomeration — **Paul Larsen, Zoltan Benko, Venkateswarlu Bhamidi, Jay Bradstreet II, Steve Coats, Navraj Hanspal, Yamini Krishnan, Ipsita Mishra, Kevin Peil, Xi Yang**

**2:06 Paper 23c:** Opencrystaldata: An Open-Access Crystal Image Database for Enabling the Image-Based Analysis of Crystallization Systems — **Wei-Lee Wu, Yash Barhate, Christopher Boyle, Hossein Salami, Andreas Bommarius, Javier Cardona, Zoltan Nagy, Ronald Rousseau, Martha Grover**

**2:24 Paper 23e:** Microfluidic Phase Diagram of Sucrose Droplets: Freezing, Freeze-Concentrated Glass Transition, and Melting Temperatures — **Leif-Thore Deck, Nadia Shardt, Imad El-Bakouri, Florin N. Isenrich, Andrew J. deMello, Ulrike Lohmann, Marco Mazzotti**

**2:42 Paper 23d:** ‘Regeneration’ Phenomenon Observed in Pharmaceutical Crystals Post Breakage – a Case Study on Paracetamol and the Effect of Growth Solvents — **Isha Bade, Vivek Verma, Allison Arber, Jerry Heng**

---

**(24) Materials Interfaces - Celebrating the Career of John Ekerdt**

**Monday, Nov 6, 12:30 PM  
Hyatt Regency Orlando,  
Celebration 10**

**Jane Chang, Chair  
Gyeong Hwang, Co-Chair**

**Sponsored by:** Material Interfaces as Energy Solutions

**12:30 Paper 24a:** Chemical Processing of Function Accelerated Nano-Materials at the Atomic Scale — **Jane Chang**

**12:48 Paper 24b:** Surface Reaction Kinetics during Area-Selective Thin Film Deposition — **Gregory N. Parsons**

**1:06 Paper 24c:** Controlling Nucleation and Selectivity in Atomic Layer Deposition for Materials Synthesis — **Stacey Bent**

**1:24 Paper 24d:** High Quality Tunable Plasmonic Nanostructures By Atomic Layer Deposition — **Brian Willis, John A. Grasso, Rahul Raman**

**1:42 Paper 24e:** Chemical “Engineerifying” Electronics — **Michael A. Filler**

**2:00 Paper 24f:** The Elusive Surface M2O7 Dimer Active Site — **Israel Wachs**

**2:18 Paper 24g:** The Dual Nature of Chemical Reaction Engineering — **James Rawlings**

**2:36 Paper 24h:** Plasma Enhanced Atomic Layer Deposition of Silicon Carbonitride — **Samuel Johnson, Tsung-Hsuan Yang, Jianping Zhao, Toshihiko Iwao, Charles Schlechte, John Carroll, Gabriel Blankemeyer, Peter Ventzek, Joaquin Resasco, Gyeong S. Hwang, John Ekerdt**

---

**(25) Graduate Education and Support**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando, Bayhill 28**

**Adam Melvin, Chair  
Mo Jiang, Co-Chair  
Weijian Diao, Co-Chair**

**Sponsored by:** Graduate Education

**3:30 Paper 25a:** Perspective on Starting a Mentoring Program for First Year Ph.D. Students — **Mariah Arral**

**3:45 Paper 25b:** Teaching Chem-E Journal Club: An Opportunity for Career Exploration and Student Support — **Rebecca Harmon**

**4:00 Paper 25c:** Green Chemical Engineering Innovation: Turning Design Constraints into a Source of Creativity — **Christopher V. H-H. Chen**

**4:15 Paper 25d:** Retrospective Analysis of the Effect of an Online “Bridging” Course Sequence on Student Success in Graduate Studies — **Matthew Cooper, Lisa Bullard, Aaron Frye**

---

**(26) IDEAL Featured Session: A Conversation on Equity, Diversity, and Inclusion**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando, Plaza  
International Ballroom G/H**

**Martha Grover, Chair  
Lori McDowell, Co-Chair  
Yu Shi, Co-Chair  
Christopher Pope, Co-Chair**

**Sponsored by:** Engineering for Inclusion

---

**(27) Poster session:  
Bioengineering**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando,  
Regency Ballroom R/S**

**Jamie Spangler, Chair  
Yongchan Kwon, Co-Chair  
Christopher Kieslich, Co-Chair  
Jason Boock, Co-Chair  
Phanourios Tamamis, Co-Chair**

**Sponsored by:** Bioengineering

---

**■ BIOCATALYSIS AND  
BIOBASED PRODUCTS**

**Poster 27a:** Photoenzymatic Asymmetric Hydroamination of Simple Aliphatic Amines and Vinyl Arene Olefins — **Wesley Harrison, Huimin Zhao**

**Poster 27c:** Understanding and Engineering Chain Translocation in Assembly-Line Polyketide Synthases — **Alexander Soohoo, Dillon Cogan, Chaitan Khosla**

**Poster 27d:** Polyethylene Terephthalate (PET) Plastic Intermediates Deconstruction in One Pot *B. Subtilis* Bioprocess — **Apurv Mhatre, Bethany Kalsheur, Haley McKeown, Bruce Rittmann, Arul Mozhy Varman**

**Poster 27e:** Cellulose Hydrolysis Using Chitosan Coated Enzyme-Magnetic Nanoparticle — **Heejoon Park**

**Poster 27f:** Process Development and Techno-Economic Analysis of Biomass-Derived GVL Production As an Intermediate for Chemo-Enzymatic Bio-Jet Fuel Production — **Joungho Park, Kyung-Ran Hwang, Kyoungseon Min**

**Poster 27g:** Polymer Motion Energizing Enzyme Conformational Dynamics and Catalytic Kinetics in Organic Solvents — **Yupei Jian, Zheng Liu**

**Poster 27h:** Simulation-Based Evaluation of the Pre-Treatment of Acid Raw Materials in Biodiesel Production — **Francisco Lucas Carneiro, Marcilio Maximo, Bianca Viana, Fernando V. Lima, Heleno Bispo**

**Poster 27i:** Improving Biomass-Derived Graphene Coating on Transitional Metals — **Suriya Narayanan Ramasubramanian, Hema Ramsurn, Gabriel LeBlanc**

**Poster 27j:** Impact of pH Adjustment on Hydrogen Production in Pressurized Gas Fermentation — **Gwon Woo Park, Myoungsoon Moon, Min-Sik Kim**

**Poster 27k:** Development of a Cell Culture-Derived Viral Insecticide to Control the Spread of *Drosophila* *Suzukii* — **Keven Lothert, Yasmina Harsy, Thorsten Gröb, Kwang-Zin Lee, Michael W. Wolff**

---

**■ CELL CULTURE  
ENGINEERING AND  
BIOPHARMACEUTICAL  
MANUFACTURING**

**Poster 27m:** Bioreactors Scale-up and Optimization from Lab to Manufacturing Scale — **Nima Yazdanpanah**

**Poster 27n:** Fluorescence Complementation Enables Quantitative Imaging of Transcription Factor Delivery in Plants — **Henry Squire, Jeffrey Wang, Natalie S. Goh, Heyuan M. Ni, Edward Lien, Cerise Wong, Eduardo Gonzalez-Grandio, Markita Landry**

**Poster 27o:** Effect of Oxidative Stress on Pertactin Productivity in *Bordetella Pertussis* Fermentations: A Study on Glutamate-Induced ROS Inhibition — **Abhishek Mishra, Melih Tamer, Hector M. Budman**

---

**■ PROTEIN SCIENCE AND  
ENGINEERING**

**Poster 27q:** Probing the Origins of Collateral Fitness Effects of Mutations — **Cameron Goff, Marc Ostermeier**

**Poster 27r:** Enhanced Protein Stability Enabled By Mixtures of Ionic and Amphoteric Surfactants Compared to Each Alone — **Tridwip Sen**, Evan Danielson, Kerri Peterson, Kayla Thompson, Elaine Reece, Jason Berberich, Jason Boock

**Poster 27s:** Adaptability of 22 Functional Cas12a Orthologs Using a Combinatorial Approach for Nucleic Acid Detection in Clinical Samples — **Dylan Carman**, Long Nguyen, Noah Rakestraw, Nicolas C. Macaluso, Piyush Jain

**Poster 27t:** Comparison of GST and SUMO Fusion Tags for Enhanced Yield and Purity of Recombinant Osh4 — **Andrew Loveland**, Dinara Konakbayeva, Jeffery Klauda, Amy Karlsson

**Poster 27u:** Understanding the Inherent Bias in the Activity of Mismatch Specific Exonuclease — **Rushant Sabnis**, Qing Sun

**Poster 27v:** Engineering Bispecific Receptor Decoy Antagonists to Treat Neovascular Eye Diseases — **Emily Ariail**, Paul Sargunas, Jamie Spangler

**Poster 27w:** Metabolic Engineered *Escherichia coli* Strains to Express Flavoprotein Monooxygenases from Actinomycetes Isolated from the Atacama Desert for Industrial Applications. — **Carolina Gonzalez**, Irene Martinez

**Poster 27x:** Computational Design of Peptides As Detectors, Drugs, and Biomaterials — **Sudeep Sarma**, Greg Hudalla, Stefano Menegatti, Nathan Crook, Scott Magness, Anant Paravastu, Carol Hall

**Poster 27y:** Characterizing Cas12i Proteins As Novel Enzymes for Diagnostics and Gene Editing — **Carlos Orosco**, Santosh Rananaware, Minji Chang, Zoe Fang, Lilia Yang, Noah Rakestraw, Grace Shoemaker, Katelyn Meister, Jordan Lewis, Briana Pizzano, Piyush Jain

**Poster 27z:** Assessing Prediction Fairness of AlphaFold2 in Drug Discovery — **Usman Abbas**, Xingjian Shan, Jin Chen, Qing Shao

**Poster 27aa:** Directed Evolution of an Alpha-Synuclein Degrading Enzyme — **Lawton Long**, Cassidy Simas, Carl Denard

**Poster 27ac:** Meta-Analysis of Proteolytic Cleavage Specificity Using Machine Learning — **Suhyeon Kim**, Hyeju Song, Sumaiya Islam, Christopher Kieslich

**Poster 27ad:** 8-Oxo-7,8-Dihydroguanosine Alters RNA Degradation Behavior of Polynucleotide Phosphorylase — **Lucas Miller**, Shawn Schowe, Runhua Han, Vashita Jain, Sean Engels, Juan Camilo Gonzalez Rivera, Marino Resendiz, Lydia Contreras

**Poster 27ae:** Environmental Dependence of Collateral Fitness Effects — **Erh-Yeh Tsou**, Jacob D. Mehlhoff, Jacob D. Mehlhoff, Marc Ostermeier

**Poster 27af:** Novel Lasso Peptides Produced By Actinobacteria from the Atacama Desert — **Valeria Razmilic**, Juan Asenjo, Irene Martinez

**Poster 27ag:** Discovery and Characterization of a Structurally Unique Heterocyclic Peptide Enterolysin S — **Chengyou Shi**, Marko Nesic, David Sarlah, Huimin Zhao

**Poster 27ah:** *In Situ* Characterization of Ammonia-Dependent Enzymes — **Adam Caparco**, Bettina Bommarius, Laurine Ducrot, Carine Vergne-Vaxelaire, Julie Champion, Andreas Bommarius

**Poster 27aj:** Artificial Lipid Biomembranes for Full-Length Sars-Cov-2 Receptor — **Ting Wang**

**Poster 27ak:** Multiplexing of Cas Orthologs for Disease Detection — **Briana Pizzano**, Lilia Yang, Piyush Jain

**Poster 27al:** Programmable RNA Detection with CRISPR-Cas12a — **Grace Shoemaker**, Santosh R. Rananaware, Emma K. Vesco, Swapnil Anekar, Luke Samuel W. Sandoval, Katelyn Meister, Nicolas C. Macaluso, Long Nguyen, Piyush Jain

**Poster 27cl:** Balancing Monoatomic Ion-Biomolecular Interactions in the Polarizable Drude Force Field — **Yiling Nan**, Alexander D. MacKerell

## ■ BIOSENSORS AND BIODIAGNOSTICS

**Poster 27am:** An Ultrasensitive Amplification-Free Nucleic Acid Detection Using CRISPR Chain Reaction v2 — **Minji Chang**, Santosh Rananaware, Carlos Orosco, Lilia Yang, Emma K. Vesco, Grace Shoemaker, Piyush Jain

**Poster 27an:** Nanopore Sequencing of 8-Letter Xenonucleic Acids — **Hinako Kawabe**, Jorge A. Marchand

**Poster 27ao:** Dielectric Characterization of Babesia Bovis Using the Crossover Frequency Technique on a Point and Planar Electrodes Microfluidic Device — **Raphael Oladokun**, Soumya K. Srivastava

**Poster 27aq:** Quantifying Plasma Exosomes for Early Cancer Detection Using Rotational Brownian Motion of Janus Particles — **John Sinclair**, Sonu Kumar, Tiger Shi, Satyajyoti Senapati, Han-Sheng Chuang, Hsueh-Chia Chang

**Poster 27ar:** A Low-Cost Flow Cytometer for Blood Cell Analysis. — **Mahrukh Mir**

**Poster 27as:** Development of a Supercontinuum Laser-Based Confocal Microscope System for Excitation-Scanning Hyperspectral Imaging — **Silas J. Leavesley**, Joel F. Andrews, Craig M. Browning, Megan Patterson, Mark S. Taylor, Thomas C. Rich

**Poster 27at:** A Rapid, Fully Automated Modular Electrochemical Platform Based on a Porous Flow-through Electrode for Sensing Biological Molecules of Interest — **Sagnik Basuray**, Yu-Hsuan Cheng, Zhenglong Li, Sreerag Kaaliveetil, Niranjan Haridas

**Poster 27au:** A Point-of-Care Device Capable of High-Throughput Diagnostic Testing Using Recombinase Polymerase Amplification (RPA) — **Aubrey Schultz**, Robert Beitle

**Poster 27av:** PAM-Independent Detection of Nucleic Acid Targets with CRISPR-Cas12a — **Santosh Rananaware**, Katelyn Meister, Grace Shoemaker, Emma K. Vesco, Luke Samuel W. Sandoval, Jordan Lewis, Briana Pizzano, Piyush Jain

**Poster 27aw:** Production and Application of SARS-CoV-2 Pseudotyped Virus for Screening Antiviral Efficacy of Test Compounds on a High-Throughput Platform — **Maisha Feroz**, Seok-Joon Kwon, Yuefan Song, Jonathan Dordick

**Poster 27ax:** Nonfluorescent Ratiometric Sensing Utilizing CRISPR-Cas12a-Induced DNA Supercoil Relaxation — **Noor Mohammad**, Logan Talton, Selen Dalgan, Qingshan Wei

## ■ METABOLIC ENGINEERING

**Poster 27ay:** Engineering *Corynebacterium Glutamicum* for Biomanufacturing of  $\beta$ -Ketoadipate from Lignin-Derived Aromatics — **Arren Liu**, Tyler Okane, Nandini Kannoju, David Nielsen, Arul Mozhy Varman

**Poster 27az:** Engineering Novel Microbes for Upcycling Waste Plastic and Solving Climate Crisis — **Yuxin Tian**, Jinjin Diao, Yifeng Hu, Tae Seok Moon

**Poster 27ba:** Continuous Production of Acetic Acid By *Eubacterium Limosum* KIST612 Using an External Membrane Module — **Myounghoon Moon**, Gwonwoo Park, Min-Sik Kim

**Poster 27bb:** Enzymatic Optimization of the Biosynthetic Production of Paraxanthine By Site-Saturated Mutagenesis with Enhanced Formaldehyde-Sensitive Selection — **Meredith Mock**, Margaret Kapperman, Camden Hutchison, Joseph Rodriguez, Kayla Pakulski, Nick Gleason, Ryan Summers

**Poster 27bd:** Harnessing Robustness of Thermophilic *Bacillus Coagulans* for Conversion of Switchgrass Hydrolysates to Designer Bioesters at Elevated Temperatures — **David Dooley**, Seunghyun Ryu, Jackson Edwards, Khanh Ha, Richard Giannone, Bruce S. Dien, Cong Trinh

**Poster 27be:** Agent-Based Metabolic Modeling for the Rational Engineering of *Chlamydomonas Reinhardtii* — **Sandra Gomez Romero, Nanette Boyle**

## ■ SYNTHETIC BIOLOGY AND APPLICATIONS

**Poster 27bf:** Engineering High-Throughput Fluorescent Reporters for Selenocysteine Incorporation — **Devon Kulhanek, Qiyao Wei, Zach Jansen, Andrew Gilmour, Ross Thyer**

**Poster 27bg:** Feedforward Loop-Based Antithetic Controller for Improved Adaptation Dynamics — **Thales Spartalis, Xun Tang**

**Poster 27bh:** Single and Multiplexed Gene Repression in Solventogenic *Clostridium* Via Cas12a-Based CRISPR Interference — **Rochelle Joseph, Nicholas Sandoval**

**Poster 27bi:** Streamlined Yeast Cell Reactors with Residence Time Control to Engineer and Profile Protein-Modifying Enzymes — **Sage Nelson, Samantha Martinusen, Lawton Long, Ethan Slaton, Carl Denard**

**Poster 27bj:** Heterologous Derived Proteins Tethered to the Surface of Yeast: Arming *Saccharomyces Cerevisiae* with Sars-Cov-2 Receptor Binding Domain and Green Fluorescent Protein. — **Shadrach Ibinola, Hazim Aljewari, Sebastian Freeman, Vicki Thompson, Kaiming Ye, Robert Beitle**

**Poster 27bk:** Investigating the Relaxase Behavior and Replication Functionality of the Mobilization Protein *Mobv* in the Plasmid pBBR1 — **Mark Kathol, Cheryl Immethun, Dianna Morris, Rajib Saha**

**Poster 27bl:** Leveraging the Carbon Storage Regulatory Network to engineer Complex Post-Transcriptional Gene Circuits — **Trevor Simmons, Gina Partipilo, Anna Stankes, Darian Chiu, Benjamin Keitz, Lydia Contreras**

**Poster 27bm:** Dynamic DNA Nanoaggregation Driven By Ionic Self-Association — **Sneha Mukherjee, Kevin Lin, Albert J. Keung, Orlin D. Velev**

**Poster 27bn:** Engineering of Tunable Cell Network with Endogenous Template Activation of Non-Excitable Cells — **Junkai Xie, Bo-Chuan Huang, Chongli Yuan**

**Poster 27bo:** Assemblytron: Flexible Automation of DNA Assembly with Openrons OT-2 Lab Robots — **John Bryant Jr., Mason Kellinger, Cameron Longmire, Ryan Miller, Clay Wright**

**Poster 27bp:** Bringing Physical Signals into Cell-Free Expression — **Junzhu Yang**

**Poster 27bq:** Engineered Biological Security Systems: Introducing Biotic Cryptography and Encryption — **Downan Kim, Ishita Kumar, Corey Wilson**

**Poster 27br:** Specific Codons Control Cellular Resources and Fitness — **Nikhil U. Nair**

**Poster 27bs:** Glutathione-Responsive Disulfide-Containing Poly ( $\beta$ -amino esters) Nanogels for Drug Delivery Applications — **Anastasiia Aronova, Alea Smith, Brittany Givens Rassoolkhani, Thomas D. Dziubla**

## ■ SYSTEMS AND QUANTITATIVE BIOLOGY

**Poster 27bt:** Regulating Cell Function to Accelerate Bone Cell Growth Using Micro- to-Nano Crumpled Mxene Multilayers. — **Mohammad Asadi Tokmedash, Jouha Min**

**Poster 27bu:** Framework for Optimizing Modulations of Enzyme Expression Levels and Kinetic Parameters for Computational Microbial Strain Design — **Patrick Suthers, Mengqi Hu, Costas D. Maranas**

**Poster 27bv:** Investigating the Effects of Surface Stiffness on Human Mesenchymal Stem Cell Immunomodulatory Potential — **Sara Olsen, Bethany Almeida**

**Poster 27bw:** Caffeine Affects Horizontal Gene Transfer in Bacteria — **Tracy Mei, Robert Jinkerson, Qing Sun**

**Poster 27bx:** Illuminating Cell Entry Pathways of Sars-Cov-2 By Replicating Distinct Host Environments on a Bioelectronic Sensor — **Susan Daniel, Zhongmou Chao, Ekaterina Selivanovitch, Konstantinos Kallitsis, Zixuan Lu, Alberto Salleo, Roisin Owens**

**Poster 27by:** Deep Neural Networks for Predicting Single Cell Responses and Probability Landscapes — **Heidi E. Klumpe, Jean-Baptiste Lugagne, Ahmad S. Khalil, Mary J. Dunlop**

**Poster 27bz:** The Effects of Pfas-Induced Activation of ER Stress Sensor IRE1 $\alpha$  and Its Downstream Pathways for DNA Damage Repair — **Kevin Chen, Sean Foster, Caleb Sandum, Sardar Murtaza, Elaina Gouin, S. Patrick Walton, Christina Chan**

**Poster 27ca:** Investigation of Interaction of Stress Response, Virulence, and Antibiotic Resistance in *Listeria Monocytogenes* through Protein Network Analysis — **Robert Hanes Jr., Zuyi Huang, Fangyuan Zhang**

**Poster 27cb:** Development of a Genome-Scale Metabolic Model for *Auxenochlorella Protothecoides* to Enable Rational Engineering — **Mark Vigliotti, Jacob Tamburro, Nanette Boyle**

