Welcome to Penn State and to the 92nd American Chemical Society Colloid & Surface Science Symposium! Penn State researchers engage in world-class research in colloidal and surface science, through many departments, as well as through our Materials Research Institute and our NSF MRSEC Center for Nanoscale Science. The Millennium Science Complex and other facilities house world-class facilities, with outstanding technical staff. So we welcome you here. As part of the Colloid & Surface Science family, we hope that you’ll feel right at home.

We thank our sponsors for their generous support. And we welcome our exhibitors and encourage you to visit their tables in the Penn Stater Hotel. We are all part of this exciting research adventure.

We hope you enjoy our 3-day program, with a dozen topical sessions, including an exciting new session on “Connecting the Dots in Industry”. We have more than 60 keynotes and 81 sessions, with contributions from around the globe.

So welcome to the Symposium, and to Penn State!

Darrell Velegol & Seong H. Kim
Symposium co-chairs
# Table of Contents

Welcome! ................................................................. 1
Sponsors ................................................................. 2
Table of Contents ...................................................... 3
Organizing Committee ............................................. 4
  Symposium co-chairs: ......................................... 4
  Session co-organizers ....................................... 4
Symposium Committees & Support Staff ............... 6
Program at a Glance ............................................... 7
  Sunday 2018 June 10 ......................................... 7
  Monday 2018 June 11 ......................................... 7
  Tuesday 2018 June 12 ....................................... 7
  Wednesday 2018 June 13 .................................... 7
  Sessions on June 11, 2018 (Monday) ................. 8
  Sessions on June 12, 2018 (Tuesday) ................. 9
  Sessions on June 13, 2018 (Wednesday) .......... 10
Hotel Map ............................................................ 11
Exhibitors ............................................................. 12
Plenary & Award Lectures ...................................... 13
Keynote Talks ...................................................... 17
Technical Program ............................................... 19
  Plenary Lecture 1 ............................................. 20
  Plenary Lecture 2 ............................................. 49
  Unilever Award Lecture ................................... 67
  Victor K. LaMer Award Lecture ....................... 68
Author Index ....................................................... 82
Notes .................................................................... 93
2019 ACS CSSS Symposium .................................. 96
Organizing Committee

Symposium co-chairs:

Darrell Velegol  
Distinguished Professor of Chemical Engineering

Seong H. Kim  
Professor of Chemical Engineering

Session co-organizers

Active and Adaptive Matter  
Ilona Kretzschmar  City College, New York  
Ayusman Sen  Penn State University  
Orlin Velev  NC State University

Colloidal and Surface Forces  
Mike Bevan  Johns Hopkins University  
Norma Alcanta  University of South Florida  
Chris Wirth  Cleveland State University

Colloidal Nanoparticle Synthesis & Characterization  
Jill Millstone  University of Pittsburgh  
Ray Schaak  Penn State University  
Alina Schimpf  UC San Diego

Connecting the dots in industry  
Jim Adair  Penn State University  
Huda Jerri  Firmenich  
Dan Miller  Dow Chemical

Directed assembly of molecules and particles  
Jim Gilchrist  Lehigh University  
Chris Keating  Penn State University  
Ning Wu  Colorado School of Mines

Electrokinetics and microfluidics  
Kyle Bishop  Columbia University  
Sarah Perry  U of Massachusetts (Amherst)  
Todd Squires  U of California (Santa Barbara)

Emulsions, bubbles, foams  
Sven Behrens  Georgia Tech
Lisa Biswal Rice University
Lauren Zarzar Penn State University

Energy systems
Enrique Gomez Penn State University
Jae Lee KAIST
Donghai Wang Penn State University

Environmental systems
Jamie Lead University of South Carolina
Nathalie Tufenkji McGill University
Stephanie Velegol Penn State University

General
Jacinta Conrad University of Houston
Valeria Milam Georgia Tech
Christian Pester Penn State University

Molecules and particles at fluid interfaces
Laura Bradley U of Massachusetts (Amherst)
Daeyeon Lee University of Pennsylvania
Ali Mohraz University of California (Irvine)

Posters
John Riley NIST
Lorena Tribe Penn State University (Berks)

Rheology and dynamics
Matt Helgeson U California (Santa Barbara)
Lilian C. Hsiao NC State University
Roseanna Zia Stanford University

Wetting and adhesion
Joelle Frechette Johns Hopkins University
Kate Jensen Williams College
Tak-Sing Wong Penn State University
Symposium Committees & Support Staff

ACS Division of Colloid & Surface Science, Symposium Committee
Jim Schneider  Carnegie Mellon University
Jacinta Conrad  University of Houston
Daeyeon Lee  University of Pennsylvania
Reghan Hill  McGill University

LaMer Award Committee
Joelle Frechette (chair)  Johns Hopkins University
Charles Maldarelli  City College NY
Amanda Haes  University of Iowa
Ning Wu  Colorado School of Mines

Unilever Award Committee
Nicholas L. Abbott  University of Wisconsin
Patricia Aikens  Melaleuca Inc.
K. P. Ananth  University of Cincinnati
Joseph Carnali  Unilever
Raymond Farinato  Solvay
Ramanathan Nagarajan  NSRDEC (Natick Labs)
P. "Som" Somasundaran  Columbia University

Symposium Support Staff
Event Planning: John Farris, Ann Goeke, Michelle Robison

Website: Penn State Outreach Marketing

Abstract Collection: OASIS – CTI Meeting Technology

Photographers & poster assistants: Inseok Chae, Mohamadamin Makarem, Xin He, Shixin Huang

Poster judges: John Riley, Lorena Tribe, Inseok Chae, Amin Makarem
Program at a Glance

Most of the events below will occur at the Penn Stater Hotel and Conference Center, except the conference banquet.

