

Engineering Sciences and Fundamentals

Held at the 2024 AIChE Annual Meeting

San Diego, California, USA
27-31 October 2024

ISBN: 979-8-3313-1657-0

Printed from e-media with permission by:

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



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

Copyright© (2024) by AIChE
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

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

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

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

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

FUNDAMENTAL RESEARCH IN TRANSPORT PROCESSES

397a Accounting for Excitations Allows for Liquid Phase Dynamics Predictions.....	1
<i>Kelly Badilla, Andreas Bommarius, Marcus T. Cicerone</i>	
397b Thermodynamics of Out of Equilibrium Steady States	2
<i>Karol Makuch, Robert Hołyst, Anna Maciołek, Paweł Żuk, Konrad Giżyński</i>	
397c Transport Behaviors of Shape-Changing Colloidal Particles.....	3
<i>Minxiang Zeng</i>	
397d Heat Transfer Characteristics Using Structured Catalyst Support in Packed Bed Reactors	4
<i>Abdullah Saleem, Zirui He, Dong H. Nguyen, Raymond Lau</i>	
397e Modeling and Optimization of Eddy Current-Induced Microfluidic Heating for Lab-on-a-Disc Platforms	5
<i>Christopher Ticknor, Aashish Priye</i>	
397f Recent Cryogenic Propellant Transfer Line Steady State Flow Boiling Experiments in 1-g	6
<i>Jason Hartwig, Sunjae Kim, Nishad Damle, Dylan Foster, Issam Mudawar</i>	
397g A Wickless Heat Pipe Using a Binary Working Fluid: Results from Microgravity	7
<i>Sophia Peach, Joel Plawsky, Scott Gilley, Jim McClellan</i>	

MICROSCALE TRANSPORT PROCESSES

466a Fluid Flow Enhancement through Porous Scaffolds Utilizing Bijel-Templated Materials.....	8
<i>Luciano Groisman, Todd Thorson, Elliot L. Botvinick, Ali Mohraz</i>	
466b A New Equation for the Mean Free Path of Air.....	9
<i>Dimitrios Tsalikis, Vlasios Mavrantas, Sotiris E. Pratsinis</i>	
466c Correlation-Based Predictions of Gas Solute Diffusivity in Viscous Ionic Liquid Solvents: Logarithmic Diffusivity Relationships with Solvent-Accessible Surface Area	12
<i>Feranmi Olowookere, Heath Turner</i>	
466d High-Pressure CO ₂ and CH ₄ Transport in Smooth Crystalline Silica Mesopores: A Molecular Dynamics Study	13
<i>Lian Duan, Zhehui Jin</i>	
466e Comparison of Gas and Liquid Transport Properties for Diffusion of Gases Dissolved in Hydrocarbon Liquids inside Mesoporous Silicas with Different Pore Sizes.....	15
<i>Omar Boloki, Blake Trusty, Pavel Kortunov, Sergey Vasenkov</i>	
466f Electrostatic Repulsion Facilitated Ion Transport in Covalent-Organic Framework Membranes	16
<i>Bohui Lyu, Zhongyi Jiang, Jianwen Jiang</i>	
466g Electronic Polarization as the Fundamental Mechanism for Pronounced Curvature Dependence of Water Slip Flow in Carbon Nanotubes	17
<i>Rahul P. Misra, Shuang Luo, Daniel Blankschtein</i>	

ELECTROCHEMICAL ADVANCES TO ENABLE EFFICIENT OXYGEN, HYDROGEN AND WATER REACTIONS

633b Investigation of Gas-Liquid Separation in Large-Scale PEM Electrolysis.....	19
<i>Michael Stadler, Felix Flegiel, Harald Klein, Sebastian Rehfeldt</i>	
633c Techno-Economic Analysis on Near-Term and Future Projections of Levelized Cost of Hydrogen for Low-Temperature and High-Temperature Water Electrolysis Technologies.....	20
<i>Yaset Acevedo, Mark Jensen, Max Graham, Zachary Watts, Jacob Prosser, Jennie Huya-Kouadio, Kevin McNamara, Brian D. James</i>	
633e Supported Iridium Catalysts for Low-Cost Water Electrolysis.....	22
<i>Maira Amjad, Ian McCrum</i>	
169bw Proton Transport on Graphamine: A Deep-Learning Potential Study.....	23
<i>Lakshmi Y. Ananthabhoila, Siddarth Achar, Karl Johnson</i>	
633g Non-Iridium-Based Electrocatalyst for Durable Acidic Oxygen Evolution Reaction in Proton Exchange Membrane Water Electrolysis.....	24
<i>Feng-Yang Chen, Haotian Wang</i>	

ELECTROCHEMICAL FUNDAMENTALS: FACULTY CANDIDATE SESSION I

201a Unveiling Electrochemical Reaction Mechanisms Under Realistic Conditions: An <i>Ab Initio</i> Molecular Dynamics Study of Ammonia Electro-Oxidation on Pt(100) Surface.....	26
<i>Kunran Yang, Bo Yang</i>	
201b Suppressing the Hydrogen Evolution on Chiral Cu-Based Catalyst for Efficient Electrochemical Carbon Dioxide Reduction	27
<i>Jeewan Tan, Jao Van De Lagemaat, Nathan Neale</i>	
201c Designing Experimental and Computational Methods to Probe the Diurnal Performance of Electrochemical Solar-Driven CO ₂ r Systems	28
<i>Kyra Yap, Adam Nielander, Thomas Jaramillo</i>	
201d Three-Dimensional Atomic Structure and Local Chemical Order of Medium- and High-Entropy Alloy Electrocatalysts	29
<i>Saman Moniri</i>	
201e Multi-Faceted Roles of Lithium Metal in Batteries and Electrocatalysis	30
<i>Xintong Yuan, Yuzhang Li</i>	
201f Understanding Catalyst Dynamics in Formate Dehydrogenation for Hydrogen Storage: Insights into Operational Efficiency and Deactivation Mechanisms	31
<i>Shyam Deo</i>	
201g Modeling Interfacial Dynamics on Single Atom Electrocatalysts: Explicit Solvation and Potential Dependence	33
<i>Zisheng Zhang, Jun Li, Yang-Gang Wang</i>	
201h Electrifying Chemical Production to Decarbonize the Chemical Industry	34
<i>Rong Xia, Edward Sargent</i>	
201i The Influence of the Electrochemical Interface on Protein Structure and Function.....	35
<i>Haochen Zhang, Karthish Manthiram</i>	

201j Opportunities for Electrochemistry in Chemical Conversions and Human Health	36
<i>Evan Miu, James R. McKone, Giannis Mpourmpakis, Karthish Manthiram</i>	
2011 Design Principles for Electrode-Electrolyte Interfaces in Energy Conversion.....	37
<i>Yirui Zhang, Martin Bazant, Yang Shao-Horn</i>	

ELECTROCHEMICAL SEPARATIONS TOWARD SUSTAINABILITY: ANALYTICAL TECHNIQUES AND EMERGING APPLICATIONS (INVITED TALKS)

524a Porous Solid Electrolytes for Efficient CO ₂ Electrolysis.....	38
<i>Sarah Adaryan, Abdullah Alazmi, Tae-Ung Wi, Ahmad Elgazzar, Haotian Wang, Rafael Verduzco</i>	
524b Bipolar Membranes for pH Assisted Electrochemical Separations	39
<i>Christopher Arges, Tanmay Kulkarni, Bin Yang, Xiaoliu Zhang, Aliya M. I. Al Dhamen, Hanrui Zhang, Feifei Shi, Revati Kumar</i>	
524c Recent Advancements in Electrochemical CO ₂ Separation and Concentration from Various Sources	40
<i>Mim Rahimi</i>	
524d Equatic: The Development of a Seawater-Based Atmospheric Carbon Removal and Hydrogen Co-Production Platform.....	41
<i>Gaurav Sant</i>	

ELECTROCHEMISTRY AND ELECTROCHEMICAL ENGINEERING FOR ENVIRONMENTAL AND SUSTAINABILITY APPLICATIONS

677a Enzyme-Inspired Conductive Polymers Enhance Charge Transfer from Electroactive Microbes.....	42
<i>Alec Agee, Ariel Furst</i>	
677b Imaging Electron Transfers in Electro-Active Bacteria for Sustainable Chemical Synthesis.....	43
<i>Jeffrey DuBose</i>	
677c Electrochemical Co-Production of Chlorine and Hydrogen from Waste Poly(vinyl chloride).....	44
<i>Bertrand Neyhouse, Anne McNeil</i>	
677e Electrochemical CO ₂ Capture with pH-Independent Redox Chemistry	45
<i>Sang C. Kim, Steven Chu</i>	
677f Integrated Electrocoagulation for the Separation and Valorization of Lignin: Scale-up Evaluation.....	46
<i>Shoumik Sadaf, Tae-Sik Oh, Xinyu Zhang, Zhihua Jiang</i>	
677g Process Simulation Study on the Lifecycle and Techno-Economic Analyses of Electrochemical Phosphate Recovery from Municipal Wastewater Using Sacrificial Magnesium Anode	47
<i>Richard N. Arthur, Jason Trembley, Damilola Daramola</i>	
677h Towards Sustainable Lithium-Ion Battery Recycling: Electrochemical Recovery of Metals from Cathode Materials	49
<i>Suchithra A. Sahadevan, Mohamed Shahid, Shrihari Sankarasubramanian, Vijay Ramani</i>	

677i Leaching Mechanism for Chalcopyrite in Electrochemically Regenerated Vanadium(II)	51
<i>Tongwei Xu, Brian Donovan, Charles Kim, Scott Banta, Jeffrey Fitts, Alan West</i>	

LITHIUM AND BEYOND: FUNDAMENTAL ADVANCES IN HIGH PERFORMANCE BATTERIES I

680a Revealing SEI Breakdown during Lithium Deposition and Dissolution	52
<i>Solomon Oyakhire, Yi Cui, Stacey F. Bent</i>	
680b Ultrafast Deposition of Faceted Li Polyhedra by Outpacing SEI Formation	53
<i>Xintong Yuan, Yuzhang Li</i>	
680c Revealing Design Principles for an Interphase Layer of Lithium Metal Anodes Via Cryogenic/in-Situ Transmission Electron Microscopy.....	54
<i>Tae-Ung Wi, Haotian Wang, Hyun-Wook Lee</i>	
680d Formation of a Stable Fluorophosphate-Rich SEI in Li-Metal Batteries Using a Semi-Solid Composite Electrolyte	55
<i>Hossein Pazooki, Juchen Guo</i>	
680e Identifying Reaction Intermediates of Fluorinated Electrolytes	56
<i>Sapna Ramesh, Yuxin Huang, Natan Spear; Xiaoyang Liu, Linda J. Broadbelt, Jeffrey Lopez</i>	
680f Operando Electrochemical Fluorescent Microscopy to Predict Li-Ion Battery Performance	57
<i>Karla Negrete, Maureen Tang</i>	
680g Mechanistic Understanding of Lithium-Ion Adsorption, Intercalation, and Plating in Graphite Anodes Down to -40 °C	60
<i>Brian Chen, Robert Messinger, Alexander Couzis</i>	
680h Kinetics of Coupled Ion-Electron Transfer for Li-Ion Intercalation.....	61
<i>Yirui Zhang, Dimitrios Fraggedakis, Tao Gao, Shakul Pathak, Ryan Stephens, Martin Bazant, Yang Shao-Horn</i>	

TUTORIAL SESSION ON ELECTROCHEMICAL METHODS, SYSTEMS AND APPLICATIONS (INVITED TALKS)

588a Direct Electrochemical Reduction of Ores to Metals: from Single Particles to Electrochemical Stacks	62
<i>Paul Kempler</i>	
588b The Bipolar Stack	63
<i>Tom Fuller</i>	
588c Electrochemical Formalism for Redox Flow Battery	64
<i>Thomas Zawodzinski</i>	
588d Utilizing Spectroscopic Signatures in Operando NMR for Realistic Battery Applications.....	65
<i>Lauren Marbella</i>	

ACTIVE COLLOIDAL SYSTEMS

17a A Kernel-Based Unified Framework for Passive and Active Phoretic Spheres	66
<i>Amir Nourhani, Mohammad Nabil</i>	

17i Bacterial Colonies Growing in Polymeric Fluids Form 'Active Gels'	67
<i>Sebastian G. La Corte, Ned Wingreen, Sujit Datta</i>	
17d Orbits, Spirals, and Trapped States: Tuning the Dynamics of a Phoretic Janus Particle Near a Chemical Fuel Source or Sink	68
<i>Parvin Bayati, Stewart Mallory</i>	
17e Cargo Capture and Transport by Magnetic Field Actuated Microellipsoids.....	69
<i>Hashir Gauri, Ruchi Patel, Michael A. Bevan, Bhuvnesh Bharti</i>	
17f Induction Heating of Microwheels for Melting and Clearance of Gelatin-Based Blockages.....	70
<i>Aaron K. Ishiki, Keith B. Neeves, David W. M. Marr</i>	
17g High Energy Density Picoliter-Scale Zn-Air Microbatteries for Colloidal Robotics and Sensors	71
<i>Sungyun Yang, Ge Zhang, Michael S. Strano</i>	
17h Harnessing Surface-Driven Instabilities at Oil-Water Interfaces for Extractions	72
<i>Damilola Fadipe, Jude Obijiaku, Karthik Nayani</i>	
17b Collective Behavior of Active Cell-like "Flexicle" Microrobots.....	73
<i>Philipp Schönhöfer, Sharon Glotzer</i>	
17j Magnetic Manipulation of Living Organisms without Hybridization	74
<i>Ahmed Al Harraq, Min Feng, Hashir Gauri, Ankur Gupta, Qing Sun, Bhuvnesh Bharti</i>	