**Poster 27cc:** Bacterial Metabolites Required for Post-Embryonic Development in *C. Elegans* — **Min Feng, Luis R. Garcia, Qing Sun**

**Poster 27cd:** Analysis of Pmad and Medea Expression in BMP Pathway in S2 Cells and *Drosophila* Germline Stem Cells Niche — **Hung-Yuan Chen, Gregory Reeves**

**Poster 27ce:** Expression of Glycolytic Genes in NAFLD Correlates with the Risk of Hepatocytes Dysfunction — **Samantha Harvat, Srivatsan Kidambi**

**Poster 27cf:** A Systems Engineering Computer-Assisted Biomarker Detection Framework for Autism Spectrum Disorder Using Proteomic Data — **Farnaz Yousefi Zowji, Q. Peter He**

**Poster 27cg:** An SPNS1-Dependent Lysosomal Lipid Transport Pathway That Enables Cell Survival Under Choline Limitation — **Wentao Dong, Samantha Scharenberg, Ali Ghoochani, Kwamina Nyame, Roni Levin-Konigsberg, Aswini Krishnan, Eshaan Rawat, Kaitlyn Spees, Michael Bassik, Monther Abu-Remaileh**

**Poster 27ch:** A Novel Method to Measure Transcriptional Maturity of Engineered Liver Cells — **Daniel Guiggey, Natesh Parashurama**

**Poster 27ci:** Multi-Omic Characterization of CHO Cells Reveals Fluxomic Diversity and Amino Acid Utilization Bottlenecks in High-producer Clones — **Saratram Gopalakrishnan, William Johnson, Miguel Angel Valderrama-Gomez, Elcin Icten, Cleo Kontoravdi, Nathan Lewis**

**Poster 27cj:** Constraining the Predictions of Conserved SMAD Signaling Pathway through Parameter Identifiability Informed Experimental Design. — **Razeen Shaikh, Gregory Reeves**

**Poster 27ck:** Using Experimentally Validated ML Models to Predict the Thawing Time of Biologics during Large Scale Freeze-Thawing Cycles — **Venkatraman Nagarajan, Bodhisattwa Chaudhuri, Bruna Minatovicz, Lauren Fontana, Tibo Duran, Tanu Mehta, Yangchao Luo, Yi Wang**

## (28) Poster session: Engineering Fundamentals in Life Science

**Monday, Nov 6, 3:30 PM Hyatt Regency Orlando, Regency Ballroom R/S**

**Shreyas Rao, Chair**

**Sponsored by:** Engineering Fundamentals in Life Science

**Poster 28b:** Engineering an  $\alpha$ -P-Selectin Antibody for Quantifying Drug Delivery in Glioblastoma — **Omar Abed, Timon Lwo, Colin Greineder, James Moon**

- Poster 28c:** Novel Treatment of *Streptococcus Pneumoniae* and Nontypeable *Haemophilus Influenzae*-Coinfected Otitis Media — **Xiaojing Ma, Rong Yang**
- Poster 28d:** Combining Targeted  $\alpha$ -Particle Therapy with Chemotherapy: A Two-Pronged Approach to Combat Breast Cancer Brain Metastases — **Pooja Hariharan, Stavroula Sofou**
- Poster 28e:** Experimental and Simulation Investigation on Application of Metal-Organic Frameworks to Multi-Drugs Carrier — **Ayumi Ohashi, Kazuki Ohshima, Shuji Ohsaki, Hideya Nakamura, Satoru Watano**
- Poster 28f:** Optogenetic-Mediated Preconditioning As a Novel Approach to Protect Cells from Stress-Induced Injury — **Seulhee Kim, Patrick Ernst, Xiaoguang Liu, Lufang Zhou**
- Poster 28g:** A Matlab-Based Analysis of the Dynamics and Organization of *Staphylococcus Aureus* Surface Adhesion in a Bioflux 200 System — **Sarees Shaikh, Patrick Ymele-Ieki**
- Poster 28h:** Survival of Aging CD264<sup>+</sup> and CD264<sup>-</sup> Populations of Human Bone Marrow Mesenchymal Stem Cells Is Independent of Colony-Forming Efficiency — **Sean Madsen, Alan Tucker, Margaret Giler, Katie Russell, Georgina Dobek, Mimi Sammarco, Bruce Bunnell, Kim O'Connor**
- Poster 28i:** Versatile, Rapid, and Trackable Light-Activated Drug Release from Nanocarriers Using a Photo-Cleavable Prodrug Approach for Precise Immunology. — **Amy Moreno, Jennifer Vilnot, Victoria Hempstead, Stefan Chassaing, Nathalie Pinkerton**
- Poster 28j:** Apoptotic Effects of Low Molecular Weight Fucoidan Released from PEGDA Nanoparticles Encapsulated in Chitosan on MDA-MB-231 and MCF-7 Cell Lines — **Hazim Aljewari, Raquel de Castro, Robert Beitle, Audie Thompson**
- Poster 28k:** Microfluidic Oscillators Enable Dynamic Concentration Flow Profiles — **Xiaoqian Wang, Priyan D. Weerappuli, Sasha Cai Lesher-Pérez**
- Poster 28l:** Leveraging Synergy of Hitchhiking Nanocarriers and Chemotherapy to Overcome Delivery Challenges in Glioblastoma — **Aira Sarkar, Rangaramanujam Kannan, Stavroula Sofou**
- Poster 28m:** Customized Biodegradable 3D-Printed Bone Grafts with Biomimetic Porosity — **Nilesh R Bhoi, Jayesh Bellare**
- Poster 28n:** Engineering a 3D Multilayer Multicellular Model of Endometrial Cancer for High Throughput Drug Screening with paclitaxel Loaded Poly (caprolactone) Nanoparticles — **Ines Cadena Cabezas, Claire Rowlands, Brittany Givens Rassoolkhani, Kaitlin Fogg**
- Poster 28o:** Optimization of Functionalized Hydrogels for iPSC-Derived Midbrain Dopaminergic Neuron Culture — **Nicole Marguerite, Ethan Lippmann**
- Poster 28p:** Aged and Young Breast Matrix Bound Vesicles in Breast Cancer — **Jun Yang, Gokhan Bahcecioglu, George Ronan Jr., Pinar Zorlutuna**
- Poster 28q:** 3D-Printed Implantable Neural Arrays Based on Templated Conductive Polymer Electrodes — **Seoyeon Won, Huanan Zhang**
- Poster 28r:** The Sars-Cov-2 Virus at Interfaces: A Molecular Dynamics Simulation Study — **Florian Fleckenstein, Hans Hasse, Simon Stephan**
- Poster 28s:** Multivalent Anchoring of Cell Wall Binding Domains By Using Split Fluorescent Proteins — **Shirley Xu, Inseon Lee, Seok-Joon Kwon, Jonathan Dordick**
- Poster 28t:** Promising Routes for Mitigating RBC Storage Lesions in As-3 — **Linh Tran, Cristina González-Fernández, Stefano Ciannella, Mitchell Weigand, Jacob Strayer, Xian Wu, Hyeon Choe, Eugenio Bringas, Inmaculada Ortiz, Jeffrey Chalmers, Jenifer Gomez Pastora**
- Poster 28u:** Evaluation of Structure-Activity Function of a Lasso Peptide Using High-Throughput Screening — **Alina Thokkadam, Truc Do, A. James Link**
- Poster 28v:** Designing Recombinant Protein-Based Sensory Vesicle System — **Bornita Deb, Adriana LaVopa, Jackson Powers, Carl Denard, Yeongseon Jang**
- Poster 28w:** Artificial Intelligence-Based Parametrization of Next Generation Systems Biology Models — **Achilleas Karakoltzidis, Spyros Karakitsios, Dimosthenis Sarigiannis**
- Poster 28x:** Miner: An Ontology-Based Approach for Advancing Toxicological and Public Health Sciences — **Achilleas Karakoltzidis, Spyros Karakitsios, Dimosthenis Sarigiannis**
- Poster 28y:** Enhancing Next Generation Systems Biology Models with Deep Learning for Initial Conditions Specification — **Achilleas Karakoltzidis, Spyros Karakitsios, Dimosthenis Sarigiannis**
- Poster 28z:** Modeling Nanocarrier Efficacy in a Three-Dimensional Multicellular Model of Endometrial Cancer — **Claire Rowlands, Brittany Givens Rassoolkhani, Ines Cadena Cabezas, Kaitlin Fogg**
- Poster 28aa:** M2 but Not M1 Macrophages Can be Induced to Migrate Against the Direction of Shear Flow — **Aman Mittal, Alexander Buffone Jr.**
- Poster 28ab:** The Potential of Tetrahydrobiopterin As an Early Biomarker of Cardiovascular Diseases: A Computational Analysis — **Saptarshi Kar, Hala Al Amrani, Shahad Almutairi**
- Poster 28ac:** Aspa Mediated Persistence State in *Escherichia coli* — **Rauf Shiraliyev, Sayed Golam Mohiuddin, Mehmet Orman**
- Poster 28ad:** Development of a Genetically-Encoded Delivery Vehicle for Biomolecule delivery into Plants — **Mark Legendre, Gözde Demirer**
- Poster 28ae:** Application of Metal-Organic Frameworks for Pharmaceuticals Fields: Improvement of Water Solubility and Multi-Drugs Carrier — **Shuji Ohsaki, Ayumi Ohashi, Kazuki Ohshima, Hideya Nakamura, Satoru Watano**
- Poster 28af:** On-Demand Electrochemically Controlled Fluorescein Release from an Ultrasonically Powered Implant — **Mohammad Mofidfar, Max L. Wang, Christian F. Chamberlayne, Haixia Xu, Spyridon Baltsavias, Justin P. Annes, Amin Arbabian, Richard Zare**
- Poster 28ag:** Investigating Synthetic Biological Membranes with Sensitivity to Low-Strength Electric Fields — **Thomas Kinard, Steven P. Wrenn**
- Poster 28ah:** Role of Extracellular Vesicles in Maintaining Stemness in Breast Cancer Metastasis — **Spenser Brown, Yifei Sun, Joseph Danner, Steven Weinman, Yonghyun (John) Kim**
- Poster 28ai:** A Microphysiological System for Modeling Enteric Neuron and Epithelium Interactions in the Gut — **Kyla Nichols, Abigail Koppes, Ryan Koppes**
- Poster 28aj:** A Microbead-Based Artificial Germinal Center (aGC) Model for the Proliferation and Differentiation of Human B Cells in Vitro — **Pearlson Prashanth Austin Suthanthiraraj, Kyung-Ho Roh**
- Poster 28ak:** Investigating the Role of H<sub>2</sub>S in Liver Fibrosis — **Neeti Gandhi, Kaleb Chan, Emma Henderson, Ishani Sarkar, John Matson, Padmavathy Rajagopalan**

---

**(29) Poster session: Food and Bioprocess Engineering**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando,  
Regency Ballroom R/S**

**Sitanan Thitprasert, Chair  
Maobing Tu, Co-Chair**

**Sponsored by: Food**



**Poster 29a:** Influence of Citric Acid Pretreatment and Different Temperatures on the Convective Drying of Banana — **Adriano Souza, Manuela Duarte, João H. Fernandes da Silva, Shirley C. Rupert Brandão, José Moura, Rafael A. Batista de Medeiros, Patricia Azoubel**

**Poster 29b:** Preparation of Low-Sugar Jujube Powder through Facultative Anaerobic Fermentation Process As Prebiotics — **Tianhao Chen, Hui ren Zhuang, Zhenguan Yang, Yalin Zhou, Guoqiang Jiang**

**Poster 29c:** Production of Rice Bran Oil from Rice Bran By Using Solvent Extraction Technique — **Syed Farzan Ali Shah**

**Poster 29e:** Fungally and Bacterially Antifouling Coatings on Galvanized Steel Surfaces — **Shuhao Liu, Wentao Zhou, Minchen Mu, William DeFlorio, Sang Ha Song, Ha Young Choi, Luis Cisneros-Zevallos, Jun Kyun Oh, Mustafa Akbulut**

**Poster 29f:** Optimisation of Microbial Protein Fermentation, Using a Hybrid of Learning-Based Control and Model Predictive Control. — **Tom Vinestock, Miao Guo**

**Poster 29g:** Integrated Fermentation Process with Microbial Consortia for Acetate Production from Lignocellulosic Biomass — **Surya Tamang, Momodou Sowe, Jie Dong**

**Poster 29h:** Improving Efficacy of Cyclophosphamide in the Treatment of Murine Colon Cancer By Remodulating Gut Microbiota with Jujube Powder — **Huiren Zhuang, Nan Jing, Luoyang Wang, Guoqiang Jiang, Zheng Liu**

**Poster 29i:** Recent Advances in the Employment of Probiotics for the Syntheses of Bacteriocins, Sugar Alcohols, Bioactive Peptides and Other Food Additives — **Bababode Kehinde, Oluwakemi Igiehon, Ishrat Majid**

**Poster 29k:** Oyster Mushroom Drying in Tray Dryer: Parameter Optimization, Drying Kinetics and Characterization — **Talbachew Tadesse Nadew, Ali Shemsedin Reshad, Petros Demissie Tegenaw**

**Poster 29l:** Uncovering the Role of Impurity Sugars on the Crystallization of D-Tagatose Crystal: Experiments and Molecular Dynamics — **Dongbo Wang, Dandan Han, Junbo Gong**

**Poster 29m:** De Novo Biosynthesis of Butyl Butyrate Using Heterologous Lipase in *Clostridium Tyrobutyricum* — **Geng Wang, Shang-Tian Yang**

**Poster 29n:** Carbon-Economic Biosynthesis of Polymalic Acid and Malic Acid from Ethanol and Biomass Feedstocks — **Xiang Zou**

**Poster 29o:** Enhanced Butanol Production from Lignocellulose Hydrolysate By Engineered *Clostridium Tyrobutyricum* with Alleviated Glucose-Mediated Carbon Catabolite Repression — **Qingke Wang, Shang-Tian Yang**

**Poster 29p:** A Cotransformation Strategy for Combinatorial Engineering Paralogueous Genes in *Clostridium Acetobutylicum* — **Chao Zhu, Zixuan Wang, Chuang Xue**

**Poster 29q:** Biochar Regulates Anaerobic Metabolism for Increased Production of Biohydrogen — **Weiming Li, Chi Cheng, Meng Liu, Shang-Tian Yang, Nanqi Ren**

**Poster 29r:** Disrupting Sporulation in Engineered *C. Tyrobutyricum* Strain Showed Increased Butanol Production and More Stable Bioprocess — **Zonghao Zhang, Shang-Tian Yang**

**Poster 29s:** Energy-Efficient Butanol Production By *Clostridium Acetobutylicum* with Histidine Kinase Regulation to Improve Strain Tolerance and Process Robustness — **Chuang Xue, Chao Zhu, Youduo Wu**

**Poster 29t:** Metabolic Engineering of *Clostridium Tyrobutyricum* for Butyl Butyrate Production from Glucose and Mannitol — **Jufang Wang**

**Poster 29u:** Fixing Carbon Dioxide in Situ during Ethanol Production By Formate Dehydrogenase — **Wenjie Yuan, Cong Du, Yimin Li**

**Poster 29v:** Metabolic Engineering of *Thermoanaerobacterium Aotearoense* SCUT27 for Biofuels Production from Sucrose and Molasses — **Hongxin Fu**

**Poster 29w:** Engineering Self-Assembled Nanoreactors for Enhanced Biocatalysis — **We Kang**

**Poster 29x:** Transforming How the World Makes Chemicals: Sustainably Produced Bio-Based Chemicals that are Made to Scale™ — **Jacob Wolf, Trevor Rosensohn, Zhixia Ye**

### (30) Poster Session: Nanoscale Science and Engineering Forum

**Monday, Nov 6, 3:30 PM Hyatt Regency Orlando, Regency Ballroom R/S**

**Yoonjee Park, Chair Avery Zheng, Co-Chair**

**Sponsored by:** Nanoscale Science and Engineering Forum

**Poster 30a:** Electrochemical Windows of Sulfone-Based Electrolytes for Lithium Metal Batteries: A Density Functional Theory and Cluster-Continuum Model Investigation — **Minhee Park, JunBeom Cho, Bumjoon Seo, Won Bo Lee**

**Poster 30b:** Uniformly Embedded Cobalt Phosphide Nanoparticles in Carbon Nanofibers As Sulfur Host Via Co-PBA in-Situ Growth for High-Performance Li-S Batteries — **Zhi Liu, Cameron Romero, Kenneth Gordon, Le'Naedrea Moore, Ling Fei**

**Poster 30c:** Modeling Elastic Properties of Hydrogel Depending on Effective Structures Using Mixed Force-Field Coarse Graining Method — **Seunghyok Rho**

**Poster 30d:** High Resolution Measurement of Potential-Dependent Electrochemical Activities on HOPG Using Scanning Electrochemical Cell Microscopy (SECCM) — **Myunghoon Choi, Sang-Joon Cho, Lane Baker, Stefan Kaemmer**

**Poster 30e:** Wetting Transparency of Free-Suspended Single-Layer Graphene on Liquid Substrate. — **Fan Yang, Annette Thompson, Lei Li**

**Poster 30f:** Feedback Control System of Iron Catalyst in Reactors Using Deep-Injection Floating Catalyst Chemical Vapor Deposition (DI-FCCVD) — **Mingrui Gong, AnaVi Benavides Figueroa, Arthur Sloan, Matteo Pasquali**

**Poster 30g:** Facile Synthesis of Halogen Terminated Mxene from Different MAX Phases for Electromagnetic Interface Shielding — **Shane Reed, Pitchaimari Gnanasekar, Sanjay Singh, Natalie Arnett, Dinadayalane Tandabany, Theo Siegrist, Subramanian Ramakrishnan**

**Poster 30h:** Rheo-Electric Investigation of Carbon Black Suspensions Undergoing Shear-Induced Microstructural Rearrangement — **Paolo Ramos, Julie Hipp, Jeffrey Richards**

**Poster 30i:** Lyotropic Liquid Crystals of Cellulose Nanocrystal/Boron Nitride Nanotube Mixtures: Phase Behavior and Aligned Assemblies — **Eren Katnas, Geyou Ao**

**Poster 30j:** Scalable Manufacturing of Inorganic Nanomaterials Using Jet Mixing Reactors — **Priya Jana, Faiz Khan, Pinaki Ranadive, Jessica Winter, Nicholas Brunelli**

**Poster 30k:** Threshold and Excess Electrolyte-to-Sulfur (E/S) Ratios in Lean-Electrolyte Li-S Batteries — **Xiaosi Gao, Siddharth Tiwari, Aditya Pandey, Yiqi Shao, Ziang Gao, Yong Lak Joo**

**Poster 30l:** Glycopolymers-Wrapped Carbon Nanotubes Detection of Viral Proteins — **Brandon Heppe, Geyou Ao, Xue-Long Sun**

**Poster 30n:** Polymer-Cerium Oxide Nanocomposites Synthesized By Hydrothermal Method for Bone Tissue Regeneration Applications — **Shreya Pawar**

**Poster 30o:** Surface Modifications to Functionalized Outer Coating of Magnetic Nanoparticles to Target Medical Dyes in Solution and Their Impact on Contaminated Water Compositions. — **Evan Wetmore, Keisha Walters**

**Poster 30p:** Creation of Carbohydrate-Decorated Organic Color Centers Via Copper-Free Click Chemistry — *Nina Dzombic, Joseph Keil, Xue-Long Sun, Geyou Ao*

**Poster 30q:** Lipid Nanoparticle Structure and Immune Response Regulate mRNA Organ Tropism and Pup Growth during Pregnancy in Mice. — *Namit Chaudhary, Alexandra Newby, Mariah Arral, Saigopalakrishna Yerneni, Samuel LoPresti, Rose Doerfler, Daria Petersen, Bethany Fox, Tiffany Coon, Angela Malaney, Yoel Sadovsky, Kathryn Whitehead*

**Poster 30r:** The Particle Drifting Effect – Impact of Membrane Sink Condition, Particle Size, Drug Solubility, and Colloid Type — *Na Li*

**Poster 30s:** h<sup>6</sup> Organometallic Hexagonal Boron Nitride: Functionalization and Prope — *Kartikey Sharma*

**(31) Poster Session: Decarbonization by Electrification**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando,  
Regency Ballroom R/S**

**Elizabeth Biddinger, Chair  
Miguel Modestino, Co-Chair  
Ignasi Palou-Rivera, Co-Chair  
Dharik Mallapragada, Co-Chair**

**Sponsored by:** Decarbonization of the Chemical Industry through Electrification

**Poster 31a:** Modeling and Techno-Economic Assessment of an Air-to-Syngas Process — *Hussain Almajed, Omar J. Guerra, Wilson A. Smith, Bri-Mathias Hodge, Ana Somoza Tornos*

**(32) Issues in Law for Practicing Engineers**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando, Bayhill 26**

**Sponsored by:** Chemical Engineering & the Law Forum

**4:00 Paper 32a:** How to Protect Your Intellectual Property in the Academic World — *Paul Townsend, Charles Collins-Chase, Lauren Dowty*

**4:30 Paper 32b:** Obviously New or Just a Copy – Engineers Play a Critical Role in Evaluating Patent or Trade Secret Infringement Claims — *Achim Wechsung, David Hietala*

**(33) Invited Session In Honor of Prof. Babatunde A. Ogunnaike**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando, Bayhill 25**