Sunday 2018 June 10

3:00-6:00  Registration / Info Desk (Conference Wing)
6:00-7:30  Welcome Reception (Deans Hall)

Monday 2018 June 11

7:00 am  Registration / Info Desk (Conference Wing)
8:00  Continental Breakfast (Break Areas)
8:15  Opening remarks (Presidents Hall)
8:30  Plenary 1: John Rogers (Presidents Hall)
9:30  Coffee Break
9:30  Exposition for Exhibitors (until 5:00 pm)
10:00  Technical sessions
12:00 pm  Lunch (Presidents Hall)
1:20  Technical sessions
3:00  Coffee Break
3:20  Technical sessions
5:30  Posters and reception - until 7:30 pm (Deans Hall)

Tuesday 2018 June 12

7:30 am  Registration / Info Desk (Conference Wing)
8:00  Continental Breakfast (Break Areas)
8:30  Plenary 2: Sharon Glotzer (Presidents Hall)
9:30  Coffee Break
9:30  Exposition for Exhibitors (until 5:00 pm)
10:00  Technical sessions
12:00 pm  Lunch (Presidents Hall)
1:20  Technical sessions
3:00  Coffee Break
3:20  Technical sessions
5:15  Unilever Award (Presidents Hall)
6:30  Banquet (Penn State Arboretum)

Wednesday 2018 June 13

8:00 am  Registration / Info Desk (Conference Wing)
8:00  Continental Breakfast (Break Areas)
8:30  Victor K. LaMer Award (Presidents Hall)
9:30  Coffee Break
9:30  Exposition for Exhibitors (until noon)
10:00  Technical sessions
12:00 pm Lunch (Presidents Hall)
1:20   Technical sessions
3:00   Coffee Break
3:20   Technical sessions

**Sessions on June 11, 2018 (Monday)**

<table>
<thead>
<tr>
<th>Session title</th>
<th>10:00-12:00</th>
<th>1:20-3:00</th>
<th>3:20-5:00</th>
<th>Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary lecture</td>
<td>PH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active &amp; adaptive matter</td>
<td></td>
<td>104</td>
<td>104</td>
<td>104</td>
</tr>
<tr>
<td>Colloidal nanoparticles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colloidal &amp; surface forces</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Connecting the dots in industry</td>
<td></td>
<td>206</td>
<td>206</td>
<td>206</td>
</tr>
<tr>
<td>Directed assembly of molecules &amp; particles</td>
<td></td>
<td>208</td>
<td>208</td>
<td>208</td>
</tr>
<tr>
<td>Electrokinetics &amp; microfluidics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emulsions, bubbles, &amp; foams</td>
<td>107</td>
<td>107</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Energy systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental systems</td>
<td>218</td>
<td>218</td>
<td>218</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>204</td>
<td>204</td>
<td>204</td>
<td></td>
</tr>
<tr>
<td>Molecules &amp; particles at fluid interfaces</td>
<td>205</td>
<td>205</td>
<td>205</td>
<td></td>
</tr>
<tr>
<td>Rheology</td>
<td>207</td>
<td>207</td>
<td>207</td>
<td></td>
</tr>
<tr>
<td>Wetting &amp; adhesion</td>
<td>106</td>
<td>106</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>Posters</td>
<td></td>
<td></td>
<td></td>
<td>DH</td>
</tr>
</tbody>
</table>

Number = meeting room
PH = Presidents Hall
DH = Deans Hall
<table>
<thead>
<tr>
<th>Session title</th>
<th>10:00-12:00</th>
<th>1:20-3:00</th>
<th>3:20-5:00</th>
<th>Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary lecture</td>
<td>PH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active &amp; adaptive matter</td>
<td>104</td>
<td>104</td>
<td>104</td>
<td></td>
</tr>
<tr>
<td>Colloidal nanoparticles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colloidal &amp; surface forces</td>
<td>105</td>
<td>105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting the dots in industry</td>
<td>206</td>
<td>206</td>
<td>206</td>
<td></td>
</tr>
<tr>
<td>Directed assembly of molecules &amp; particles</td>
<td>208</td>
<td>208</td>
<td>208</td>
<td></td>
</tr>
<tr>
<td>Electrokinetics &amp; microfluidics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emulsions, bubbles, &amp; foams</td>
<td>107</td>
<td>107</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Energy systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>204</td>
<td>204</td>
<td>204</td>
<td></td>
</tr>
<tr>
<td>Molecules &amp; particles at fluid interfaces</td>
<td>205</td>
<td>205</td>
<td>205</td>
<td></td>
</tr>
<tr>
<td>Rheology</td>
<td>207</td>
<td>207</td>
<td>207</td>
<td></td>
</tr>
<tr>
<td>Wetting &amp; adhesion</td>
<td>106</td>
<td>106</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>Unilever Award</td>
<td></td>
<td></td>
<td></td>
<td>PH</td>
</tr>
</tbody>
</table>

Number = meeting room
PH = Presidents Hall
<table>
<thead>
<tr>
<th>Session title</th>
<th>10:00-12:00</th>
<th>1:20-3:00</th>
<th>3:20-5:00</th>
<th>Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>LaMer Award</td>
<td>PH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active &amp; adaptive matter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colloidal nanoparticles</td>
<td>104</td>
<td>104</td>
<td>104</td>
<td></td>
</tr>
<tr>
<td>Colloidal &amp; surface forces</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting the dots in industry</td>
<td>206</td>
<td>206</td>
<td>206</td>
<td></td>
</tr>
<tr>
<td>Directed assembly of molecules &amp; particles</td>
<td>208</td>
<td>208</td>
<td>208</td>
<td></td>
</tr>
<tr>
<td>Electrokinetics &amp; microfluidics</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Emulsions, bubbles, &amp; foams</td>
<td>107</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy systems</td>
<td>106</td>
<td>106</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>Environmental systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>204</td>
<td>204</td>
<td>204</td>
<td></td>
</tr>
<tr>
<td>Molecules &amp; particles at fluid interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wetting &amp; adhesion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number = meeting room
Hotel Map