ANISOTROPIC PARTICLES: SYNTHESIS, CHARACTERIZATION, MODELING, ASSEMBLY, AND APPLICATIONS

61a Enhancing Light Transmission through Modulated Rotation of Janus Particles Via Electric Field Gradients	75
<i>Ji-Young Lee, Patrick Sullivan, Leila F. Deravi</i>	
61b Controlling the Order in Colloidal Crystals by Progressively Changing the Shape of Particles	76
<i>Jansie Smart, Marco Lattuada</i>	
61c Assembly and Dynamics of Shape Anisotropic Colloidal Particles in Time-Varying Magnetic Fields	77
<i>Hashir Gauri, Kendra Kreienbrink, Jin G. Lee, C. Wyatt Shields, Bhuvnesh Bharti</i>	
61d Effects of Particle Shape and Surface Roughness on Van Der Waals Interactions	78
<i>Jaehun Chun, Jaewon Lee, Elias Nakouzi, Jaeyoung Heo, Benjamin A. Legg, Gregory K. Schenter, Dongsheng Li, Chanwoo Park, Hongbin Ma</i>	
61e Rheological Properties of Aspherical Particle Networks	79
<i>Narayani Kelkar, Jyoti Seth</i>	
61f Non-Reciprocal Interactions between Active and Passive Colloids in Ac Electric Fields	80
<i>Ahmed Al Harraq, Ruchi Patel, Jaehun Chun, Bhuvnesh Bharti</i>	
61g Janus Particles on a Roll.....	81
<i>Amrutha Raghu, Bhuvnesh Bharti</i>	
171m Biomimetic Swarm of Polar Active Particles at Microscale.....	82
<i>Amir Nourhani</i>	

AREA PLENARY: INTERFACIAL PHENOMENA (INVITED TALKS)

255a Long-Range Interactions in Highly Concentrated Electrolytes	83
<i>Rosa Espinosa-Marzal</i>	
255b Active Colloids as Models, Materials, and Machines.....	84
<i>Kyle Bishop</i>	
255c AI-Driven Experiments and Open-Source Automation for Accelerated Soft Matter Research	85
<i>Lilo Pozzo</i>	

BIOMOLECULES AT INTERFACES

316a Selective Separation of Rare Earth Elements from Industrial Waste Streams Using Gold Nanoparticles Functionalized with Peptides Derived from the EF-Hand Loop 1 of Lammodulin.....	86
<i>Geeta Verma, Jacob Hostert, Alex A. Summerville, Alicia Robang, Ricardo G. Cárcamo, Anant Paravastu, Rachel Getman, Christine Duval, Julie N. Renner</i>	
316b Nanoparticle-Assisted Adsorption of LBT Peptides for Selective Rare Earth Recovery by Ion Foam Flotation	87
<i>K. T. Surabh, Luis O. Macias, Jason Marmorstein, E. James Petersson, Kathleen J. Stebe, Raymond Tu, Robert Messinger, Charles Maldarelli</i>	
316c Quantification of Adsorption of Lanthanide-Binding Peptides at the Air-Water Interface Via Confocal Laser Scanning Microscopy.....	88
<i>Stephen Crane, Jason Marmorstein, E. James Petersson, Kathleen J. Stebe, Ivan J. Dmochowski</i>	
316d Investigation of Polyproline II Peptides as Antifouling Biomaterials	89
<i>Rebecca Ahn, Sogol Asaei, Henry Grome, Geeta Verma, Christina Dang, Harihara Baskaran, Julie Renner</i>	
316e Influence of Silica Nanoparticle Hydrophobicity on the Interfacial Dynamics of DPPC Monolayers.....	90
<i>Monica Iepure, Jonathan Arredondo, Younjin Min</i>	
316f Controlled Recruitment of Particles into Biomolecular Condensates	91
<i>Fleurie Kelley, Anas Ani, Emily Pinlac, Bridget Linders, Arjun Singh, Yuchen Ma, Bruna Favetta, Mayur Barai, Gregory L. Dignon, Yuwei Gu, Benjamin S. Schuster</i>	
316g Insights into Hierarchical Protein Assembly <i>Via</i> Shape Complementarity.....	92
<i>Raymond Asare, Kelly Wang, Sharon C. Glotzer</i>	
316h Examining the Differences in Phase Separation and Adhesion in Intrinsically Disordered Proteins.....	93
<i>Qi V. Jorgensen, Gregory Dignon</i>	

BIOMATERIALS AND BIOLOGICAL SYSTEMS

462a Matrix Shear Strength Regulates T Cell Migration through 3D Confining Microenvironments	94
<i>Byunghang Ha, Maria Korah, Paul Bollyky, Daniel Delitto, Ovijit Chaudhuri</i>	

462b Measurements of Cell-Mediated Degradation of Poly(ethylene glycol)-Norbornene Hydrogels with Non-Linear Chemical Gradients of Cytokines Using Microrheology	98
<i>Thomas O'Shea, Kelly Schultz</i>	
462c Adhesive Interactions of Flexible Nanofilaments Versus Nanogels with Biological Cell Membranes	99
<i>Saba Mirahsani, Fatemeh Ahmadpoor, Samaneh Farokhirad</i>	
462d Magnetic Stress Rheometer for Biological Fluid Characterization	100
<i>Audrey Shih, Stella Chung, Lucia G. Brunel, Fotis Christakopoulos, Sanna Herwald, Alexander Vezeridis, Gerald Fuller</i>	
462e Swimmers at Interfaces Enhance Interfacial Transport	101
<i>Kathleen J. Stebe</i>	
462f Analysis of Pearling, Buckling, and Wrinkling Stability of Cylindrical Multicomponent Vesicles.....	102
<i>Anirudh Venkatesh, Aman Bhargava, Vivek Narsimhan</i>	
462h Hybrid Synthesis of Bottlebrush DNA Polymers for Single-Molecule Rheology.....	103
<i>Michael Burroughs, Lisa Nieman, Ava C. Conyer, Louis X. Wang, Danielle Mai</i>	
171t Computational Modeling of the <i>E. coli</i> Ribosome L12 Complex and Impacts on mRNA Translation Rate.....	104
<i>Jialun Wang, Vishal S. Sivasankar, Roseanna Zia</i>	

COLLOIDAL DISPERSIONS

463a Engineering the Dispersant Phase to Enhance Control of Electron Transport in Conductive Particle Suspension.....	105
<i>Matthew Brucks, Alina Arslanova, Janan Hui, Mark C. Hersam, Jeffrey Richards</i>	
463b Surfactant-Driven Dynamic Changes in Rheology of Activated Carbon Slurry Electrodes.....	106
<i>Mohan Das, Kang J. Lee, Christopher L. Wirth</i>	
463c Accelerating Aging in Colloidal Dispersions Using Acoustics	107
<i>Shourie Yerabati, Lilian Hsiao</i>	
463d Colloidal-Scale Modeling of Monoclonal Antibodies: Aggregation and Rheological Properties for Therapeutic Use	108
<i>Umesh Dhumal, Jialun Wang, Roseanna Zia</i>	
463e The Structure and Rheology of Bimodal Attractive Colloidal Systems.....	109
<i>Calvin Zhuang, Robert Campbell, Safa Jamali, Ali Mohraz</i>	
463f How Bulk Liquid Viscosity Shapes Capillary Suspensions	110
<i>Ahmed Jarray, Elke Scholten</i>	
463g Transport of mRNA in <i>Bijel</i> Systems	111
<i>Marco T. Portella, Xuan D. T. Nguyen, Dimitrios Papavassiliou</i>	
463h Altering Shear Thickening in Kaolin Clay + Silica Nanoparticle Mixtures	112
<i>Sedi Helsper, Matthew Liberatore</i>	

COLLOIDAL HYDRODYNAMICS

256a On the Shear Rheology of Particle Suspensions in Shear Thinning Polymer Solutions	113
<i>Eric Shaqfeh, Anni Zhang, Boon S. Neo</i>	
256b Efficiency of Colloid Separation through Diffusiophoresis.....	114
<i>Fernando T. Coletto, Marcel Louis, Howard A. Stone</i>	
256c Using Network Theory Insights into Flow and Dynamics of Dense Suspension Rheology: Node- and Edge-Centric Methods	115
<i>Alessandro D'Amico, Sidong Tu, Abhinendra Singh</i>	
256e Colloidal Surface-Anisotropy Toolbox for Engineering Suspension Flow.....	116
<i>Shravan Pradeep, Lilian Hsiao</i>	
256f Dynamics of Soft Particle Glasses in Transient and Steady Shear Flow.....	117
<i>Hrishikesh Pable, Harsh Pandya, Michel Cloitre, Fardin Khabaz</i>	
256g Revisiting Brenner's Stokes Resistance of a Deformed Sphere	118
<i>Amir Nourhani, Mohammad Nabil</i>	
256h Effect of Non-Newtonian Rheology and Microstructure on a Swimming Bacterium in a Yield Stress Polymer Solution	119
<i>Sabarish V. Narayanan, Donald L. Koch, Sarah Hormozi</i>	
256i The Role of Hydrodynamic Interactions on the Rheology of Colloidal Rods	120
<i>Lucas H. P. Da Cunha, Paul F. Salipante, Steven D. Hudson</i>	

COMPLEX FLUIDS

257a Phage Probes Couple to DNA Relaxation Dynamics to Reveal Universal Behavior across Scales and Regimes	121
<i>Farshad Samghabadi, Juexin Marfai, Mehdi Aporvari, Philip Neill, Maede Chabi, Rae Robertson-Anderson, Jacinta C. Conrad</i>	
257b Asymptotic Drag Limits in Turbulent Taylor-Couette Flow of Dilute Polymeric Solutions	122
<i>Bamin Khomami, Fenghui Lin, Jiaxing Song, Nansheng Liu</i>	
257c Odd Viscodiffusive Chiral Fluids	123
<i>Alhad Deshpande, Cory Hargus, Karthik Shekhar, Kranthi K. Mandadapu</i>	
257d Diffusiophoretic Transport of Colloids in Porous Media.....	124
<i>Amir Pahlavan</i>	
257e Linear Viscoelasticity of Nanocolloidal Suspensions from Rotating Probe Rheology Simulations	125
<i>Masoumeh Pourasgharoshtebin, Rajesh Khare</i>	
257f Complex Fluids in Confined Flows: Squishing, Intermittency, and Jamming	126
<i>Sara Hashmi</i>	
257g Creep and Recovery in Dense Suspensions of Rough Colloids.....	127
<i>Yug C. Saraswat, Eli Kerstein, Lilian Hsiao</i>	

257h	Linking Molecular-Level Information to the Rheology of Polymer-Grafted Nanoparticles	128
	<i>Mehryar J. Ghomsheh, Sotoodeh Rassouli, Anubhab Roy, Donald L. Koch, Sarah Hormozi</i>	
257i	Brittle-to-Ductile Rheology in Composite Hydrogels with a Fibrous Colloidal Network	129
	<i>Yug C. Saraswat, Pedro W. Reis, Lilian Hsiao</i>	

COMPUTATIONAL STUDIES OF SELF-ASSEMBLY

18a	Understanding Formation of Cholesterol Clusters in a Biomimetic Solvent	130
	<i>Ayush Gupta, Güл Zerze</i>	
18b	A Computational Model Predicts the Three-Dimensional Homeostatic Structure and Dynamics of the Cellular Assembly in an Epithelial Organoid	131
	<i>Richard Dickinson, Tanmay Lele</i>	
18c	Investigating the Impact of Molecular Imposters on Crystal Growth Promotion Using Molecular Dynamics Simulations	132
	<i>Qizan Chen, Si Li, Jeffrey Rimer, Jeetain Mittal</i>	
18d	Oriented Motions of Gibbsite Particles During Self-Assembly.....	133
	<i>Tuan Ho, Hasini Senanayake</i>	
18e	Controlling Topological Defects in Curved Spherical Crystals of Hard Superballs	134
	<i>Gabrielle Jones, Philipp Schönhöfer, Sharon C. Glotzer</i>	
18f	Modeling and in-Situ Observation of Mesomorphological Structure Formation of Colloids in Drying Droplets	135
	<i>Michael Engel</i>	
18g	Dynamics and Assembly of Deformable Objects Using Vertex Model with Thermal Fluctuations	136
	<i>Patrick Underhill</i>	
18h	Quantifying Hierarchical Causality in Active Matter Systems.....	137
	<i>Alexander Smith, Dipanjan Ghosh, Xiang Cheng, Prodromos Daoutidis</i>	
18i	Hybrid Active Learning for Thermally-Responsive Solid-Solid Structural Transitions in Self-Assembled DNA-Functionalized Nanoparticle Crystals	139
	<i>Nicholas Herringer, Daniel McKeen, Huat Thart-Chiang, Qizan Chen, Jeetain Mittal, Lilo Pozzo, Oleg Gang, Andrew Ferguson</i>	
18j	Inverse Design of Self-Assembled Optical Nanoparticle Metamaterials	140
	<i>Zachary Sherman, Rishabh Sanghavi</i>	
18k	Generating Nanomaterial Design Surfaces with Physics-Informed Machine Learning Models	141
	<i>Melody Zhang, Shih K. Lee, Benjamin Laubach, Sharon C. Glotzer, Rebecca Lindsey</i>	
18l	A Classical Density Functional Theory of Entropic Colloidal Crystals.....	142
	<i>Kristi Pepa, Isaac R. Spivack, Trevor Teague, Domagoj Fijan, Sharon C. Glotzer</i>	
18m	Subdiffusion Symphony: Multiplicity and Spatiotemporal Patterns in Autocatalytic Systems.....	143
	<i>Uttam Kumar, Subramaniam Pushpavanam</i>	