**Ali Mesbah, Chair  
Masoud Soroush, Co-Chair**

**Sponsored by:** Systems and Process Control

**3:30 Paper 33a:** A Career of Excellence and Service — *Levi Thompson*

**3:55 Paper 33b:** Tunde's Contributions to Advanced Process Control — *Lorenz Biegler*

**4:20 Paper 33c:** On Using Feedback Control to Contend with Nature's Randomness — *James Rawlings, Robert McAllister*

**4:45 Paper 33d:** Distributed Statistics – Some Challenges — *Christos Georgakis*

**5:10 Paper 33e:** Modeling and Control of Biopharmaceutical Manufacturing — *Richard Braatz*

**5:35 Paper 33f:** Connecting Engineering and Biomedicine in Closed Loop to Study Heart and Liver Diseases — *Rajanikanth Vadigepalli*

**(34) Process Intensification and Modular Manufacturing: Intensified Reaction and Separation Processes**

**Wednesday, Nov 8, 3:30 PM  
Hyatt Regency Orlando,  
Celebration 16**

**Patricia Gillenwater, Chair  
Julia Faeth, Co-Chair**

**Sponsored by:** Process Intensification & Modular Chemical Processing

**3:30 Paper 34a:** Modular Manufacturing of Active Pharmaceutical Ingredients (APIs): Novel Approaches for Continuous Heavy Metal Removal from API Syntheses Solutions — *Daniel Moser, Joscha Boehm, Peter Neugebauer, Heidrun Gruber-Woelfler*

**3:50 Paper 34c:** Process Intensification of Electrodialysis through the Investigation and Elimination of Maldistribution — *Jack Ledingham, Alasdair Campbell, Jonathan R Howse, Elliot Tyndale-Biscoe, Kyra Sedransk Campbell*

**4:10 Paper 34d:** Intensification of Polymer Production Using Ultrasound: The Polyurethane Case As Example — *Ariana Bampouli, Sofie Scheers, Quinten Goris, Joachim Demaerel, Wim De Borggraeve, Georgios D. Stefanidis, Tom Van Gerven*

**4:30 Paper 34e:** Process Design and Intensification of a Continuous Modular Crystallization System — *Monika Neal, Montgomery Smith, Zoltan Nagy*

**4:50 Paper 34f:** Research and Development on Purification Technology of High-Purity Hexane and High-Purity Benzene — *Zhongfeng Geng, Hao Gong, Yingzhe Yu, Haoxi Jiang, Minhua Zhang*

**(35) Invited: Celebrating 30 years of the PTF (Last 15 years)**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando, Bayhill 21**

**Liang-Shih Fan, Chair  
James Gilchrist, Co-Chair**

**Sponsored by:** Particle Technology Forum

**3:30 Paper 35a:** Advances in the Simulation of Dry Powder Inhalation Flows — *Sankaran Sundaresan*

**3:48 Paper 35b:** People and Tools Advancing the Science of Particle Technology — *Richard Lueptow*

**4:06 Paper 35c:** Ten years at PTF: Connect fundamental research with industrial scale problem solving — *Yi Fan*

**4:24 Paper 35e:** Progress in wet granulation process development - from a pharmaceutical industry application perspective — *Maitraye Sen*

**4:42 Paper 35f:** Spherical Agglomeration as a Tool for Manufacturing of Formulated Products: Mechanistic Understanding and Mathematical Modelling — *Rachel Smith*

**5:36 Paper 35d:** Particle Technology and Clean Energy Transition for Sustainable Future — *Ah-Hyung Alissa Park*

**(36) Feedstock Conversion Interface Consortium – Understanding Feedstock Variability to Enable Next Generation Biorefineries (Invited Talks)**

**Monday, Nov 6, 3:30 PM  
Hyatt Regency Orlando,  
Regency Ballroom T**

**Jordan Klinger, Chair  
Edward Wolfrum, Co-Chair  
Vicki Thompson, Co-Chair**

**Sponsored by:** Sustainable Biorefineries

**3:30 Paper 36a:** Biological Degradation and Moisture Effects on Corn Stover Comminution — *Tiasha Bhattacharjee, Jordan Klinger, Noah Berglund, Bradley Wahlen, Vicki Thompson, Yidong Xia, Neal Yancey*

**3:49 Paper 36b:** Impacts of Municipal Solid Waste Feedstock Variability on Bench-Scale Gasification — *Dan Dupuis*

**4:08 Paper 36c:** Experiment-Informed Virtual Physics for Granular Feedstock Preprocessing and Handling Operations: Overview of Recent Progress — *Yidong Xia, Wencheng Jin, Ahmed Hamed, Jordan Klinger, Nepu Saha, Tiasha Bhattacharjee, Mark Small, Neal Yancey, C. Luke Williams, John E. Aston, David Thompson, Lynn Wendt, Vicki Thompson*

**4:27 Paper 36d:** Assessment of the Abrasiveness of Biomass and MSW Feedstock Particulate Materials — *Oyelajo Ajayi, George Fenske, Jun Qu, James Keiser, Jeffrey A. Lacey, Vicki Thompson, Miranda Kuns*

**4:46 Paper 36e:** Effect of Particle Size, Moisture Content, and Tissue Fraction on Mechanical and Feeding Behavior of Milled Corn Stover and Loblolly Pine Residues — **Nepu Saha**, Jordan Klinger, Tiasha Bhattacharjee, Noah Berglund, Wencheng Jin, Yidong Xia

**5:05 Paper 36f:** Failure Modes and Effects Analysis of Biorefinery Pathways — **Rachel Emerson**, Pralhad Burli, Lorenzo Vega-Montoto, Tiasha Bhattacharjee

---

**(37) Area Plenary: Carbon Nanomaterials (Invited Talks)**

**Tuesday, Nov 7, 8:00 AM**  
Hyatt Regency Orlando, Discovery 43

**Geyou Ao, Co-Chair**  
**Anju Gupta, Co-Chair**

**Sponsored by:** Carbon Nanomaterials

**8:00 Paper 37a:** Exploring the Best CVD Conditions for Growth of Small-Diameter Single-Wall Carbon Nanotubes Using an Autonomous Research System — **Brian M. Everhart**, Rahul Rao, Tsung Wei Liu, Diego Gomez Gualdrón, Benji Maruyama, **Placidus Amama**

**8:30 Paper 37b:** Molecular Design and Investigation of 2-D Hybrid Materials — **Sanket Deshmukh**

---

**(38) Area Plenary: Interfacial Phenomena (Invited Talks)**

**Tuesday, Nov 7, 8:00 AM**  
Hyatt Regency Orlando, Orlando Ballroom N

**Marina Tsianou, Chair**  
**Christopher Wirth, Co-Chair**

**Sponsored by:** Interfacial Phenomena

---

**(39) Tutorial Session on Electrochemical Methods, Systems and Applications (Invited Talks)**

**Tuesday, Nov 7, 8:00 AM**  
Hyatt Regency Orlando, Orlando Ballroom M

**Abdoulaye Djire, Chair**  
**Wesley Chang, Co-Chair**  
**Elizabeth Corson, Co-Chair**  
**Magda Barecka, Co-Chair**

**Sponsored by:** Electrochemical Fundamentals

**8:00 Paper 39a:** Electrocatalysis for Carbon Dioxide Utilization — **Feng Jiao**

**8:35 Paper 39b:** Localized States-of-Charge in Battery Electrodes: Using Microscopic X-Ray Diffraction Data to Solve Current Distributions — **Joshua Gallaway**

**9:10 Paper 39c:** Designing Electrochemical Interfaces for Small Molecule Activation — **Sara Thoi**

**9:45 Paper 39d:** An Introduction to Combining Electroanalysis with Microkinetic Modeling — **Maureen Tang**

---

**(40) Topical Plenary: Frontiers in Green Process and Product Engineering (Invited Talks)**

**Tuesday, Nov 7, 8:00 AM**  
Hyatt Regency Orlando, Bayhill 18

**Sponsored by:** Green Process and Product Engineering

**8:00 Paper 40a:** Systems Analyses of Green Ammonia As a Sustainable Energy Carrier — **Qi Zhang**

**8:35 Paper 40b:** Sustainable Aviation Fuel from Methanol and Ethanol Intermediates — **Karthikeyan Ramasamy**

**9:10 Paper 40c:** Electrochemical Approaches to Decarbonizing Fuels and Chemicals — **Haotian Wang**

---

**(41) Charting Your Course from Academia to a Successful Professional Career (Panel Discussion/Workshop)**

**Tuesday, Nov 7, 8:00 AM**  
Hyatt Regency Orlando, Regency Ballroom Q

**Carmen Daoud, Chair**  
**Marissa Martine, Co-Chair**

**Sponsored by:** Early Career Community (ECC) - Formerly YPC

---

**(42) Laboratory and Pilot Plant Safety**

**Tuesday, Nov 7, 8:00 AM**  
Hyatt Regency Orlando, Bayhill 28

**David Edwards, Chair**  
**Pratik Bhishikar, Co-Chair**  
**Tsatsral Battsengel, Co-Chair**  
**Sponsored by:** Pilot Plants

**8:00 Paper 42a:** Electrically Heated Equipment Safety in Pilot Plants — **Richard Palluzi**

**8:25 Paper 42d:** What to Expect When Expecting in Lab: Safety Considerations and Green Chemistry Resources for Pregnant Researchers in the Chemical Laboratory — **Mary Kate Lane**, Paul T. Anastas, Julie B. Zimmerman

**8:50 Paper 42b:** Evaluation of Filler Containing Si-H (Silicon hydride) Formulations for H<sub>2</sub> off-Gassing Risks during Production and Packaging — **Hulusi Turgut**, Jeff Kelly, Nate Stelzer, Craig Gorin, Chi-Hao Chang, Rocky Zhu, Travis Scholtz, Ryan Gilliland, Michael Whitbrodt, Jyo Lyn Hor, Zach Rolfs

**9:15 Paper 42c:** Overlooked Considerations during Safety Reviews of Lab Scale Systems and Pilot Plants — **Pratik Bhishikar**

**9:40 Paper 42e:** Utilizing Simple Heat Transfer Models for Safe Scale-Ups of Exothermic Chemistries — **Jessica Nichols**, **Seshasayee Mahadevan**, Jason S. Fisk, Mike DePierro, Jeff Kelly

**10:05 Paper 42f:** Utilizing a Digital Process Safety Game to Improve Training Strategies in Pilot Plants — **Brittany Butler**, Cayla Ritz, Jeffrey Stransky, Cheryl A. Bodnar, Emily Dringenberg, Elif Miskioglu

---

**(43) Distillation and Absorption Processes Fundamentals, Developments, Optimization, and Applications I**

**Tuesday, Nov 7, 8:00 AM**  
Hyatt Regency Orlando, Manatee Spring II

**Gregory Cantley, Chair**  
**Izak Nieuwoudt, Co-Chair**

**Sponsored by:** Distillation and Absorption

**8:25 Paper 43a:** Numerical Simulation of Fluid Dynamics and Mass Transfer of a Two-Phase Flow in Structured Packings — **Marc Xia**, Sebastian Rehfeldt, Harald Klein

**8:50 Paper 43b:** Will Laboratory and Pilot Plant Columns Soon be Superfluous? — **René Pöschmann**, Georg Brösigke, Markus Illner, Juergen Paschold, Steffen Mueller, Christoph Hiller, Laura-Selin Harding, Nico Lachmann, Ilja Ausner, Ansoor Gaebler, Jens-Uwe Repke

**9:15 Paper 43c:** Azeotropic Refrigerant Mixture Separation Using Extractive Distillation with Ionic Liquids Entrainers — **Abdulrhaman Arishi**, Mark B. Shiflett

**9:40 Paper 43d:** Dynamic Behavior of a Multiple Dividing Wall Column – a Theoretical and Experimental Study — **Yannick Waibel**, Lena-Marie Ränger, Thomas Grütznert

**10:05:** Break

**10:30 Paper 43f:** Quantifying the Point Efficiency of a Distillation Column Under Non-Total Reflux Mode of Operation — **Rukhsar Ahmed**, Tony Cai, Izak Nieuwoudt, Sayeed Mohammad, Clint Aichele

---

**(44) Sustainable Engineering Forum Plenary Session (Invited Talks)**

**Tuesday, Nov 7, 8:00 AM**  
Hyatt Regency Orlando, Regency Ballroom V

**Ana I. Torres, Chair**  
**Magda Barecka, Co-Chair**  
**Ramalingam Subramaniam, Co-Chair**

**Sponsored by:** Sustainable Energy

**8:00 Paper 44b:** Green Ammonia for Sustainable Energy and Agriculture — **Prodrimos Daoutidis**

**8:45 Paper 44a:** Machine Learning Boosted Catalyst and Operation Design for Clean Energy — **Fanglin Che**

**9:30 Paper 44c:** Establishing a Circular Economy in the Food Industry — **Mariano Martin**

---

**(45) Women in Engineering [WIC]  
Keynote & Breakfast -  
TICKETED EVENT - OPEN TO  
ALL**

**Tuesday, Nov 7, 9:00 AM  
Hyatt Regency Orlando,  
Windermere Ballroom X**

**Ashley Bird, Chair**

**Sponsored by:** Women in  
Chemical Engineering Community  
(WIC)

**9:00 Paper 45a:** Women in  
Engineering (WIC) Keynote — **Erin  
Kane, Ariel Furst**

---

**(46) Education Division Awards  
Plenary (Invited Talks)**

**Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando, Bayhill  
30**

**Benjamin Davis, Chair  
Christy West, Co-Chair**

**Sponsored by:** Education

**12:30 Paper 46a:** Navigating  
Professional Service When It's  
Personal — **Anthony Butterfield**

**1:00 Paper 46b:** Cooperative,  
Hands-on, Active, Problem-Based  
Learning – Ideas & Insights for the  
Classroom — **Bernard Van Wie**

**1:30 Paper 46c:** Engineering  
Illustrated: Engaging Students'  
Interest, Confidence, and  
Understanding through STEM  
Comics and Videos — **Luke  
Landherr**

**2:00 Paper 46d:** Enhancing  
Research Impact through  
Meaningful and Strategic Service  
— **Sindia M. Rivera-Jimenez**

---

**(47) Fundamental Research in  
Transport Processes**

**Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando, Orlando  
Ballroom M**

**Samaneh Farokhirad, Chair  
Dmitry Kopelevich, Co-Chair**

**Sponsored by:** Transport  
Processes

**12:30 Paper 47a:** Cryogenic  
Propellant Transfer Line Chilldown  
Experiments in 1-g using Low  
Thermally Conductive Coatings  
and Pulse Flow — **Jason Hartwig,  
Jacob N. Chung, Samuel Darr**

**12:48 Paper 47b:** Computational  
Study of 3-Phase Contact Line:  
Effect of Oscillations on Heat  
Transfer — **Anisha Pawar, Joel  
Plawsky**

**1:06 Paper 47c:** Insulation System  
Design for Spherical Cryogenic  
Storage Tanks — **Swapnil  
Sharma, Mahsa Taghavi, Vemuri  
Balakotaiah**

**1:24 Paper 47d:** Hydrodynamics,  
Conjugate Mass Transfer and  
Chemical Reaction from a Rising  
Spherical Droplet — **Hadrien  
Godé, Sophie Charton, Dominique  
Legendre, Eric Climent**

**1:42 Paper 47e:** Modeling  
Multicomponent Wax Deposition  
and Aging on Cold Surfaces with  
Application to Pipeline Fouling  
— **Samuel Ogunwale, Luqman  
Ahmad Mahir, Ronald Larson**

**2:00 Paper 47f:** Phenomenological  
Study of Hazardous Gas Releases  
from Buried Pipelines — **Ola  
Srouf, Konstantinos Kakosimos,  
Luc Vechot**

**2:18 Paper 47g:** Minimizing Energy  
Consumption By Insights into  
Vortex Dynamics in a Fluid  
Induced By a Freely Rotating  
Cylinder with Splitter Plate — **Nitin  
Minocha, Chenguang Zhang,  
Rahul Ramaraju, Krishnaswamy  
Nandakumar, J. B. Joshi**

**2:36 Paper 47h:** The Shear  
Viscosity of Mixtures Revisited – a  
Novel Way to Define and Calculate  
Viscosities for Mixtures and Its  
Relation to Diffusion — **Joe-Hin  
Yip, Kai Langenbach**

---

**(48) Design and Analysis of  
Sustainable Carbon Capture and  
Emissions Control Technologies  
I**

**Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando, Blue  
Spring I/II**

**Dora Lopez De Alonzo, Chair  
David Miller, Co-Chair  
Omar Guerra Fernandez, Co-  
Chair**

**Sponsored by:** Fossil Energy

**12:30 Paper 48a:** Systematic  
Comparison of CO<sub>2</sub> Capture  
Towards the Renewable  
Production of Methanol and  
Methane: Spain Case  
— **Guillermo Galán Iglesias,  
Mariano Martin, Ignacio  
Grossmann**

**12:55 Paper 48b:** Amine Vapor  
Emissions Control Technology for  
Water-Lean Solvents for Point  
Source CO<sub>2</sub> Capture — **Jacob  
Nelson, Lucas Cody, Moumita  
Bhattacharya, Paul Mobley, Jak  
Tanthana, Daniel Mogollon,  
Addison Lane, Hannah Honeycutt,  
Marty Lail**

**1:20 Paper 48c:** Modeling CO<sub>2</sub>  
Adsorption in an Euler-Lagrange  
Framework Accounting for  
Pseudo-Turbulence and  
Intraparticle Diffusion — **Rebecca  
Grawe, Jesse Capecehatro**

**1:45 Paper 48d:** Optimizing CO<sub>2</sub>  
Capture through Solid Adsorption:  
Developing Optimal Strategies  
— **Ilse María Hernández-  
Romero, Antonio Flores-  
Tlacuahuac**

**2:10:** Break

**2:35 Paper 48f:** Grey and Blue  
Hydrogen Production Costs in  
Hydrogen Plants: A Comparative  
Analysis — **Mary Katebah,  
Mamoun Al-Rawashdeh, Patrick  
Linke**

---

**(49) Division Plenary: Valorization  
of Waste Plastics (Invited Talks)**

**Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando,  
Challenger 41/42**

**Amar K. Mohanty, Chair  
Manjusri Misra, Co-Chair**

**Sponsored by:** Forest and Plant  
Bioproducts Division

**12:30 Paper 49a:** Biocarbon-Metal  
Sustainable Composites for Energy  
Storage — **Ange Nzihou**

**1:00 Paper 49b:** High-  
Performance Silicon Active  
Materials from Biorenewable  
Resources — **Srikanth Pilla**

**1:30 Paper 49c:** From Waste to  
Treasure: Multiple-Functional  
Materials from Bio-Based Waste  
— **Zhaohui Tong**

**2:00 Paper 49d:** Circular Economy  
Driven Sustainable Composites  
through Waste Valorisation for  
Single-Use Plastic Alternatives  
— **Manjusri Misra**

---

**(50) Area Plenary: Leaders in  
Electronic and Photonic  
Materials (Invited Talks from  
Industry and Academia)**

**Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando,  
Celebration 9**

**Matthew Crane, Chair  
Elizabeth Lee, Co-Chair  
Peijun Guo, Co-Chair**

**Sponsored by:** Electronics and  
Photonics

**12:30:** Introductory Remarks

**12:35 Paper 50a:** Dopant Selective  
Photoelectrochemical Etching of  
SiC — **Samuel J. Whiteley, Adam  
Sorensen, John J. Vajo, Shanying  
Cui, Jason Graetz**

**1:10 Paper 50b:** Modifying Halide  
Perovskites with Small Molecules  
for Novel Functionality — **Joseph  
M. Luther**

**1:45 Paper 50c:** Low Dimensional  
Metal Halide Perovskites and  
Hybrids for Optoelectronics  
— **Biwu Ma**

**2:20 Paper 50d:** Let's Twist Again:  
High-Quality-Factor Metasurfaces  
to Enhance Spin in Molecules and  
Monolayer Materials — **Jennifer  
Dionne**

---

**(51) Plenary Session for  
Nanomaterials for Energy  
Applications (Invited Talks)**

**Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando,  
Discovery 45**

**Seung Soon Jang, Chair  
Tae-Sik Oh, Co-Chair**

**Sponsored by:** Nanomaterials for  
Energy Applications

**12:30 Paper 51a:** Direct Air  
Capture (DAC) of CO<sub>2</sub> Using  
Porous Sorbent Materials Coupled  
with Scalable Processes  
— **Christopher Jones**

**1:20 Paper 51b:** Thermally Stable  
Single Atom Catalysts for Energy  
Conversion — **Abhaya Datye**

**2:10 Paper 51c:** Computational Materials Design with Machine Learning and Atomistic Simulations — *Rafael Gomez-Bombarelli*

**(52) Wilson Award Presentation and Lecture (Invited Talks)**

Tuesday, Nov 7, 1:30 PM  
Hyatt Regency Orlando, Atlantic

**Courtney Bottenus, Chair**

**Sponsored by:** Nuclear Engineering Division

**(53) Fluidization: Experimental Investigation and Modeling of Fluidization Processes**

Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando, Bayhill 21

**Luke Neal, Chair**  
**Eric Jia, Co-Chair**

**Sponsored by:** Fluidization and Fluid-Particle Systems

**12:30 Paper 53a:** Dynamical Analysis of Velocity Time Series in a Binary Fluidized BED: MODEL Validation with Radioactive Particle Tracking (RPT) Experiments — *Subi Nath, Akshat Yadav, Shantanu Roy*

