

Particle Technology Forum 2021

Held at the 2021 AIChE Annual Meeting

Boston, Massachusetts, USA and Online
7 - 11 November and 15 - 19 November 2021

ISBN: 978-1-7138-5699-3

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© (2021) by AIChE
All rights reserved.

Printed with permission by Curran Associates, Inc. (2022)

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

Influence of Interfaces in Electrical Properties of 3D Printed Structures	1
<i>Fraser Daniel, Andy Gleall, Adarsh Radadia</i>	
Modeling Heat Transfer in Material Extrusion Additive Manufacturing: Balancing Model Resolution with Computational Demands	3
<i>Michael Bortner, James T. Owens, Arit Das</i>	
Assessing the Fidelity of Additively Manufactured Objects	4
<i>Hajar Taheri Afarani, Edward Garboczi, Newell H. Moser, Ebrahim Nasr-Esfahani, Joseph J. Biernacki</i>	
Design and Processing of Open Lattice Structures for Tunable Fluid Phenomena	5
<i>Ian Woodward, Lucas Attia, Premal Patel, Catherine Fromen</i>	
Methods to Evaluate Residual Stress in FDM Printed Parts.....	6
<i>Daniyal Shoukat, Connor Forte, Macrae Montgomery, Haley Hilborn, Jerry Qi, Nese Orbey</i>	
Characterizing and Modeling Structured Bubbling in Gas-Solid Fluidized Beds	7
<i>Qiang Guo, Yuxuan Zhang, Azin Padash, Christopher M. Boyce</i>	
Modeling of Taylor-Couette Vortices in Fluidized Beds	8
<i>Christopher M. Boyce</i>	
Fluid-Mediated Sources to Granular Temperature in Homogeneous Fluidization	9
<i>Aaron Lattanzi, Vahid Tavanashad, Shankar Subramaniam, Jesse Capecelatro</i>	
Effect of Particle Size on the Modulation of Near-Wall Turbulent Flow Structures in Particle-Resolved Direct Numerical Simulations and Eulerian-Lagrangian Simulations	11
<i>Jonathan Van Doren, Mohamed H. Kasbaoui</i>	
Particulate Process and Product Design: Single Drop Granulation	12
<i>Heather Emady</i>	
A Stimuli-Responsive, Hydrolysable Poly(Vinyl Laurate-Co-Vinyl Acetate) Nanoparticle Platform for in Situ Release of Surfactants	13
<i>Bashayer S. Aldakkan, Mohammed A. Hammami, Qi Genggeng, Mazen Kanj, Emmanuel P. Giannelis</i>	
Surface Characterization of Modified Fe ₃ O ₄ Catalysts for Inductively Driven Alcohol Oxidation.....	15
<i>Natalia da Silva Moura, Cameron Roman, Khashayar R. Bajgiran, Kerry M. Dooley, Adam Melvin, James Dorman</i>	
Heat Transfer in a Rotary Drum	16
<i>Bhaumik Bheda, Heather Emady</i>	
Scale-Up of Heat Transfer for Rotary Drums with Baffles	17
<i>Elaheh Ardalani, William Borghard, Benjamin Glasser, Alberto Cuitiño</i>	
Continuum Modeling of Corn Stover Feedstock Through a Compression Feed Screw	18
<i>Abhishek Paul, Marcial Gonzalez, Carl R. Wassgren</i>	
Starch Salt Composites; How to Reduce Water Uptake and Weakening	19
<i>Gabrie M.H. Meesters, Quinten Fung-A-Jou</i>	

Particle-Level Residence Times in a Twin-Screw Feeder	20
<i>Peter Toson, Johannes G. Khinast</i>	
An Experimental Investigation of Ultra-High Temperature and Pressure Fluidized Bed for Thermal Energy Storage and Transfer	21
<i>Jason Schirck, Zhiwen Ma, Aaron Morris</i>	
A Modified Frictional Solids Stress Model Fortwo Fluid Modeling of Gas-Solid Fluidized Beds.....	22
<i>Qiang Guo, Christopher M. Boyce</i>	
The Effects of Adding Soft Particles on the Clogging of Rigid Particles in a 2D Hopper	24
<i>Saeed Alborzi, Sara Hashmi</i>	
CFD Simulation of the Entire Circulating Fluidized Bed (CFB) Carbon Capture Loop Using Solid Supported Amine Sorbents.....	25
<i>Farnaz Esmaeili Rad, Javad Abbasian, Hamid Arastoopour</i>	
Computational Modeling for FCC RTD Design Optimization.....	26
<i>Raj Singh, Steve Shimoda</i>	
Model-Aided Design and Translation of Glucose-Responsive Insulins: From Simple to Complex Mechanisms.....	27
<i>Jing Fan Yang, Naveed Bakh, Xun Gong, Michael S. Strano</i>	
Programmable Biohybrid Nanocarriers for the Sustained Release of Cancer Therapeutics.....	28
<i>Robert Mosley, Jacek Wower, Mark E. Byrne</i>	
Self-Organization of Iron Sulfide Nanoparticles into Multi-Compartment Supraparticles	29
<i>Emine Sumeyra Turali-Emre</i>	
Understanding Die Compaction of Hollow Spheres Using the Multi-Particle Finite Element Method (MPFEM).....	30
<i>Ahmet Demirtas, Gerard Klinzing</i>	
Access: Autonomous Characterisation and Calibration Using Evolutionary Simulation Software	34
<i>Andrei-Leonard Nicusan</i>	
Machine Learning-Based View Factor Modelling in Polydisperse Particle Beds Including Walls.....	36
<i>Josef Tausendschön, Stefan Radl, Gero Stöckl</i>	
Transition Between Shear-Induced Segregation and Free-Sifting of Fines.....	39
<i>Song Gao, Julio M. Ottino, Paul B. Umbanhowar, Richard Lueptow</i>	
Designing Non-Segregating Granular Mixtures for Free Surface Flows	40
<i>Yifei Duan, Paul B. Umbanhowar, Julio M. Ottino, Richard Lueptow</i>	
Deep Composites: Bioinspired AI Towards Modeling, Design and Manufacturing	41
<i>Markus J. Buehler</i>	
Evaluation of Process Variable Influence on Mechanical Properties of Short Fiber-Reinforced 3D-Printed Parts	42
<i>Martin Etemadi, Arit Das, Michael Bortner</i>	
Direct Ink Write of High Solid Suspensions: Considerations in Particle Type and Binder Properties.....	43
<i>Alexandra Marnot, Blair Brettmann</i>	