CONNECTING THE DOTS IN INDUSTRY (INVITED TALKS)

396a From Industry to Academia: Technical Excellence, People, and Understanding Your Why	144
<i>Jean Tom</i>	
396b Capturing the Unmeasurable: How Atomistic Simulations Are Bringing Understanding to Interfacial Phenomena	145
<i>Andrea Browning</i>	
396c Accelerating Nanomaterials Research: From Fundamentals to New Synthesis Strategies	146
<i>Rebecca Lindsey</i>	

FLUIDS IN ENERGY, ENVIRONMENT, AND SUSTAINABILITY

584a Efficient Fuel Atomization Via Spontaneous Wave Swirling	147
<i>Wayne Strasser</i>	
584b Self-Similar Dynamics of Axisymmetric Point Rupture of Highly Viscous Liquid Sheets	149
<i>Ajay H. Kumar, Hansol Wee, Viishrut Garg, Sumeet S. Thete, Osman A. Basaran</i>	
584c Vortical Interactions in Nature	150
<i>Pankaj Rohilla, Saad Bhamla</i>	
584d Validation of Dynamic Layering in Computational Study of Bristling Shark Denticle.....	151
<i>Wayne Strasser, Kent Gingerich</i>	
584e Leveraging Viscoelastic Flow Instabilities for Remediation of Soiled Porous Media.....	152
<i>Emily Chen, Sujit Datta</i>	
584f New Correlations for Interphase Drag in Two-Fluid Models to Predict the Pressure Drop across a Packed Bed Reactor	153
<i>Pranay Nagrani, Amy Marconnet, Ivan Christov</i>	
584g Understanding Particle-Cell Interactions Under Shear	154
<i>Qin Qi</i>	
584h Observing Bacterial Dynamics in Transparent Soil Microcosms	155
<i>Ahmed Al Harraq, Joshua Shaevitz, Sujit Datta</i>	

DEVELOPMENT OF INTERMOLECULAR POTENTIAL MODELS

258a Virial Coefficients and Virial Equation of State as a Stringent Method for Validation of Intermolecular Potentials of Pure Fluids and Mixtures	156
<i>Raghavendran Suresh, Omkar Desai, Andrew J. Schultz, David A. Kofke</i>	
258b Balancing Divalent Ion-Biomolecular Interactions in the Polarizable Drude Force Field	157
<i>Yiling Nan, Alexander D. MacKerell</i>	
258c Machine Learning Potentials for Thermodynamic and Transport Properties of Bulk Liquids	158
<i>Eliseo M. Rimoldi, Edward Maginn</i>	

DIRECTED AND SELF ASSEMBLY OF COLLOIDS

523a Stable Intermediate Structures Along a Martensitic Transformation Pathway in Self-Assembling Nanocrystals	159
<i>Timothy C. Moore, Yasutaka Nagaoka, Sharon C. Glotzer, Ou Chen</i>	
523b Self-Assembly of Shape-Shifting Chiral Colloids.....	160
<i>Hamed Almohammadi, Jacopo Movilli, Haritosh Patel, Haichao Wu, Joanna Aizenberg</i>	
523c Inverse Design of Self-Stratifying Colloidal Films Using Surrogate Modeling on Smolyak Sparse Grids	161
<i>Mayukh Kundu, Michaela Bush, Mohammadreza Fakhraei, Christopher Kieslich, Michael Howard</i>	
523d High Shear, Capillary Rheosans of Block Copolymer Micelles.....	162
<i>Kelsi Rehmann, Paul F. Salipante, Steven D. Hudson, Katie Weigandt</i>	
523e 3D Printing-Directed Chiral Self-Assembly in Cellulose-Based Materials	163
<i>Monirosadat Sadati, Mohsen Esmaeli, Kyle George, Nader Taheri-Qazvini</i>	
523f Colloidal Crystal Annealing by Rotating Electric Fields	164
<i>Tianyu Liu, Syahidah M. Khairi, Michael Solomon</i>	
523g Directed Assembly of Binary Structures of Ellipsoids	165
<i>David Harris, Isaac T. Diaz</i>	
523h Timed Material Self-Assembly Controlled by Circadian Clock Proteins	166
<i>Rae Robertson-Anderson</i>	
523i Three-Dimensionally Ordered Assemblies of Yolk–Shell Particles with Controllable Regularity by Electric Field-Assisted Core Motion	167
<i>Hikaru Namigata, Tom A. J. Welling, Kanako Watanabe, Keishi Suga, Daisuke Nagao</i>	

DYNAMIC PROCESSES AT INTERFACES

583a Impact of Resin Molecular Weight on Drying Kinetics and Sag of Coatings.....	168
<i>Marola Issa, Steven V. Barancyk, Reza Rock, James Gilchrist, Christopher L. Wirth</i>	
583b Towards Real-Time Inference of Thin Liquid Film Thickness Profiles from Interference Patterns Using Transformer Models.	169
<i>Vinny C. Suja, Arnuv Tandon, Gerald Fuller</i>	
583c Effect of Side Chain Arrangement and Chemistry on the Properties of Precise Bottlebrush Polymer Surfactants (BBPs).....	170
<i>Titilayo Oluwole, Nduka Ogbonna, Tianyi Wang, Michael Dearman, Philip Brahana, Chamberlain Amofa, Yaxin An, Bhuvnesh Bharti, Jimmy Lawrence</i>	
583d Influence of Surfactants and Nanoparticles on Desorption Behavior of Nanoparticles at Fluid Interfaces	171
<i>Xuan D. T. Nguyen, Dimitrios Papavassiliou, Sepideh Razavi</i>	
583e Characterization of Adsorption of Food Proteins at Oil-Water Interfaces of Monodisperse Emulsions	172
<i>Varun Potdar, Stefan Baier, Michael Boehm, Siva A. Vanapalli</i>	

583f Wettability Effects on Interfacial Rheology and Stability of Particle-Laden Oil/Water Interfaces	173
<i>Eduarda B. De Oliveira, Sepideh Razavi</i>	
29k Designing Tunable Self-Assembly Process of Microparticles at Fluidic Interfaces.....	174
<i>Sungwan Park, Justin J. Choi, Albert Liu</i>	
583h Adsorption of Na ⁺ , K ⁺ , and Ca ²⁺ Ions and Their Hydration Structures on Charged Silica Surfaces: A Molecular Dynamics Study	175
<i>Kaijie Zhang, Zhehui Jin</i>	

EMULSIONS AND FOAMS

634a Augmenting the Stability and Properties of Chemical Surfactant-Stabilized Nanoemulsions with Trace Rhamnolipid Biosurfactant Addition	176
<i>Nansee A. Zaid, Mustafa Nasser, Sagheer Onaizi</i>	
634b Study of the Interdroplet Interactions and Rheology of Nanoemulsions	178
<i>Zahra A. Chaleshtari, Reza Foudazi</i>	
634c Preventing Coarsening of Foams Using Hydrophobically Modified Silica Nanoparticles.....	179
<i>Nicole Donovan, Mrinal Bera, Raymond S. Tu, Benjamin Ocko, Honghu Zhang, Jing Fan, Charles Maldarelli</i>	
634d Fabrication, Rheology and Microstructure of Cellulose Acetate Stabilized Pickering Emulsions with Internal Hydrophobic Moieties	180
<i>Mariam Sohail, John Cheadle, Vaishavi Patil, Tahira Pirzada, Nathan Crook, Charles H. Opperman, Saad Khan</i>	
634e Fluid -Fluid Interfaces Stabilized by Solid Particles in Pickering Emulsions.....	181
<i>Narayani Kelkar, Jyoti Seth</i>	
634f Pickering Emulsions of Thermotropic Liquid Crystals for Sensing Phospholipid Membranes	182
<i>Maria K. Oñate-Socarras, Oscar H. Piñeres-Quiñones, David M. Lynn, Claribel Acevedo-Velez</i>	
634g Structure to Function of Polymer-Surfactant Complexes Coating Emulsion Drops.....	183
<i>Raymond Dagastine, Xiaotong Song</i>	
634h The Life and Death of Animal and Plant-Based Milk Foams.....	184
<i>Lena Hassan, Monse Reynoso, Chenxian Xu, Karim Al Zahabi, Ramiro Maldonado, Vivek Sharma</i>	

FACULTY CANDIDATES IN COMSEF/AREA 1A, SESSION 1

62a Physics-Guided Machine Learning for Transferable Prediction of Polymer Properties	185
<i>Shengli Jiang, Michael Webb</i>	
62b Predicting Polymer–Surface Adhesion Strength Via Machine Learning and Transfer Learning.....	187
<i>Jiale Shi</i>	
62c Inverse Design of Self-Assembled Materials.....	188
<i>Ella King, Ryan Krueger, Chrisy X. Du, Michael P. Brenner</i>	

62d Freezing the Carbon Footprint: Exploring Metal-Organic Frameworks for Sustainable Adsorption Cooling through Molecular Simulations.....	189
<i>Filip Formalik</i>	
62e Something Old Something New: Molecular Understanding of Interfacial (electro)Chemistry with Machine Learning and Liquid State Theory	190
<i>Amro Dodin</i>	
62f Towards Molecular Design of MRI Contrast Agents to Improve NMR Relaxivity and Chemical Stability Using Classical and Quantum Modeling.....	191
<i>Thiago J. P. Dos Santos, Dilip Asthagiri, Philip Singer, Walter Chapman</i>	
62g Reactive Active Learning for Machine Learning Potentials Using Transition-State Finding Methods.....	192
<i>Siddarth Achar, Priyanka B. Shukla, Chinmay Mhatre, Caitlyn Vinger, Leonardo Bernasconi, Karl Johnson</i>	
62h Machine Learning Driven Discovery of 2D Materials for Energy and Environmental Applications.....	193
<i>Moses A. Bokinala</i>	
62i Understanding the Role of Cu Oxidation State in Unassisted CO ₂ Reduction and Electrochemical Oxygen Evolution.....	194
<i>Pooja Basera</i>	
62j Powering Next-Generation Batteries through Data Science in Synergy with Simulations and Experiments.....	195
<i>Ritesh Kumar, Canh Vu, Peiyuan Ma, Chibueze Amanchukwu</i>	
62k Pynta: An Automated Quantum Chemistry Workflow for Surface and Gas-Surface Kinetics Including Coverage Dependence	196
<i>Matthew S. Johnson, Shinae Kim, Trevor Price, Judit Zádor</i>	
62n Modeling Adsorbate-Induced Restructuring of Cu Surface in Electro-Reduction Conditions	197
<i>Zisheng Zhang, Philippe Sautet, Anastassia Alexandrova</i>	
62o Elevating Density Functional Theory Towards Chemical Accuracy for Condensed Phase Simulations through Machine Learning and Many-Body Techniques	198
<i>Saswata Dasgupta</i>	

FUNDAMENTALS OF INTERFACIAL PHENOMENA I

678a Competitive Adsorptionat Interfaces: Insights from Experiments and Simulations	200
<i>Alberto Striolo</i>	
678b Direct Numerical Simulation of Surfactant-Laden Two Phase Flows with Moving Contact Lines Above the Critical Micelle Concentration	201
<i>Debashis Panda, Lyes Kahouadji, Seungwon Shin, Jalel Chergui, Damir Juric, Omar Matar</i>	
678c A Theoretical Study of Halide Adsorption on Metal Surface: Grand-Canonical Molecular Dynamics Based on a Machine Learning Force Field	203
<i>Eun M. Kim, Kristen Fichthorn</i>	
678d CO ₂ Mass Transfer Model in Packed Columns for CFD Simulations	204
<i>Holger Huck</i>	

678e Diffusioosmotic Flow Reversals Due to Ion-Ion Electrostatic Correlations in a Mixture of Electrolytes.....	209
<i>Shengji Zhang, Henry Chu</i>	
678f Evaluating the Dynamic Properties of Amphiphilic Monolayers to Environmental Stimuli	210
<i>Allison Cordova-Huaman, Nicholas C. Craven, Christopher Iacovella, Clare McCabe, G. Kane Jennings</i>	
678h Unravelling Bacterial Ballet: Deciphering Swarming and Biofilm Dynamics through a Multiphase Lens	211
<i>Uttam Kumar, Subramaniam Pushpavanam</i>	
678i Inhibition of Ice Recrystallization by Regulating the Surface Free Energy of Nanoparticles.....	212
<i>Bingbing Sun, Xin Li</i>	
678g Polysaccharide Aqueous Solution Structure and Properties Modulated by Additives.....	215
<i>Emmanuel Nsengiyumva, Mark P. Heitz, Paschalis Alexandridis</i>	