Deans Hall

Presidents Hall

Exhibition area
Exhibitors

Anton Paar
www.anton-

BRUKER
www.bruker.co

KRÜSS
Advancing your Surface Science
www.kruss-

Malvern Panalytical
www.malvernpanalytical.co

Park SYSTEMS
www.parksystems.co

PARTICLEMETRIX
www.particle-

SAXSLAB
saxlab.co

TA Instruments
www.tainstruments.co

www.mri.psu.edu/materials-characterization-
Professor John A. Rogers obtained BA and BS degrees in chemistry and in physics from the University of Texas, Austin, in 1989. From MIT, he received SM degrees in physics and in chemistry in 1992 and the PhD degree in physical chemistry in 1995. From 1995 to 1997, Rogers was a Junior Fellow at Harvard University. He joined Bell Laboratories in the Condensed Matter Physics Research Department in 1997, and served as Director of this department from 2000 to 2002. He then spent thirteen years on the faculty at University of Illinois, most recently as the Swanlund Chair Professor and Director of the Seitz Materials Research Laboratory. In 2016, he joined Northwestern University as the Simpson/Querrey Professor of Materials Science and Engineering, Biomedical Engineering and Medicine, with joint appointments in Mechanical Engineering, Electrical and Computer Engineering and Chemistry. He is Director of the Center for Bio-Integrated Electronics. His research has been recognized by many awards including a MacArthur Fellowship (2009), the Lemelson-MIT Prize (2011) and the Smithsonian Award for American Ingenuity in the Physical Sciences (2013). He is a member of the National Academy of Engineering, the National Academy of Sciences and the American Academy of Arts and Sciences.

TITLE (Talk 1). Mechanically Assembled 3D Mesostructures as Scaffolds for Multifunctional Materials
Sharon C. Glotzer is the Anthony C. Lembke Department Chair of Chemical Engineering at the University of Michigan in Ann Arbor. Glotzer is also the John Werner Cahn Distinguished University Professor of Engineering and the Stuart W. Churchill Collegiate Professor of Chemical Engineering, and Professor of Materials Science and Engineering, Physics, Applied Physics, and Macromolecular Science and Engineering. She is a member of the National Academy of Sciences and the American Academy of Arts and Sciences, and a fellow of the American Physical Society, the American Association for the Advancement of Science, the American Institute of Chemical Engineers, the Materials Research Society, and the Royal Society of Chemistry.

Professor Glotzer’s research on computational assembly science and engineering aims toward predictive materials design of colloidal and soft matter, and is sponsored by the NSF, DOE, DOD, Simons Foundation and Toyota Research Institute. Glotzer has published over 225 refereed papers and presented over 340 plenary, keynote and invited talks around the world. She is a Simons Investigator, a former National Security Science and Engineering Faculty Fellow, and the recipient of numerous other awards and honors, including the 2016 Alpha Chi Sigma Award from the American Institute of Chemical Engineers, the 2014 MRS Medal from the Materials Research Society and the 2008 Charles M.A. Stine Award from the American Institute of Chemical Engineers.

TITLE (talk 215): The colloidal glass transition, engineering entropic bonds, and inverse design of colloidal crystals.
Prof. Qian Chen is currently an Assistant Professor in the Materials Science and Engineering Department at University of Illinois at Urbana-Champaign (UIUC). She obtained her PhD from the same department with Prof. Steve Granick (2012) and did her postdoc with Prof. Paul Alivisatos at UC Berkeley under the prestigious Miller Fellowship. She joined the faculty of UIUC in 2015 and since then has received awards for the research in her group such as the Victor LaMer award in ACS (2015), Forbes 30 under 30 Science List (2016), Air Force Office of Scientific Research YIP award (2017), National Science Foundation CAREER award (2018) and Sloan Research Fellow in Chemistry (2018). The research in her group focuses on the broad scheme of imaging, understanding and engineering active soft matter, including systems such as nanoparticle and colloidal self-assembly, protein aggregation, advanced battery devices, and energy-efficient water filtration.

TITLE (talk 339): Direct nanoscopic imaging: from crystallizing of nanoparticles to crumpling of polymer films
Dr. Wu was born in Jiangxi, China. He obtained his B.S. degree in materials physics from University of Science and Technology of China (2010) and his Ph.D. degree in physical chemistry from Emory University (2015, with Prof. Tim Lian). His Ph.D. work unraveled interfacial charge separation and recombination mechanisms in colloidal photocatalytic semiconductor-metal nanostructures and also established a novel, high-efficiency plasmon-induced hot electron transfer mechanism in these structures. From 2015 to 2017, he was the director’s funded postdoctoral fellow at Los Alamos National Laboratory (with Dr. Victor Klimov), where he worked on the application of colloidal nanocrystals for lasers and luminescent solar concentrators. In 2017, he was enrolled into the 1000-Young-Talent program of China and joined State Key Laboratory of Molecular Reaction Dynamics, Dalian Institute of Chemical Physics, CAS, as a principle investigator. He is now the leader of “Dynamics in Optoelectronic Materials” research group, working on the ultrafast spectroscopy and device applications of colloidal low-dimensional optoelectronic materials.

TITLE (talk 340): Engineered colloidal nanostructures for carrier and photon managements in solar energy conversion.
Keynote Talks

Active and Adaptive Matter
Anna C. Balazs    University of Pittsburgh
Peer Fischer    Max Planck Inst. for Intelligent Sys.
Jinyao Tang    University of Hong Kong

Colloidal and Surface Forces
Suzanne Giasson    University of Montreal
Marina Ruths    U of Massachusetts (Lowell)

Colloidal Nanoparticle Synthesis & Characterization
Daniel Gamelin    University of Washington
Matthew R. Jones    Rice University
Jianwei Miao    UCLA
Jihyeon Yeom    MIT

Connecting the dots in industry
Nicholas Abbott    University of Wisconsin-Madison
James Adair    Pennsylvania State University
Ankit Agarwal    Imbed Biosciences
Monty Alger    Pennsylvania State University
Samiul Amin    Manhattan College Chem Engr
Gretchen Baier    The Dow Chemical Company
Michael Bevan    Johns Hopkins University
James Bohling    The Dow Chemical Company
Gavin Braithwaite    MIT
Ray Dagastine    University of Melbourne
Melik Demirel    Pennsylvania State University
Patrick Doyle    MIT
Philipp Erni    Firmenich
Jaime Ferreira    Estee Lauder Company
Matt Helgeson    U of California-Santa Barbara
Travis Hodgdon    Procter & Gamble
Abhishek Kar    Shell Global Solutions US Inc
Mark Kester    University of Virginia
Dan Miller    The Dow Chemical Company
Jonathan Spadt    RatnerPrestia
Pat Spicer    U of New South Wales Sydney
Kate Stebe    University of Pennsylvania
Darrell Velegol    Pennsylvania State University
Stephanie Velegol    Pennsylvania State University
Orlin Velev    North Caroline State University
Krassimir Velikov    Unilever
Russel Walters Johnson & Johnson
Eric Wasserman The Dow Chemical Company
David Weitz Harvard University
Alisar Zahr Revision Skincare