Dimensionalization of Two-Phase Newtonian/Non-Newtonian Flow Problems.....	44
<i>Abdul Salam Mohammad, Joseph J. Biernacki</i>	
Influence of Relative Humidity on the Spreadability and Triboelectric Properties of Powders in Additive Manufacturing Processes	45
<i>Sebastien Depaifve, Aurelien Neveu, Filip Francqui, Geoffroy Lumay</i>	
Toward Next Level of Pharmaceutical 3D-Printing Through Advanced Lipid-Based Excipients.....	46
<i>Moaaz Abdelhamid, MSc, Carolina Corzo, Martin Spoerk, Ioannis Koutsamanis, Carolina Alva, Ana Belén Ocampo, Eyke Slama, Dirk Lochmann, Sebastian Reyer, Sharareh Salar-Behzadi</i>	
CFD Modeling and Liquid Vaporization: Industrial FCC Riser Feed Injection Application	48
<i>Peter Blaser, Ali Akhavan</i>	
Machine Learning Based Interaction Force Model for Non-Spherical Particles in Incompressible Flows	49
<i>Soohwan Hwang, Jianhua Pan, L.-S. Fan</i>	
Experiments and Simulations of Gas-Solid Flow Dynamics with a Moving Porous Media Model.....	50
<i>Julia Hartig, Davis R. Conklin, Alan Weimer</i>	
Optimization of Fluidized Bed Incineration Process for Explosive Waste Treatment Via Artificial Neural Network Surrogate Modeling Method	51
<i>Sunghyun Cho, Minsu Kim, Hyungtae Cho, Junghwan Kim, Il Moon</i>	
Numerical Analysis and Experimental Verification of Boehmite to Alumina Particles Conversion Under Concentrating Light.....	52
<i>Konstantinos E. Kakosimos, Fathyia Salih, Navaira Fathima, Mamoun Al-Rawashdeh, Athanasios G. Konstandopoulos</i>	
Extraction of Particle-Scale Cohesion Parameters from Straightforward Bulk Measurements.....	53
<i>Ipsita Mishra, Abhishek Shetty, Christine Hrenya</i>	
Flame Aerosol Synthesis of Mesoporous Silica for Application in CO ₂ Oxidative Dehydrogenation of Propane	54
<i>Shuo Liu, Junjie Chen, Satyarat Rao, Mihir Shah, Abhishek Kumar, Eleni Kyriakidou, Mark Swihart</i>	
Role of Water in Methane Oxidation Observed by Transient Drifts at Low Temperatures Using Bimetallic Aupd Catalysts	56
<i>Joseph Brindle, Michael Nigra</i>	
Continuous Green Millifluidic Synthesis of Five-Fold Palladium Nanorods Using L-Ascorbic Acid and Their Catalytic Application	57
<i>Chamath Vindula Bandara Basnayake, Shohreh Hemmati</i>	
Designer Hybrid Colloids: A Study of Gold Adsorption onto Polystyrene to Control Morphologies of Reactive Nanoparticles.....	58
<i>Joanna Schneider, Victoria E. Lee, Jason Liu, Sujit Datta, Rodney Priestley</i>	
Rheoelectric Characterization of Oxidized Carbon Nanoparticles as Slurry Active Materials	59
<i>Paolo Ramos, Connor Call, Lauren Simitz, Jeffrey Richards</i>	
Utilizing Atomic Layer Deposition to Influence Selectivity for Ni Reverse Water Gas Shift Catalysts	60
<i>Megan English, Kent J. Warren, Alan Weimer</i>	