**12:50 Paper 53b:** Novel Pathways for Fluidized Bed Coating with the Aid of Non Conventional Fluidizing Media: Experiments and Models — *Aydin Sunol, Anurag Guha*

**1:10 Paper 53c:** Quantifying Powder Cohesivity through Fluidisation Tests — *Amalia Thomas, Nathalie Vriend, Alexander Routh*

**1:30 Paper 53d:** 100 Years of Scaling up Fluidized Bed and Circulating Fluidized Bed Reactors — *Jia Wei Chew, Wyatt Casey LaMarche, Ray Cocco*

**1:50 Paper 53e:** Behaviour of Lumps in Gas-Solid Fluidized-Bed Reactors — *Matteo Errigo, Massimiliano Materazzi, Paola Lettieri*

**2:10 Paper 53f:** Improving FCC Regenerator Performance and Capacity Utilization through CFD Analysis — *Zhizhong Ding, Todd Foshee, Manoj Katakdaunde, Robert Ludolph*

**2:30 Paper 53g:** CFD Modeling of Particle Binary Mixing in Fluidized Bubbling Bed Reactors — *Kuo-Chen Tsai*

**(54) Experiences in Teaching Process Safety**

Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando, Bayhill 29

**Kenneth Cox, Chair**  
**Raymond Rooks, Co-Chair**

**Sponsored by:** Product Design

**12:30 Paper 54a:** Resources for Teaching Process Safety That Are Managed or Have Been Developed By the Center for Chemical Process Safety — *Bruce Vaughen, Dr. Anil Gokhale*

**12:49 Paper 54b:** Increasing Chemical Engineering Students' Awareness of New out-of-Textbook Safety Topics — *Jack Shultz, Jared Rhodes, Joontaek Park*

**1:08 Paper 54c:** Bringing the Real World into the Classroom: A Risk-Based Assessment of the Train Derailment in East Palestine, Ohio — *Obioma Uche*

**1:27 Paper 54d:** Understanding Engineering Students' Approaches to Process Safety Judgements through a Digital Process Safety Game — *Cayla Ritz, Brittany Butler, Jeffrey Stransky, Cheryl A. Bodnar, Emily Dringenberg, Elif Miskioglu*

**1:46 Paper 54e:** Teaching Process Safety with Simulink Simulations of Runaway Reactions — *Akhil Gopinath, Spandhana Gonuguntla, Aycan Hacıoglu*

**2:05 Paper 54f:** Development of an Elective Process Safety Course at the University of Michigan — *Kenneth First, Henry Y Wang*

**2:24 Paper 54g:** Instruction of Process Safety Engineering through Project Based Learning (PBL) — *Pedro J. Arias-Monje, Sepehr Arbabi*

**2:43 Paper 54h:** On the Use of CSB Videos for Reflective Learning in Teaching Process Safety — *Paul Amyotte*

**(55) Honorary Session for Prof. Steve Cramer I (Invited Talks)**

Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando, Coral Spring I/II

**Cristiana Boi, Chair**  
**Ranil Wickramasinghe, Co-Chair**

**Sponsored by:** Bio Separations

**12:30 Paper 55a:** Recent Advances and Current Directions in Downstream Processing for Biotherapeutics — *Anish Dighe, Vivekananda Bal, Ayse Eren, Dulashani Ruwanthika Ranasinghe Weerakkodige, Jay Yadav, Moo Sun Hong, Paul W. Barone, Stacy Springs, Anthony Sinskey, Allan S. Myerson, Richard Braatz*

**12:48 Paper 55b:** Innovation in Downstream Processing: Next Generation Solutions and Need for Speed — *Nihal Tugcu*

**1:06 Paper 55c:** Integrated Membrane Process for the Isolation of Plant-Derived Extracellular Vesicles. — *Sara Giancaterino, Riccardo Onesti, Cristiana Boi*

**1:24 Paper 55d:** Improving Filtration Performance of Virus Filters at High Product Titers — *Wenbo Xu, Xianghong Qian, Ranil Wickramasinghe*

**1:42 Paper 55e:** SMA and ACT: A Tale of Two Isotherms — *Todd Przybycien*

**2:00 Paper 55f:** The Effect of Monovalent Cations on the Structure and Dynamics of Multimodal Chromatographic Surfaces — *Camille Bilodeau, Emily Baum, Daniel Garzon*

**2:18 Paper 55g:** Scaled-Down, High-Throughput Optimization of Lentiviral Vector Production for Therapeutic and Drug Discovery Applications — *Sneha Gopal, Seok-Joon Kwon, Maisha Feroz, Ronit Ghosh, Shivani Kulkarni, Todd Przybycien, Steven Cramer, Jonathan Dordick*

**2:36 Paper :** Tissue Adhesive Tattoos for Gastrointestinal Endoscopy — *Kaushal Rege*

**(56) Topical Plenary: Environmental Analytical Technology: Sensor Applications in Sustainability (Invited Talks)**

Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando, Celebration 16

**Ariel Furst, Chair**  
**Stephanie McCalla, Co-Chair**

**Sponsored by:** Sensors for Sustainability

**12:30:** Introductory Remarks

**12:40 Paper 56a:** Invited Talk by Dr. Gang Fan — *Gang Fan*

**1:10 Paper 56b:** Invited Talk from Prof. Astrid Mueller — *Astrid Mueller*

**1:40 Paper 56c:** Invited Talk from Dr. Bertrand Neyhouse — *Bertrand J. Neyhouse*

**2:10 Paper 56d:** Invited Talk by Prof. Fikile Brushett — *Fikile Brushett*

**2:40:** Concluding Remarks

**(57) Plenary Session: Waste Plastics (Invited Talks)**

Tuesday, Nov 7, 12:30 PM  
Hyatt Regency Orlando, Rainbow Spring I/II

**Mary Ellen Ternes, Chair**  
**Jeffrey Seay, Co-Chair**  
**Shelby Browning, Co-Chair**

**Sponsored by:** Waste Plastics

**12:30 Paper 57a:** Plastic Policy Developments for Chemical Engineers 2023 — *Mary Ellen Ternes*

**1:00 Paper 57b:** Scale-Up of PureCycle Solvent Dissolution Recycling Process — *Dustin Olson*

**1:30 Paper 57c:** Advanced Recycling Applications around the World — *Shelby Browning*

**2:00 Paper 154af:** Polymer-Based Catalyst for Efficient Glycolysis of Poly (ethylene terephthalate) (PET) — *Fahimeh Forouzesfar, Maria Coleman, Joseph Lawrence*

**2:30 Paper 57e:** Revolutionizing Sustainability: TimePlast's Integration of Advanced Computing and Engineering for Water Soluble, Time-Programmable Bioplastics — **Manuel Rendon, Tony Martinez, Thomas Anderson, Christina Fontanesi**

---

**(58) Interactive Session: Applied Mathematics and Numerical Analysis**

**Tuesday, Nov 7, 3:30 PM**  
**Hyatt Regency Orlando,**  
**Regency Ballroom R/S**

**Joel Paulson, Chair**  
**Kamil Khan, Co-Chair**

**Sponsored by:** Applied Mathematics and Numerical Analysis

**Poster 58a:** Towards an Integrated Wide Approach for Upstream Field Recovery — **Shakeel Ramjane**

**Poster 58b:** Towards an Integrated Approach for Upstream Recovery — **Shakeel Ramjane**

**Poster 58c:** Analytical Solutions for the Modeling, Optimization, and Control of Microwave-Assisted Freeze Drying — **Prakitr Srisuma, George Barbastathis, Richard D. Braatz**

**Poster 58d:** Computational Modeling of Cell Migration in Complex Chemokine Environments — **Kailei Liu, Michael B. Dwinell, Ashlee Ford Versypt**

**Poster 58e:** Simulating Solute Transport through the Kidney Glomerulus Using Febio — **Nicholas O. Glover, Ashlee N. Ford Versypt**

**Poster 58f:** An Improved Algorithm for Flux Variability Analysis — **Dustin Kenefake, Erick Armingol, Nathan E. Lewis, Efstratios Pistikopoulos**

**Poster 58g:** Using Dynamic Metabolic Modeling to Predict the Transcriptional Regulation of Cuticle Biosynthesis. — **Lohani Esterhuizen, Rajib Saha**

**Poster 58h:** A Computational Model of the Interplay of Pancreatic Islet Beta-Cells and Alpha-Cells on the Secretion of Insulin and Glucagon — **Aedan Brown, Emmanuel Tzanakakis**

**Poster 58i:** Stability and Bifurcation Analysis of Natural Convection Effects in Liquid Hydrogen Tank Dual Layered Insulations — **Swapnil Sharma, Vemuri Balakotaiah**

**Poster 58j:** Development of an Optimal Maintenance Scheduling Framework for Maintenance 4.0 Applications — **Louis Allen, Joshua Aldred, Martha Scattergood, Joan Cordiner**

**Poster 58k:** Simulation and Optimization of Gas Based Ammonia Plant Using Advanced Tools of MS Excel — **Bhupen Mehta, Chandan Kumar Mishra**

**Poster 58l:** A Smart Computing-Based Protocol for Analysis of Certain Classes of Complex Chemical Reactions — **Satish Parulekar**

**Poster 58m:** Quantum Algorithms for Optimization over Discrete Variables — **Nicolas Sawaya**

**Poster 58n:** Mathematical Modelling of Gene Delivery in Patients with Haemophilia B — **Elnaz Jamili, Amit C. Nathwani, Vivek Dua**

**Poster 58o:** A Techno-Economic Model and Decision-Making Matrix for Wastewater Biosolids Reuse Application — **Hesan Elfaki, Dhabia Al-Mohannadi**

**Poster 58p:** Design and Optimization of Hydrogen-Blended Natural Gas Pipeline and Separation Systems — **Shiya Gu, Yachao Dong, Yu Zhuang, Jian Du**

**Poster 58q:** An Enhanced Particle Swarm Optimization Employing Quasi-Random Numbers with Application to Efficient Removal of Pfas from Water — **Shiva Kannan, Urmila Diwekar**

---

**(59) Interactive Session: Data and Information Systems**

**Tuesday, Nov 7, 3:30 PM**  
**Hyatt Regency Orlando,**  
**Regency Ballroom R/S**

**Salvador García-Muñoz, Chair**  
**Maria Papathanasiou, Co-Chair**

**Sponsored by:** Information Management and Intelligent Systems

**Poster 59a:** Measure This, Not That: Pareto Optimal Trade-Offs Between Model-Based Information Content and Measurements Cost (Poster corresponding to plenary presentation) — **Jialu Wang, Alexander Dowling**

**Poster 59b:** Real-Time Fault Detection Models for Smart Manufacturing: A Case Study with Heat Exchanger Equipment and Innovation Platform — **Lucky Yerimah, Mrunal Sontakke, Andreas Rebmann, Sambit Ghosh, Ronald Hedden, B. Wayne Bequette**

**Poster 59c:** Towards an Integrated Approach for Upstream Field Recovery — **Shakeel Ramjane**

**Poster 59d:** Hybrid Bayesian-Based Surrogate Optimization for Sustainable Process Design within Planetary Boundaries — **Sachin Jog, Daniel Vázquez, Lucas Francisco Dos Santos, Jose A. Caballero, Gonzalo Guillén-Gosálbez**

**Poster 59e:** Probabilistic Lifespan Prediction of Lithium-Ion Batteries Under Varying Operating Protocols Using Gaussian Process Regression — **Seyeong Park, Jaewook Lee, Jay Hyung Lee**

**Poster 59f:** Automated Synthesis of Hybrid Models for Ionic Separations — **Teslim Olayiwola, Luis Briceno-Mena, Tanmay Kulkarni, Christopher Arges, Revati Kumar, Jose A. Romagnoli**

**Poster 59g:** Modeling and Predictive Control of Hybrid Dynamical Systems Using Machine Learning Methods — **Cheng Hu, Ming Xiao, Zhe Wu**

**Poster 59h:** Smells like AI: Harnessing Machine Learning for Advanced Olfactory Experience Reproduction and Odorant Optimization — **Vinicius Viena Santana, Bruno Rodrigues, Sandris Murins, Nadia Shardt, Idelfonso Nogueira**

**Poster 59i:** A Novel Recurrent Neural Network for Hydroprocessing Unit Modeling Using Neural Circuit Policies and Attention-Based Encoder-Decoder — **Shu-Bo Yang, Zukui Li**

**Poster 59j:** A Parametric Cost Function Approximation Algorithm for Multiscale Decision-Making — **Kaiyu Cao, Asha Ramanujam, Can Li**

**Poster 59k:** Data-Driven Linear Predictive Control of Nonlinear Processes Based on the Reduced-Order Koopman Operator — **Xuewen Zhang, Minghao Han, Xunyuan Yin**

**Poster 59l:** Modelling of Non-Conventional Streams in the Context of Circular Economy-the Case of Hydrothermal Liquefaction — **Antonios Kokosis**

**Poster 59m:** Data Embedding and Hybrid Modeling for Industrial Fluid Catalytic Cracking — **Antonios Kokosis, Dimitrios Blitas**

**Poster 59n:** A Graph Attention Network Based Approach for Interpretable and Domain-Aware Modeling of a Wellhead Water Treatment System — **Jasmine Sekhon**

**Poster 59o:** Development of Algorithms for Mass and Energy Constrained Dynamic Neural Network Models — **Angan Mukherjee, Debangsu Bhattacharyya**

**Poster 59p:** Design of Microfluidic Chromatographs through Reinforcement Learning — **Mohammad Shahab, Raghunathan Rengaswamy**

**Poster 59q:** A Continuous Learning, Generative Model Pipeline for Kinetic Model Parameter Estimation — **Michael Volk, Shekhar Mishra, Huimin Zhao**

**Poster 59r:** Enhancing Multi-Objective Particle Swarm Optimization with the Cluster-Based Approach: Application to Hydrogen Production Process Optimization — **Seokyoung Hong, Jaewon Lee, Junghwan Kim**

**Poster 59s:** Investigating the Effects of Tunable Experimental Parameters on hiPSC-Cms Maturation Via Clustering Techniques — **Shenbageshwaran Rajendiran, Selen Cremaschi**

**Poster 59t:** Improving Industrial-Scale Bioreactor Performance: Development and Validation of Computationally Efficient Compartment-Based Models Using Real Plant Data — **Parth Shah, Joseph Kwon**

**Poster 59u:** Learning Dynamical Process Models Using Plant Data: A Real-World Case Study in the Sustainable Manufacturing of Insulation Products — **Siddharth Prabhu, Srinivas Rangarajan, Mayuresh Kothare**

**Poster 59w:** Automating the Discovery of Reaction Networks for Complex Reaction Systems from Spectroscopic Measurements — **Karthik Srinivasan, Vinay Prasad**

**Poster 59x:** Data-Driven Supply Chain Monitoring Based on Canonical Variate Analysis — **Jing Wang, Christopher Swartz, Kai Huang**

**Poster 59y:** Optimal Sensor Network Design for Maximizing Net Present Value and Its Application to Corrosion Monitoring in a Power Plant — **Chandra Sekhar Somayajula, Debangsu Bhattacharyya, Xingbo Liu, Shanshan Hu**

**Poster 59z:** Combined Use of Recursive Neural Network (RNN), Convolutional Neural Network (CNN), and Attention Mechanism on Cycling Data of Lithium Ion Battery for Lifespan Prediction — **Jaewook Lee, Jay Hyung Lee**

**Poster 59aa:** Adversarial Data in Demand Side Management — **Eike Cramer**

**Poster 59ab:** Generalization Error Bounds for Neural Networks Modeling Two-Time-Scale System Dynamics with Application to Model Predictive Control of Nonlinear Processes — **Aisha Alnajdi, Atharva Vijay Suryavanshi, Fahim Abdullah, Panagiotis Christofides**

**Poster 59ac:** Control Lyapunov-Barrier Function-Based Safe Reinforcement Learning for Nonlinear Optimal Control — **Yujia Wang, Zhe Wu**

**Poster 59ad:** Reinforcement Learning (RL)-Based Process Controller Design: An Implementable Approach — **Hesam Hassanpour, Xiaonian Wang, Brandon Corbett, Prashant Mhaskar**

**Poster 59ae:** Efficient Hybrid Modeling and Sorption Model Discovery for Non-Linear Advection-Diffusion-Sorption Systems: A Systematic Scientific Machine Learning Approach — **Vinicius Viena Santana, Erbet Costa, Carine Rebello, Ana M. Ribeiro, Christopher Rackauckas, Idelfonso Nogueira**

**Poster 59af:** Using Artificial Neural Networks for Real-Time Tuning of PID Controllers — **Tate Bestwick, Kyle V. Camarda**

**Poster 59ag:** Chemistry-Aware Retrosynthesis and Forward Reaction Prediction Using Smiles Grammar Tree Transformer — **Vipul Mann, Kevin Zhang, Venkat Venkatasubramanian**

**Poster 59ah:** Control Invariant Set Enhanced Reinforcement Learning for Process Control: Improved Sampling Efficiency and Guaranteed Stability — **Song Bo, Yin Xunyun, Jinfeng Liu**

**Poster 59ai:** A Comprehensive Decision Making and Networking Facility for the Biorefining Community — **Edlira Kalemi, Franjo Cecelja**

**Poster 59aj:** Hybrid Methods for Battery State of Charge Estimation Based on Electrochemical Model — **Seunghyeon Oh, Jiyong Kim, Il Moon**

**Poster 59ak:** Structure-Based Prediction of Kinase Activation amidst a Varied Mutational Landscape Using Privileged Learning — **Yiming Wang, Fangping Wan, Zhangtao Chen, Jonathan Nukpezah, Cesar de la Fuente-Nunez, Ravi Radhakrishnan**

**Poster 59al:** Identifying PDAC Diagnostic Biomarkers Utilizing Machine Learning Combined with Genome-Scale Metabolic Modeling — **Tahereh Razmpour, Andrea Goertzen, Rajib Saha**

**Poster 59am:** Self-Optimizing Control Methodology Using Surrogate Models for Complex Systems: A Jupyter-Based Application for Flexible Exploration and Adjustment — **Marcilio Maximo, Herbert Teixeira, Antônio Tavernard, Heleno Bispo**

**Poster 59an:** Chemical Substance Diagnosis System Based on Knowledge Inference and Machine Learning for Chemical Exposure Symptoms — **Kangseop Kim, Dongil Shin**

**Poster 59ao:** Augmented Control Using Reinforcement Learning and Conventional Process Control — **Daniel Beahr, Debangsu Bhattacharyya, Douglas A. Allan, Stephen Zitney**

**Poster 59ap:** Intelligent Size Characterization of Granules By Machine Learning Method — **Mehrdad Khakbiz, Maryam Rezaeizadeh, Gerardo Callegari, Fernando Muzzio Sr.**

**Poster 59ar:** Designing pH-Temperature Responsive Microgels with Targeted Transition Temperature Using a Novel Partial Least Squares (PLS) Model Inversion Technique — **Prashant Mhaskar, Todd Hoare, Seyed Saeid Tayebi**

**Poster 59as:** Prediction of Chemical Toxicity and Exposure Symptoms Based on Knowledge Graph Embedding and Language Models — **Young Min Jung, Jinkyung Son, Kangseop Kim, Dongil Shin**

**Poster 59at:** Data-Driven Adaptive Sparse Identification of Time-Varying Nonlinear Dynamics for 2,3-Bdo Distillation Column — **Yeongryeol Choi, Bhavana Bhadriraju, Hyungtae Cho, Jongkoo Lim, Il Moon, Joseph Kwon, Junghwan Kim**

**Poster 59av:** Intelligent Robotic Platform for Closed-Loop pH Adjustment of Personal Care Formulations — **Aniket Chitre, Jayce Cheng, Alexander Pomberger, Kristina Wang, Long Wang, Kedar Hippalgaonkar, Alexei A. Lapkin**

## (60) Interactive Session: Systems and Process Design

**Tuesday, Nov 7, 3:30 PM  
Hyatt Regency Orlando,  
Regency Ballroom R/S**

**Selen Cremaschi, Chair  
David Miller, Co-Chair**

**Sponsored by: Systems and  
Process Design**

**Poster 60a:** An Optimization Model for the Integration of the Hydraulic Fracturing with a Power Plant Considering CO<sub>2</sub> As Fracture Fluid — **Victor Osvaldo Vega-Muratalla, Luis Fernando Lira-Barragán, Roberto Guerra-González**

**Poster 60b:** Simultaneous Integration of Machine Learning in a Mixed-Integer Nonlinear Programming Formulation to Optimize Gas Production and Water Management in Shale Gas Reservoirs — **Francisco Javier López Flores, Luis Fernando Lira-Barragán, Eusiel Rubio-Castro, Mahmoud El-Halwagi, José María Ponce-Ortega**

**Poster 60c:** Modeling and Simulation of a Process That Converts Ethane to Low Density Polyethylene — **Ernest Mokaya, Omar Almaraz, Srinivas Palanki**

**Poster 60d:** Simultaneous Optimization of Electrochemical CO<sub>2</sub> Reduction Process and Reaction System — **Youngwon Lee, Sun Young Lee, Jonggeol Na**

**Poster 60e:** Physics-Guided Autonomous Design for Acid-Stable Water Oxidation Catalyst — **Areum Han, Yesol Lee, Dong Hyeon Mok, Seoin Back, Young Jin Sa, Jonggeol Na**