HIGH PRESSURE PHASE EQUILIBRIA AND MODELING

202a Development of a Custom High-Temperature, High-Pressure Phase Behavior Apparatus.....	216
<i>Aaron Rowane</i>	
202b Novel Melting and Freezing Behavior at High Pressure	217
<i>Karl P. Travis, Richard J. Sadus</i>	
202d Molecular Insights into the Dissociation of Carbon Dioxide Hydrates in the Presence of an Ionic Liquid, [BMIM][PF ₆]	218
<i>Aratrika Chaudhury, Bhavesh Moorjani, Soumya Chatterjee, Jhumpa Adhikari, Samik Hait</i>	
202e Thermodynamics Modelling of CO ₂ + n-Alkane + Alcohol Systems with the RK-Aspen Thermodynamic Model	220
<i>Cara Schwarz</i>	
202f Investigating the Ability of the RK-Aspen Equation of State to Correlate the High-Pressure Phase Behavior of Binary and Ternary CO ₂ -Containing Systems	223
<i>Susanna H. Du Plessis, Cara Schwarz</i>	
202g Effect of a Thermodynamic Promoter (TBAB) on Hydrate Phase Equilibria Conditions for Systems Containing Water, Hexane, Octane, Decane, Dodecane, and Carbon Dioxide.....	227
<i>Angel M. Notario-López, Roberto M. Balan-Chan, Julio C. Salinas-Reyes, Alfredo Pimentel-Rodas, Luis A. Galicia-Luna</i>	

INTERFACIAL AND NON-NEWTONIAN FLOWS

398a Quantifying the Rates of Viscous Spreading of Surfactant on a Deep Fluid Subphase	228
<i>Fernando T. Coletto, Howard A. Stone</i>	
398b Surface Forces Sculpt Nanoscopic Mesas in Micellar Foam Films.....	229
<i>Chenxian Xu, Yiran Zhang, Subinur I. Kemal, Vivek Sharma</i>	
398c The Determination of the Critical Concentrations of Aqueous Polymeric Solutions Using the Fingerprint of Impacting Drops.....	230
<i>Ziwen He, Huy Tran, Min Pack</i>	

398d Effect of Surfactant Solubility on the Stability of Thin Liquid Jets.....	231
<i>Jiayu Li, Harishankar Manikantan</i>	
398e Interfacial and Foaming Properties of per- and Polyfluoroalkyl Substances (PFAS) Solutions	232
<i>Muchu Zhou, Reza Foudazi</i>	
398f Escape from Pinch-Off During Contraction of Low-Viscosity Liquid Sheets or 2D Drops.	233
<i>Hansol Wee, Ajay H. Kumar, Xiao Liu, Osman A. Basaran</i>	
398g Rheology and Dispensing of Real and Vegan Mayo: The Chickpea or Egg Problem	234
<i>Nadia Nikolova, Somayeh Sepahvand, Vivek Sharma</i>	
398h The Rheology of Particle-Stabilized Emulsions.....	235
<i>Ali Mohraz</i>	
398i Crack Patterns in Drying Binary-Mixture Suspensions.....	236
<i>Amir Pahlavan</i>	

INTERFACIAL PHENOMENA IN ELECTROCHEMICAL AND ELECTROKINETIC SYSTEMS

399a Electrokinetic Transport Dynamics of Nanoparticles in 3D Ordered Porous Media	237
<i>Anni Shi, Daniel K. Schwartz</i>	
399b Enhanced Thermal Safety of Li-Ion Batteries in Presence of Fire Retardants	238
<i>Annie Sun, Shawn Belongia, Vilas Pol</i>	
399c Effect of Electrode Functionalization on the Electrosynthesis of Molecular Imprinted Polymers for PFOS Detection	240
<i>Daniel A. B. Aguilar, McKenna Dunmyer, Cameron Malloy, Matthew Danley, Vasiliki Karanikola, Suchol Savagatrup</i>	
399d Mechanistic Elucidation of Inorganic-Rich Solid-Electrolyte-Interphase Enabled by Advanced Fluorinated Ether Electrolyte Design for Silicon-Based Anodes	241
<i>Esin Aydemir, Zheng Li, Vilas Pol</i>	
399e Structure of the Electric Double Layer during Nitrate Reduction	243
<i>Elizabeth Corson, Matthew Liu, Jinyu Guo, Michael Tang, Joakim H. Stenlid, Dean Miller, Kristen Abels, Kindle S. Williams, Qianhong Zhu, Kevin Stone, Frank Abild-Pedersen, William Tarpeh</i>	
399f Enhancing Electrode Interfaces Through <i>in Situ</i> Polymerization for Wide Temperature Li-Ion Batteries.....	244
<i>Sayan Das, Dongjoon Shin, Vilas Pol</i>	
399g Pure Elongation Flow Behavior of an Electrorheological Fluid as a Model Soft-Jammed System: Understanding Wall-Slip from Electrorheology	246
<i>Ishu Chaudhary</i>	
399h Kirchhoff's Laws Get an Upgrade: Double-Layer Dynamics in Pore Networks Described by a De Levie Circuit for an Effective Electrochemical Potential of Charge	247
<i>Filipe Henrique, Ankur Gupta</i>	

INTERFACIAL PHENOMENA IN ENERGY AND SUSTAINABILITY

585a Ion Pairing in Nanoconfined Electrolytes from Machine Learning-Based Molecular Simulations.....	248
Kara Fong, Barbara Sumic, Niamh O'Neill, Christoph Schran, Clare Grey, Angelos Michaelides	
585b Characterizing the Influence of Surfactant Adsorption on the Electrical Properties of Flowing Carbon Black Slurries Important to Flow Battery Applications.....	249
KangJin Lee, Christopher L. Wirth	
585c Controlling Morphology Via Nucleation and Evaporation in Solution-Processed Perovskite Thin Films	250
Jesse L. Starger, Richard A. Cairncross, Nicolas J. Alvarez	
585d Bipolar Membrane Polarization Governed by Interfacial Ionic Species	251
Thomas Y. George, Paige Brimley, Wilson A. Smith, Michael J. Aziz	
585e An Integrated Experimental and Modelling Investigation on the Interfacial Properties of Live Fluids at Reservoir Conditions	253
David Uko, Martin Trusler	
585f Iridium/Ionomer Interfaces in Water Electrolyzers	254
Sarah Berlinger, Xiong Peng, Ahmet Kusoglu, Ethan Crumlin, Adam Z. Weber	
585g Molecular Recycling of Mixed Plastics Based on Dissolution/Precipitation	255
Shikha Solanki, Christian Ferger, Nikolina Cejic, Paschalis Alexandridis, Marina Tsianou	
585h Carbonated High Salinity Waterflooding for Simultaneous EOR, CO ₂ Storage, and Produced Water Disposal.....	256
Sushobhan Pradhan, Clint Aichele, Prem Bikkina	
585i Effective and Sustainable Fuel Gas Storage Via Hydrate Formation in a Melamine Sponge Media with a Low Amount of Promoter.....	257
Jeongwoo Lee, Dong W. Kang, Wonhyeong Lee, Yun-Ho Ahn, Kwangbum Kim, Jae Lee	

INTERFACIAL PROCESSES AT BIOMEMBRANES

464a Functional Disorder at Biological Membranes	258
Wade Zeno	
464b An Engineered Platform for High-Throughput Characterization of Peptide Binding to Membranes	259
Peter Chung	
464c Investigating the Biomolecular Mechanisms of Membrane Fission by Clathrin during Endocytosis	260
Nicoletta Bouzos, Wade Zeno	
464d Activity, Instability and Reorganization within Viscous Membranes	261
Fizzia Usmani, Harishankar Manikantan	
464e Nanoscale Interactions between Graphene and Lung-Surfactant Monolayers.....	262
Joseph Samaniuk, Amy Chacon	

464f Unraveling the Role of Total Cerebroside in Modulating the Biomechanical and Thermodynamic Properties of Myelin Monolayers.....	263
<i>Monica Iepure, Maryam Darwish, Younjin Min</i>	

464g Deriving Line Tension and Dipole Density Values for Solid-Liquid Phase Monolayers.....	264
<i>Zachary McAllister, Cain Valtierrez-Gaytan, Alexander Smith, Joseph Zasadzinski, Joseph Barakat, Bjorn Solberg, Aidan Dosch, Benjamin Stottrup</i>	

464h Ion Transport Near Biological Membranes I: The Role of Dielectric Mismatch.....	265
<i>Hyeongjoo Row, Joshua B. Fernandes, Kranthi K. Mandadapu, Karthik Shekhar</i>	

464i Ion Transport Near Biological Membranes II: In-Plane Signal Propagation.....	266
<i>Joshua B. Fernandes, Hyeongjoo Row, Karthik Shekhar, Kranthi K. Mandadapu</i>	

MICROFLUIDIC AND MICROSCALE FLOWS: MULTIPHASE AND FIELDS

465a Learning the Diffusion of Nanoparticles in Liquid Phase TEM Using Physics-Informed Generative AI	267
<i>Zain Shabeb, Naisargi Goyal, Vida Jamali</i>	

465b A Phenomenological Model for Chains and Bands in Dipolar Suspensions	268
<i>Jeremy Kach, Lynn Walker, Aditya Khair</i>	

465c Dynamics of Deformable Droplets in 3D Channels of Different Geometries: An Experimental and Numerical Study	269
<i>Rajarshi Chattopadhyay, Aditya Vepa, Gesse Roure, Robert Davis</i>	

465d Efficient Design of Droplet-Based Microfluidic Chips: A Numerical Simulation and Experimental Study	270
<i>Mohsen Khorsand, Cavus Falamaki, Leila Zargarzadeh</i>	

465e Diffusioosmotic Flow Reversals Due to Ion-Ion Electrostatic Correlations	272
<i>Henry Chu, Shengji Zhang</i>	

465f Densitaxis: Active Particle Motion in Density Gradients.....	273
<i>Vaseem Shaik, Gwynn Elfring</i>	

465g Predicting Lyotropic Liquid Crystals through Out-of-Equilibrium Thermodynamics and Numerical Methods	274
<i>Jonathan Salmeron-Hernandez, Pablo Zubierta, Hans C. Öttinger, Juan J. De Pablo</i>	

465h Multiphase Fluidic Oscillator in a Heart-Spade Micro-Mixer.....	275
<i>Lyes Kahouadji, Filip Horvath-Gerber, Seungwon Shin, Jalel Chergui, Damir Juric, Omar Matar</i>	

465i Exploring Aerosol-Gas Dynamics in Fluidic Logic Oscillator Ventilation	277
<i>Ryan Learn, Wayne Strasser</i>	

465j Simulation of Fluid-Particle Suspension Using the Immersed Boundary Method	280
<i>Azim B. Memon, Devang Khakhar, Krishnaswamy Nandakumar</i>	

MICROFLUIDIC AND MICROSCALE FLOWS: SEPARATIONS AND PARTICULATES

586a A Low-Cost Flow Cytometer for Blood Cell Differentiation.....	281
<i>Mahrukh A. Mir, Mahesh Tirumkudulu</i>	

586b Multifunctional Microfluidic Clamp for Simultaneous Behavior Phenotyping, Neural Imaging, and Chemical Stimulation of <i>C. Elegans</i>	283
<i>Hyun J. Lee, Julia Vallier, Hang Lu</i>	
586c AI-Driven Soft-Sensor Feedback Control for Microfluidic Production of Anisotropic Rods.....	284
<i>Owen Land, Warren Seider, Daeyeon Lee</i>	
586d Simultaneous Measurement of Thermophoretic and Brownian Particle Motion Using Multiple Particle Tracking Microrheology.....	285
<i>Nazrin Hasanova, Maria C. Roffin, Xuanhong Cheng, Kelly Schultz, James Gilchrist</i>	
586j A Simple Trick of the Light: Direct Imaging of Single Droplets in Dense Emulsions	286
<i>Charles T. Drucker, Joseph Peterson</i>	
586k Magnetophoretic Transport of Paramagnetic Nanoparticles: Effects of Collective Hydrodynamics and Structure Formation.....	287
<i>Zachary Sherman</i>	
586f Transport and Clogging of Fibers in Millifluidic Channels.....	288
<i>Thomas M. Nguyen, Justin Maddox, Sebastien Kuchly, Nathan Vani, Alban Sauret, Harishankar Manikantan</i>	
586g Steric Hindrance in Diffusiophoresis in Porous Media	289
<i>Siddharth Sambamoorthy, Henry Chu</i>	
586h Monte Carlo Simulations of DNA Electrophoresis Via Entropic Trapping Transport through Polydisperse Nanoscale Pores	290
<i>Sourav Bandyopadhyay, Victor M. Ugaz</i>	
586i Average Stress in a Dilute Suspension of Rigid Spheroids in a Second-Order Fluid in a Linear Flow Field	291
<i>Tanvi Apte, Arezoo Ardekani, Vivek Narsimhan</i>	