Directed assembly of molecules and particles
Henry Ashbaugh Tulane University
Lisa Biswal Rice University
Sven H. Behrens Georgia Institute of Technology

Electrokinetics and microfluidics
Aditya Khair Carnegie Mellon University
Sindy Tang Stanford University

Emulsions, bubbles, foams
Tom Mason UCLA
Lilo Pozzo University of Washington

Energy systems
Jeong Y. Park KAIST

Environmental systems
Vicki Chen University of NSW (Sydney)
Susan Louise Svane Stipp University of Copenhagen

General
Matthias Ballauff HZB (Berlin)
Alexander Böker Fraunhofer Institute
Alberto Fernandez-Nieves Georgia Tech

Molecules and particles at fluid interfaces
Ka Yee Lee University of Chicago
Robert Tilton Carnegie Mellon University

Rheology and dynamics
Roger Bonnecaze U of Texas (Austin)
Jaci Conrad University of Houston

Wetting and adhesion
Hans-Jürgen Butt Max Planck Institute for Polymer Research
Manoj K. Chaudhury Lehigh University
Carlos Colosqui Stony Brook University
Technical Program
Plenary Lecture 1

Monday, June 11, 2018, 8:30 AM - 9:30 AM  
Location: Presidents Hall

8:30  1. PLENARY. Mechanically Assembled 3D Mesostructures as Scaffolds for Multifunctional Materials. J. Rogers; Northwestern University, Evanston, IL.

ABSTRACT: A rapidly expanding area of research in materials science focuses on the development of routes to complex functional materials that exploit engineered three dimensional (3D) architectures. This talk summarizes recently developed strategies in geometric transformation that allow for the spontaneous, guided assembly of 3D mesostructures from two dimensional (2D) precursors, where the characteristic feature sizes can span the entire mesoscopic range, from tens of nanometers to hundreds of microns and more. A goal is to create scalable capabilities for defining properties of materials systems not only through the chemical compositions and morphological characteristics of their constituents but also through well-defined, static or tunable 3D configurations. The resulting systems can be viewed as metamaterials, where engineered mesostructures lead to unique and important optical, thermal, acoustic, mechanical and electronic properties. This presentation includes a broad range of such examples.

Active and Adaptive Matter

Monday, June 11, 2018, 10:00 AM - 12:00 PM  
Location: Room 104

10:00  2. KEYNOTE. Nanocolloids on the move. P. Fischer; Micro Nano and Molecular Systems, Max Planck Institute and Univ. of Stuttgart, Stuttgart, GERMANY.

10:40  3. Encoding biomimetic 3D helical motion in microparticles: Finding new pathways for navigating complex environments. J. Lee, B. Bharti; Cain Department of Chemical Engineering, Louisiana State University, Baton Rouge, LA.

11:00  4. Chemical oscillation of micromotors drives reversible assembly of colloids. A. Altemose, A. Sen; Chemistry, Penn State, State College, PA.
5. Active colloidal assemblies of metallo-dielectric microcubes: Self-reconfiguring microbots and self-propelling microswimmers. K. Han¹, C. W. Shields IV², B. Bharti³, G. P. López⁴, O. D. Velev¹; ¹Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC, ²Wyss Institute for Biologically Inspired Engineering, Harvard University, Cambridge, MA, ³Chemical Engineering, Louisiana State University, Baton Rouge, LA, ⁴Chemical and Biological Engineering, University of New Mexico, Albuquerque, NM.

6. 2D Colloidal clusters that beat like a heart or wrinkle like a brain. C. Zhou¹, R. Dong², S. Granick², W. Wang¹; ¹School of Materials Science and Engineering, Harbin Institute of Technology (Shenzhen), Shenzhen, CHINA, ²Center for Soft and Living Matter, Institute of Basic Science, Ulsan, KOREA, REPUBLIC OF.

---

**Colloidal and Surface Forces**

*Monday, June 11, 2018, 10:00 AM - 12:00 PM*

*Location: Room 105*

10:00  7. **KEYNOTE.** Stimuli-Responsive and Nanostructured Polymer Films for Modulating Adhesion and Friction: Fabrications, Applications and Limitations. S. Giasson¹, L. Giraud²; ¹Chemistry and Pharmacy, Universite de Montreal, Montréal, QC, CANADA, ²Pharmacy, Universite de Montreal, Montréal, QC, CANADA.


11:00  9. Domain Expansion Dynamics and Nanoridge-to-Mesa Instability in Stratifying, Micellar Foam Films. V. Sharma, Y. Zhang; Chemical Engineering, University of Illinois at Chicago, Chicago, IL.

11:20  10. Characterizing DNA-mediated interactions between colloidal particles and fluid membranes. S. Merminod, W. B. Rogers; Physics, Brandeis University, Waltham, MA.

11:40  11. Dynamics of graphite and graphene at fluid-fluid interfaces. J. Samaniuk; Chemical and Biological Engineering, Colorado School of Mines, Golden, CO.
Connecting the Dots in Industry

Monday, June 11, 2018, 10:00 AM - 12:00 PM
Location: Room 206

10:00  12. KEYNOTE. Measurements & Models of kT-Scale Microcapsule-Substrate Interactions to Optimize Fragrance Delivery. M. Bevan¹, I. Torres¹, A. Coughlan¹, H. Jerri²; ¹Johns Hopkins University, Baltimore, MD, ²Firmenich, Inc., Plainsboro, NJ.

10:40  13. KEYNOTE. Unjustified Assumptions: How to avoid dysfunctional Industry-Academic Collaborations. P. Spicer; The University of New South Wales Sydney, Sydney, AUSTRALIA.