**Poster 60f:** Explainable Artificial Intelligence (XAI)-Based Causality Analysis for Chemical Process — **Yuna Ko, Kyojin Jang, Jonggeol Na**

**Poster 60k:** Control of the Absorption so<sub>2</sub> with NaOH Solution in Packed Columns Using Aveva Process Simulation — **Paulo Henrique N. Ferreira, Carlos Alexandre M. da Silva, Milene Codolo**

**Poster 60l:** Heuristic-Aided Emulgels Design for Food and Cosmetic Applications — *Natalia Linares, Juan Sebastian Rodríguez, Javier Camilo Martínez, Alvaro Orjuela, Rolando Acosta, Camilo Andrés Castro*

**Poster 60m:** Analysis of Correlation between Microbubble and Precipitated Calcium Carbonate Size Using Image Processing Model for Carbon Utilization Process — *Yup Yoo, Yujeong Yun, Youngbok Ryu, Hojun Song, Hyun Sic Park, Junghwan Kim, Hyungtae Cho*

**Poster 60n:** An Energy Efficient Process Design for Ethyl Levulinate Production Using Double Reactive Distillation Columns — *Devrim Kaymak, Aslihan Balkan*

**Poster 60o:** Process Development and Analyses for Production of Green Hydrogen Using Liquefied Natural Gas Cold Energy — *Bomin Choe, Wangyun Won*

**Poster 60p:** A Novel Carbon Emission Optimization Method for Chemical Processes Based on Thermodynamic 1st and 2nd Law: Naphtha Cracking Center Application — *Wonjun NOH, Juyeong SEO, Seoyeon CHO, Inkyu Lee*

**Poster 60q:** Multiscale Modeling of Dry Reforming of Methane to Study the Effect of Catalyst Morphology — *Hye Min Choi, Joseph Kwon, Jay Hyung Lee*

**Poster 60r:** A Hybrid Catalytic Route to Ethanol from Residue Gases Via the Dimethyl Ether and Methyl Acetate Synthesis: Process Design and Techno-Economic Analysis — *Minseong Park, Chanhee You, Chanmok Kim, Hyeon Yang, Thai Ngan Do, Jiyong Kim*

**Poster 60s:** Synthesis of Indirect Multi-Plant Heat-Integrated Water Allocation Networks — *Jack Chou, Linlin Liu, Jian Du*

**Poster 60v:** Study of CO<sub>2</sub> Absorption in Packed Columns Using Aveva Process Simulation — *Vinicius S. S. Machado, Carlos Alexandre M. da Silva, Milene Codolo*

## **(61) Interactive Session: Systems and Process Operations**

**Tuesday, Nov 7, 3:30 PM**  
**Hyatt Regency Orlando,**  
**Regency Ballroom R/S**

**Faruque Hasan, Chair**  
**Qi Zhang, Co-Chair**

**Sponsored by:** Systems and Process Operations

**Poster 61a:** Decision-Focused Surrogate Modeling for Mixed-Integer Optimization (Poster corresponding to plenary presentation) — *Shivi Dixit, Rishabh Gupta, Qi Zhang*

**Poster 61b:** Neural Network Models for Predicting Impurity Removal Amount in ARDS Process and Operation Condition Optimization Using Genetic Algorithm — *Yungun Jung, Yeonsoo Kim*

**Poster 61c:** Simulation and Optimization of the Supply-Chain of Plastic Recycling with Environmental Considerations — *Elisavet Anglou, Riddhi Bhattacharya, Patrisia M. Stathatou, Fani Boukouvala*

**Poster 61d:** Temporal Intergrated Planning of Design, Shipping Scheduling, and Energy Management System for International Hydrogen Supply Chain — *Jay Hyung Lee, Sunwoo Kim*

**Poster 61e:** Reliable Design and Optimization of Crystallization Systems Under Uncertainty — *Yash Barhate, Zoltan Nagy*

**Poster 61f:** Applying a Comprehensive View of Resilience to Power Distribution Network Optimization — *Benjamin P. Riley, Prodromos Daoutidis, Qi Zhang*

**Poster 61g:** Adjustable Robust Optimization for the Synthesis of Continuous Rufinamide Manufacturing Process Under Uncertainty — *Wenhui Yang, Taoyu Qiu, Zhihong Yuan*

**Poster 61h:** Integrated Design and NMPC-Based Control Under Uncertainty and Naturally Ordered Structural Decisions: A Discrete-Steepest Descent Approach. — *Oscar Palma-Flores, Luis Ricardez-Sandoval, Lorenz Biegler*

**Poster 61i:** Uncertainty Quantification of Physics Informed Neural Networks Using Bayesian-Last-Layer Approach, and Its Application to Real-World Bioprocess — *Shu Yang, Huiyi Cao, William Fahey, Reza Kamyar*

**Poster 61k:** A Framework for Resilient Multi-Product Supply Chains: An Application to Healthcare — *Miriam Sarkis, Nilay Shah, Maria Papathanasiou*

**Poster 61l:** Reducing Solution Times of Continuous Production Scheduling MILP Models with Record Keeping Variables — *Amin Samadi, Christos T. Maravelias*

**Poster 61m:** Perspective Reformulation of Stochastic Agrochemical Supply Chain Optimization Problem with Mean-Variance Risk Management — *Saba Ghasemi Naraghi, Zheyu Jiang*

**Poster 61n:** Integration of Production Planning and Scheduling Problems with Uncertainty and Feasibility Analysis — *Ziqing Guo, Yachao Dong, Jingxing Gao, Jian Du*

**Poster 61o:** Multi-Stage Stochastic Programming for the Planning of a Mobile Modular Closed-Loop Supply Chain — *Congqin Ge, Zhang Lifeng, Wenhui Yang, Zhihong Yuan*

**Poster 61p:** Energy Flow Redistribution for Optimal Operation of Heat Exchanger Networks — *Karthika Mohanan, Sujit Jogwar*

**Poster 61q:** Management of Multi-Microgrid System with 2D CNN Forecasting Model and End-Effect Mitigation Using Value Function — *Dongho Han, Teemu Ikonen, Iiro Harjunkoski, Jay Hyung Lee, Seongmin Heo*

**Poster 61r:** Clustering-Based Forecasting Framework for the Energy Sector — *Funda Iseri, Harsh Shah, Rahul Kakodkar, Efstratios Pistikopoulos*

**Poster 61s:** Applications of Data-Driven Approaches in Chemical Process and Energy System Optimization — *Mohammed Alkatheri, Tuhin Poddar, Ali Elkamel, Ali Almansoori*

**Poster 61t:** Use of Bayesian Optimization for Efficient Finding of Optimal Operating Condition of Simulated Moving Bed Process — *Woohyun Jeong, Jay Hyung Lee*

**Poster 61u:** Optimization of Waste Water Plant Operations — *Komal Rathore, Aydin Sunol, Tolga Pirasaci, Andres Tejada-Martinez, Kiesha Pierre, Aaron Driscoll, Gita Iranipour, Kyle Cogswell*

**Poster 61v:** Quantitative Studies of Decomposition Algorithm Efficiencies for Global Nonconvex Stochastic Optimization Problems — *Pengfei Cheng, Joseph K. Scott*

**Poster 61w:** Accelerating Process Design and Optimization with Novel Computational Tools — *Patrik Furda, Juraj Myšiak, Miroslav Variny*

**Poster 61x:** Generalised Optimisation Framework for Process Synthesis and Intensification in the Equation-Oriented Environment — *Chao Liu, Yingjie Ma, Dongda Zhang, Jie Li*

**Poster 61y:** Learning to Select the Best Optimization Solution Strategy: An Algorithm Selection Approach — *Ilias Mitrai, Prodromos Daoutidis*

**Poster 61z:** Stochastic Community Detection: Novel Solution Approach and Application to Sustainable Process Operations — *Hongxuan Wang, Andrew Allman*

**Poster 61aa:** Adaptive Real-Time Exploration and Optimization for Safety-Critical Industrial Systems: The Arto Algorithm — *Buse Sibel Korkmaz, Tong Liu, Marta Zagorowska, Mehmet Mercangoz*

**Poster 61ab:** A Comparison of Nonlinear Optimal Control Trajectory Sensitivity Formulations — *Hainan Wang, Edward Gatzke*

**Poster 61ac:** Discrete Nonlinear Optimization: Modeling and Solutions Via Novel Hardware and Decomposition Algorithms — *David E. Bernal Neira*



---

**(62) Collaborative Discussion: Empathy in Action - Catalyzing Inclusivity for LGBT+ and Marginalized Communities in ChemE**

**Tuesday, Nov 7, 3:30 PM**  
**Hyatt Regency Orlando, Bayhill 31**

**Alon McCormick, Chair**

**Sponsored by:** LGBTQ+ and Allies Community

---

**(63) Poster Session: Materials Engineering & Sciences (08D - Inorganic Materials)**

**Tuesday, Nov 7, 3:30 PM**  
**Hyatt Regency Orlando, Regency Ballroom R/S**

**Gaurav Giri, Chair**  
**Rachel Letteri, Co-Chair**  
**Kelly Burke, Co-Chair**

**Sponsored by:** Inorganic Materials

**Poster 63a:** Pathway to Develop a Carbonate-Based Protective Layer in Zinc Ion Batteries — **Anuja Tripathi**

**Poster 63b:** Rhenium-Tungsten Alloy Feedstock Preparation Using Incipient Wetness Impregnation — **Davis R. Conklin, Hermann Klein-Hessling Barrientos, Alan Weimer**

**Poster 63d:** Effect of Wool Substrate and Its Processing on the Performance of Conductive Textiles — **Alyssa Grube, Syed Ibrahim Gnani Peer Mohamed, Laurel Hilger, Mona Bavarian**

**Poster 63e:** Material Properties of Recycled Glass Sand: A Case Study Conducted with Glass Half Full Nola — **Julie Albert, Julie Vanegas, Nicholas Borne, Shehbaz Ahmad, Leah Michaeloff, Diego Molina**

**Poster 63f:** Unlocking Kinetically-Limited Nucleation Regimes through Continuous Modular Microfluidics — **Jacob Crislip, Andrew R Teixeira**

**Poster 63g:** In Situ Characterization of Zeolite Surface Growth Using Atomic Force Microscopy — **Zhiyin Niu, Rishabh Jain, Madhuresh Choudhary, Jeffrey Rimer**

**Poster 63h:** Elucidating the Mechanism of Nanosheet Pillaring in MFI-Type Zeolites — **Muhammad Fijj Firdaus, Tanvir Ahmed, Rishabh Jain, Luke Tufaro, Patrick Kruszon-Oeffner, Simon Vornholt, Karena Chapman, Jeffrey Rimer**

**Poster 63i:** A Priori Data Collection for Thermodynamic Modeling of Off-Stoichiometric Metal Oxides Via Bayesian Methods — **Steven Wilson, Christopher L. Muhich**

**Poster 63j:** Preparation of Two-Dimensional Fe<sub>3</sub>O<sub>4</sub> Nanoparticles Transformed from  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> Analogues and Their Applications in Magnetic Field-Assisted Microalgal Biorefinery Process — **Yujeong Jeong, Bolam Kim, Laxmi Priya Sathiya Vahisan, Rendi Mahadi, Kyubeom Lee, Eun-Hye Jang, You-Kwan Oh, Sungwook Chung**

**Poster 63k:** Autonomous Synthesis of Eco-Friendly Metal Halide Perovskite Nanocrystals — **Sina Sadeghi, Fazel Bateni, Milad Abolhasani**

**Poster 63l:** A Pyrogallate-Based Metal-Organic Framework with a Two-Dimensional Secondary Building Unit — **Stavroula Kampouri, Mircea Dinca**

---

**(64) Poster Session: Materials Engineering & Sciences (08F - Composite Materials)**

**Tuesday, Nov 7, 3:30 PM**  
**Hyatt Regency Orlando, Regency Ballroom R/S**

**Mohammad Hassan, Chair**  
**Albert Liu, Co-Chair**  
**Ali Alshami, Co-Chair**  
**Rachel Letteri, Co-Chair**  
**Kelly Burke, Co-Chair**

**Sponsored by:** Composites

**Poster 64a:** From Brown Tides to 3D Printers: Fabrication & Characterization of Novel Sargassum-Based Polymer Composite Filaments for 3D Printing — **Zuanichi Figueroa, Abraham Polanco, Jeziel Rodriguez, Sebastian Toro Bernal, Omar Movil**

**Poster 64b:** An Exploratory Study on the Development of Sargassum Algae-Based Biodegradable Polymer Composites Via Selective Laser Sintering. — **Stephanie Garcia, Marielisa Ortiz, Omar Movil**

**Poster 64c:** Liquid Metal Polymer Composites to Enable Soft Robotics and Stretchable Electronics — **Amanda Koh, Anh Hoang, Elizabeth Bury**

**Poster 64d:** Engineering Magnetic Composites for Improved Shear Behavior through Orthogonal Means — **Amanda Koh, Sandhiya Thiagarajan, Emmanuel Johnson**

**Poster 64e:** Prediction of Organic Compound Aqueous Solubility Using Interpretable Machine Learning—a Comparison Study of Descriptor-Based and Topological Models — **Arash Tayyebi, Ali Alshami**

**Poster 64f:** Sustainable Generator and in-Situ Monitor For reactive Oxygen Species Using Photodynamic Effect of Single-Walled Carbon Nanotubes in Ionic Liquids — **Erin Witherspoon, Zhe Wang**

**Poster 64g:** Highly Stretchable P3HT Containing Core-Shell Composite Fibers from Coaxial Electrospinning — **Humayun Ahmad, Maggie Britton, Santanu Kundu**

**Poster 64j:** Development of a Novel PEO-Based Solid Electrolyte for Lithium-Sulfur Batteries — **Basem Al Alwan, Zhao Wang, Wissam Fawaz, K.Y. Simon Ng**

---

**(65) Poster Session: General Topics on Separations**

**Tuesday, Nov 7, 3:30 PM**  
**Hyatt Regency Orlando, Regency Ballroom R/S**

**Sponsored by:** General Topics and Other Methods

**Poster 65a:** Hollow Fiber Membrane Module Fabrication for the Separation of R-410A — **Luke Wallisch, Abby Harders, Mark B. Shiflett**

**Poster 65b:** Process-Based Solvent Screening for Efficient Extractive Distillation — **Sahil Sethi, Xiang Zhang, Kai Sundmacher**

**Poster 65c:** Poster: Real-Time Induced Magnetic Vibration to Reduce Membrane Fouling: Experimental and Modeling Investigation — **Jasneet Pala, Ryan Tracy, Milad Esfahani, Nima Mahmoodi**

**Poster 65d:** "Highly Charged Ion-Exchange Membranes for Treatment of Highly Impaired Waters Via Electrodialysis" — **Carolina Espinoza, José Carlos Díaz, David Kitto, Hyunjik Kim, Jovan Kamcev**

**Poster 65e:** Investigating Reactive Oxygen Species of Chitosan-Graphene Oxide Composites for Water Treatment Membranes — **Justin Puhnaty, Chris Griggs, Audie Thompson**

**Poster 65f:** Numerical Simulations with Continuous Flow in Magnetic Separator — **Hyeon Choe, Jacob Strayer, Xian Wu, Jenifer Gomez Pastora, Jeffrey Chalmers**

**Poster 65g:** Unexpectedly High Propylene-Selective Mixed-Matrix Membranes with Additive-Incorporated Facile *in-Situ* ZIF-8 Filler Formation Process — **Yinying Hua, Hae-Kwon Jeong**

**Poster 65h:** Effect of Capping Group Binding on Chemical Reactivity — **Chinmay Mhatre, Bradley Gibbons, Amanda J. Morris, Karl Johnson**

---

**(66) Division Plenary: Food, Pharmaceutical, and Bioengineering Division (Invited Talks)**

**Tuesday, Nov 7, 3:30 PM**  
**Hyatt Regency Orlando, Regency Ballroom P**

**Mark Brynildsen, Chair**  
**Whitney Stoppel, Co-Chair**

**Sponsored by:** Food, Pharmaceutical & Bioengineering Division

**3:30 Paper 66a:** Division 15 Plenary Award - Development of a Microneedle Patch for Long-Acting Contraception — **Mark Prausnitz**

**4:20 Paper 66b:** Division 15 Early Career Award - Environmental Microbes for Efficient (re)Use of Renewable Feedstocks and Consumer Wastes in Biomufacturing — **Kevin Solomon**

**4:45 Paper 66c:** Area 15A Plenary Award - Engineering of Aromatic Amino Acid Production in Cyanobacteria — **John Morgan**

**5:10 Paper 66d:** Area 15C Plenary Award - Data Driven Microbial Strain Engineering — **Ian Wheeldon**

**5:35 Paper 66e:** Area 15DE Plenary Award - a Trip to the Zoo: Lessons for Tissue Engineers — **Celeste Nelson**

---

**(67) AIChE Journal Futures: New Directions in Chemical Engineering Research (Invited Talks)**

**Tuesday, Nov 7, 3:30 PM  
Hyatt Regency Orlando,  
Manatee Spring I**

**David Sholl, Chair**

**Sponsored by:** Publication Committee

**3:30 Paper 67a:** Engineering *Vibrio natriegens* for Degrading and Assimilating Poly(ethylene terephthalate) — **Tianyu Li, Stefano Menegatti, Nathan Crook**

**3:49 Paper 67b:** Applications of Lignin-derived Deep Eutectic Solvents in Biorefinery Processes — **Chang Geun Yoo, Yunxuan Wang, Jiae Ryu, Kwang Ho Kim, Xianzhi Meng, Yunqiao Pu, Yang Tian, Aymerick Eudes, Gyu Leem, Arthur Ragauskas**

**4:08 Paper 67c:** Predicting Thermodynamic and Transport Properties of Organophosphates: A Molecular Simulation Substitute for Experiments that You Don't Want to Perform — **Gennady Gor, Ella Ivanova**

**4:27 Paper 67d:** Leveraging multiplex genome engineering and metabolic pathway design to upcycle waste plastics and biomass via aldehyde transformations in live bacteria — **Aditya Kunjapur**

**4:46 Paper 67e:** Surface Anisotropic Particles, Capillary Interactions, and Dynamics of Fluid Interfaces — **Elton Lima Correia, Sepideh Razavi**

**5:05 Paper 67f:** Designing better drug delivery particles: Protein corona formation and multicomponent aggregation of particles in blood plasma — **Aida Lopez Ruiz, Guangliang Liu, Kathleen McEnnis**

**5:24 Paper 67g:** AIChE Journal Futures Placeholder 7

**5:43 Paper 67h:** Stability and kinetics of Fe-based MOFs with diverse structures in aqueous pollutant degradation — **Samuel C. Moore, Michele Sarazen**

---

**(68) Advances in Life Cycle Assessment**

**Tuesday, Nov 7, 3:30 PM  
Hyatt Regency Orlando,  
Regency Ballroom U**

**Tapajyoti Ghosh, Chair  
Bhavik Bakshi, Co-Chair  
Vikas Khanna, Co-Chair**

**Sponsored by:** Sustainability Science and Engineering

**3:30 Paper 68a:** Study on Life Cycle Assessment and Optimization of Pesticide Production Process from the Perspective of Sustainable Development — **Kexuan Yang**

**3:50 Paper 68b:** Life-Cycle Assessment Integration into Scalable Open-Source Numerical Models (LiAISON) for Prospective Impact Analysis of Novel Technologies — **Tapajyoti Ghosh, Patrick Lamers, Alberta Carpenter**

**4:10 Paper 68c:** Guiding Food Colorant Production Via Fermentation Using Techno-Economic, Life Cycle and Absolute Sustainability Assessment — **Samir Meramo, Sumesh Sukumara, Peter Fantke, Eleonora Passuto**

**4:30 Paper 68d:** Community-Engaged Life Cycle Analysis: Ensuring Sustainability While Protecting Sovereignty — **Margaret O'Connell, Jenna Trost, Kimberly Marion Suiseeya, Jennifer Dunn**

**4:50 Paper 68e:** On the Interplay of Food Packaging Design and Food Supply Chain Sustainability — **Aurora Del Carmen Munguia Lopez, Paola Alejandra Munoz Briones, Styliani Avraamidou, Victor Zavala**

---

**(69) Advances in smart monitoring, optimization and control of process manufacturing**

**Tuesday, Nov 7, 3:30 PM  
Hyatt Regency Orlando, Bayhill 32**

**Zhenyu Wang, Chair  
Masoud Soroush, Co-Chair**

**Sponsored by:** Digital Manufacturing

**3:30 Paper 69a:** Designing Efficient Human-Machine Interfaces for Decision-Support Tools: Case Studies in Healthcare and Process Systems — **Mrunal Sontakke, Sambit Ghosh, Faye Cameron, Alan Ganz, Henry Weber, Lucky E. Yerimah, Andreas Rebmann, Craig Dory, Ronald Hedden, Joel Plawsky, Johnson Samuel, B. Wayne Bequette**

**3:49 Paper 69b:** GMP Implementation of Continuous Manufacturing: A Case Study — **Edward Wong**

**4:08 Paper 59v:** Machine Learning-Based Prediction and Optimization of Liquid Wettability of an iCVD-Produced Fluoropolymer — **Daniel Schwartz, Tien Nguyen, Zhengtao Chen, Kenneth Lau, Michael C. Grady, Ali Shokoufandeh, Masoud Soroush**