Targeted Delivery of Surfactants Via Directed Assembly of Nanoparticles at Liquid-Liquid Interfaces by Fine-Tuning Molecular Interactions	61
<i>Mohamed Amen Hammami, Genggeng Qi, Bashayer S. Aldakkan, Mazen Kanj, Emmanuel P. Giannelis</i>	
Design and Use of a Thermogelling Methylcellulose Nanoemulsion to Formulate Nanocrystalline Oral Dosage Forms.....	62
<i>Liang-Hsun Chen, Patrick S. Doyle</i>	
Particle Formation from the Drying of Liquid Droplets Containing Insoluble Material	64
<i>Siavash Zamani, Aaron Morris</i>	
Development of Apap Tablets in a 3D Mold Using Drops of Dissolved Excipients.....	65
<i>Sheena Reeves, Nigel Brooks Jr., Yazmine Rincon</i>	
Wet Milling with in-Line Fines Dissolution.....	67
<i>Paria Coliae, Moussa Boukerche, John G. Gaertner, Daniel Pohlman, Manish Kelkar, Meenesh Singh, Nandkishor K. Nere</i>	
Autocatalytic Initiation Followed by Oriented Attachment Governs the Nucleation and Crystal Growth of MOF Crystals.....	68
<i>Anish Dighe, Luke Huelsenbeck, Prince Verma, Kevin Stone, Meenesh Singh, Gaurav Giri</i>	
Controlling Polymorphism and Orientation of Nu-901/Nu-1000 Metal–Organic Framework Thin Films.....	69
<i>Prince Verma, Luke Huelsenbeck, Asa Nichols, Timur Islamoglu, Helge Heinrich, Charles Machan, Gaurav Giri</i>	
Thermodynamic Modeling of Competing Crystal Species from a MIL-53 Metal Organic Framework (MOF) Reaction	70
<i>Andrew Garcia, Dirk Steyn III, Sergey Vasenkov, Kirk J. Ziegler</i>	
Preparation and Evaluation of Hafnium Oxide Nanoparticle CT Contrast Agents	71
<i>Sitong Liu, Matthew Po, Bo Yu, Carlos Rinaldi</i>	
Encapsulated Platinum Nanoparticles, Targeted Therapy for Triple Negative Breast Cancer	72
<i>Aida Lopez Ruiz, Kathleen McEnnis</i>	
Engineering High-Throughput Gold Nanoshell-Liposomes for Effective mRNA Delivery	73
<i>Anisha Veeren, Sarah Merkel, Mark Osborn, Joseph Zasadzinski</i>	
Fabricating Gold Nanoparticles-Loaded Polyvinyl Alcohol Contact Lens for Laser Protection.....	76
<i>Zhen Liu, Olivia Lanier, Anuj Chauhan</i>	
Gold Nanoparticle Synthesis in Contact Lenses for Drug-Less Ocular Cystinosis Treatment.....	77
<i>Zhen Liu, Uday Kompella, Anuj Chauhan</i>	
Modulation of Neutrophil Extracellular Trap Formation Through Polymer Coating of Metal Oxide Nanoparticles.....	78
<i>Dhruvi Panchal, Esra Al Abazaid, Hunter Snoderly, Celia Martinez de la Torre, Kasey Freshwater, Margaret Bennewitz</i>	
Application of CFD-DEM in the Process and Pharmaceutical Industries	80
<i>Ahmad Haidari</i>	
Discrete Element Method Analysis for the Mechanochemical Grinding of Polymers	81
<i>William Bradley, Elisavet Anglou, Andrew Tricker, Carsten Sievers, Fani Boukouvala</i>	

Effect of Aspect Ratio on Breakage Kinetics of Urea Crystals in Agitated Slurries	82
<i>Priscilla Hill</i>	
Simulation of Full-Scale Open-Circuit, Multi-Compartment Cement Ball Mills: A New True Unsteady-State Simulator.....	83
<i>Nontawat Muanpaopong, Rajesh Dave, Ecevit Bilgili</i>	
Characterization of Polymeric Powders Through Capillary Flow for Additive-Manufacturing Techniques.....	86
<i>Sebnem Ozbek, Katrina J. Donovan, Travis W. Walker</i>	
Estimating the Three Characteristic Lengths of Plate-Like Particles in Suspension	88
<i>Pietro Binel, Ankit Jain, Anna Jaeggi, Daniel Biri, Ashwin Kumar Rajagopalan, Andrew J. deMello, Marco Mazzotti</i>	
Predicting the Behavior of Different Tablet Press Feed Frame Systems Using the Discrete Element Method (DEM) Modeling.....	90
<i>Zihao Li, Rohit Kumar, Hector Guzman</i>	
Fundamental Investigation of the Rheology and Structure of Capillary Suspensions Made with Oyster Particles.....	91
<i>Pablo Garcia-Trinanes, Makrina A. Chairopoulou, Ulrich Teipel</i>	
Novel Altair Simulation Solutions for Particulate and Particle Laden Flows	93
<i>Mohammadreza Ebrahimi</i>	
Spray Drying of Drug Loaded Nanoparticles with Matrix Forming Excipients.....	94
<i>Nicholas J. Caggiano, Robert K. Prud'homme, Rodney Priestley</i>	
Methods for Encapsulating Mobile Microparticles	95
<i>Samuel Wilson-Whitford, Jinghui Gao, Maria Chiara Roffin, Thitiporn Kaewpatch, James Gilchrist</i>	
Magnetic Nanomaterial Endocytosis: Uptake and Cytotoxicity	96
<i>Chen Zhou, Abhinav Sannidhi, Paul W. Todd, Thomas R. Hanley</i>	
Engineering Nanostraws for MCM-41 Microparticles Towards Enhancing the Adsorption of Guest Molecules: Application in CO ₂ Capture.	97
<i>Azeem Farinmade, Oluwole Ajumobi, Lei Yu, Julia A. Valla, Daniel F. Shantz, Vijay T. John</i>	
Characterizing Graphene Oxide Suspensions with Rheological Testing and Modeling, Neutron Scattering, and Electrochemical Performance	98
<i>Matthew Armstrong, Enoch Nagelli, Ryan P. Murphy, Benjamin Thompson, Katie Weigandt, Jeffrey Chin, Simuck Yuk, F. John Burpo, Gabriela Huggins, Taylor Vessel, Andrew Mackey, Kevin Brooks, Lucas McCleery</i>	
Binder-Free Twin-Screw Melt Granulation: An Effective Approach to Manufacture High-Dose API Formulations.....	99
<i>Thamer OMAR, Ivana Cobabarren, Fernando Muzzio</i>	
A Mechanistic Analysis on the Effect of Mixing Dynamics on Granule Microstructure.....	101
<i>Lalith Venkat Gopal Kotamarthy, Rohit Ramachandran</i>	
Controlled Release of Urea Composites Through Formulation and Process Design	104
<i>Camila Garcia Jange, Carl R. Wassgren, Kingsly Ambrose</i>	