11:00  14. KEYNOTE. Lessons learned in developing university-industry relationships. K. Stebe; University of Pennsylvania, Philadelphia, PA.

11:20  15. KEYNOTE. Multiple emulsions: scaling up and scaling down. M. E. Helgeson; Department of Chemical Engineering, University of California Santa Barbara, Santa Barbara, CA.


Directed Assembly of Molecules and Particles

Monday, June 11, 2018, 10:00 AM - 12:00 PM
Location: Room 208

10:00  17. KEYNOTE. Driving Colloids with Rotating Magnetic Fields. S. L. Biswal; Chemical & Biomolecular Engineering, Rice University, Houston, TX.

10:40  18. Inkjet printing of magnetic particles towards anisotropic magnetic properties. K. N. Al-Milaji, S. M. Harstad, R. L. Hadimani, H. Zhao; Mechanical and Nuclear Engineering, Virginia Commonwealth University, Richmond, VA.

11:00  19. Tuning the dielectrophoretic assembly of particles through surface functionalization. N. D. Burrows, C. D. Keating; Department of Chemistry, Pennsylvania State University, University Park, PA.
11:20  20. Enabling low voltage electrophoretic deposition of semiconductor nanocrystals. A. T. Fafarman; Chemical Engineering, Drexel University, Philadelphia, PA.

11:40  21. High-throughput assembly of colloidal crystals by acoustophoresis. M. Akella, J. Juarez; Mechanical Engineering, Iowa State University, Ames, IA.

---

Emulsions, Bubbles and Foams

Monday, June 11, 2018, 10:00 AM - 12:00 PM
Location: Room 107

10:00  22. KEYNOTE. Multi-compartment Cerberus nanoemulsions created by flow-induced droplet fusion and by self-limiting coalescence. T. G. Mason; Chemistry & Physics, UCLA, Los Angeles, CA.

10:40  23. Dynamics of partial coalescence and destabilization in 2D monodisperse emulsions. S. Abedi, C. Chen, S. Vanapalli; Texas Tech University, Lubbock, TX.

11:00  24. Microfluidic production of phase separated cellular mimics. C. D. Crowe, C. D. Keating; Chemistry, Pennsylvania State University, University Park, PA.

11:20  25. Complex multi-compartment and internally ordered emulsions. X. Wang¹, Y. Zhou², Y. Kim¹, M. A. Tsuei¹, K. Iwabata¹, J. J. de Pablo²,³, N. L. Abbott¹; ¹Chemical and Biological Engineering, University of Wisconsin-Madison, Madison, WI, ²Institute for Molecular Engineering, University of Chicago, Chicago, IL, ³Argonne National Laboratory, Chicago, IL.

Environmental Systems

Monday, June 11, 2018, 10:00 AM - 12:00 PM
Location: Room 218

10:00 27. KEYNOTE. Engineering New Membranes for Critical Environmental Challenges. L. Li, W. Zhong, C. Ji, J. Hou, V. Chen; 1Chemical Engineering, University of New South Wales, Sydney, AUSTRALIA, 2Materials Science & Metallurgy, Cambridge University, Cambridge, UNITED KINGDOM.

10:40 28. Water desalination by capacitive deionization methods. K. Tang, J. Gabitto, S. Yiacoumi, C. Tsouris; 1Georgia Institute of Technology, Atlanta, GA, 2Prairie View A&M University, Prairie View, TX, 3Oak Ridge National Laboratory, Oak Ridge, TN.

11:00 29. Moringa oleifera f-Sand Filters for Sustainable Water Purification. B. Xiong, B. Piechowicz, Z. Wang, R. Marinaro, E. Clement, A. Uliana, M. Kumar, S. Velegol; 1Pennsylvania State University, Pennsylvania State University, University Park, PA, 2School of Chemical, Biological, and Materials Engineering, University of Oklahoma, University Park, OK.


11:40 31. Stability and transport of two different TiO2 nanoparticles in the Canadian environment. J. Farner Budarz, J. De Tommaso, R. Cheong, N. Mantel, N. Tufenkji; 1Chemical Engineering, McGill University, Montreal, QC, CANADA, 2Chemical Engineering, Politecnico di Torino, Turin, ITALY.
10:00 32. Developing potential designer rules for aptamer libraries. V. Milam¹, R. Sullivan, 30332¹, M. Adams¹, R. Naik²; ¹Georgia Institute of Technology, Georgia Institute of Technology, Atlanta, GA, ²Georgia Institute of Technology, ARFL, WPAFB, OH.

10:20 33. Combined Effects of Temperature and Compression/Dilation of an Air-Water Interface on Therapeutic Protein Aggregation. C. V. Wood¹, V. I. Razinkov², W. Qi², E. M. Furst¹, C. J. Roberts¹; ¹Chemical and Biomolecular Engineering, University of Delaware, Newark, DE, ²Drug Product Development, Amgen, Thousand Oaks, CA.

10:40 34. Controlled Delivery of Signaling Molecules using Magnetic Microrobots. S. Das¹, E. E. Hunter², E. B. Steager², V. Kumar²; ¹Chemical and Biomolecular Engineering, University of Pennsylvania, philadelphia, PA, ²GRASP Laboratory, University of Pennsylvania, philadelphia, PA.

11:00 35. Investigating dehydration-induced physical strains of cellulose microfibrils in plant cell walls. S. Huang¹, M. Makarem¹, S. N. Kiemle², Y. Zheng², X. He¹, D. Ye¹, E. W. Gomez¹, E. D. Gomez¹, D. J. Cosgrove², S. H. Kim¹; ¹Chemical Engineering, The Pennsylvania State University, University Park, PA, ²Biology, The Pennsylvania State University, University Park, PA.

11:20 36. An ultra melt resistant hydrogel from food grade carbohydrates. B. Thompson¹, T. Horozov², S. D. Stoyanov³, V. N. Paunov²; ¹Chemical and Biomolecular Engineering, University of Maryland, College Park, College Park, MD, ²School of of Mathematics and Physical Sciences (Chemistry), University of Hull, Hull, UNITED KINGDOM, ³Unilever R&D Vlaardingen, Vlaardingen, NETHERLANDS.