MODELING OF LIPID MEMBRANES AND MEMBRANE PROTEINS

587a Dynamic Basis of Subtype Selectivity of Endocannabinoids for Cannabinoid Receptors	292
<i>Soumajit Dutta, Diwakar Shukla</i>	
587b Preferential Binding of Bacterial Membrane Lipids Influences the Free Energy of Membrane Binding and Refolding of the Antimicrobial Peptide CM15	293
<i>Avijeet Kulshrestha, Sudeep Punnathanam, K Ganapathy Ayappa</i>	
587c Lipid-Mediated Protein-Protein Interactions: Modeling the Formation of Hepatitis C Virus p7 Dimers	294
<i>Oluwatoyin Campbell, Viviana Monje-Galvan</i>	
587e Mechanistic and Thermodynamic Characterization of Dynamic Membrane Topology in an Unassembled Membrane Protein.....	295
<i>Byung U. Park, Reid Van Lehn</i>	
587f Enhancing Nanocarrier Targeting: Role of Cell Morphology, Mechanics, and Receptor-Ligand Interactions	296
<i>Seyed M. H. Pahnehkolaei, Fatemeh Ahmadpoor, Samaneh Farokhirad</i>	

587g Breaking Boundaries: Free Energy Landscapes for Membrane Pore Formation Induced by Antimicrobial Peptides	297
<i>Joshua Richardson, Reid Van Lehn</i>	
587h Electromechanical Coupling in Biological Membranes	299
<i>M. Sojib Kaisar, Anh Vo, Samaneh Farokhirad, Fatemeh Ahmadpoor</i>	
587i Entropic Pressure on Fluctuating Solid Membranes.....	300
<i>Rubayet Hassan, Samaneh Farokhirad, Fatemeh Ahmadpoor</i>	
587j Entropic Pressure on a Fluid Biological Membrane with Surface Tension	301
<i>Rubayet Hassan, Samaneh Farokhirad, Fatemeh Ahmadpoor</i>	

MOLECULAR SIMULATION AND MODELING OF COMPLEX MOLECULES

525a Revealing the Dynamic Coupling between Protein and DNA in Heterochromatin Condensates Using Physics-Based Computational Models.....	302
<i>Dinesh S. Devarajan, Jeetain Mittal</i>	
525c Decoding Growth Hormone Receptor Interactions: From Docking to Dynamics	303
<i>Hemant Nagar, John Kopchick, Sumit Sharma</i>	
525d Monte Carlo Simulation Study of the Vapour-Liquid Coexistence for Hinokitiol, a Natural Product	304
<i>Azra Shuaib, Jhumpa Adhikari</i>	
525e Exploring Gas Diffusion in the Carbon Monoxide Dehydrogenase/Acetyl-CoA Synthase (CODH/ACS) Enzyme Complex Using Molecular Simulations.....	306
<i>Suman Samantray, Bojana Ginovska-Pangovska, Simone Raugei</i>	
525f Understanding the Adsorption Behavior of Asphaltene Molecules at Oil–Rock Interface	310
<i>Prashil Badwaik, Shubham Chobe, Ateeque Malani</i>	

NEW FRONTIERS OF MOLECULAR THERMODYNAMICS (INVITED TALKS)

63a The Thermodynamics for Tuning Chirality in Block Copolymers and Small Oligomers.....	311
<i>Poornima Padmanabhan</i>	
63b Long Range Interactions in Machine Learning Models of Molecular Systems.....	312
<i>Richard Remsing</i>	
63c Leveraging Diverse Computational Tools and Approaches to Advance Molecular Understanding of Infectious and Neurological Diseases	313
<i>Jonathan Faris, Bailey Zinger, David Saeb, Emma Lietzke, Vanessa Bauer, Sarah Sawyer, Kimberly Bruce, Kayla Sprenger</i>	
63d Unraveling Mechanisms of Assembly and Transport with Coarse-Graining and Accelerated Sampling.....	314
<i>Jonathan K. Whitmer</i>	

PARTICULATE AND MULTIPHASE FLOWS: COLLOIDS AND POLYMERS

317a Modeling the Rheology of Gelation Using Recovery Rheology	315
<i>Jiachun Shi, Simon Rogers</i>	

317b Defining the Structure and Properties of Colloidal Rod Systems during Dynamic Phase Transitions	316
<i>Shiqin He, Marco Caggioni, Seth Lindberg, Kelly Schultz</i>	
317c Yield in Colloidal Gels Under the Start-up Shear Flow: Role of Hydrodynamic Interactions	317
<i>Jae H. Jeong, Roseanna Zia</i>	
317d Tuning Mechanical Failure in Multiphase Soft Particulate Systems	318
<i>Shravan Pradeep, Paulo Arratia, Douglas Jerolmack</i>	
317e Shear Reversal in Cohesive Frictional Dense Suspensions: A Numerical Study.....	319
<i>Abhinendra Singh, Sidong Tu, Kang J. Lee, Ryan Pappalardo, Michel Orsi</i>	
317f Optimizing Polymer Bridging in Colloidal Suspensions	320
<i>Ryan Poling-Skutvik</i>	
317g Coarsening and Arrest Dynamics in a Ternary Polymer Solution Undergoing Phase Separation	321
<i>Douglas Tree</i>	
317h Role of Polymer Molecular Weight Distribution on Extensional Flow of Polymer Solutions and Colloid-Polymer Suspensions.....	322
<i>Diego Soetrisno, Carina D. V. M. Narváez, Mariah Gallegos, Vivek Sharma, Jacinta C. Conrad</i>	
317i Hydrodynamic Flows in Unentangled Polymer Nanocomposites	323
<i>Christian Aponte-Rivera, Andrew Wijesekera, Ting Ge</i>	
317j An Experimental and Numerical Investigation of Collisions of Wet Particles	324
<i>Souradeep Roychowdhury, Griffin Hayrynen, Robert Davis</i>	

PARTICULATE AND MULTIPHASE FLOWS: EMULSIONS, BUBBLES, DROPLETS

400a Droplet Coalescence -- The Tandem Roles of Interfacial Viscosity and Marangoni Stresses on This Process.....	326
<i>Vivek Narsimhan, Natasha Singh</i>	
400b Dynamics of a Compound Droplet in a Vertical Channel Under Pulsatile Flow	327
<i>Shubham Lanjewar, Sundari Ramji</i>	
400c A Pairwise Hydrodynamic Theory and Boundary Layer Analysis for Particle De-Mixing in Wall-Bounded Suspension Flows	328
<i>Rodrigo Reboucas, Michael Loewenberg</i>	
400d Accelerated Acoustic Prediction of Aging in Nanoemulsions	329
<i>Nazanin Shakoury, Lilian Hsiao</i>	
400e A Coupled Computational Fluid Dynamic/Population Balance Method to Understand Microstructure in Emulsions and Foams	330
<i>Helen Cleaves, Weston Ortiz, Christine C. Roberts, Nicholas B. Wyatt, Rekha Rao</i>	
400f Towards 'factory in a Box' for Tailored Emulsions	332
<i>Vivek V. Ranade</i>	
400g Antifoam Hinders Air Release in Lubricating Oil	334
<i>Chenxian Xu, Suzanne Calhoun, Eric B. Mock, Jan Zawala, Gerald Fuller</i>	

400h Nanoemulsion-Laden Hydrogels for Tunable Release of Immiscible Active Ingredients	335
<i>Riley Dowdy-Green, Kristine M. Smith, Rony Waheibi, Shivani Sutrave, Lilian Hsiao</i>	

**PLENARY SESSION ON FLOWS IN SUSTAINABILITY AND THE ENVIRONMENT
(INVITED TALKS)**

124b Synthesis and Characterization of Ligand-Exchange Adsorbents for Wastewater Refining.....	336
<i>William A. Tarpeh</i>	
124c Dynamic Surface Tension and Phase Transitions of Sea Spray Droplets Using Microfluidics	337
<i>Cari Dutcher</i>	
124d Life in a Tight Spot: Visualizing Microbial Transport Processes in the Ground Beneath Our Feet.....	338
<i>Sujit Datta</i>	
124e Self-Quenching Battery Pack: D ³ Concept of Detect, Direct, and Douse to Contain Thermal Runaway	339
<i>Sreekanth Pannala, Tingwen Li, Lei Chen</i>	

POSTER SESSION: FLUID MECHANICS

171a Dimensional Analysis to Scale Impulse and Overpressure Caused by Shock and Subsonic Waves	340
<i>Nate Breed</i>	
171b Dolphin Skin CFD Analysis for Biomimetic and Hydrodynamic Applications	341
<i>Wayne Strasser</i>	
171c A Combined Experimental and Computational Study on MHD Rotating Flow of a Hybrid Nanofluid over an Expanding Surface with Chemical Reaction and Heat Dissipation	342
<i>B. Venkateswarlu, Sang W. Joo</i>	
171d Influence of Reynolds Number on Variations of Turbulent Statistics in Channel Flow of Dilute Polymer Solutions	343
<i>Kyoungyoun Kim</i>	
171e Measurement of 3D Flow Patterns with TS-PIV in a Stirring Blade Turning Space from Laminar to Transitional Regime.....	344
<i>Takemi Shinkai, Fumiya Hirowatari, Ryuta Misumi</i>	
171f Ventricular Wall Contact and Its Role in Flow Disruption in Hydrocephalus Treatment.....	347
<i>Christopher Roberts, Prashant Hariharan, Carolyn Harris</i>	
171g Utilization of the Euler-Lagrange Approach for Modelling of Gas-Liquid and Liquid-Liquid Systems.....	349
<i>Pavel Krýsa, Miroslav Šoóš</i>	
171h Elucidating Tunable Diffusioosmotic Flow Reversals Due to Ion-Ion Electrostatic Correlations	352
<i>Shengji Zhang, Henry Chu</i>	
171i Elucidating Hydrodynamic Interactions and Steric Hindrance in Diffusiophoresis in Porous Media.....	353
<i>Siddharth Sambamoorthy, Henry Chu</i>	

171j Experimental Analysis of Power Consumption and the Metzner-Otto Constant for Highly Shear-Thinning Fluids	354
<i>Mehak Jain, Ryuta Misumi</i>	
171k Influence of Surfactants, Polymers and Proteins on Foam Film Drainage	358
<i>Chenxian Xu, Carina D. V. M. Narváez, Lena Hassan, Patrycja Kotwis, Vivek Sharma</i>	
171l Explorations of Intermittency at the Cusp between L → P and L → M Types of Laminar-to-Turbulent Transitions in Drag-Reducing Polyox W301 Solutions	359
<i>Preetinder Virk</i>	
171n Symmetry-Group-Protected Microfluidics for Multiplexed Stress-Free Manipulations	361
<i>Jeremias Gonzalez, Ajay Gopinathan, Bin Liu</i>	
171o A Viscosity Measurement Technique for Ultra-Low Sample Volumes.....	362
<i>Mahesh Tirumkudulu, Mahrukh A. Mir</i>	
171p Insights into Bubble Coalescence Phenomena: Utilizing the Navier-Stokes-Korteweg Approach	363
<i>Christian Wachsmann, Kai Langenbach</i>	
171r Exploring the Influence of Evaporation on Respiratory Droplet Dynamics in Ventilated Indoor Environments.....	365
<i>Yi Feng, Daniele Marchisio, Marco Vanni, Antonio Buffo</i>	
372f Simulation of a Sedimenting Sphere in a Viscoelasticfluid with Openfoam	368
<i>Claire Love</i>	
171ad Brittle-to-Ductile Rheology in Composite Hydrogels with a Microfibrous Network.....	369
<i>Chenxian Xu, Yug C. Saraswat, Lilian Hsiao</i>	
171v Performance of Triboelectric Nanogeneration Using Flow through Porous Elastomers	370
<i>Kushal Yadav, Lilian Hsiao</i>	
171w Developing Next-Generation of Adeno-Associated Viral (AAVs) Vectors for Therapeutic Gene Delivery.....	371
<i>Danqing Zhu</i>	
171y Optical Tweezers Map Spatiotemporal Force Generation in Active Actin-Microtubule Composites	372
<i>Rae Robertson-Anderson</i>	
171z A Microrobotic Design for the Spontaneous Tracing of Isochemical Contours in the Environment	373
<i>A. Merritt Brooks, Sungyun Yang, Michael S. Strano</i>	
171aa Coupled Level-Set Volume of Fluid (CLS-VOF) Computational Fluid Dynamics of a Molten-Tin Bubble Column Reactor for Sulfur Hexafluoride (SF ₆) Degradation.....	374
<i>Son I. Ngo, Young-II Lim, Uen-Do Lee</i>	
171ab Directed Motion of Light-Activated Janus Colloids in a Thermotropic Nematic Liquid Crystal	375
<i>Antonio Tavera-Vazquez, Sam Rubin, Andres Cordoba, Haijie Ren, Rui Zhang, Vincenzo Vitelli, Juan J. De Pablo</i>	
171ac The Effect of Mixing Conditions on Drag Enhancement of Polymer Solutions in Pipes	376
<i>Kotaybah Hashlamoun, Saleh Baakeem, Nashaat Nassar</i>	

POSTER SESSION: INTERFACIAL PHENOMENA (AREA 1C)