A Moving Porous Media Model for Simulations of Continuous Spatial Particle ALD	105
<i>Julia Hartig, Davis R. Conklin, Alan Weimer</i>	
What is More Important for Improved Drug Dissolution: Agglomerate Size Reduction Or Enhancing Particle Surface Wettability?.....	106
<i>Sangah Kim, Hira Khurshid, Rajesh Dave</i>	
Radiation Heat Transfer in a Rotary Drum.....	109
<i>Bhaumik Bheda, Heather Emady</i>	
Effect of Dopant Modification in Iron Sulfide-Based Sulfur Carrier for Hydrogen Production from Hydrogen Sulfide in a One-Reactor Cyclic Sulfur Looping Scheme	110
<i>Kalyani Jangam, Yu-Yen Chen, Lang Qin, L.-S. Fan</i>	
Mastering the Processing Methods of Engineered Particles.....	111
<i>Willie Hendrickson, Chris Rueb, Charles Bowman, Robert G. Bowman</i>	
Microstructure Design and Release Kinetics of Layer-Wise Agglomerated Granules.....	112
<i>Camila Garcia Jange, Carl R. Wassgren, Kingsly Ambrose</i>	
Analysis of Structure Formation and Layer Build-Up from Dried Deposited Nanoparticle Suspension Droplets	113
<i>Manuel Janocha, Evangelos Tsotsas</i>	
A Deep Learning Approach for Chord Length Distribution Modeling of Two-Dimensional Crystals	114
<i>John Tsortos, Georgios Makrygiorgos, Giovanni Maria Maggioni, Ali Mesbah</i>	
Handling and Solid-State Method Development for Improved Isolation of Molecules with Complex API Structures	116
<i>Brian Linehan</i>	
Hollow Crystal Formation Through a Novel Ripening Mechanism in Crystallization	117
<i>Fredrik Nordstrom, Yongjian Wang, Huayu Li, Michelle Raikes, Brian Linehan, John Robson</i>	
Crystallization Engineering for the Robust Manufacturing of Islatravir Using SINTAX (shear- Induced Nucleation and Thermal Annealing Crystallization)	118
<i>Thomas Kwok, Eric Sirota</i>	
Evaluation of Liquid-Liquid Phase Separation and Spinodal Boundaries Using a Continuous-Flow Microfluidic Mixer	119
<i>Paria Coliaie, Moussa Boukerche, Manish Kelkar, Marianne Langston, Chengxiang Liu, Neda Nazemifard, Daniel Patience, Dimitri Skliar, Nandkishor K. Nere, Meenesh Singh</i>	
Molecular Simulations Reveal Underlying Mechanism of Cooling and Antisolvent Crystallization to Predict the Polymorphism and Growth of Organic Crystals	120
<i>Anish Dighe, Prem Kumar Reddy Podupu, Paria Coliaie, Meenesh Singh</i>	
Cephalexin and Amoxicillin Crystal Shape Modification by Manipulating the Supersaturation and Wet Milling	121
<i>Hossein Salami, Patrick Harris, Andreas Bommarius, Martha Grover, Ronald Rousseau</i>	
Accelerated Early-Stage Enabling API Crystallization Process Development and Scale-Up	123
<i>Ryan Ellis, Moussa Boukerche, Collin Morris, Michael Lesslie, Jie Chen, James Stambuli, Nandkishor K. Nere</i>	

Development and Scale-Up of a Crystallization Process for a Kinetically-Unfavorable Polymorph.....	124
<i>Paul Larsen, Navraj Hanspal, Nicole Hough, Christian Lowe, Yamini Krishnan, Patrick McGough, Abraham Schuitman, Joseph Wei</i>	
Acid-Catalyzed Esterification Governs the Chain Elongation and the Oriented Attachment in Cof-5 Synthesis.....	125
<i>Rajan Bhawnani, Anish Dighe, Santanu Chaudhuri, Meenesh Singh</i>	
Enabling a Selective Dissolution Scheme for the Removal of Fines in Crystallization with a Hydrocyclone: Modeling and Experimental Validation.....	126
<i>Pietro Binel, Marco Mazzotti</i>	
Crystallization Modeling of a Pharmaceutical Compound for Digital Twin Based in-Silico Optimization with Experimental Validation.....	128
<i>Ayse Eren, Botond Szilagyi, Justin Quon, Charles D. Papageorgiou, Zoltan Nagy</i>	
CFD Investigation of the Nanoparticle Distribution Within the Peritoneal Cavity for the Treatment of Ovarian Cancer Metastasis.....	130
<i>Tanu Mehta, Hossain Aziz, Derek Hargrove, Syed Ahsan, Venkatraman Nagarajan, Andrew Salner, Xiuling Lu, Bodhisattwa Chaudhuri</i>	
Measurements on the Acoustic Properties of Powders.....	131
<i>Mohammad Barzegar, Clive Davies, Gabe Redding, Miles C. E. Grafton, Luke Fullard</i>	
A Comprehensive Review: Metal Dust Cloud Combustion & Nonstandard Explosion Protection Applications.....	132
<i>Nicholas Reding, Mark Shiflett</i>	
A Linear Peristaltic Device for Pumping and Mixing Liquids and Slurries	133
<i>Gerald Olson, Beau Welch, Clive Davies, Rose Davies, Gourab Sen Gupta, Luke Fullard</i>	
Preparation of Abamectin Nanoparticles by Flash Nanoprecipitation for Extended Photostability and Sustained Pesticide Release	134
<i>SungGyu Chun, Jie Feng</i>	
Geometric Similarity on Force Evaluation for Scaled-Up Particle Model in DEM	135
<i>Kimiaki Washino, Yuze Hu, Ei L. Chan, Takuya Tsuji, Toshitsugu Tanaka</i>	
A Scale-Independent Approach to Modeling Filtered Drag in Fluidized Gas-Particle Flows by Introducing the Solid Volume Fraction at a Larger Scale	136
<i>Qiang Zhou, Ming Jiang</i>	
Direct Numerical Simulations of Dynamic Gas-Solid Suspensions: A New Inhomogeneous Drag Model for CFD-DEM Simulations	138
<i>Li Zhao, Qiang Zhou</i>	
Analysis of Fluidization and Particle Temperature in Semicontinuous Fluid Bed Drying of Pharmaceutical Granules	139
<i>Tuur Vandepitte, Michael Ghys, Thomas De Beer, Ingmar Nopens</i>	
Magnetic Drug Screening Nanoplatform Using Immobilized Ion Channels as Targets.....	141
<i>Shomit Mansur, Yuping Bao</i>	
Thomas Baron Award in Fluid-Particle Systems (Sponsored by Shell): Design of Multiphase Reactors for the Synthesis of Renewable Chemicals and Semiconductor Nanocrystals	142
<i>Triantafyllos Mountziaris</i>	