**4:27 Paper 69d:** Towards Scalable and Cost-Effective Plasmid DNA Manufacturing — **Niki Triantafyllou, Miriam Sarkis, Nilay Shah, Maria Papathanasiou, Cleo Kontoravdi**

**4:46 Paper 69e:** Barrier-Free Paper Analytical Devices for Multiplex Colorimetric Detection — **Ayushi Chauhan, Bhushan J. Toley**

**5:05 Paper 69f:** Advanced Manufacturing Via Self-Assembled Colloidal Cracking of Binary Nanoparticles — **Ryan Dumont, Bo Li**

**5:24 Paper 69g:** Bioprocess Control Using Stoichiometric Models of Metabolism — **Mariana Monteiro, Sarah Fadda, Cleo Kontoravdi**

---

**5:43 Paper 69h:** Edge-Enabled Monitoring System in 3D Printing Manufacturing Factory — **Michelle C. Almendrala, Danielle Jaye Agron**

---

**(70) Department Heads Forum (Invited Talks)**

**Wednesday, Nov 8, 8:00 AM  
Hyatt Regency Orlando, Bayhill 22**

**Daniel Shantz, Chair  
C. Heath Turner, Co-Chair**

**Sponsored by:** Department Heads Forum

**8:00:** Introductory Remarks

**8:05 Paper 70a:** Salary Survey — **Tyler Johannes**

**8:35 Paper 70b:** ABET Update — **Randy S. Lewis**

**8:45 Paper 70c:** State of the Institute — **Darlene Schuster**

**9:15:** Panel Discussion

**9:45:** Open discussion

**10:25:** Concluding Remarks

---

**(71) Atmospheric Chemistry and Physics: Laboratory, Modeling, and Field Studies**

**Wednesday, Nov 8, 8:00 AM  
Hyatt Regency Orlando, Silver Spring I/II**

**Marwa El-Sayed, Chair  
Coty Jen, Co-Chair**

**Sponsored by:** Air

**8:00 Paper 71a:** Strategies to Understand Dust Transport and Screen for Potential Health Impacts — **Kamaljeet Kaur, Reuben Attah, Kerry Kelly**

**8:20 Paper 71b:** Observations of Atmospheric Conditions during the 2020 Solar Eclipse over South America — **Konstantine Geranios, Alexander Chambers, Malachi Mooney-Rivkin, Jennifer Fowler, Matthew Bernards**

**8:40 Paper 71c:** COSMO-RS Re-Parameterization for Accurately Predicting Deep Eutectic Solvent-Fluorinated Compound Systems. — **Thomas Quaid, Toufiq Reza**

**9:00 Paper 71d:** Rapid Photolysis Decay of Gaseous Organic Nitrates Formed from Hydroxyl and Nitrate Radical Oxidations of  $\alpha$ -Pinene and  $\beta$ -Pinene — **Nga Lee Ng, Masayuki Takeuchi, Yuchen Wang**

**9:20 Paper 71e:** PM<sub>2.5</sub> bound Species Variation and Source Characterization in the Post-Lockdown Period of the Covid-19 Pandemic and Fireworks Period in National Capital of India — **Mohd Faisal, Umer Ali, Vikram Singh, Mayank Kumar**

**9:40 Paper 71f:** Eliminating Soot Emissions from Jet Fuel Combustion — **Georgios Kelesidis, Amogh Nagarkar, Una Trivanovic, Sotiris E. Pratsinis**

**10:00 Paper 71g:** “I Can’t Breathe:” the Invisible Slow Violence of Breathing Politics in Minneapolis — **Marwa El-Sayed, Heather O’Leary, Scott Parr, Deondre Smiles**

**10:20 Paper 71h:** Development of Large-Scale Fire Whirls for Offshore Oil Spill Cleaning — **Mitchell Huffman, Joseph Dowling, Bhushan Pawar, Wuquan Cui, Mohammadhadi Hajilou, Karen Stone, Elaine Oran, Michael J. Gollner, Qingsheng Wang**

---

**(72) Division Plenary: Materials Engineering & Sciences Division (Invited Talks)**

**Wednesday, Nov 8, 8:00 AM Hyatt Regency Orlando, Celebration 5**

**April Kloxin, Chair  
Rafael Verduzco, Co-Chair  
Adrienne Rosales, Co-Chair**

**Sponsored by:** Materials Engineering and Sciences Division

**8:00 Paper 72a:** Braskem Award Lecture: Ion Solubility, Diffusivity, and Transport in Charged Polymer Membranes — **Benny D. Freeman**

**8:30 Paper 72b:** Owens Corning Early Career Award Lecture: Supramolecular Design of Biomaterials and Drug Delivery Technologies — **Matthew Webber**

**9:00 Paper 72c:** Organic Electronics and Optoelectronics: Enabling New Energy and Information Technologies — **Samson A. Jenekhe**

**9:30 Paper 72d:** Peering into Batteries: Insights into Electrochemical Behavior through Operando and in-Situ Characterization — **Esther Takeuchi, Amy C. Marschlok, Kenneth J. Takeuchi**

**10:00 Paper 72e:** Bio-like Soft Materials with Life-like Intelligence — **Ximin He**

---

**(73) Functional Nanoparticles and Nanocomposites**

**Wednesday, Nov 8, 8:00 AM Hyatt Regency Orlando, Bayhill 21**

**Jaewon Lee, Chair**

**Sponsored by:** Nanoparticles

**8:00 Paper 73a:** Polymer-Grafted Plasmonic Nanocomposites with Enhanced Chiroptical Properties — **Shema Rachel Abraham, Jojo P. Joseph, Alexander Baev, Paras N. Prasad, Mark Swihart**

**8:18 Paper 73b:** Preceramic Polymer Grafted Nanoparticle Composites: Influence of Thermal Curing on Rheology, Microstructure, and Ceramic Yield — **Gary Germanton Jr., Pitchaimari Gnanasekar, Subramanian Ramakrishnan**

**8:36 Paper 73c:** Perovskite-Coated Biomimetic Chiral Microparticles with Circularly Polarized Light Emission — **Michael Veksler, Nicholas Kotov**

**8:54:** Break

**9:12 Paper 73e:** Electrically Responsive Yolk-Shell Colloidal Photonic Crystals with Controllable Coherent Scattering Intensities — **Hikaru Namigata, Tom A. J. Welling, Kanako Watanabe, Keishi Suga, Arnout Imhof, Alfons van Blaaderen, Daisuke Nagao**

**9:30 Paper 73f:** Essential Oil-Loaded Mesoporous Silica Nanoparticles for the Development of Multifunctional Nonfouling Coatings — **Minchen Mu, Yu-Ting Lin, William DeFlorio, Yashwanth Arcot, Shuhao Liu, Wentao Zhou, Xunhao Wang, Younjin Min, Luis Cisneros-Zevallos, Mustafa Akbulut**

**9:48 Paper 73g:** Silica-Polyelectrolyte Nanocomposites As Stabilizers for Aqueous Microcapsules with Adjustable Properties — **Matthew Lertola, Michael B. Schmithorst, Michael Persson, Romain Bordes, Krister Holmberg, Bradley F. Chmelka**

---

**(74) Particle Breakage**

**Wednesday, Nov 8, 8:00 AM Hyatt Regency Orlando, Bayhill 19**

**Jung-Sheng Wu, Chair  
Priscilla Hill, Co-Chair**

**Sponsored by:** Particle Production and Characterization

**8:00:** Delayed Start

**8:40 Paper 74b:** Breakage Kernels Based on 2D Analysis of High Aspect Ratio Particles — **Priscilla Hill**

**9:00 Paper 74c:** Bridging Crystallization and Mechanical Properties to Particle Size Reduction Efficiency in Jet Milling Industrial Pharmaceutical Processes — **Goncalo Marcelo, André Dias, Luis Sobral, Rachid Santos, João Sequeira, Tiago Porfírio**

**9:20 Paper 74d:** Breakage of Alumina Aggregates Under Shear By CFD-DEM Simulations — **Eirini Goudeli, Lequan Zeng, George Franks**

**9:40 Paper 74e:** Comminution of Carbon Particles in a Fluidized Bed Reactor: A Review — **Sama Manzoor, Erin Bobicki**

**10:00 Paper 74f:** Buckling of a Particles Suspension Drop during Fast Drying: Experiments — **Om Prakash Bamboriya, Mahesh Tirumkudulu**

---

**(75) Division Plenary: Pharmaceutical Discovery, Development, and Manufacturing Forum (Invited Talks)**

**Wednesday, Nov 8, 8:00 AM Hyatt Regency Orlando, Regency Ballroom Q**

**Kevin Seibert, Chair  
Carla Luciani, Co-Chair  
Christopher Marton, Co-Chair**

**Sponsored by:** Pharmaceutical Discovery, Development and Manufacturing Forum

**8:00 Paper 75a:** PD2M Plenary 1 — **Andrew Livingston**

**8:50 Paper 75b:** PD2M Plenary 2 — **Paresma Patel**

**9:40 Paper 75c:** PD2M Plenary 3 — **Eleni Dokou**

---

**(76) Challenges and Best Practices in Technology Commercialization I**

**Wednesday, Nov 8, 8:00 AM Hyatt Regency Orlando, Bayhill 27**

**John Peragine, Chair  
Raymond Rooks, Co-Chair  
Ha Dinh, Co-Chair**

**Sponsored by:** Technology Transfer and Manufacturing

**8:00 Paper 76a:** Utilizing Digital Transformation to Accelerate Technology Commercialization — **Anam Ahmed**

**8:30 Paper 76b:** Modular Process Development (versus Designing Modular Process Equipment) — **Robert Nunley**

**9:00 Paper 76c:** Characterization of Non-Traditional Reactors for Scale up of Highly Branched Polymers — **Jennifer Larimer**

**9:30 Paper 76d:** Multiphase Reaction/Separation Processes; Technologies and Apparatus Design — **Georg Rudelstorfer, Rafaela Greil, Dominik Wickenhauser, Maximilian Neubauer, Matthäus Siebenhofer, Susanne Lux, Annika Graftschaffer**

---

**(77) John M. Prausnitz AIChE Institute Lecture**

**Wednesday, Nov 8, 11:15 AM Hyatt Regency Orlando, Plaza International Ballroom G/H**

**Yu Shi, Chair  
Martha Grover, Co-Chair**

**Sponsored by:** Awards Committee

**11:15 Paper 77a:** Translation of Biomedical Microtechnologies from the Lab to the Clinic — **Mark Prausnitz**

---

**(78) ABET Updates and Insights  
(Invited Talks)**

**Wednesday, Nov 8, 12:30 PM  
Hyatt Regency Orlando, Bayhill  
22**

**Thomas Spicer III, Chair**

**Sponsored by:** Undergraduate  
Education

---

**(79) Advanced Treatment  
Technologies for Water I**

**Wednesday, Nov 8, 12:30 PM  
Hyatt Regency Orlando, Blue  
Spring I/II**

**Steven Weinman, Chair  
Selma Mededovic, Co-Chair  
Deepak Sharma, Co-Chair  
Monday Okoronkwo, Co-Chair**

**Sponsored by:** Water

**12:30 Paper 79a:** Superfine  
Activated Carbon-Functionalized  
Adsorptive Thin-Film  
Nanocomposite Membranes for  
Selective Pfas Removal from Water  
— **Medha Kasula, Jasneet Pala,  
Milad Esfahani**

**12:49 Paper 79b:** Development of  
Cationic Hydrogel PAC  
Composites for Pfas Remediation  
in Aqueous Solutions — **Maria  
Victoria Ximenes Klaus, Nicole  
Marguerite, J. Zach Hilt**

**1:08 Paper 79c:** Photocatalytic  
Removal of Heavy Metals from  
Private Well Water — **Liz Diaz,  
Kevin McPeak**

**1:27 Paper 79d:** The Role of  
Redox-Active Metallopolymers in  
the Selective Remediation of Water  
from Pfas Contaminants — **Paola  
Baldaguez Medina, Valentina  
Ardila Contreras, Johannes Elbert,  
Markus Gallei, Xiao Su**

**1:46 Paper 79e:** Two-Dimensional  
Molybdenum Disulfide Based Field  
Effect Transistor Sensor for Pfas  
Detection in Water — **Md Mohidul  
Alam Sabuj, Mo Li, Maria  
Armanious, Meng-Qiang Zhao**

**2:05 Paper 79f:** Polyelectrolyte  
Nanofiltration Membranes for Base  
Recovery Processes — **Joshua  
Livingston, G. Kane Jennings,  
Shihong Lin**

**2:24 Paper 79g:** Evaluation of a  
Janus Membrane for Enhanced  
Rejection of PFAS in Membrane  
Distillation — **Hyunsik Kim,  
Mallikarjuna Nadagouda, Tae Lee**

**2:43 Paper 79h:** Graphene As a  
Rational Interface for Enhanced  
Removal of Cyanotoxins and  
Emerging Contaminants for Water  
Security — **Jesse Roberts, Sarah  
Grace Zetterholm, Luke A.  
Gurtowski, Ashvin Fernando, Kevin  
Wyss, Angela Evans, Justin  
Puhnaty, Brianna Fernando, Audie  
Thompson, James M. Tour, Chris  
Griggs**

---

**(80) CO2 Industrial, Engineering  
and R&D Approaches**

**Wednesday, Nov 8, 12:30 PM  
Hyatt Regency Orlando, Silver  
Spring I/II**

**Selen Cremaschi, Chair  
Xiaonan Wang, Co-Chair**

**Sponsored by:** Sustainability

**12:30 Paper 80a:** The Feasibility of  
Palm-Based Biomass Co-Firing  
and Different Oxygen Carriers to  
Enhance the Performance of Coal-  
Based IGCC Power Plant — **Nasir  
Al Lagtah**

**12:48 Paper 80b:** Process  
Modeling, Techno-Economic and  
Life-Cycle Assessments of  
Producing Potentially Carbon-  
Negative Building Material from  
CO<sub>2</sub> and Waste Lignin or Lignite  
— **Yuan Jiang, Francesca  
Pierobon, Nicholas Nelson, Keerti  
Kappagantula, Satish Nune, David  
J. Heldebrant**

**1:06 Paper 80c:** Improved  
Approach for Benefit Analysis of  
Carbon Dioxide Reduction  
Methods That Use Rechargeable  
Batteries — **Leisa Porter, Robert  
Deshotels**

**1:24 Paper 80d:** Evaluating on-  
Board CO<sub>2</sub> Capturing Methods for  
the Ship with Outlook on Storage  
and Utilization Options  
— **Mamoun Al-Rawashdeh,  
Jaafar Ballout, Dhabia Al-  
Mohannadi, Gareth Burton, Joseph  
Rousseau, Patrick Linke**

**1:42 Paper 80e:** A Cross-Sector  
Tool for Assessing and Strategizing  
Mitigation of Industrial Carbon  
Dioxide Emissions — **Ajay Koushik  
V, Ram Kishore Sankaralingam,  
Peter Kamau Waiyaki, Achyuta  
Krishnan, Arun Muthukkumaran,  
Ramesh Murugan Natarajan, Gowri  
Shankar Navagana,  
Satyanarayanan Seshadri, Preeti  
Aghalayam, Raghunathan  
Rengaswamy**

**2:00 Paper 80f:** A Framework for  
the Combined Evaluation of  
Economic and CO<sub>2</sub> Fixation  
Feasibility of Carbon Capture and  
Utilization (CCU) Reaction  
Pathways — **Gasim Ibrahim,  
Mohamed Sufiyan Challiwala,  
Mahmoud El-Halwagi, Nimir  
Elbashir**

**2:18 Paper 80g:** Determination of  
CO<sub>2</sub> Solubility in Brines and  
Hydrocarbons for Carbon Storage  
and Enhanced Oil Recovery  
— **Sushobhan Pradhan, Rupom  
Bhattacharjee, Clint Aichele, Prem  
Bikkina**

**2:36 Paper 80h:** Research on the  
Construction of Advanced CO<sub>2</sub>  
Capture Absorbent and the  
Regeneration Enhancement  
Strategy — **Weixin Kong**

---

**(81) Emerging Junior  
Investigator Open Innovation  
Forum (Invited Talks)**

**Wednesday, Nov 8, 12:30 PM  
Hyatt Regency Orlando,  
Celebration 6**

**Dongjin Seo, Chair  
Hyun-Tae Hwang, Co-Chair  
Taeyoung Kim, Co-Chair  
Won Tae Choi, Co-Chair**

**Sponsored by:** International  
Committee

**12:30 Paper 81a:** Beyond Surface  
Facilitates Electrocatalytic  
Reactions of Renewable Carbons  
— **Dohyung Kim**

**12:55 Paper 81b:** Rationally  
Designing Nanoporous Catalytic  
Materials for Sustainable Energy  
Applications — **Hong Je Cho**

**1:20 Paper 81c:** Nanoparticle-  
Based Crosslinks in Polymer  
Networks — **S. Eileen Seo**

**1:45 Paper 81d:** Metabolomics-  
Guided Discovery of Metabolic  
Design Principles and Engineering  
Strategies — **Junyoung Park**

**2:10 Paper 81e:** Hanwha Travel  
Award Flash Presentations

---

**(82) Process Intensification –  
Novel Integration Concepts**

**Wednesday, Nov 8, 12:30 PM  
Hyatt Regency Orlando, Bayhill  
28**

**Pranav Karanjkar, Chair  
Jennifer Larimer, Co-Chair**

**Sponsored by:** Process  
Intensification & Microprocess  
Engineering

**12:30 Paper 82a:** Design  
Consideration of Multiple Dividing  
Wall Columns for Renewable  
Olefins Production Using  
Economic, Environmental, and  
Exergy Criteria — **Heehyang Kim,  
Hosanna Uwitonze, Aejin Lee,  
Hankwon Lim**

**12:55 Paper 82b:** Improved Energy  
Efficiency and CO<sub>2</sub> Emission  
Reduction in Dimethyl Carbonate  
Reactive Distillation System  
through Various Heat Integration  
Methods — **Minyong Lee,  
Heecheon Lee, Chaeyeong Seo,  
Jeongwoo Lee, Jae Lee**

**1:20 Paper 82c:** Ultrasonically  
Enhanced Chemical Processes  
— **Elia Colleoni, Paolo Guida,  
Deoras Prabhudharwadkar, Chiara  
Canciani, William Roberts**

**1:45:** Break

**2:10 Paper 82e:** Process  
Intensification Based on Modular  
Decomposition to Improve the  
Sustainability of Chemical  
Processes — **Arick Castillo  
Landro, Diana Domingullo  
Ramirez, Aburto Jorge, Elias  
Martinez Hernandez**

**2:35 Paper 82f:** Concept for the  
Integrated, Quasi-Continuous  
Production of Crystals – from the  
First Idea to the Industrial Pilot  
Plant — **Timo Dobler, Marco  
Gleiss, Hermann Nirschl**

---

**(83) Poster Session: Fuels and Petrochemicals Division**

**Wednesday, Nov 8, 3:30 PM**  
**Hyatt Regency Orlando,**  
**Regency Ballroom R/S**

**Sponsored by:** Fuels and Petrochemicals Division

**Poster 83a:** Evolving Robust and Interpretable Enzymes for the Bioethanol Industry — **Anni Li, Yijie Sheng, Minghui Wang, Xiujuan Li, He Huang**

**Poster 83b:** In-house Developed Resilient and Sustainable Material for Enhanced Oil Recovery — **Syed Muhammad Shakil Hussain, Muhammad Shahzad Kamal, Afeez Gbadamosi, Shirish Patil, Dhafer Al-Shehri**

**Poster 83c:** Assessing the Technical Feasibility of Steam Hydrogasification of Agriculture-Derived Wastes for Renewable Fuel Production in the Leading Agriculture Region — **Zhongzhe Liu, Chan Seung Park, Partho Roy, Xin Fan, Marco Ceja, Rosely Ayala, Robert Lozano, Serina Ishida**

**Poster 83d:** Multiphase Particle in Cell Simulation Study of Ammonia Co-Combustion in a Circulating Fluidized Bed Combustor — **Jester Lih Jie Ling, Han Saem Park, Ha Eun Lee, Seung Seok Oh, Hyun Jun Park, Sang Mun Jeong, See Hoon Lee**

**Poster 83e:** Hydrogen Production By Oxidation of Aluminum Nanopowder in Water Under the Action of Laser Pulses — **Yaroslav Kraft, Boris Aduv, Denis Nurmukhametov, Gennadiy Belokurov, Natalia Nelubina, Zinifer Ismagilov**

**Poster 83f:** Performance Targets for Oxidative Coupling of Methane from Techno-Economic Profiling — **Faisal Ashour, Mamoun Al-Rawashdeh, Patrick Linke**

---

**(84) General Poster Session**

**Wednesday, Nov 8, 3:30 PM**  
**Hyatt Regency Orlando,**  
**Regency Ballroom R/S**

**Sponsored by:** Poster Sessions

**Poster 84a:** Machine Learning with Weighted-Soap to Efficiently Predict Electron Densities — **Siddarth Achar, Leonardo Bernasconi, Karl Johnson**

**Poster 84b:** Rapid Microfluidic Methods for Development of the Chemicals for More Efficient CO<sub>2</sub> Utilization and Sequestration — **Ayrat Gizzatov, Zuhair Al Yousef, Muhammad Almajid**

**Poster 84c:** Confined Fluid Phase Behavior of Carbon Dioxide in Nanoporous Media — **Omer Salim, Keerti Sharma, Mohammad Piri**