172a Evaluation of Stability in Liposomes Composed of Mixed Phospholipids.....	378
<i>Sharareh Rezaei, Kenneth Mineart</i>	
172b Compatibility of the Surfactant-Chelating Agent Formulations for EOR Application	379
<i>Muhammad S. Kamal, Syed M. S. Hussain, Xiao Deng, Shirish Patil, Mohammad Alotaibi, Mohanad Fahmi</i>	
172c Biomimetic Artificial Knee Meniscus	380
<i>Melika Farzam, Mohamadreza Beitollahpoor, Noshir Pesika</i>	
172d Light-Induced Oxidation of Polysorbate 80 in Citrate Buffer with Glutathione Disulfide (GSSG) and Trace Iron.....	381
<i>Estephanie N. Escobar, Ginny Ke, Christian Schoneich, Prajnaparamita Dhar</i>	
172e A Nanometer Thick Ionic Liquid Coating with Simultaneously Hydrophilic/Oleophobic Behavior	382
<i>Alan Tirado</i>	
172f Investigating Mineral-Water Interfacial Dynamics through Zeta Potential Measurements with Mono and Divalent Salts	383
<i>Monica Iepure, Rae K. Yodong, Yuanzhong Zhang, Younjin Min</i>	

POSTER SESSION: THERMODYNAMICS AND TRANSPORT PROPERTIES (AREA 1A)

378a Dynamic Modeling and Simultaneous Simulation of Helical-Coiled Supercritical Steam Generator of MHTGR	384
<i>Yao Tong, Qinyu Bao, Zhijiang Shao</i>	
378b A Proposal on Thermodynamic Consistency Test of Vapor-Liquid Equilibria Data at High Pressure	386
<i>Katsumi Tochigi, Hiroyuki Matsuda, Tomoya Tsuji, Kiyofumi Kurihara</i>	
378c Investigating the Impact of Water Activity on the Hydration Dynamics and Thermodynamics of Ye'Elmite-Calcium Sulfate Hydrate Systems	387
<i>Godwin Ogbuehi, Monday Okoronkwo</i>	
378d Utilizing Phase Equilibrium Conditions for Separating Hydrogen from Hydrogen-Compressed Natural Gas Blends	388
<i>Jun H. Lee, Geumbi Han, Wonhyeong Lee, Jae Lee, Yun-Ho Ahn</i>	
378e Improving Hydrogen Storage Performance of Clathrate Hydrates Formed within Superabsorbent Polymers	389
<i>Lee Jae-Cheol, Wonhyeong Lee, Min-Kyung Kim, Jae Lee, Yun-Ho Ahn</i>	
378f Vapor-Liquid Equilibria for Selected Binary Systems 2-Methyltetrahydrofuran + Alkane	390
<i>Hiroyuki Matsuda, Soma Hirai, Kazuma Nozaki, Retsu Takanashi, Kiyofumi Kurihara, Katsumi Tochigi</i>	
378h New Initialization Procedures from Stability Testing in Multiphase Flash Calculations for Water/Hydrocarbon/CO ₂ Mixtures	391
<i>Juan Heringer, Michiel Wapperom, Catinca Seculianu, Denis Voskov, Dan V. Nichita</i>	

378i Modeling Vapor Liquid Equilibrium Using Machine Learning.....	392
<i>Mohammad Alam, Charles McGill</i>	
378j Engineering Ionic Liquid Specificity for Efficient Lanthanide Extraction: A Computational Study.....	393
<i>Balantrapu Harshit, Utkarsh Kapoor</i>	
378k Volumetric and Acoustic Properties of Metamizole and Polyethylene Glycol (PEG 200) in Water at Different Temperatures.....	394
<i>Lucas E. S. Estevan, Gustavo V. Olivieri, Ronaldo G. Santos, Ricardo Torres</i>	
378l Compressed Liquid Densities of Octane + Decane and Thiophene + Octane + Decane Mixtures at Temperatures up to 363.15 K and Pressures from 1 to 25 MPa	395
<i>Diana L. Salas-Gallegos, Angel M. Notario-López, Alfredo Pimentel-Rodas, Rubén P. Mendoza-Sánchez, Luis A. Galicia-Luna</i>	

SELF-ASSEMBLY IN SOLUTION

19a Harnessing Unsaturated Surfactant Tails in Tailoring Polyelectrolyte/Surfactant Complex Properties.....	396
<i>Jose C. B. Bassante, John G. Levendis, Maria R. Coleman, Joseph G. Lawrence, Yakov Lapitsky</i>	
19b PFAS Surfactants at Air-Water and Solid-Water Interfaces.....	397
<i>Dmitry Bedrov, Paschalis Alexandridis, Marina Tsianou</i>	
19c Complexity in a Simple Self-Assembling System: Lecithin-Water-Ethanol Mixtures Exhibit a Re-Entrant Phase Transition and a Vesicle-Micelle Transition (VMT) on Heating.....	398
<i>Faraz Burni, Niti Agrawal, Srinivasa R. Raghavan</i>	
19d Kinetic and Minimum Free Energy Pathways in Diblock Copolymer Micelle Exchange	399
<i>Samuel Varner; Marcus Mueller, Alejandro Gallegos, Kevin Dorfman, Tim Lodge, Zhen-Gang Wang</i>	
19e Predictive MODEL for Aggregation RATE of Nanoparticles in Porous MEDIA	400
<i>Thi K. V. Nguyen, Ngoc H. Pham, Dimitrios Papavassiliou</i>	
19f Self-Assembly of Bidisperse Colloidal Gels.....	401
<i>Rony Waheibi, Lilian Hsiao</i>	
19g Investigation of the Foaming Characteristics of Newly Developed Surfactants Under Harsh Reservoir Conditions	402
<i>Muhammad S. Kamal, Syed M. S. Hussain, Ahmed Bashir, Shirish Patil, Ahmad Mahboob</i>	
19h Interfacial Demixing of Co-Surfactant “Frenemies” Stabilizes Complex Nanoemulsions	403
<i>Tanvi Sheth, Céleste Prileszky, Nairiti Sinha, Matthew Helgeson</i>	

SOFT AND ACTIVE SYSTEMS

319a Self-Organization of Fluids in Autonomous Enzymatic Pump Systems.....	404
<i>Ayusman Sen</i>	
319b Merging Turing Patterns and Cellular Automata: Simultaneously Assembling and Evolving Structures Via Diffusiophoresis	405
<i>Siamak Mirfendereski, Ankur Gupta</i>	

319c Emergent Activity	406
<i>Ella King, Mia Morrell, David Grier</i>	
319d Effects of Hydrodynamic Interactions in Motility-Induced Phase Separations.....	407
<i>Tingtao Zhou, John Brady</i>	
319e The Mechanics of Classical Nucleation and the Surface Tensions of Active Matter	408
<i>Luke Langford, Ahmad Omar</i>	
319f Getting in Shape—Unraveling the Morphodynamics of Microbial Communities.....	409
<i>Alejandro Martinez-Calvo, Tapomoy Bhattacharjee, Carolina T. Yuste, R. Konane Bay, Hyunseok Lee, Hao N. Luu, Anna Hancock, Jeff Gore, Ned Wingreen, Sujit Datta</i>	
319g Bacterial Cells in Cytoskeleton Composites for Living Materials	410
<i>Katarina Matic, Nimisha Krishnan, Gregor Leech, Moumita Das, Megan T. Valentine, Michael Rust, Jennifer Ross, Rae Robertson-Anderson</i>	
319h Emergent Micro-Mechanics of Active Bio-Synthetic Composites.....	411
<i>Rae Robertson-Anderson</i>	
319i Cooperation of Motility- and Growth-Driven Activity in Biofilm Dynamics	412
<i>Kimberly Bowal</i>	

SOLID-LIQUID INTERFACES

715a A Theoretical Study of the Origins of Ru Nanocrystal Phase Control Directed by Solvent	413
<i>Eun M. Kim, Quynh Nguyen, Yong Ding, Annemieke Janssen, Chenxiao Wang, Kei K. Li, Junseok Kim, Younan Xia, Kristen Fichthorn</i>	
715b Reversible Molecular Capture and Release with Liquid Metals.....	414
<i>Mohammadreza Zare, Man H. Vong, Michael D. Dickey, Qingshan Wei</i>	
715c Interfacial Friction Control by Surface Free Energy Modification of Elastomers.....	415
<i>Oluwatobi Ojuade, Lilian Hsiao</i>	
715d Equilibrium Contact Angle Profiles Along Capillary Tubes: Measurements and Implications for the Analysis of Capillary Filling Dynamics	416
<i>Jose C. Contreras-Naranjo, Oyindamola Aje, Ifeoluwa Babalola, Ghada Abdelrahman, Victor Ugaz</i>	
715f A Nanometer-Thick Ionic Liquid Coating with Simultaneously Hydrophilic/Oleophobic Behavior	417
<i>Alan Tirado</i>	

THERMODYNAMIC AND TRANSPORT PROPERTIES UNDER PRESSURE

21a A Comprehensive Model for the Sub and Supercritical Sorption and Transport of Gases in Polymers: Analysis of Swelling and Non-Swelling Agents at High Pressures	418
<i>Roberta Di Carlo, Eleonora Ricci, Matteo Minelli</i>	
21b Modelling and Experimental Study of Viscosity and Density of Live Fluids at Reservoir Conditions	420
<i>Iusiph Eiubovi, Martin Trusler</i>	

21c High-Pressure Thermodynamic and Rheological Properties of Lubricant Mineral Base Oils and the Effects of Viscosity Index Modifiers with Different Architectures.....	421
<i>Katrina Avery, Erdogan Kiran, Mark Devlin</i>	
21d Melting and Crystallization Temperatures of Ethylene-Octene Block Copolymers in Compressed Carbon Dioxide and Nitrogen.....	422
<i>Dawn D. Rhee, Joseph Sarver, Erdogan Kiran</i>	
21e PC-SAFT Parametrization for Ionic Liquids from Density and Viscosity Data Using Entropy Scaling.....	423
<i>Diego T. Melfi, Aaron M. Scurto</i>	
21f Molecular Dynamics Simulations of Shear Thinning of Lubricants at High Strain Rates	424
<i>Wenhui Li, Vikram Jadhao</i>	
21g Simultaneous Experimental Determination of Dynamic Viscosity and Density of THF, Ethyl Acetate, and Thiophene at Temperatures up to 353.15 K and Pressures up to 50 MPa.....	425
<i>Cristopher A. Arroyo-Hernández, Alfredo Pimentel-Rodas, Luis Galicia-Luna</i>	

THERMODYNAMICS OF BIOMOLECULAR FOLDING AND ASSEMBLY

467a Design of Peptide Nanofibrils Using Monte-Carlo Sampling and Coarse-Grained Simulations.....	426
<i>Sudeep Sarma, Haoyu Wang, Carol Hall</i>	
467b Effect of High Pressure on the Conformational Landscape of Human Γ d-Crystallin from Replica Exchange Molecular Dynamics Simulations.....	427
<i>Arlind Kacirani, Betul Uralcan, Tiago Domingues, Amir Haji-Akbari</i>	
467c A Colloidal Model for Equilibrium Assembly and Liquid-Liquid Phase Separation of Reflectin Protein.....	428
<i>Tse-Chiang Huang, Robert Levenson, Youli Li, Phillip Kohl, Daniel Morse, M. Scott Shell, Matthew Helgeson</i>	
467d Using All Atom Simulation to Predict RNA Behavior in Biomolecular Condensates.....	429
<i>Vailankanni Rodrigues, Gregory Dignon</i>	
467e Elucidating the Distinct Unfolding Pathways of Bovine Serum Albumin Under Varying External Stressors: A Comprehensive Molecular Dynamics Simulation Study.....	430
<i>Yinhao Jia, Clare Cocker, Janani Sampath</i>	
467f Mutation Location Impacts the Efficacy of Tyrosine Kinase Inhibitors on Epidermal Growth Factor Receptor Proteins: Insights from Molecular Dynamics Calculations.....	431
<i>Ashwin Ravichandran, Dinesh S. Devarajan, Sriramvignesh Mani, Xiuning Le, John Heymach, John W. Lawson</i>	
467g Revealing the Atomic-Level Details of Helix-Mediated TDP-43 Oligomerization and Phase Separation.....	432
<i>Azamat Rizuan, Jayakrishna Shenoy, Priyesh Mohanty, Nicolas L. Fawzi, Jeetain Mittal</i>	
467h Conformational and Energetic Effects Associated with Methylation in RNA.....	433
<i>Lev Levintov, Harish Vashisth</i>	
467i Universal Folding Mechanisms of Lasso Peptides.....	434
<i>Diwakar Shukla</i>	

467j λ Dynamics: An Emerging Method for Physics-Based Protein Design.....	435
<i>Ryan Hayes</i>	