Elsevier Lifetime Achievement Award: Fluidization Centennial -- Reflection on the Past and Prospection in the Future	143
<i>Jesse Zhu</i>	
PSRI Lectureship Award in Fluidization: CFD as a Tool to Better Understand Multiphase Flow Physics.....	144
<i>Sofiane Benyahia</i>	
Boron-Aluminum Nanoenergetics: Substantial Improvement of Energy Release in Blended Nanomaterials.....	145
<i>Prawal P. K. Agarwal, Themis Matsoukas</i>	
Utilizing Meniscus Guided Coating Techniques to Obtain Polymorphic Control and Large Area Single Crystalline Domains in Energetic Material Thin Films.....	147
<i>Natalie Smith, Gaurav Giri</i>	
Application of a Neural Network Approach to Predict the Filtered Drag Force for Gas-Solid Flows	148
<i>Yu Zhang, Qiang Zhou</i>	
Development and Validation of a Comprehensive Drag Model for Simulating Gas-Solid Fluidization in Dense and Dilute Regimes	149
<i>Xinyao Guo, Guodong Liu</i>	
Spatially-Averaged Two-Fluid Models for Heat and Mass Transfer	150
<i>Stefanie Rauchenzauner, Simon Schneiderbauer</i>	
Enhancement of Fluidization of Fine Powders.....	152
<i>Kaiqiao Wu, Gabrie M.H. Meesters, J Ruud Van Ommen</i>	
Pressure Fluctuations in Gas-Solid Fluidized Beds: Measurement and Analysis.....	153
<i>Kaiqiao Wu, Federico Galli, Gregory S. Patience, J Ruud Van Ommen</i>	
Fluidization of Wet Granular Materials.....	155
<i>Sudeshna Roy, Chongqiang Zhu, Raffaella Ocone</i>	
Effect of Scale Up Process on Reactor Performance Within Riser: Simulation Using Ozone Decomposition.....	156
<i>Congjing Ren, Can Zi, Jingyuan Sun, Jingdai Wang, Yongrong Yang</i>	
X-Ray Computed Tomography-Based Micro-Porosity Analysis and Discrete Element Modeling: Algorithm Development and Application for Woody Biomass	158
<i>Qiushi Chen, Quan Sun, Yidong Xia, Jordan Klinger</i>	
Continuum Simulations of Granular Flow Near the Maximum Packing Limit Using a Novel Solution Approach to Address Realizability	160
<i>Viraj Vilas Belekar, Alberto Passalacqua, Theodore Heindel, Kushal Sinha, Shankar Subramaniam</i>	
Optimizing Superparamagnetic Iron Oxide Nanoparticle Synthesis and Peg Coating for Magnetic Particle Imaging Performance and Long Blood Circulation Half Life	161
<i>Sitong Liu, Andreina Chiu-Lam, Angelie Rivera-Rodriguez, Ryan DeGroff, Shehab Savliwala, Nicole Sarna, Carlos Rinaldi</i>	
On the Relative Effect of Nanorod Versus Oval-Shaped ZnO Nanoparticles in Their Photocatalytic Activity.....	163
<i>Sukesh Tumram, Rajdip Bandyopadhyaya</i>	