11:40 37. Optimization of Liposome-Hollow gold nanoparticle for mRNA delivery. A. Veeren¹, M. J. Osborn², S. Merkel³, J. Shin¹, J. A. Zasadzinski¹; ¹Department of Chemical engineering and Material science, University of Minnesota, Minneapolis, MN, ²Department of Pediatrics, University of Minnesota,
Molecules and Particles at Fluid Interfaces

Monday, June 11, 2018, 10:00 AM - 12:00 PM
Location: Room 205

10:00 38. **KEYNOTE.** Fundamental aspects and applications of star polymer adsorption at fluid interfaces. **R. D. Tilton;** Department of Chemical Engineering and Department of Biomedical Engineering, Carnegie Mellon University, Pittsburgh, PA.

10:40 39. **Tears of Wine.** **P. Rathore, C. Xu, V. Sharma;** Chemical Engineering, University of Illinois at Chicago, Chicago, IL.

11:00 40. Adsorption dynamics and equilibrium of PEO-PDMS block copolymers at oil/water interfaces. **M. L. Davidson¹, M. Gottlieb², L. M. Walker¹;** ¹Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, ²Chemical Engineering, Ben-Gurion University of the Negev, Beer-Sheeva, ISRAEL.

11:20 41. Competitive adsorption of mAbs and excipients at the air-water interface. **A. Kanthe¹, M. Krause², S. Zheng², B. Lin³, W. Bu³, J. Strzalka³, C. Maldarelli⁵, R. Tu¹;** ¹Chemical Engineering, City University of New York, City College, New York, NY, ²Drug Product Science and Technology, Bristol-Myers Squibb, New Brunswick, NJ, ³Center for Advanced Radiation Sources, The University of Chicago, Chicago, IL, ⁴Time-Resolved Research, X-Ray Science Division, Argonne National Laboratory, Chicago, IL, ⁵Levich Institute, City College of New York, City College, New York, NY.

11:40 42. Measurement of surface tension and viscoelastic parameter values in ultra-thin liquid crystal films at the air/water interface. **N. K. Thapa¹, H. A. Alwusaydi¹, A. E. Smart², W. V. Meyer³, A. I. Belgovskiy⁴, J. A. Mann, Jr.⁵, E. K. Mann¹;** ¹Physics, Kent State University, Kent, OH, ²Scattering Solutions, Inc., Costa Mesa, CA, ³Scattering Solutions, Inc., Kent State University, Cleveland, OH, ⁴Scattering Solutions, Inc., Cleveland, OH, ⁵Chemical Engineering, Case Western Reserve University, Cleveland, OH.
Rheology

Monday, June 11, 2018, 10:00 AM - 12:00 PM
Location: Room 207

10:00  43. KEYNOTE. Phase behavior and rheology of disperse colloid-polymer mixtures. J. Conrad; University of Houston, Houston, TX.

10:40  44. First normal stress differences of attractive model colloid + polymer mixtures. N. Park, J. C. Conrad; Chemical and Biomolecular Engineering, University of Houston, Houston, TX.

11:00  45. Excess entropy scaling law in two-dimensional "attractive" colloidal fluids. X. MA¹, J. LIU¹, Y. Zhang², P. Habdas³, A. G. Yodh¹; ¹Physics & Astronomy, University of Pennsylvania, Philadelphia, PA, ²Physics, Peking University, Beijing, CHINA, ³Physics, Saint Joseph's University, Philadelphia, PA.

11:20  46. Direct investigation of microstructure dynamics during drying of colloid-polymer thin films. T. Kaewpetch, J. F. Gilchrist; Lehigh University, Bethlehem, PA.

11:40  47. Understanding the transient behavior of soft glassy materials far from equilibrium with Sequence of Physical Process (SPP) analysis. J. PARK, S. A. Rogers; Chemical and Biomolecular engineering, University of Illinois at Urbana-Champaign, Urbana, IL.

Wetting and Adhesion

Monday, June 11, 2018, 10:00 AM - 12:00 PM
Location: Room 106

10:00  48. KEYNOTE. Simple model to describe adaptive wetting. H. J. Butt, Sr., R. Berger, Sr, W. Steffen, Sr, D. Vollmer, MS, S. Weber, Sr; Physics at interfaces, Max-Planck-Institute for Polymer Research, Mainz, GERMANY.

10:40  49. Exploring drop transition to Leidenfrost state on nano/micro-structured surfaces. N. Saneie, V. Kulkarni, S. Anand; Mechanical Engineering, University of Illinois at Chicago, CHICAGO, IL.

11:00  50. Liquid-based membranes as unusual particle separators. B. Boschitsch; Mechanical and
Active and Adaptive Matter

Monday, June 11, 2018, 1:20 PM - 3:00 PM
Location: Room 104

1:20 PM  53. From donuts to micromotors: Novel 3-D printed janus tori. R. D. Baker¹, I. S. Aranson², A. Sen³, T. Johnson⁴, E. Lauga⁵, ¹Material Science and Engineering, Pennsylvania State University, University Park, PA, ²Mathematics, Pennsylvania State University, University Park, PA, ³Chemistry, Pennsylvania State University, University Park, PA, ⁴Applied Mathematics, University of Cambridge, Cambridge, UNITED KINGDOM.

1:40 PM  54. Shape-directed motion of homogeneous catalytic micromotors. A. M. Brooks¹, M. Tasinkevych², S. Sabrina¹, D. Velegol¹, K. J. Bishop³, A. Sen⁴, ¹Chemical Engineering, The Pennsylvania State University, State College, PA, ²Universidade de Lisboa, Lisboa, PORTUGAL, ³Chemical Engineering, Columbia University, New York, NY, ⁴Chemistry, The Pennsylvania State University, State College, PA.

2:00 PM  55. Shape-directed dynamics of active colloids powered by contact charge electrophoresis. Y. Dou, K. J. M. Bishop; Chemical ENGINEERING, Columbia University, New York, NY.

2:20 PM  56. Acoustically-Regulated Rheotaxis of Bimetallic Micromotors. L. Ren¹, D. Zhou², Z. Mao¹, P. Xu³, T. J. Huang⁴, T. E. Mallouk³, ¹Engineering of science and mechanics, Pennsylvania State University,
State college, PA, 2School of Mechatronics Engineering, Harbin Institute of Technology, Harbin, CHINA, 3Department of Chemistry, Pennsylvania State University, State college, PA, 4Department of Mechanical Engineering and Material Science, Duke University, Durham, NC.