THERMOPHYSICAL PROPERTIES AND PHASE BEHAVIOR I

126a Ice Nucleation from Drop-Freezing Experiments: Impact of Droplet Volume Dispersion and Cooling Rates	436
<i>Ravi K. R. Addula, Ingrid De Almeida Ribeiro, Valeria Molinero, Baron Peters</i>	
126c A New Three-Phase Equilibrium Calculation Method with Partial Solubility of Selected Components Applied to CO ₂ Storage in Depleted Reservoirs	437
<i>Juan Heringer, Michiel Wapperom, Catinca Secuianu, Denis Voskov, Dan V. Nichita</i>	
126d Storing Hydrogen-Natural Gas Blends in the Water-Frameworks of Tuned Clathrate Hydrates.....	438
<i>Yun-Ho Ahn, Youngjune Park, Jae Lee</i>	
126e Modeling Nucleation of Molecular Crystals from Solution.....	439
<i>Jacob McKibbin, Erik Santiso</i>	
126f Towards Transferable and User-Friendly Machine Learning Models for Thermophysical Property Prediction - a Case Study with Melting Points	442
<i>Frank Mtetwa, Thomas Knotts, Wade V. Wilding</i>	
126g Molecular Insights into Liquid-Liquid Equilibria Obtained on Use of Alcohols for Efficient Extraction of Acetonitrile from Its Mixtures with Water	443
<i>Azra Shuaib, Jhumpa Adhikari</i>	
126h A Hybrid Newton-Trust-Region Method in Multiphase Isenthalpic Flash Calculations for CO ₂ Storage Simulations.....	445
<i>Lingfei Xu, Arthur Moncorgé, Dan V. Nichita</i>	
126i Thermal Stability and CO ₂ Uptake of Dicationic Ionic Liquids Containing 2-Cyanopyrrolide Anions	447
<i>Junwon Park, Louise Canada, Joan Brennecke</i>	
126j A Computationally Efficient Polar Cubic Equation of State for Predictive Modeling of the Phase Behavior and Critical Phenomena of Polar and Aromatic Mixtures	448
<i>Mohammed Abutaqqa, Bennett Marshall</i>	
126k Hansen Solubility Parameters for the Prediction of 2,5-Furandicarboxylic Acid Solubility in Aqueous/Organic Solvent Mixtures at 293 K.....	449
<i>Jacob Molinaro, Stephanie Wettstein, Annabelle S. Young, Matthew R. Carroll</i>	
126l Bridging Residue-Level Thermodynamics with Sequence-Dependent Phase Behavior of Intrinsically Disordered Proteins	450
<i>Shiv Rekhi, Jeetain Mittal</i>	

THERMOPHYSICAL PROPERTIES: THEORY AND EXPERIMENTS FOR CHARGED SYSTEMS

636a <i>In-Silico</i> Interfacial Characterization of Ultra-Low Crosslinked (ULC) Charged Microgel Pastes.....	451
<i>E. Daniel Cárdenas-Vásquez, L. Andrew Lyon</i>	

636b Electrolytic Conductivity, Density and Viscosity Measurements and Models for Ten Ionic Liquids.....	452
<i>Joseph Magee, Jason Bara</i>	
636c Structure-Property Relationships for the Electrothermic and Thermophysical Properties of Ionic Liquids Under External Electric Fields	453
<i>Fernando C. Esteva, Yong Zhang, Edward Maginn, Yamil Colón</i>	
636d Thermal Conduction in Ionic Liquids, Hydrofluorocarbons, and Their Mixtures: Molecular Simulation, and Elucidation of Heat Conduction Mechanisms	455
<i>Barnabas Agbodekhe, Karim Al-Barghouti, Aaron M. Scurto, Edward Maginn</i>	
636e Influence of Solution Environment on Estimation of Ionic Conductivity in Ionic Liquid Electrolytes.....	456
<i>Amey Thorat, Ashutosh K. Verma, Rohan Sartape, Rohit Chauhan, Meenesh R. Singh, Jindal Shah</i>	
636g Unraveling the Sequence-Dependent Conformational Transitions of Disordered Proteins during Condensation.....	457
<i>Jiahui Wang, Dinesh S. Devarajan, Youngchan Kim, Arash Nikoubashman, Jeetain Mittal</i>	
636h An Investigation on the Utility of Association Electrolyte Nonrandom Two-Liquid Activity Coefficient Model for Aqueous Electrolyte Systems.....	458
<i>Cheng-Ju Hsieh, Chau-Chyun Chen</i>	

INTERFACIAL TRANSPORT PHENOMENA

679a Exploration of Irregular Porous Networks by Active and Passive Nanoparticles.....	459
<i>Anni Shi, Daniel K. Schwartz</i>	
679b Brownian Motion of a Soft Particle Near a Fluctuating Lipid Bilayer	460
<i>Micheline Abbas, Salah U. Din Sheikh, Ali Mohammadi, Zhen Li, Barbara Lonetti</i>	
679c Water-Lubricated CO ₂ and CH ₄ Transport in Crystalline Silica Mesopores: A Molecular Dynamics Study	461
<i>Lian Duan, Zhehui Jin</i>	
679d The Influence of Surfactants in Contraction Dynamics of Liquid Sheets.....	463
<i>Naresh K. Dhanwani, Ajay H. Kumar, Hansol Wee, Osman A. Basaran</i>	
679e Microfluidic Platform to Study the Effect of Mass Transfer Dynamics on the Morphology of Drug-Loaded Polymer Microparticles.....	464
<i>Suryavarshini Sundar, Eric Hukkanen, Renato Chiarella, Arun Ramachandran</i>	
679f Evaluating Differences in the Onset of Viscoelastic Film Formation at the Air-Liquid Interface for an IgG Monoclonal Antibody and an Fc-Fusion Protein	465
<i>Valerie Griffin, Estephanie N. Escobar, Ankit Kanthe, Madhushree Gokhale, Prajnaparamita Dhar</i>	
679h Molecular Insights into Methane Hydrate Dissociation: Role of Methane Nanobubble Formation	466
<i>Bhavesh Moorjani, Jhumpa Adhikari, Samik Hait</i>	

EXPERIMENTAL METHODS FOR THE STUDY OF INTERFACIAL PHENOMENA

635b Resonance Imaging Microscopy: Breaking the Diffraction Limit with Visible Light.....	468
<i>Christopher Bolton, Tanweepriya Das, Raymond Dagastine</i>	
635c An Instrument for Measuring Dilatational and Shear Rheology of Interfacial Films: RheoSurfR.....	469
<i>Benjamin Thompson, Kiet Pham, Alicia Platck, Richard Dombrowski, Norman J. Wagner</i>	
635d Use of Drop Rest Technique to Evaluate the Stability of Waxy Crude Oil	470
<i>Pooja Verma, Vinay A. Juvekar, Jyoti Seth, Vidhya Vijaykumar, Rochish Thaokar</i>	
635e Insights on Drop Formation Dynamics in Presence of Interfacial Mass Transfer	471
<i>Muzammilanwar Khan, Amol Kulkarni</i>	
635f Direct Measurement of Lateral Capillary Force with a Cantilevered Capillary Force Apparatus.....	474
<i>Joseph Samaniuk, John Frostad</i>	

ANALYSIS, DESIGN AND CONTROL OF NANO/BIO/INTERFACES - AIChE AND SOCIETY OF CHEMICAL ENGINEERS, JAPAN (SCEJ) JOINT SESSION

318a All-Atom Analysis of Crystal Growth and Its Modulation by MD Simulation and Free-Energy Calculation.....	475
<i>Nobuyuki Matubayasi</i>	
318b Design of Inorganic Nanoparticle Surface Toward Frequent Control of Intracellular Particle Localization.....	476
<i>Keishi Suga, Ryota Kameda, Taisei Suzuki, Kanako Watanabe, Daisuke Nagao</i>	
318c How Well Can You Tailor the Charge of Lipid Vesicles?	477
<i>Tonya L. Kuhl, Deepshika Gilbile</i>	
318d A Methodology of Quantifying Membrane Permeability Based on Returning Probability Theory and Molecular Dynamics Simulation.....	478
<i>Kento Kasahara, Nobuyuki Matubayasi</i>	
318e Mechanistic Insights into Cell-Sized Giant Liposome Assembly	479
<i>Anand B. Subramaniam</i>	
318d Multiplicity of Solvent Environments in Lipid Bilayer Revealed by DAS Deconvolution of Twin Probes: Comparative Method of Laurdan and Prodan.....	480
<i>Nozomi M. Watanabe, Natsuumi Ito, Hiroshi Umakoshi</i>	
318g Osmotically-Activated Membrane Biointerfaces	481
<i>Atul Parikh</i>	

SYMPOSIUM IN MEMORY OF JEFFREY DAVIS (INVITED TALKS)

125a From Capture of Flowing Particles at Heterogeneous Surfaces to the Impact of Particle Shape	482
<i>Maria Santore</i>	
125d Computational Prediction and Optimization of Protein Anti-Freeze Activity	483
<i>Daniel Kozuch, Jack Weis, Pablo Debenedetti</i>	

125c The Thin Film Dynamics of iCLIP: A New Vat Polymerization Process	484
<i>Eric Shaqfeh, Joseph M. DeSimone, Gabriel Lipkowitz, Navneeth Krishnan</i>	
125b Thin Film and Related Flows with Various Complexities	485
<i>Omar Matar</i>	
125e Shear-Induced Depinning of Thin Droplets on Rough Substrates	486
<i>Ninad Mhatre, Satish Kumar</i>	
125f Caging Dynamics of Polymeric Fluids and Concentrated Colloids	487
<i>Henning Winter</i>	
125g Some Examples of Interfacial Separations and Pattern Formation.....	488
<i>Martin Bazant</i>	

FUNDAMENTALS OF INTERFACIAL PHENOMENA II

713a Effect of Wettability on the Void Formation during Liquid Infusion into Fibers.....	489
<i>Jared Turner, Daniel Lippert, Dongjin Seo, Andrew George</i>	
713b Droplet Impact-Mediated Liquid-Liquid Mass Transfer	490
<i>Xiaoguang Wang</i>	
713c Exploring the Size Limit of Lateral Capillarity in Interfacial Assembly Processes.....	491
<i>Sungwan Park, Albert Liu</i>	
713d Using Atomic Force Microscopy to Estimate Hamaker Constants of Solid Materials: Effect of Repulsive Interactions	492
<i>Juan Vazquez, Stephen P. Beaudoin, David Corti</i>	
713e Interactions of Soft Microcapsules with a Nearby Boundary Measured Via Scattering Morphology Resolved Total Internal Refraction Microscopy (SMR-TIRM).....	493
<i>Hairou Yu, Jiarui Yan, Laura G. Tirado, Jairo D. Amaya, Christopher L. Wirth</i>	
713f Application of Surface Element Integration to Diffuse Double Layer Pair Interactions Between Non-Simple, Non-Smooth, and Oriented Particles.....	494
<i>Siddharth Rajupet, Clayton Radke, Adam Z. Weber</i>	
713g Structure-Property Relationships for the Use of Novel Amphiphilic Polyacrylates to Break Water-in-Crude-Oil Emulsions.....	496
<i>Jonathan Moore, T. C. Kuo, Kathryn Grzesiak, Arash Nowbahr, Adam Schmitt, Decai Yu, Daniel Miller, Thomas Kalantar, David Brennan, Mladen Ladika</i>	
713h Understanding Light Oil – Rock Interactions Using Molecular Dynamics	497
<i>Prashil Badwaik, Shubham Chobe, Ateeque Malani</i>	

SYMPOSIUM IN MEMORY OF BILL RUSSEL - 1/2 (INVITED TALKS)

20b From Microhydrodynamics to Computational Drug Discovery - My Journey with Bill Russel	498
<i>Sangtae Kim</i>	
20c Still Playing with Gels and Watching Paint Dry: Rheology of Associative Semicrystalline Polymers and Stratification in Colloidal Films.....	499
<i>Surita Bhatia</i>	

20d Bill Russel's Quest for Understanding the Viscosity of Hard Sphere Colloidal Suspensions.....	500
<i>Norman J. Wagner</i>	
20e Measuring the Conformation of Organic Friction Modifiers Under Shear Using Neutrons.....	501
<i>Alexander Routh, Beatrice B. Robutti, Alexander Armstrong, Rebecca Welbourn, Beatrice Cattoz, Colin Willis, Philip Camp, Peter J. Dowding</i>	
20f Macromolecular Sequence of Nonionic Surface-Active Polypeptoids as a Tool to Control on Properties of Fluid-Fluid Interfaces.....	503
<i>Michał Roguski, Michael L. Davidson, Rachel Segalman, Lynn Walker</i>	
20h Chemical Engineering Modeling in Life and Work.....	504
<i>Robert Davis</i>	

NONLINEAR FLOWS AND COMBINED TRANSPORT PROCESSES

526a Bacterial Barriers in Chaotic Flows: A Lagrangian Description.....	505
<i>Paulo Arratia</i>	
526b Bacterial Chemotaxis in Disordered Environments.....	506
<i>Amir Pahlavan</i>	
526c Convective Instability Driven by the Interfacial Reaction of Oppositely Charged Surfactants Meeting at an Oil–Water Interface	507
<i>Brian McKenzie, Hao-Wen Teng, Stephen Garoff, Aditya Khair, Robert Tilton</i>	
171s Spontaneous Climbing of Thin Films Due to Drainage-Induced Surfactant Marangoni Effect.....	508
<i>Pooria Pirdavari, Huy Tran, Ziwen He, Min Pack</i>	
526e Diffusiophoresis in Porous Media Saturated with Electrolytes.....	510
<i>Henry Chu, Siddharth Sambamoorthy</i>	
526f Nested Travelling Wave Underlying Elastoinertial Turbulence	511
<i>Manish Kumar, Michael D. Graham</i>	
526g Accelerating Mixing and Reaction Kinetics in Porous Media Using an Elastic Instability	512
<i>Christopher Browne, Sujit Datta</i>	
526h Nanomotor-Enhanced Diffusion Transport in Porous Media	513
<i>Anni Shi, Daniel K. Schwartz</i>	
526i Physics-Based Modeling of a Minimal Synthetic Cell: Nucleoid and Cytoplasm Organization.....	514
<i>Gesse Roure, Vishal S. Sivasankar, Roseanna Zia</i>	