Biomineralization of Functional AIS/ZnS Quantum Dots.....	166
<i>Nur Ozdemir, Joseph Cline, John Sakizadeh, Shannon Collins, Angela Brown, Steven McIntosh, Christopher Kiely, Mark Snyder</i>	
CG-MD and CFD Simulation of Continuous Manufacturing of Liposome Formation.....	167
<i>Tibo Duran, Antonio Costa, Venkatraman Nagarajan, Xiaoming Xu, Hossein Mohammadiarani, Diane Burgess, Bodhisattwa Chaudhuri</i>	
Facet Effects Define Structure-Activity Relationships of Ultra-Low Loading Pt/CeO ₂ Catalysts with Atomic Dispersion.....	169
<i>Bochuan Song, Yan Xin, Helena Hagelin Weaver</i>	
Investigating Colloidal PbSe Quantum Dots as a Room Temperature Operating Material for Gamma Ray Spectroscopy	171
<i>Tyler McCrea, Han Mei, Changqing Pan, Jo E. Bergevin, Chih-hung Chang, Haori Yang, Gregory S. Herman</i>	
Effect of Surfactant in Continuous Millifluidic Green Synthesis of One-Dimensional Silver Nanostructures Using Tannic Acid.....	172
<i>Sina Kaabipour, Shohreh Hemmati</i>	
Solving the Population Balance Equation: A Novel Quadrature Method	173
<i>Vasiliki Tsikourkitoudi, Georgios Lolas, Panagiotis N. Gavrilidis, Themis Matsoukas</i>	
Towards a Generic Model for Twin-Screw Wet Granulation: Linking Material Properties to PBM Parameters.....	175
<i>Ana Barrera Jimenez, Daan Van Hauwermeiren, Michiel Peeters, Thomas De Beer, Ingmar Nopens</i>	
High Speed Friction Grinding of Thermoplastics Assisted by Food Gums.....	178
<i>Samarthyia Bhagia, Nidia C. Gallego, Nitilaksh Hiremath, David Harper, Richard A. Lowden, Richard R. Lowden, Yunqiao Pu, Uday Vaidya, Soydan Ozcan, Arthur J. Ragauskas</i>	
Unsteady-State Simulation of Cement Milling in Closed-Circuit Operation: A Fully Coupled Ball Mill-Air Classifier Model.....	179
<i>Nontawat Muanpaopong, Rajesh Dave, Ecevit Bilgili</i>	
A Hybrid Model to Predict the Formulation Dependent Granule Growth in a Bi-Component Wet Granulation Process.....	182
<i>Indu Muthancheri, Rohit Ramachandran</i>	
Sonofragmentation of Two-Dimensional Plate-Like Crystals: Population Balance Modelling and Experimental Validation.....	184
<i>Ashok Das, Jitendra Kumar</i>	
A Molecular Dynamics Study of Interparticle Interactions in Fresh Cement Pastes.....	185
<i>Juan Pablo Gallo-Molina, Adilson Alves de Freitas, José N. Canongia Lopes, Ingmar Nopens, Karel Lesage</i>	
The Lasting Legacy of Prof. John Grace	187
<i>Xiaotao Bi</i>	
Relationship Between the Net Electrostatic Charge Inside a Fluidized Bed and Particles Accumulation on the Column Wall	188
<i>Poupak Mehrani, Andrew Sowinski</i>	

Numerical Study of Particle Tracking Measurements in Fluidized Bed Reactors.....	189
<i>Tingwen Li</i>	
Kinetics & CFD Simulations for Industrial FCC Units	190
<i>Mohammad Abdur Rakib, Qi Xu, Zied Soua, Ibrahim A. Abba</i>	
CFD-DEM Simulation of the Onset of Fluidization for Large Particles in a Bed of Fine Sand.....	191
<i>Mohamad Sharei, Farzam Fotovat</i>	
Characterization of the Main Components of Fluidization Technology Applied to Thermochemical Conversion.....	192
<i>Sina Tebianian</i>	
Experimental Investigation of Wet Pharmaceutical Granulation Using In-Situ Synchrotron X-Ray Imaging.....	193
<i>Chen Li, Yuzhou Zhang, Ning Zhu, Heather Emady, Lifeng Zhang</i>	
Solids Flux Profiles in High Velocity CFB Risers of FCC Catalyst Particles.....	194
<i>Allan Issangya, Raymond Cocco, SB Reddy Karri, T. M. Knowlton</i>	
Comparative Assessment of Spray-Dried Hybrid Nanocrystal–Amorphous Solid Dispersions (HyNASDs) and ASDs.....	195
<i>Ecevit Bilgili, Mahbubur Rahman, Keanu Radgman, James Tarabokija, Stephanie Ahmad</i>	
Clarifying the Formulation Effect on the Drying Behavior of Pharmaceutical Granules After Wet Granulation.....	198
<i>Tuur Vandeputte, Michael Ghijs, Marie Vandromme, Selien Van Langenhove, Thomas De Beer, Ingmar Nopens</i>	
Assessing the Impact of API Surface Engineering on Drug Content Uniformity of Low-Dose Tablet Blends.....	200
<i>Sangah Kim, Chelsea Castillo, Muhammad Sayedahmed, Mirna Cheikhali, Rajesh Dave</i>	
A Combined Kinetic–Microhydrodynamic Analysis of the Fenofibrate Nanosuspension Production in a Wet Stirred Media Mill.....	202
<i>Gulenay Guner, Dogacan Yilmaz, Ecevit Bilgili</i>	
Cross-Linked Biopolymer Nanosuspension Preparation: Impact of Solvents	206
<i>Mohammad Azad, Gulenay Guner, Afolawemi Afolabi, Rajesh Dave, Ecevit Bilgili</i>	
Wurster Coating: Prediction of Undesired Agglomeration	209
<i>Jiri Kolar, Pavel Kovačík, František Štěpánek</i>	
Accelerated Quantitative DEM Simulation of Large Screw Feeder and Tablet Press Feeder Using Adaptive Coarse Graining Technique	211
<i>Tarun De, Lokeshwar Mahto, Jayanta Chakraborty, Jitendra Kumar, Anurag Tripathi, Maitraye Sen, William Ketterhagen</i>	
Numerical Workflow for Predicting Tablet Coating Uniformity in Pharmaceutical Coating Processes from Lab to Commercial Scale	213
<i>Rahul Bharadwaj, Leon White, Rakulan Sivanesapillai, Anja Ehrig, Branko Vukosavljevic, Rok Sibanc, Ilija German Ilic, Blaz Grilc</i>	
Practical Applications of Dry-Coating for Pharmaceutical Tablet Manufacturing.....	214
<i>Maxx Capece, Jeffery Larson</i>	