**Poster 84d:** Water Thin Films on Kaolinite Basal and Edge Surfaces and Their Effects on Surface Wettability in Relation to Geological Carbon Sequestration — **Minjunshi Xie, Zhehui Jin**

**Poster 84e:** Revitalize Conventional Legacy OIL Fields in North Dakota with Waterflooding and CO<sub>2</sub> EOR — **Tao Jiang, Lu Jin, Stephen Guillot, Michael Warmack, James A. Sorensen, John A. Hamling, Xincheng Wan**

**Poster 84f:** Development of Machine Learning [ML] Based Model for Predicting CO<sub>2</sub> Hydrate Formation Kinetics in Porous Media — **Vikas Dhamu, M Fahed Qureshi, Praveen Linga**

**Poster 84h:** A Model Selection Workflow for Assimilating Time-Lapse Seismic Data in Models for Point Bar Geologic System — **Ismael Dawuda, Sanjay Srinivasan**

**Poster 84i:** Expanding the Adsorbate Binding Energy Correlation from Pt Surface Site Stabilities to the Surface Site Stabilities of Other Metals — **Shyama Charan Mandal, Frank Abild-Pedersen**

**Poster 84j:** Predicting Surface Coverage Effects in Heterogeneous Catalysis Via an Interaction-Counting Approach — **Deep Patel, Luke Roling**

**Poster 84k:** Quantification of Self-Interaction Errors in Selective Catalytic Reduction of NO<sub>x</sub> in Zeolites — **Priyanka Bholanath Shukla, Selim Romero, Rajendra Zope, Tunna Baruah, Koblar Jackson, Karl Johnson**

**Poster 84m:** An efficient and universal solar interfacial photothermal reactor toward liquid phase oxidation — **Chen Wu**

**Poster 84n:** Optimization of Trickle Bed Reactor Distribution: A Computational Fluid Dynamic Approach — **Madison Holly, Carly Fox, Sebastian Uribe, Muthanna Al-Dahhan**

**Poster 84o:** The Design, Preparation of Metal-Organic Materials and Their Applications in Green Synthesis of API — **Yajing Shen**

**Poster 84p:** Engineering Bio-MOF-1 Derived Single-Atom Catalyst with a Hierarchical Porous Nanostructure for Highly Selective CO<sub>2</sub> Electroreduction — **Ye Chan Lee, Byoung Joon Park, Jeong Woo Han**

**Poster 84q:** Strategies to Control the Microenvironment in Electrochemical CO<sub>2</sub> Reduction — **Yaqi Cheng, Chaolong Wei, Fei Yu, Panpan Zhang, Wang Xin, Andrew Wong**

**Poster 84r:** Effect of Synthesis Method on Performance of Hybrid Catalyst for Direct DME Synthesis: Flame Synthesis and Co-Precipitation. — **Onochie Okonkwo, Komal Tripathi, Sonal Asthana, Yiming Xi, Sujit Modi, Kamal Pant, Pratim Biswas**

**Poster 84s:** Reverse Microemulsion Synthesis Promotes the Formation of Iron Carbide in Direct Hydrogenation of CO<sub>2</sub> to Light Hydrocarbons — **Yue Yu, David Simakov**

**Poster 84t:** A Modeling of Flow Cell eCO<sub>2r</sub> System for Elucidating the Phenomena of Local Reaction Environment Using Multi-Physics Simulation. — **Hyeonggeon Lee, Ung Lee**

**Poster 84u:** CO<sub>2</sub> Upgradation By Methane Coupling on Metal Ion-Exchanged Zeolites — **Sundar Raam Swaminathan, Venugopal Balashanmugam, Niket Kaisare**

**Poster 84v:** A Structure-Guided Design of an Oligomeric Hydrophobin Bundle Using Coiled Coils — **Mohamad Mahmoud, Suna Jo, Won Min Park**

**Poster 84w:** Single Particle Cryo-EM Structure of Ferritin Biomimetalization Showing the Protein-Nanoparticle Conjugate — **Sagnik Sen**

**Poster 84x:** Investigating the Potential of TMS-EDTA Modified Silica for Valuable Element Adsorption from Produced Water — **Saeed Azizi, Anirban Ghosh, Songpei Xie, Mark Krzmarzick, Clint Aichele**

**Poster 84y:** Treatment of Domestic Wastewater By Coagulation, Adsorption, and Filtration for Reusing in the Production of Concrete Mixtures — **R. Morsy, Salma O. Mahmoud, Emad El-Din E. Abdel-Qader, Kareem M. Bakr, Anas K. Taha, Ahmed M. Abdallah, Hassan M. Abdul Karim, Ahmed Mahmoud, Mohamed Mostafa**

**Poster 84z:** High-Efficiency Solar Evaporator System for Treating Brackish and Produced Water. — **Mounika Chevula, Punya Mainali, Charlie Cutts, Sharad Puri, David N. McIlroy, Seokjhin Kim**

**Poster 84aa:** Demonstration of a Batch Electrochemical System for Phosphorus Recovery from a Real Municipal Wastewater Recycle Stream — **Syed Asad Abbas, Sana Heydarian, Lawrence Ajayi, Jason Trembly, Damilola Daramola**

**Poster 84ab:** Enhanced Electro-Activity of Nickel Phosphide By Pre-Treatment for Efficient Hydrogen Sulfide Elimination — **Xin Zhang, Riyong Qi, Kuichuan Sheng, Ruo He, Hongjian Lin**

**Poster 84ac:** Modified Donnan Dialysis Process for Selective Nutrient Removal from Agricultural Liquid Waste — **Amir Akbari, Lauren F. Greenlee, Bruce E. Logan**

**Poster 84ad:** A Stochastic Optimization and Machine Learning-Based Framework for Evaluating Ammonia Utilization As a Hydrogen Carrier — **Dongjun Lim, Jiwon Gu, Jong Ah Moon, Yeong Jin Koh, Hankwon Lim**

**Poster 84ae:** Electrochemical Capacitance Tuning of Carbon Nanosheets Using a Salt-Template Process — **Devapriya Basu, Ramesh Achayalingam, M. Sterlin Leo Hudson**

- Poster 84af:** Developmental Pb Exposure Increases AD Risk Via Altered Intracellular  $\text{Ca}^{2+}$  Homeostasis in hiPSC-Derived Cortical Neurons — **Junkai Xie, Shichen Wu, Chongli Yuan**
- Poster 84ag:** Analysis of Internal Flow Phenomena in a High Speed Rotating Cylinder Using Double Parabolic Axial Flow Model — **Dr. Sahadev Pradhan**
- Poster 84ah:** Soiling Impacts on Hydrophobic Coating with and Without Dew Suppression — **Aniket Ratnaparkhi, Drashti Dave, Michael Valerino, Mike Bergin, Chinmay Ghoroi**
- Poster 84ai:** Effect of Water-Gas Seepage and Salt Ions on Hydrate Phase Transition in Porous Media — **Huiru Sun**
- Poster 84aj:** Persistence of *Phi6*, a Sars-Cov-2 Surrogate, in Simulated Indoor Environments: Effects of Humidity and Material Moisture Adsorption — **Eloise Parry-Nweye, Zhenlei Liu, Youssr Dhaouadi, Xin Guo, Jianshun Zhang, Dacheng Ren**
- Poster 84ak:** Multi-Objective Optimization for Work-Integrated Heat Exchange Network — **Yongjian Huang, Yu Zhuang, Linlin Liu, Jian Du, Shengqiang Shen**
- Poster 84al:** Pre-Differentiation Pfas Exposure and Its Effect in Human Dopaminergic-like Neurons — **Shichen Wu, Junkai Xie, Han Zhao, Xihui Zhao, Chongli Yuan**
- Poster 84am:** Sustainable Detection of Oil at Well Site: High Contrast UV Fluorescence Imaging System for Pixel-Level Detection of Oil-Bearing Rock Cuttings — **Richa Sharma, Karim Bondabou, Mahdi Ammar, Matthias Francois**
- Poster 84ao:** A Novel Approach to Develop Industrial Facility's Life-Time Energy Efficient Design **Zeeshan Farooq & Abdulrahman Hazazi, Energy System Division, P&csd Saudi Aramco, Dhahran** — **Zeeshan Farooq**
- Poster 84ap:** Economic and Environmental Assessment of Plastic Sorting and Recycling: A Multi-Period Approach — **Cheon JaePil, Junhyeok Son, Yuchan Ahn**
- Poster 84aq:** Maximizing Cost Savings and Reducing CO<sub>2</sub> Emission in NCC Process with Heat Exchanger Networks: An Integrated Analysis — **Subin Jung, Hyojin Jung, Yuchan Ahn**
- Poster 84ar:** Techno-Economic Assessment of Biomass to Valuable Pyrolyzed Hydrochar Via Hydrothermal Carbonization and Pyrolysis. — **Cadianne Chambers, Toufiq Reza, Sumit Sharma, Nirupam Aich**
- Poster 84as:** Application of a Developed Techno-Economic Analysis Framework to CO<sub>2</sub> Electrochemical Reduction Processes — **Claudemi Alves Nascimento, Fernando V. Lima**
- Poster 84at:** Asset Intensification: Application of Modelling Tools and Methodologies from a Cdm Perspective — **Filipe Ataide, Jose Luis Santos, Filipe Gaspar**
- Poster 84au:** Developing Efficient and Sustainable Packaging Processes in the Downstream Operations of the Oil and Gas Sector — **Swapana Jerpoth, Barnabas Gao, Robert Hesketh, C. Stewart Slater, Mariano J. Savelski, Kirti Yenkie**
- Poster 84av:** Economic Comparison of Nano-Porous Silica Production Processes from Rice Husk and Sand — **Semie Kim, Young-Il Lim**
- Poster 84aw:** Optimizing Reformer Performance for Integrated Blue Hydrogen-Methanol Production: A Multi-Objective Optimization and Techno-Economic Study — **Ajay Koushik V, Achyuta Krishnan, Niket Kaisare, Preeti Aghalayam**
- Poster 84ax:** Life Cycle Assessment of Biodiesel Production Processes from Waste Animal Fats with Pretreatment Process — **Pyeong-Gon Jung, Semie Kim, Young-Il Lim**
- Poster 84ay:** Catalytic Performance Promotion of Pd Cluster Towards H<sub>2</sub>O<sub>2</sub> Production By Potential-Driven Coordination Adjustment — **Zhiping Deng, Xiaolei Wang**
- Poster 84az:** Stability and Redox Kinetics of Ti<sup>4+</sup>/Ti<sup>3+</sup> for Flow Battery Applications — **Maria Bruce, Vijay Ramani**
- Poster 84ba:** Highly Efficient Redox Flow Batteries Using Low Cost Materials — **Abena Williams, Robert Emmett, Xueting Wang, Eric M. Davis, Mark E. Roberts**
- Poster 84bb:** Understanding the Role of Calcium Zincate ( $\text{CaZn}_2(\text{OH})_6 \cdot 2\text{H}_2\text{O}$ ) in Improving Cycle Life of Rechargeable Alkaline Zinc Batteries — **Patrick K. Yang, Damon E. Turney, Michael Nyce, Timothy N. Lambert, Stephen O'Brien, Sanjoy Banerjee, Gautam Yadav, Jinchao Huang, Meir Weiner, Shinju Yang**
- Poster 84bc:** Effects of Composite Sulfur Electrode Structures and Electrolyte Compositions on Rechargeable Aluminum-Sulfur Batteries — **Snehal Bhalekar, Robert Messinger**
- Poster 84be:** Efficient Scalable Hydrothermal Synthesis of MnO<sub>2</sub> with Controlled Polymorphs and Morphologies for Enhanced Battery Cathodes — **Shifeng Hong, Shuo Jin, Lynden A. Archer**
- Poster 84bf:** Imidazole-Based Concentrated Hydrogen-Bonded Electrolytes for Energy Storage Applications — **Miguel Muñoz Sánchez, Burcu Gurkan, William Dean**
- Poster 84bg:** Effect of Cathode Precursor Particle Size Distribution on Cobalt-Free Lithium-Nickel-Manganese-Oxide Battery Performance — **Sunuk Kim, Sourav Mallick, Arjun Patel, Jethrine Mugumya, Sophie Kothe, M. Parans Paranthaman, Michael L. Rasche, Ram Gupta, Herman Lopez, Mo Jiang**
- Poster 84bh:** High-Throughput Screening of Electrosynthetic Reactions Enabled By Wireless Electrochemical Cell — **Yiming Mo**
- Poster 84bi:** Increasing Data Collection Efficiency through Incorporation of Derivative and Uncertainty Information into Gaussian Process Regression — **Jacob Monroe, William P. Krekelberg, Austin McDannald, Vincent K. Shen**
- Poster 84bj:** Data-Driven Design of Selective Partial Agonist for Cannabinoid Receptors — **Soumajit Dutta, Austin Weigle, Diwakar Shukla**
- Poster 84bk:** Removal of Insecticides from Wastewater Using Ionic Liquids: A Computational Study — **Mustafa Nasser, Mohammed Al Hassan, Ibnelwaleed Hussein, Muneer Ba-Abbad, Imran Khan**
- Poster 84bl:** Understanding Proton-Coupled Electron Transfer on Polyoxovanadate Nanoclusters — **Andreas Towarnicky, Giannis Mpourmpakis**
- Poster 84bm:** First-Principles Mechanistic Study of Oxidative Degradation of Aqueous Amine Solvents for Carbon Dioxide Capture — **Jiwon Yu, Dipam Patel, Gyeong S. Hwang**
- Poster 84bn:** A DFT Analysis of Optimal Solvents for High-Throughput Processing of Imine-Linked Covalent Organic Frameworks — **Emily Polo-Rankin, Alex Fatouros, Obioma Uche**
- Poster 244f:** Investigation of Catalytic Activity of Fecunc Catalysts for Oxygen Reduction Reaction in Alkaline Medium with Gas Diffusion Electrode Half-Cell System — **Jong Gyeong Kim, Hyeon-Seung Jung, Youngin Cho, Chanho Pak**

---

**(85) Poster Session: Process Development**

**Wednesday, Nov 8, 3:30 PM  
Hyatt Regency Orlando,  
Regency Ballroom R/S**

**Vinod Kumar Venkatakrishnan,  
Chair**

**Sponsored by:** Process Development Division

**Poster 85a:** Internally Heat-Integrated Pressure-Swing Distillation for Non-Ideal Separation Using Computational Fluid Dynamics — **Heecheon Lee, Chaeyeong Seo, Minyong Lee, Jae Lee**

**Poster 85b:** An Energy-Efficient Double Annular Column for Azeotropic Separation — **Heecheon Lee, Minyong Lee, Jae Lee**

**Poster 85d:** Efficient Cleaning Methods for Gas Supply Systems in Semiconductor Manufacture Using CFD — **Ireh Seo, Rakyong Jeon, Tae-Ung Yoon, Chang-Ha Lee**

**Poster 85e:** Amine Blending Optimization for Maximizing CO<sub>2</sub> Absorption Capacity in a MEA - Mdea -Water System Using the Thermodynamic Model  
— **Jinyoung CHA**

**Poster 85f:** Techno-Economic and Environmental Assessment of Onsite Green Hydrogen Production By Ammonia Cracking — **Sijan Devkota**

**(86) Poster Session: Sustainability Science and Engineering, Biorefineries, and Energy**

**Wednesday, Nov 8, 3:30 PM**  
**Hyatt Regency Orlando,**  
**Regency Ballroom R/S**

**Siddharth Patwardhan, Chair**  
**Clayton Jeffryes, Co-Chair**  
**Yaseen Elkasabi, Co-Chair**

**Sponsored by:** Sustainable Engineering Forum

**Poster 86a:** Selective and Efficient Valorization of Industrial Wastes Via Carbon Mineralization — **Ning Zhang, Danny Huang, Aaron Moment, Ah-Hyung Park**

**Poster 86b:** Unique Synergies between Carbon Mineralization and Biomass Conversion: Alkaline Thermal Treatment for Combined Carbon Capture and Hydrogen Production — **Jonah Williams, Ah-Hyung Park**

**Poster 86c:** Evaluation of Bioenergy Production from Advanced MFC-Fermentation Technology — **Kundan Kumar, Ming-Hsun Cheng**

**Poster 86e:** Chemical Sector Risk Management Agency Resources in Support of a Sustainable and Resilient Chemical Sector  
— **Janine Mason, Ashley Pennington, Cheryl Louck, Jacob Mehl**

**Poster 86g:** Landfill Gas Converted into Renewable Natural Gas: A Case Study in Texas  
— **Helen Lou, Elizabeth Hastings, Jian Fang, Jessica Ledwith, Samantha Adelan**

**Poster 86h:** Synthesis and Tribological Properties of Bio-Based Lubricants from Vegetable Oils — **Paulo Roberto C. F. Ribeiro Filho, Francisco Murilo Tavares de Luna, Celio Cavalcante Jr.**

**Poster 86i:** Materials for Direct Air Capture of CO<sub>2</sub> Via Particle Molecular Layer Deposition  
— **Hailey Loehde-Woolard, Bergen Evans, Kent J. Warren, Alan Weimer**

**Poster 86j:** Integration of Sustainable Extraction and Recovery of Energy-Relevant Metals Using Aldoxime-Based Ligands Systems from Unconventional Resources  
— **Amanda Whai Shin Ooi, Hunter B. Vibbert, Ah-Hyung Park**

**Poster 86k:** Guidelines for Designing Amine-Based CO<sub>2</sub> Capture Systems Onboard LNG Fuelled Ships — **Anikesh Kumar, Preethi Sridhar, Farooq Shamsuzzaman, Ittekkhar Karimi**

**Poster 86m:** A Novel Integration of Solar Chimney Power Plant with Wind Farm for Green Hydrogen and Distilled Water Production  
— **Fares Almomani, Jihad Eriekat, Hamza Alnawafah, Emad Abdelsalam**

**Poster 86n:** Electrochemical Performance of Hybrid Ferrite/(Mn, Ti)-Oxide Electrode for Asymmetric Supercapacitor — **Khang Huynh, Bharathkiran Maddipudi, Rajesh Shende**

**Poster 86o:** Data-Driven Modeling to Predict Wettability for the Rock/Hydrogen/Brine System  
— **Shams Kalam, Muhammad Arif, Sidqi A. Abu-Khamsin, Shirish Patil, Muhammad Shahzad Kamal**

**Poster 243c:** System Level Analysis of Intermittent Photocatalytic Processes for the Production of Liquid Fuels  
— **Luisdomingo Guzman, Juan Manuel Restrepo-Florez**

**(87) Poster Session: Transport and Energy Processes Division**

**Wednesday, Nov 8, 3:30 PM**  
**Hyatt Regency Orlando,**  
**Regency Ballroom R/S**

**Yangchuan Xing, Chair**  
**Zheng Chen, Co-Chair**

**Sponsored by:** Transport and Energy Processes

**Poster 87a:** Steam Reforming of Model Biomass Gasification Tar over Ni-Based Carbon Supported Catalyst — **Sang Jun Yoon, Sung Jin Park, Tae-Young Mun, Jihong Moon**

**Poster 87b:** Effects on Ammonia Injection Directions for Coal-Ammonia Co-Firing in a Circulating Fluidized Bed Combustion Test Rig  
— **Seong-Ju Kim, Sung Jin Park, Sang Jun Yoon, Tae-Young Mun**

**Poster 87c:** Techno Feasibility Analysis for Steam-to-Hot Water Conversion for West Virginia University, Morgantown Campus.  
— **Sai Kiran Yerravally, Daniel Lemasters, Thomas J. Rosson, Srinivas Palanki, Nagasree Garapati**

**Poster 87d:** Numerical Investigations of Spontaneous Imbibition in Porous Media  
— **Akshit Agarwal, Jyoti Phirani**

**Poster 87e:** Stabilizing Sodium Ion Transfer at the Nasicon Solid-State Electrolyte and Metallic Na Anode Interface By Nanoscale Metal Oxide Coating — **Baiheng Li, Ian Baker, Weiyang Li**

**Poster 87f:** Biogas Production from Co-Digesting House Hold Vegetable Waste with the Industrial Waste Water Using Expanded Granular Sludge Bed Anaerobic Digestion (AD) System — **Jackson Oglesby, Sarah Riley, Frank Reinsch, Jaden Johnson, Vena Prudent, Justin Penn, Haider Al-Rubaye, Joseph Smith**

**Poster 87g:** Insight into Electrochemical Batch Reactor for Phosphorus Recovery Using Mathematical Modeling  
— **Ardavan Zanganeh, Kody Wolfe, Damilola Daramola**

**Poster 87h:** Optimization of Capacitance in Supercapacitors By Constructing an Experimentally Validated Hybrid Artificial Neural Networks-Genetic Algorithm Framework — **Betul Uralcan**

**Poster 87i:** In silico Demonstration of Fast Anhydrous Proton Conduction on Graphanol  
— **Siddarth Achar, Leonardo Bernasconi, Karl Johnson**

**Poster 87j:** Ageing Effects of Catalyst Ink for Polymer Electrolyte Membrane Fuel Cells — **Mario Kircher, Wai Yee Koo, Michaela Roschger, Viktor Hacker**

**Poster 87k:** Electrode Development in Alkaline Direct Ethanol Fuel Cells — **Michaela Roschger, Sigrid Wolf, Boštjan Genorio, Selestina Gorgieva, Viktor Hacker**