2:40 PM 57. Rational design and dynamics of self-propelled colloidal bead chains: from rotators to flagella. H. Vutukuri; ETH, Zurich, SWITZERLAND.

Colloidal and Surface Forces

Monday, June 11, 2018, 1:20 PM - 3:00 PM
Location: Room 105

1:20 PM 58. Morphogenesis of polycrystalline dendritic patterns from evaporation of a reactive nanofluid sessile drop. H. Wu, W. H. Briscoe; School of Chemistry, University of Bristol, Bristol, UNITED KINGDOM.

1:40 PM 59. Shape dependence of particle-surface interactions in flow. M. K. Shave1, A. Balciunaite2, M. M. Santore1; 1Polymer Science and Engineering, UMass Amherst, Amherst, MA, 2Chemical Engineering, UMass Amherst, Amherst, MA.

2:00 PM 60. Influence of cap weight on the motion of a Janus particle very near a wall. A. Rashidi, C. L. Wirth; Cleveland State University, Cleveland, OH.

2:20 PM 61. Contactless particle-particle interactions in active microswimmers. J. G. Gibbs; Physics and Astronomy, Northern Arizona University, Flagstaff, AZ.


Connecting the Dots in Industry

Monday, June 11, 2018, 1:20 PM - 3:00 PM
Location: Room 206

1:20 PM 63. KEYNOTE. How can formulation problems inspire fundamental colloid and interfacial science?. R. Dagastine; Department of Chemical Engineering, University of Melbourne, Melbourne, AUSTRALIA.
1:40 PM  **64. KEYNOTE.** Ceramide nanoLiposomes: the road to the clinic. **M. Kester**; University of Virginia, Charlottesville, VA.

2:00 PM  **65. KEYNOTE.** Colloid and Material Science Open Innovation for Cosmetics and Personal Care Industries. **S. Amin**\textsuperscript{1,2}, G. Luengo\textsuperscript{3}; \textsuperscript{1}Chemical Engineering, Manhattan College, Riverdale, NY, \textsuperscript{2}Advanced Research, L’Oreal Research and Innovation, Clark, NJ, \textsuperscript{3}Advanced Research, L'Oreal Research and Innovation, Aulnay sous Bois, FRANCE.

2:20 PM  **66. KEYNOTE.** Make it disappear, the development of commercial scale self-assembled polymer pigment composites for paints with improved opacity, performance and reduced raw material demands. **J. Bohling**; The Dow Chemical Company, Collegeville, PA.

---

**Directed Assembly of Molecules and Particles**

*Monday, June 11, 2018, 1:20 PM - 3:00 PM*

*Location: Room 208*

1:20 PM  **67.** 2D to 1D Morphology Transition in Self-Assembly of Hexagonally Packed Viral Colloidal Rods. **E. Grelet**, B. Sung; Centre de Recherche Paul-Pascal, CNRS & University of Bordeaux, Pessac, FRANCE.


2:00 PM  **69.** Hierarchical self-assembly of a 3D mesocrystal from polydisperse anisometric plates. **A. Kim**, B. Luo, J. W. Smith, Z. Ou, Q. Chen; MatSE, University of Illinois Urbana-Champaign, Urbana, IL.

2:20 PM  **70.** Measuring crystal nucleation and growth of DNA-grafted colloidal particles. **A. Hensley**, W. B. Rogers; Physics, Brandeis University, Waltham, MA.

2:40 PM  **71.** Phononic properties of self-assembled nanodicolloid crystal. **H. Kim**\textsuperscript{1}, E. M. Furst\textsuperscript{1}, G. Fytas\textsuperscript{2}; \textsuperscript{1}Chemical Engineering, University of Delaware,
Emulsions, Bubbles and Foams
Monday, June 11, 2018, 1:20 PM - 3:00 PM
Location: Room 107

1:20 PM 72. Understanding mechanisms of spontaneous Pickering emulsions. **D. Neibloom**, M. Bevan, J. Frechette; Chemical and Biomolecular Engineering, The Johns Hopkins University, Baltimore, MD.

1:40 PM 73. Ultrastable simple oil-in-oil and double oil-in-oil-in-oil Pickering emulsions. **A. T. Tyowua**, Dr 1, S. G. Yiase, Dr 1, B. P. Binks, Prof 2; 1Applied Colloid Science and Cosmeceutical Group, Department of Chemistry, Benue State University, Makurdi, Makurdi, NIGERIA, 2School of Mathematics and Physical Science, University of Hull, HU6 7RX, UK, Hull, UNITED KINGDOM.

2:00 PM 74. Surface and Interfacial Interactions in Dodecane/Brine Pickering Emulsions Stabilized by Combination of Cellulose Nanocrystals and Emulsion Stabilizers. **S. Parajuli**, C. Middleton, A. Rodrigues, E. Urena-Benavides; Chemical Engineering, University of Mississippi, University, MS.

2:20 PM 75. Aqueous emulsion droplets as artificial mineralization vesicles (AMVs): Utilizing intercompartmental phases to direct mineral synthesis. **A. Rowland**; The Pennsylvania State University, University Park, PA.

2:40 PM 76. Stimuli-responsive Pickering emulsions stabilized by pH-sensitive peanut shaped particles. **T. G. Anjali**, M. G. Basavaraj; Chemical Engineering, Indian Institute of Technology Madras, Chennai, INDIA.

Environmental Systems
Monday, June 11, 2018, 1:20 PM - 3:00 PM
Location: Room 218

1:20 PM 77. **KEYNOTE.** The interface controls the system. **S. L. Stipp**; Nano-Science Center, Department of
Chemistry, University of Copenhagen, DK-2100 Copenhagen OE, DENMARK.

2:00 PM 78. Interaction of CO₂, CH₄ and H₂O at clay mineral surfaces. L. Tribe¹, R. Bennick¹, M. Kilmer²; ¹Division of Science, Penn State Berks, Wyomissing, PA, ²Department of Civil and Environmental Engineering, Temple University, Philadelphia, PA.