Scroll Compaction: A Novel Approach for Uniform Compaction of Powder Beds.....	215
<i>Katrina Brockbank, Jamie Clayton, John Yin, Tim Freeman</i>	
A DEM-Based Approach for Prediction of Pellet Mixing in a Full-Scale Conical Blender.....	216
<i>William Ketterhagen, Dana Alhasson, Daniel Mateo-Ortiz, Michael C. Dennis, Brendon Ricart</i>	
Using Powder Rheometry to Identify and Quantify Different Humidity Induced Caking Behaviours	217
<i>Katrina Brockbank, Jamie Clayton, John Yin</i>	
Influence of Temperature on the Packing Dynamics of Powders.....	218
<i>Aurelien Neveu, Sebastien Depaifve, Geoffroy Lumay, Filip Francqui</i>	
Investigation of Electrostatic Properties of Lactose Powders: Implications for Dry Powder Inhaler (DPI) Processes	219
<i>Aurelien Neveu, Michael Crowley, Tony McGorisck, Filip Francqui</i>	
Experimental and Numerical Investigations of the RTD in a Gea Consigma CTL25 Tablet Press	221
<i>Thomas Forgerber, Jakob Rehrl, Rok Sibanc, Rakulan Sivanesapillai, Johannes G. Khinast</i>	
Agitated Drying of Active Pharmaceutical Ingredients: Effect of Intermittent Mixing on Heat Transfer	222
<i>Prin Chaksmithanont, Gabrielle McEntee, Digvijay Vishwas Ghare, Carlin Leung, Charles D. Papageorgiou, Christopher Mitchell, Justin Quon, Benjamin Glasser</i>	
Beyond Brittle/Ductile Classification: Applying Proper Constitutive Mechanical Metrics to Understand the Compression Characteristics of Pharmaceutical Materials	223
<i>Edward Yost, Vincent Mazel, Kellie K. Sluga, Ariel Muliadi</i>	
Computational Modeling of Drying of Pharmaceutical Wet Granules in a Fluidized Bed Dryer Using Coupled CFD-DEM Approach	224
<i>Hossain Aziz, Syed Ahsan, Giovanni De Simone, Yijie Gao, Bodhisattwa Chaudhuri</i>	
Influence of Triboelectric Charges on Powder Behaviour in Pharmaceutical Processes.....	226
<i>Geoffroy Lumay, Filip Francqui</i>	
A Detailed Comparison of Comparison of Traditional Pan Coating to Novel Consigma Tablet Coating	228
<i>Peter Boehling, Dalibor Jajcevic, Matthew Metzger, Laura Wareham, Frederik Detobel, James Holman, Johannes G. Khinast</i>	
Accelerated Quantitative DEM Simulation of Large Screw Feeder and Tablet Press Feeder Using Adaptive Coarse Graining Technique	229
<i>Tarun De, Lokeshwar Mahto, Jayanta Chakraborty, Jitendra Kumar, Anurag Tripathi, Maitraye Sen, William Ketterhagen</i>	
Numerical Workflow for Predicting Tablet Coating Uniformity in Pharmaceutical Coating Processes from Lab to Commercial Scale	231
<i>Rahul Bharadwaj, Leon White, Rakulan Sivanesapillai, Anja Ehrig, Branko Vukosavljevic, Rok Sibanc, Ilijia German Ilic, Blaz Grilc</i>	
Practical Applications of Dry-Coating for Pharmaceutical Tablet Manufacturing.....	232
<i>Maxx Capece, Jeffery Larson</i>	
Scroll Compaction: A Novel Approach for Uniform Compaction of Powder Beds.....	233
<i>Katrina Brockbank, Jamie Clayton, John Yin, Tim Freeman</i>	

A DEM-Based Approach for Prediction of Pellet Mixing in a Full-Scale Conical Blender.....	234
<i>William Ketterhagen, Dana Alhasson, Daniel Mateo-Ortiz, Michael C. Dennis, Brendon Ricart</i>	
Using Powder Rheometry to Identify and Quantify Different Humidity Induced Caking Behaviours	235
<i>Katrina Brockbank, Jamie Clayton, John Yin</i>	
Influence of Temperature on the Packing Dynamics of Powders.....	236
<i>Aurelien Neveu, Sebastien Depaive, Geoffroy Lumay, Filip Francqui</i>	
Investigation of Electrostatic Properties of Lactose Powders: Implications for Dry Powder Inhaler (DPI) Processes	237
<i>Aurelien Neveu, Michael Crowley, Tony McGorisck, Filip Francqui</i>	
Experimental and Numerical Investigations of the RTD in a Gea Consigma CTL25 Tablet Press	239
<i>Thomas Forgber, Jakob Rehrl, Rok Sibanc, Rakulan Sivanesapillai, Johannes G. Khinast</i>	
Agitated Drying of Active Pharmaceutical Ingredients: Effect of Intermittent Mixing on Heat Transfer	240
<i>Prin Chaksmithanont, Gabrielle McEntee, Digvijay Vishwas Ghare, Carlin Leung, Charles D. Papageorgiou, Christopher Mitchell, Justin Quon, Benjamin Glasser</i>	
Beyond Brittle/Ductile Classification: Applying Proper Constitutive Mechanical Metrics to Understand the Compression Characteristics of Pharmaceutical Materials	241
<i>Edward Yost, Vincent Mazel, Kellie K. Sluga, Ariel Muliadi</i>	
Computational Modeling of Drying of Pharmaceutical Wet Granules in a Fluidized Bed Dryer Using Coupled CFD-DEM Approach	242
<i>Hossain Aziz, Syed Ahsan, Giovanni De Simone, Yijie Gao, Bodhisattwa Chaudhuri</i>	
Influence of Triboelectric Charges on Powder Behaviour in Pharmaceutical Processes.....	244
<i>Geoffroy Lumay, Filip Francqui</i>	
A Detailed Comparison of Comparison of Traditional Pan Coating to Novel Consigma Tablet Coating	246
<i>Peter Boehling, Dalibor Jajcevic, Mathew Metzger, Laura Wareham, Frederik Detobel, James Holman, Johannes G. Khinast</i>	
Experimental Investigation of Route-Mixing for Non-Spherical Particles in the Pneumatic Conveying System.....	247
<i>Sanjay Kumar Verma, Anshu Anand, Sunil Kumar, Jeetram Yogi, Doctoral Candidate, Salma Khatoon</i>	
A Comprehensive Model for the CFD Simulation of Autothermal Fast Pyrolysis of Biomass	248
<i>Barlev Nagawkar, Shankar Subramaniam, Alberto Passalacqua</i>	
An Index to Characterize Mixing from Average Volume Fraction Fields in Gas Solid Flows	251
<i>Barlev Nagawkar, Alberto Passalacqua, Shankar Subramaniam</i>	
Development of Pressure Evolution Modeling for the Combustion of Distinct Metal Dust Morphologies.....	254
<i>Nicholas Reding, Mark Shiflett</i>	
Prediction of Solid Flow Rate During the Conveying Process Based on the Generation Mechanism of Acoustic Emission Signals	255
<i>Peng Zhang, Tao Sheng, Hanqing Wang, Yao Yang</i>	