**Poster 87l:** Multi-Physics Simulations and Bayesian Optimisation of Flow in Alkaline Water Electrolyzers — **Morgan Kerhouant, Thomas Abadie, Raj Venuturumilli, Andre Nicolle, Omar Matar**

**Poster 87m:** Ion and Water Transport in Polynorbornene-Based Thin Film Membranes — **Ge Sun, Zhongyang Wang, Abhishek Sharma, Shrayesh Patel, Paul F. Nealey, Juan J. de Pablo**

**Poster 87n:** Understanding Water Absorption, Percolation, and Ion Transport in an Anion Exchange Membrane — **Zhongyang Wang, Ge Sun, Mrinmay Mandal, Abhishek Sharma, Chuting Deng, Kai Wang, Aaron Taggart, Alex Martinson, Paul Kohl, Juan J. de Pablo, Shrayesh Patel, Paul F. Nealey**

**Poster 87o:** Development of High-Power and Durable MEA for Polymer Electrolyte Membrane Fuel Cells Using Structured Carbon Nanofiber Matrix  
— **Yunseong Ji, Dae Woo Kim, Yunggun Shul**

**Poster 87p:** Computational High-Throughput Study of Hydrogen Permeation through Two-Dimensional Structures for Use As Proton-Conducting Membranes  
— **Yuting Li, Daniel Bahamon, Jaber Almarri, Nirpendra Singh, Marcelo Lozada-Hidalgo, Andre K. Geim, Lourdes Vega**

**Poster 87r:** Energy Optimization By Installation of Hrsg (HEAT RECOVERY STEAM GENERATOR) at Exhaust Gases of Gas Turbine Driven Compressor — **Kashif Jameel, Usman Asif**

---

**(88) Plenary Session:  
Computational Molecular  
Science and Engineering Forum  
(Invited Talks)**

**Wednesday, Nov 8, 3:30 PM  
Hyatt Regency Orlando, Rock  
Spring I/II**

**Jeetain Mittal, Chair  
Sapna Sarupria, Co-Chair**

**Sponsored by:** Computational  
Molecular Science and  
Engineering Forum

**3:30 Paper 88a:** Accelerating  
discovery with computational  
chemistry in challenging materials  
spaces — **Heather Kulik**

**4:10 Paper 88b:** Computational  
and Experimental Characterization  
of the Ligand Environment of a Ni-  
Oxo Catalyst Supported in  
Metal–Organic Framework  
NU-1000 — **Stephen Vicchio,**  
**Zhihengyu Chen, Karena**  
**Chapman, Rachel Getman**

**4:30 Paper 88c:** T.B.A — **Rebecca  
Lindsey**

**5:10 Paper 88d:** Electronic  
Structure and Reactivity  
Predictions for Soft Material  
Length Scales — **Nicholas  
Jackson**

**5:30 Paper 88e:** Understanding  
the Effect of Water on CO<sub>2</sub>  
Capture in Metal–Organic  
Frameworks — **Maytham Alzayer,**  
**Filip Formalik, Faramarz Joodaki,**  
**Srinivasu Kancharlapalli, Jiayang**  
**Liu, Randall Snurr**

---

**(89) Innovation and  
Entrepreneurship in Chemical  
Engineering**

**Wednesday, Nov 8, 3:30 PM  
Hyatt Regency Orlando, Bayhill  
17**

**Saurabh Maduskar, Chair  
Udit Gupta, Co-Chair  
Nitish Mittal, Co-Chair**

**Sponsored by:** Management  
Division

**3:30:** Welcoming Remarks

**3:40 Paper 89d:** Fueling the  
Energy Transition – Lessons  
Learned from a Renewable Energy  
Startup — **Derek Vardon**

**4:05 Paper 89e:** Scale-up of  
Purecycle Purification Process  
— **Michael Weber**

**4:30 Paper 89a:** Trials and  
Tribulations in Entrepreneurship for  
a Chemical Engineer — **Andrew  
Jones**

**4:55 Paper 89b:** Gambling on  
Innovation with Learning — **Darrell  
Velegol**

**5:20 Paper 89c:** Our Journey in  
Commercialising Scalable,  
Economical and Sustainable  
Porous-Silicon for Li-Ion Battery  
Anodes — **Siddharth Patwardhan**

**5:45:** Concluding Remarks

---

**(90) Division Plenary: North  
American Mixing Forum Awards  
Session (Invited Talks)**

**Wednesday, Nov 8, 3:30 PM  
Hyatt Regency Orlando, Bayhill  
31**

**Sujit Bhattacharya, Chair  
David Dickey, Co-Chair  
Richard Cope, Co-Chair**

**Sponsored by:** North American  
Mixing Forum

**3:30 Paper 90a:** Student Award  
Presentation — **Sujit  
Bhattacharya**

**3:45 Paper 90b:** “Process Always  
Comes First” When Successfully  
Applying Mixing Technology  
— **Aaron Sarafinas**

---

**(91) Fundamentals and  
Applications for Municipal Solid  
Waste Treatment and  
Valorization**

**Thursday, Nov 9, 8:00 AM  
Hyatt Regency Orlando,  
Rainbow Spring I/II**

**Matthew Alexander, Chair  
Enoch Nagelli, Co-Chair  
Mohamed Mostafa, Co-Chair  
Robert Peters, Co-Chair  
Aurora del Carmen Munguía-  
López, Co-Chair**

**Sponsored by:** Solid and  
Hazardous Waste

**8:00 Paper 91a:** Integration of the  
Carboxylate Platform with Mcl-  
PHA Fermentation to Enable a  
Universal Route from Waste to  
Bioplastics — **Jorge Arreola  
Vargas, Bing Xu, Zach Foudeh,  
Cheng Hu, Cesar Granda, Susie  
Dai, Shuhua Yuan**

**8:20 Paper 91b:** Technoeconomic  
Assessment of Emerging  
Technologies for the Enhancement  
of Anaerobic Digestion Processes  
at Municipal Wastewater Treatment  
Facilities — **Peter Valdez, Lesley  
J. Snowden-Swan, Timothy E.  
Seiple, Phillip Teller, Richard  
Garrison, Fuad Ale Enriquez, Nalok  
Dutta, Anthony Giduthuri, Birgitte  
Ahring**

**8:40 Paper 91c:** Hydrothermal  
Liquefaction of Waste Activated  
Sludge: Initial Composition Effects  
on Product Distribution and  
Nutrient Recovery — **João Poli,  
Susan Williams, Belinda S.M.  
Sturm**

**9:00 Paper 91d:** Tracking Nitrogen  
Fate in US Wastewater Treatment  
Plants: A Case Study of  
Metropolitan Water Reclamation  
District of Greater Chicago  
(MWRD) Plants — **Justin Chang**

**9:20 Paper 91e:** Process  
Modeling, Techno-Economic  
Analysis and Life-Cycle  
Assessment of Intensified Biogas  
to Liquid (IBGTL) Process.  
— **Rarosue Amaraibi, John Kuhn,  
Babu Joseph**

**9:40 Paper 91f:** Elucidation of  
Change in Oxidation State for  
Metal Recovery from WTE Ash in  
Reactive Environments — **Janhvi  
Trivedi, Marco J. Castaldi**

**10:00 Paper 91g:** On-Site  
Electricity Generation Using  
Trashology's Pur-Gen Technology  
— **William Wang, Matthew Young,  
Stephen Armstrong**

**10:20 Paper 91h:** Recovery of  
Resources from Food Waste to  
Synthesise Nutrient-Loaded Slow-  
Release Hydrogel — **Yen Wah  
Tong**

---

**(92) Crystallization in Process  
Development**

**Thursday, Nov 9, 8:00 AM  
Hyatt Regency Orlando, Bayhill  
19**

**Thomas Vetter, Chair  
Bruce Hook, Co-Chair**

**Sponsored by:** Solids Flow,  
Handling and Processing

**8:00 Paper 92a:** Development of  
Automated Milling Platform for  
Crystal Engineering — **Shailesh  
Agrawal, Saurin Hiren Rawal,  
Jeremy Merritt**

**8:25 Paper 92b:** Process Control  
and Design of the Continuous  
Crystallization of a Polymorphic  
Agrochemical — **Montgomery  
Smith, Paul Larsen, Venkateswarlu  
Bhamidi, Zoltan Nagy**

**8:50 Paper 92c:** Recovery of  
Valuable Metals from Industrial  
Leachates of Spent Ni Metal  
Hydride Batteries By Precipitation  
Processes. — **Boris Guzhov,  
Laurent Cassayre, Nicolas Coppey,  
Béatrice Biscans**

**9:15 Paper 92d:** Stabilization and  
Coagulation of Colloidal  
Suspensions during Crystallization  
— **Xiongtao Ji, Ting Wang, Na  
Wang, Xin Huang, Hongxun Hao**

---

**(94) Fundamentals and  
Applications for Waste  
Treatment and Valorization I**

**Thursday, Nov 9, 12:30 PM  
Hyatt Regency Orlando,  
Rainbow Spring I/II**

**Heriberto Cabezas, Co-Chair  
Yinlun Huang, Co-Chair  
Robert Peters, Co-Chair  
Aurora del Carmen Munguía-  
López, Co-Chair**

**Sponsored by:** Fundamentals

**12:30 Paper 94a:** Lessons  
Learned: Case Histories of Several  
Environmental Disasters and Their  
Implications for the Waste Plastics  
Crisis — **Jeffrey Seay, Mary Ellen  
Ternes, Robert Peters**

**12:48 Paper 94b:** Methods for AI-  
Enabled Water Treatment — **Da  
Yan, Robert Peters, Yang Zhou,  
Mohamed Mostafa**



**1:06 Paper 94c:** Valorization of Water Treatment Plant Residuals to Biodegradable Deicers — **Alexander Mathews**

**1:24 Paper 94d:** Bio-Electrochemical Treatment of Dairy Manure for in-Situ Sulfide Remediation — **Lingkan Ding, Bo Hu**

**1:42 Paper 94e:** A Novel Three-Stage Process to Treat Sewage Sludge with High Phosphorus Recovery and Bioenergy Production — **Lingkan Ding, Daniel Jurado Pineda, JAMES Postiglione, Bo Hu**

**2:00 Paper 94f:** A Systematic Study of Co-Digestion of Fishery Sludge and Food Waste for Biogas Production — **Reza Khorasani, Jin Wang, Q. Peter He**

**2:18 Paper 94g:** One-Pot Synthesis of a Novel Chitosan-Based Hydrogel By C-Mannich Reaction and Screening of Its Cu (II) Uptake — **John Rey Romal, Dr. Say Kee Ong**

---

**(95) Advances in machine learning and intelligent systems I**

**Sunday, Nov 5, 3:30 PM**  
**Hyatt Regency Orlando, Bayhill 23**

**Mingjian Wen, Chair**  
**Wentao Tang, Co-Chair**

**Sponsored by:** Information Management and Intelligent Systems

**3:30 Paper 95a:** A Novel Approach for VOC Emission Characteristics Identification Based on Deep Learning and Its Application in Source Tracing of a Chemical Industrial Park — **Deji Jing**

**3:51 Paper 95b:** Bayesian Optimization for Nonlinear Model and Force Field Calibration — **Montana Carlozo, Bridgette Befort, Ning Wang, Edward Maginn, Alexander Dowling**

**4:12 Paper 95c:** AI-Driven Hypergraph Network of Organic Chemistry: Applications in Reaction Classification — **Vipul Mann, Venkat Venkatasubramanian**

**4:33 Paper 95d:** Machine Learning Full Elastic Tensors of Inorganic Materials with Equivariant Neural Networks — **Mingjian Wen**

**4:54 Paper 95e:** Automated Mechanism-Based Explanation Generation of Machine Learning Models — **Arijit Chakraborty, Venkat Venkatasubramanian**

**5:15 Paper 95f:** Automating the Search for New Drugs: From Prediction to Characterization and Back Again — **Matthew A. McDonald, Brent Koscher, Richard Canty, Frank Lee, Klavs Jensen**

**5:36 Paper 95g:** A Compressed Sensing Framework for Learning Interpretable Molecular Property Models from Limited Data: Application to Discovery of Sustainable Battery Materials — **Farshud Sorourifar, Madhav Muthyala, Joel Paulson**

---

**(96) Highly Efficient DOE for Rapid Process Development**

**Sunday, Nov 5, 3:30 PM**  
**Hyatt Regency Orlando, Celebration 6**

**Mark Anderson, Chair**

**Sponsored by:** Miscellaneous

**3:30 Paper 96a:** Highly Efficient DOE for Rapid Process Development — **Mark Anderson**

---

**(97) Fluid Particle Separations in Energy and Environmental Systems**

**Sunday, Nov 5, 3:30 PM**  
**Hyatt Regency Orlando, Coral Spring I/II**

**Jenifer Gomez Pastora, Chair**  
**Seyi Oduyungbo, Co-Chair**

**Sponsored by:** Fluid-Particle Separations

**3:30 Paper 97a:** Recycling of Lithium-Ion Batteries: Selective Leaching of Lithium By Using Water As Sustainable Leaching Agent — **Rafaela Greil, Joevy Chai, Georg Rudelstorfer, Susanne Lux**

**3:55 Paper 97b:** Acoustic Oil-Water-Fines Separation for Sustainable Oil Production Operations — **Amr Abdel-Fattah**

**4:20 Paper 97c:** Elucidating the Mechanisms of Ion Permeation through Sub-Nanometer Graphene Pores: Uncovering Free Energy Barriers Via High-Throughput Molecular Simulations" — **Andres Ordorica, Piran Kidambi, Peter T. Cummings**

---

**(98) CO<sub>2</sub> Capture for Industrial Point Sources**

**Sunday, Nov 5, 3:30 PM**  
**Hyatt Regency Orlando, Regency Ballroom T**

**David Hopkinson, Chair**  
**Jonathan Stickel, Co-Chair**  
**Tae Hoon Lee, Co-Chair**

**Sponsored by:** Sustainable Energy

**3:30 Paper 98a:** Increasing Diffusion Selectivity Via Free Volume Manipulation (FVM) and *in Situ* Thermal Oxidative Crosslinks of Amine-Functionalized PIM-1 Membrane — **Taigyoo Joo, Tae Hoon Lee, Wan-Ni Wu, Sungsool Wi, Zachary P. Smith**

**3:48 Paper 98b:** Selective CO<sub>2</sub> Separation By Facilitated Transport in Ionic Liquid Gel Membranes — **Philip Cox, Alex Ferguson, Vincent Storhaug**

**4:06 Paper 98c:** CFD Modeling of Flue Gas Separation with Hollow Fiber Modules and Experimental Verification Via 3D Printing — **Victor A. Kusuma, Lili Sun, Comfort Oluleke, Lingxiang Zhu, Nathan Diemler, Grigorios Panagakos, Glenn Lipscomb, David Hopkinson**

**4:24 Paper 98d:** CFD Modeling of High-Flux Plate-and-Frame Membrane Modules for Post-Combustion Carbon Capture — **Cheick Dosso, Lingxiang Zhu, Victor A. Kusuma, David Hopkinson, Lorenz Biegler, Grigorios Panagakos**

**4:42 Paper 98e:** Development and Evaluation of Novel Biphasic Solvents for Post-Combustion Carbon Capture — **Yongqi Lu, Hong Lu, Hafiz Salih, Paul Nielsen, Qing Ye**

**5:00 Paper 98f:** Data-Driven Design and Characterization of Aprotic *N*-Heterocyclic Anion (AHA) Ionic Liquids for CO<sub>2</sub> Capture — **Austin N. Keller, Pranav J. Thacker, Louise M. Cañada, Michael Baldea, Mark Stadther, Joan Brennecke**

**5:18 Paper 98g:** Simulation and Uncertainty Quantification of a Cryogenic Carbon Capture System for Cement Industry — **Brandon Paul, Daison Manuel Yancy Caballero, Miguel A. Zamarripa, Benjamin P. Omell, Michael S. Matuszewski**

**5:36 Paper 98h:** Continuous Carbon Capture Via Oxygen/Water Electrolysis in a Modular Solidelectrolyte Reactor — **Peng Zhu, T Alan Hatton, Haotian Wang**

---

**(99) Division Plenary: CAST (Invited Talks)**

**Monday, Nov 6, 8:00 AM**  
**Hyatt Regency Orlando, Regency Ballroom Q**

**Carl Laird, Chair**  
**Matt Bassett, Co-Chair**

**Sponsored by:** Computing Systems and Technology Division

**8:00 Paper 99a:** CAST Division Update — **Matt Bassett**

**8:10 Paper 99b:** CAST Division Programming Update — **Carl Laird**

**8:20 Paper 99c:** Autocompletion of Piping and Instrumentation Diagrams (P&IDs) with Artificial Intelligence — **Artur M. Schweidtmann**

**8:45 Paper 99d:** Case Studies on the Combined Identification and Offset-Free Control of Chemical Processes — **Steven Kuntz, James J. Downs, Stephen M. Miller, James Rawlings**

**9:10 Paper 99e:** Decision-Focused Surrogate Modeling for Mixed-Integer Optimization — **Shivi Dixit, Rishabh Gupta, Qi Zhang**

**9:35 Paper 99f:** Strategies for Renewable Muconic Acid Production from Lignin-Based Aromatics through Rational Metabolic Engineering of *Pseudomonas Putida* KT2440 — **Antonis Kokossis**, *Pinelopi Marina Politi*, **Stefanos Xenios**, *Konstantinos Mexis*, *Vassily Hatzimanikatis*, *Ljubisa Miskovic*, *Ilias Toumpe*

**10:00 Paper 99g:** Measure This, Not That: Pareto Optimal Trade-Offs between Model-Based Information Content and Measurements Cost — **Jialu Wang**, *Alexander Dowling*

---

**(100) 3D Culture: Organoids and Spheroids**

**Monday, Nov 6, 8:00 AM  
Hyatt Regency Orlando,  
Celebration 3**

**Molly Kozminsky, Chair  
Quinton Smith, Co-Chair  
Sasha Cai Leshner-Pérez, Co-Chair**

**Sponsored by:** Engineering Fundamentals in Life Science

**8:00:** Break

**8:18 Paper 100a:** Evaluating the Impact of Dynamic Flow on the Chemotherapeutic Treatment of Advanced Multicellular Pancreatic Cancer Models — **Priyanka Gupta**, *Hemant Kocher*, *Bhumika Singh*, *John Malcolm Wilkinson*, *Pedro Perez-Mancera*, **Eirini Velliou**

**8:36 Paper 100b:** Development of a High-Throughput Drug Screening Platform Via Pipetting Gel Droplet Micro-Organoids Models — **Daniel Montes**, *Fei Fan*, *Liao Chen*, *Xin Lu*, *Sharon Stack*, *Donny Hanjaya-Putra*, *Hsueh-Chia Chang*

**8:54 Paper 100c:** Investigating the Role of Metabolism in Human Stem Cell Differentiation and Development Using Organoid Models — **Gautami Kelkar**, *Albert J. Keung*

**9:12 Paper 100d:** A Human iPSC-Derived Brain-on-Chip to Model Delivery to the Brain — **Rebecca L. Pinals**, *Alice Stanton*, *Nhat Truong*, *Claudia F. Lozano Cruz*, *Adele Bubnys*, *Emre Agbas*, *Sydney Hawkins*, *Alexandra Volkova*, *Dong Shin Park*, *Alan Jiang*, *Colin Staab*, *Robert Langer*, *Li-Huei Tsai*

**9:30 Paper 100e:** Glioblastoma Organoids Model Extracellular Matrix Heterogeneity — **Alexandra Avera**, *Taylor Schnorbus*, *Macy Birge*, *Yonghyun (John) Kim*

**9:48 Paper 100f:** Invited Talk: Engineered Systems for Studying Lung Injury and Disease — **April Kloxin**

---

**(101) Process Intensification and Modular Manufacturing: Modeling and Simulation**

**Wednesday, Nov 8, 8:00 AM  
Hyatt Regency Orlando,  
Celebration 16**

**Ignasi Palou Rivera, Chair  
Fadhil Al-Aboosi, Co-Chair**

**Sponsored by:** Process Intensification & Modular Chemical Processing

**8:00 Paper 101a:** Modeling and Optimization of Upfront Nitrogen Removal from LNG Baseload Plant Using Lithium Cycle — **Fares Almomani**, *Abdullah Omar*

**8:20 Paper 101b:** Thermodynamic Modeling of CO<sub>2</sub> Absorption in K<sub>2</sub>CO<sub>3</sub>-H<sub>2</sub>O Solution with Association Enrtl Model — **Cheng-Ju Hsieh**, *Viraj Patil*, *Chau-Chyun Chen*

**8:40 Paper 101c:** Optimal Operation of Intensified Fluidized Bed Membrane Reactor for Oxidative Coupling of Methane — **Moustafa Ali**, *Dustin Kenefake*, *Yuhe Tian*, *Efstratios Pistikopoulos*

**9:00 Paper 101d:** Techno-Economic Optimization of Heat-Integrated Multi-Functional System of Catalytic Reactors: The Case of Water-Gas Shift and COS Hydrolysis Reactions — **Pranav Kherdekar**, *Shantanu Roy*, *Divesh Bhatia*

**9:20 Paper 101e:** Machine Learning Aided Process Design and Intensification Using Sparse Experimental Data: An Ammonia Production Example — **Md AI Masud**, *Yuhe Tian*

**9:40 Paper 101f:** Effect of Ethylene Oxide Reactor Intensification on the Downstream Processes — **Chinmoy Basak Mukta**, *Selen Cremaschi*, *Mario Eden*