200TH ANNIVERSARY OF RENSSELAER POLYTECHNIC INSTITUTE I (INVITED TALKS)

60a Past, Present and Future of Undergraduate Chemical Engineering Education at Rensselaer Polytechnic Institute	515
<i>B. Wayne Bequette, Shekhar Garde, Joel Plawsky</i>	
60b Celebrating 200 Years (RPI) and 110 Years (CHME): Three Technical Highlights from an Academic Career	516
<i>Georges Belfort</i>	

60c Expedited Process Development for Downstream Bioprocessing	517
<i>Steven Cramer</i>	
60d Bioprocessing of Engineered Polysaccharides for Therapeutic Applications.....	518
<i>Jonathan Dordick</i>	
60e Polymer in Interstitial Space as Structure Director in Colloid Self-Assembly	519
<i>Sangwoo Lee</i>	
60f Synthesis and Application of Silk-Inspired Materials	520
<i>Helen Zha</i>	
60g Stereoregular Polymerization on Chiral Nanoparticles	521
<i>Ji-Young Kim</i>	

THERMODYNAMICS AT THE NANOSCALE

22a Contrasting the Adsorption Behavior of Quaternary Ammonium and Pyridinium Based Surfactants at Metal-Water Interfaces Via Fully Atomistic Simulations	522
<i>Sumit Sharma, Thanh M. G. Do</i>	
22b Curved Confinement-Induced Stabilized Blue Phase Liquid Crystals	523
<i>Sepideh Norouzi, Yazael R. Morales-Flores, Jeremy Money, Otilio E. Rodriguez-Lopez, Jose A. Martinez-Gonzalez, Monirosadat Sadati</i>	
22c [Invited Talk] Polymer Dynamics Near Complex Surfaces	524
<i>Svetlana Morozova</i>	
22d Phase Nucleation on Structures with Defined Geometries	525
<i>Yanchen Wu, Richard Braatz</i>	
22e Antifreeze Proteins: From Interfacial Thermodynamics and Engulfment Resistance to Thermal Hysteresis Predictions	526
<i>Hossam Farag, Baron Peters</i>	
22f [Invited Talk] Dissecting Thermodynamic Complexities in Lanmodulin Proteins	527
<i>Joseph Cotruvo</i>	
22g Uncovering the Thermodynamics of Capillary Phase Transitions Under Non-Isothermal Conditions	528
<i>Rahul P. Misra, Yu-Ming Tu, Matthias Kuehne, Samuel Faucher, Lukas Arcuri, Michael S. Strano, Daniel Blankschtein</i>	

THERMOPHYSICAL PROPERTIES AND PHASE BEHAVIOR II

203a Thermodynamic Behavior and Activity Coefficient Modelling of Low Pressure Alkane + Alcohol Systems.....	529
<i>Cara E. Schwarz, Robert M. Slabbert, Nadine Buitendach, Danielle Lamprecht, Andre Burger</i>	
203b Accurate Determination of Osmotic Pressure for Monovalent Ions Using Osmotic Force Balance and Chemical Potentials	532
<i>Alireza Hosseini, Henry Ashbaugh</i>	

203c Extension of Co-Oriented Fluid Functional Equation for Electrostatic Interactions to Include Multi-Body Repulsive Effects	533
<i>Julia Amplatz, Joshua Marx, Walter Chapman, Kai Langenbach</i>	
203d Towards Linking Engineering Workflows: Phase Behavior, Self-Assembly, and Fluctuations from Thermodynamic Perturbation Theory and Molecular Simulation.....	537
<i>Jinxin Lu, Cristel C. B. Flores, Thiago J. P. Dos Santos, Walter Chapman</i>	
203e Deciphering the Molecular Details of Fus LC-RGG1 Phase Separation with RNA.....	538
<i>Kandarp Sojitra, Tongyin Zheng, Nicolas L. Fawzi, Jeetain Mittal</i>	
203g Effect of Polarization on Ionic Conductivity Predictions in Binary Ionic Liquid Mixtures	539
<i>Ashutosh K. Verma, Amey Thorat, Jindal Shah</i>	
203h Pre-Training Large Language Models for Solvent-Solute Predictions	540
<i>Melissa Williams, Charles McGill</i>	
203j High-Pressure Phase Equilibrium Calculation by Cubic Equation of State with Various α -Functions	541
<i>Yusuke Shimoyama, Mimu Fujimori, Yuna Tatsumi, Taishi Kataoka, Yasuhiko Orita</i>	

200TH ANNIVERSARY OF RENSSELAER POLYTECHNIC INSTITUTE II (INVITED TALKS)

123a Creating a New Circular Carbon Economy via Carbon Capture, Utilization and Storage	542
<i>Ah-Hyung A. Park</i>	
123d My Journey from Polymer Blends (RPI) to Polymers Blended with Ions (Berkeley).....	543
<i>Nitash P. Balsara</i>	
123c From Biochips to Biofuels, with Reflections on a Special Relationship	544
<i>Douglas S. Clark</i>	
123b Celebrating Great Chemical Engineering	545
<i>Kathleen J. Stebe</i>	
123e Engineering the Intestinal Environment	546
<i>Rebecca Carrier</i>	
123f Honoring the Past, Innovating the Future: A Chemical Engineer's Trek.....	547
<i>Asher Williams</i>	
123g Bioactive Materials for Tissue Repair	548
<i>Kaushal Rege</i>	

200TH ANNIVERSARY OF RENSSELAER POLYTECHNIC INSTITUTE III (INVITED TALKS)

200a New Frontiers for Chemical Engineers: Why Modular Systems Could be the Future	549
<i>Bhima Sastri</i>	
200b How CAR T Has Begun to Fulfill the Promise of Cell Therapy	550
<i>Gregory Rusotti</i>	

200c Chemical Engineering to Gen AI, a Personal Journey	551
<i>Shom Ponoth, Satya Nitta</i>	
200d A Nice Time at RPI.....	552
<i>Marc-Olivier Coppens</i>	
200e The Design of Broadly Protection Vaccines	553
<i>Ravindra Kane</i>	
200f Let Yeast Fart: Modeling the Spatiotemporal Patterns of Yeast Sulfur Metabolism and Its Applications for CO ₂ Fixation.....	554
<i>Peng Xu, Hanqing Zhang, Dewei Lin, Dian Li</i>	
200h Metabolic Engineering at the RPI Constellation and Elsewhere Reshaping the Chemical Industry.....	555
<i>Gregory Stephanopoulos</i>	
<u>ACTIVE AND BIOLOGICAL SYSTEMS II</u>	
522a Enzymatic Cleaving of Entangled Circular DNA Drives Scale-Dependent Rheological Trajectories	556
<i>Rae Robertson-Anderson</i>	
522b Granular-Like Behavior of Dense Microroller Systems	557
<i>Samuel Wilson-Whitford, Maria C. Roffin, Jinghui Gao, Marietta Sisca, James Gilchrist</i>	
522c Spontaneous Assembly of Condensate Networks during the Demixing of Structured Fluids	558
<i>Christopher Browne, Yuma Morimitsu, Chinedum Osuji</i>	
522d “Moonwalking”: A New Mode of Dissipative Active Motion of Rotating Colloidal Particles in Complex Fluids	559
<i>Abhirup Basu, Eric Buchsbaum, Orlin D. Velev</i>	
522e Up, Up, and Away: Entrainment by Biogenic Bubbles Enables Long-Range Microbial Dispersal in Yield-Stress Environments	560
<i>Babak V. Hokmabad, Hao N. Luu, Meera Ramaswamy, Sujit Datta</i>	
522f Transfusion Effects on WBC Adhesion in Sickle Cell Disease Patients	561
<i>Logan Piegols, Omolola Eniola-Adefeso</i>	
522g Computational Fluid Dynamics Modeling and Experimental Studies of Multi-Port Needles for Optimization of Drug Delivery to Multiple Tissue Layers	563
<i>Alexia Passos, Jeremy Marston</i>	
522h Comparative Computational Fluid Dynamics Analysis of Pulsatile and Steady State Flow in Ventricular Catheters	564
<i>Christopher Roberts, Prashant Hariharan, Carolyn Harris</i>	
522i Investigating the Effect of Non-Invasive Respiratory Therapy on Pressure Distribution in the Upper Airway	566
<i>Robert Kacinski, Wayne Strasser</i>	
522j Viscoelasticity and Lipid Content of Minipig and Human Skin Tissue: A Comparative Study across Different Anatomical Locations and Depths.....	567
<i>Harsa Mitra, Evelyn Nonamaker, Ria D. Corder, Luis Solorio, Arezoo Ardekani</i>	

SYMPORIUM IN MEMORY OF BILL RUSSEL - 2/2 (INVITED TALKS)

64b Assembly of Two Dimensional Colloids in an Elastic Two Dimensional Fluid	568
<i>Maria Santore</i>	
64c Stress Generation in Drying Colloidal Systems: From Film Fracture to Drop Buckling	569
<i>Mahesh Tirumkudulu</i>	
64d Assembly of Particles Under Orthogonally Applied Electric and Magnetic Fields.....	570
<i>Ning Wu, Xingrui Zhu, Yuanxing Zhang</i>	
64e Colloidal Physics Instantiate Life in Biological Cells	571
<i>Jennifer L. Hofmann, Akshay Maheshwari, Alp Sunol, Emma Gonzalez, Drew Endy, Theo Yang, Roseanna Zia</i>	
64f <i>In Situ</i> Rheology of Mucus on Live Airway Epithelial Cell Cultures	572
<i>Margaret Braunreuther, Maude Liegeois, Carlos Milla, John Fahy, Gerald Fuller</i>	
64g Snell's Law for Swimmers.....	573
<i>John Brady, Tyler Ross, Paul Rothemund</i>	
20g Confined Impinging Jet Technology That Enabled COVID Lipid Nanoparticle Production: Engineering Science and History	574
<i>Robert K. Prud'Homme</i>	

APPLIED FUNDAMENTALS IN TRANSPORT PROCESSES

582a Characterization of Particle Laden Drop Impacts Based on Particulate Properties: Application to Atmospheric-Ocean Transport.....	575
<i>Whitney Tran, Jeremy Marston</i>	
582b Concentrate Minimization: Testing of Improved Static Mixer Crystallizers for Inland Brine Management	576
<i>Ajeet Singh, John Pellegrino</i>	
582c The Collective Effects of Fluid and Surface Characteristics on Rarefied Gas Transport in Smooth Crystalline Nanoslits: A Molecular Dynamics Study	578
<i>Lian Duan, Zhehui Jin</i>	
582d Enhancing Predictability of Gas Evolution Rate in Hydrocarbon Systems through Live Oil Property-Based Mass Transfer Coefficient Determination.....	580
<i>Alireza Zahedi, Anirban Ghosh, Michael Miranda, Clint Aichele</i>	
582e Direct Numerical Simulations of Miscible and Immiscible Product Changeover	581
<i>Abdullah Abdal, Lyes Kahouadji, Seungwon Shin, Jalel Chergui, Damir Juric, Omar Matar</i>	
582f Harnessing Toy-Inspired Physics for Electricity-Free Thermal Cycling.....	584
<i>Dimal K. Acahy, Aashish Priye</i>	
582g Diffusion and Flow in Complex Liquids	585
<i>Karol Makuch, Robert Holyst, Tomasz Kalwarczyk, Piotr Garstecki, John Brady</i>	
582h Oxygen Diffusion and Reaction in the Human Cornea	586
<i>William Krantz, Sudhir Ranganath</i>	

LITHIUM AND BEYOND: FUNDAMENTAL ADVANCES IN HIGH PERFORMANCE BATTERIES II

714b Multi-Model Identification of Fluorinated Ether Solvents for Lithium-Sulfur Batteries	590
<i>Rasha Atwi, Daniel Gribble, Dan T. Nguyen, Vijayakumar Murugesan, Vilas Pol, Nav N. Rajput</i>	
714d The Impact of Electrolyte Solvent on the Stability of NaO ₂ Discharge Product at the Aprotic Electrolyte/Solid Interfaces of Na-O ₂ Batteries.....	591
<i>Kunal Velinkar, Alex Von Gunten, Onyema Obi, Jeffrey Greeley, Eranda Nikolla</i>	
714e Lithium Superionic Conductivity and Interfacial Stability in Newly Predicted Li-Sulfide Battery from Reactive Force Field	592
<i>Tridip Das, Sergey Morozov, Boris Merinov, Sergey Zybin, Moon Y. Yang, William Goddard</i>	
714f Porous-Silicon for Li-Ion Battery Anodes: From Unlocking Formation Pathways to Scaled-up Manufacturing	594
<i>Sarah Martell, Maximilian Yan, Gwen Chimonides, Mita Dasog, Siddharth Patwardhan</i>	
714g Minimal Surface Co-Continuous Silicon Composites for Enhanced Lithium-Ion Batteries: A Chemo-Mechanical Study	595
<i>Sierra J. Gross, Lorenzo Valdevit, Ali Mohraz</i>	
714h Self-Rearrangement of Si Particles in Si-C Composite Anodes during Cycling in Lithium-Ion Batteries: A Reactive Molecular Dynamics Study.....	596
<i>Sungwon Park, Gyeong S. Hwang</i>	
714i Interfacial Engineering of Lithium Batteries with Conformal Polymer Thin Films.....	597
<i>Wyatt Tenhaeff</i>	

Author Index