Solar Gasification of Organic Solid Waste in an Internally-Circulated Fluidized Bed: Experiment and Modelling.....	256
<i>Xian Li, Jialing Chen, Peng Chu, Qiang Hu, Yanjun Dai, Chi-Hwa Wang</i>	
Mixture Homogeneity Measurements in a Vertical Bladed Mixer Using Tracer Particles	257
<i>Humair Nadeem, Prajwal Jamdagni, Shankar Subramaniam, Kushal Sinha, Theodore Heindel</i>	
The Effect of Process and Design Parameters on Granule Content Uniformity in High Shear Granulation.....	258
<i>Zeal Dholakia, Lalith Venkat Gopal Kotamarthy, Indu Muthancheri, Rohit Ramachandran</i>	
DEM Study of a Vibrational Powder Transport System	261
<i>Martina Trogrlic, MSc, Dalibor Jajcevic, Johannes G. Khinast, Pankaj Doshi, Barry Ager, Tata Venkata, Stephen Franklin, David Barling</i>	
Rheological Investigations of Volcaniclastic Debris Flows	263
<i>Ilaria Rucco, Fabio Dioguardi, Mauro A. Di Vito, Damiano Sarocchi, Lyes Ait Ali Yahia, Raffaella Ocone</i>	
Segregation of Non-Spherical Particles in Vibrated Packed Bed Mixers.....	264
<i>Jeetram Yogi, Doctoral Candidate, Anshu Anand, Sanjay Kumar Verma, Sunil Kumar</i>	
Flow Simulations of Size Disperse Granular Particles with Realistic Contact Models.....	266
<i>Andrew P. Santos, Ishan Srivastava, Leonardo E. Silbert, Jeremy B. Lechman, Gary S. Grest</i>	
Calibration of Particle Properties for Multilevel/Adaptive Coarse Grained DEM Simulations	267
<i>Lokeshwar Mahto, Tarun De, Jayanta Chakraborty, Jitendra Kumar, Anurag Tripathi, Maitraye Sen, William Ketterhagen</i>	
Eulerian-Eulerian Modeling of Segregation and Dispersion in Multi-Component Fluidized Beds: Verification, Validation and Limitations.....	268
<i>Shashank Tiwari, Bo Kong, Jyeshtharaj B. Joshi</i>	
A Nano-CT Informed Polyhedral Discrete Element Modeling Approach for Flow of Complex-Shaped Granular Woody Biomass.....	269
<i>Yidong Xia, Feiyang Chen, Jordan Klinger, Joshua Kane, Tiasha Bhattacharjee, Robert Seifert, Oyelayo Ajayi, Qiushi Chen</i>	
A Class of Generalized Strain-Hardening Discrete Element Method (DEM): Theory, Liggghts Open-Source Implementation, and Applications for Granular Biomass Flow	270
<i>Yidong Xia, Feiyang Chen, Jordan Klinger, Qiushi Chen</i>	
Enhanced Flowability of Dense Bi-Disperse Granular Avalanches: The Role of Fine Grains	271
<i>Chongqiang Zhu, Sudeshna Roy, Raffaella Ocone</i>	
DEM Simulation of Bin Blending Considering Different Scales.....	273
<i>Fateme Mostafaei, Dalibor Jajcevic, Johannes G. Khinast, Conrad Davies, Rand Turki, Suet Mei Wong, Avik Sarkar, Pankaj Doshi</i>	
New Developments in Positron Emission Particle Tracking and Their Applications in Food, Pharmaceuticals and Plastic Recycling	275
<i>Kit Windows-Yule</i>	
Calibration of DEM Parameters for Cohesive Powders Using an Annular Shear Cell	277
<i>Prathamesh Sankhe, William Ketterhagen, Carl R. Wassgren</i>	

DEM Modelling of Battery Electrode Structures from X-Ray Tomography-Structure Analysis Under Different Calendering Conditions.....	278
<i>Ruihuan Ge, Rachel M. Smith, Denis J. Cumming</i>	

Author Index