2:20 PM 79. Using Single Particle Mode ICP-MS for Analysis of Nanoparticles in Wastewater Effluents and Biosolids. S. Ghoshal, A. A. Rahim; Civil Engineering, McGill University, Montreal, QC, CANADA.

2:40 PM 80. Heteroaggregation of oppositely charged particles in the presence of multivalent ions. T. Cao¹, T. Sugimoto¹², I. Szilagyi¹, G. Trefalt¹, M. Borkovec¹; ¹Department of Inorganic and Analytical Chemistry, University of Geneva, Geneva, SWITZERLAND, ²Faculty of Life and Environmental Sciences, University of Tsukuba, Tsukuba, JAPAN.

General Papers

Monday, June 11, 2018, 1:20 PM - 3:00 PM
Location: Room 204

1:20 PM 81. KEYNOTE. Incorporation of Biological Functions into Polymer Materials: The Use of Protein-Polymer-Conjugates. A. Boeker, H. Charan, U. Glebe, S. Reinicke; Fraunhofer Institute for Applied Polymer Research IAP, Potsdam, GERMANY.

2:00 PM 82. Engineering the Shape of Block Copolymer Particles. J. Shin¹, Y. Kim², K. Ku¹, G. Yi³, B. J. Kim¹; ¹Chemical and Biomolecular Engineering, KAIST, Daejeon, KOREA, REPUBLIC OF, ²KAIST Institute for NanoCentury, KAIST, Daejeon, KOREA, REPUBLIC OF, ³School of Chemical Engineering, Sungkyunkwan University, Suwon, KOREA, REPUBLIC OF.


2:40 PM 84. Steady-state and transient behavior of knotted polymers in extensional fields. V. Narsimhan¹, A.
R. Klotz\textsuperscript{2}, B. W. Soh\textsuperscript{2}, P. S. Doyle\textsuperscript{2}; \textsuperscript{1}Chemical Engineering, Purdue University, West Lafayette, IN, \textsuperscript{2}Chemical Engineering, Massachusetts Institute of Technology, Cambridge, MA.

Molecules and Particles at Fluid Interfaces

\textit{Monday, June 11, 2018, 1:20 PM - 3:00 PM}
\textit{Location: Room 205}

1:20 PM 85. Nanoparticle interactions with cell membrane models: The importance of lipid asymmetry. S. Nazemidashtparjandi, A. M. Farnoud; Chemical and Biomolecular Engineering, Ohio University, Athens, OH.

1:40 PM 86. Magneto-capillary dynamics of amphiphilic Janus particles at curved liquid interfaces. W. Fei\textsuperscript{1}, M. M. Driscoll\textsuperscript{2}, P. M. Chaikin\textsuperscript{2}, K. J. Bishop\textsuperscript{1}; \textsuperscript{1}Chemical Engineering, Columbia University, New York, NY, \textsuperscript{2}Physics, New York University, New York, NY.

2:00 PM 87. The effect of bacterial secretion composition on the aggregation of particles at a liquid-liquid interface. A. White\textsuperscript{1}, M. Jalali-Mousavi\textsuperscript{1}, H. Bacosa\textsuperscript{2}, C. Xu\textsuperscript{2}, P. Santschi\textsuperscript{2}, A. Quigg\textsuperscript{2}, J. Sheng\textsuperscript{1}; \textsuperscript{1}Texas A&M Univ.-Corpus Christi, Corpus Christi, TX, \textsuperscript{2}Texas A&M University at Galveston, Galveston, TX.

2:20 PM 88. Molecules at the Polyelectrolyte Coacervate/Water Interface. N. S. Zacharia; Polymer Engineering, University of Akron, Akron, OH.

2:40 PM 89. Measuring the scaling of interparticle interaction energies by drop tensiometry. R. Mears, C. MacPhee, J. Thijsen; University of Edinburgh, Edinburgh, UNITED KINGDOM.

Rheology

\textit{Monday, June 11, 2018, 1:20 PM - 3:00 PM}
\textit{Location: Room 207}

1:20 PM 90. Thermal processing of colloidal gels: kinetics of quenching, coarsening and arrest. T. Nguyen\textsuperscript{1}, J. Kim\textsuperscript{1}, P. Padmanabhan\textsuperscript{2}, R. N. Zia\textsuperscript{3}, M. E. Helgeson\textsuperscript{1}; \textsuperscript{1}Department of Chemical Engineering, University of California Santa Barbara, Santa Barbara, CA, \textsuperscript{2}School of Chemical & Biomolecular Engineering, Cornell University, Ithaca, NY,

2:00 PM 92. Multiscale probing of colloidal gelation dynamics. J. Cho, I. Bischofberger; Mechanical Engineering, MIT, Cambridge, MA.

2:20 PM 93. Dynamics and rheology of suspension of particles with arbitrary shapes. M. Tan1, T. W. Walker2; 1School of Chemical, Biological, and Environmental Engineering, Oregon State University, Corvallis, OR, 2Chemical and Biological Engineering, South Dakota School of Mines and Technology, Rapid City, SD.

2:40 PM 94. Colloidal Elasticity Arises from Packing of Locally Glassy Clusters. J. Swan1, Z. Varga1, K. Whitaker2, L. Hsiao3, M. Solomon4, E. Furst5; 1MIT, Cambridge, MA, 2Dow Chemical Company, Midland, MI, 3North Carolina State University, Raleigh, NC, 4University of Michigan, Ann Arbor, MI, 5University of Delaware, Newark, DE.

Wetting and Adhesion

Monday, June 11, 2018, 1:20 PM - 3:00 PM
Location: Room 106

1:20 PM 95. Enhanced Condensation on Air Independent Rough Surfaces. G. Sirohia, Z. Guo, X. Dai; Mechanical Engineering, The University of Texas at Dallas, Richardson, TX.

1:40 PM 96. Superhydrophobic and anti-icing coatings and nonwovens enabled by a new class of dendrimeric polymer particles. A. Williams, S. Roh, O. D. Velev; Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC.

2:00 PM 97. Extreme icephobicity using passive de-icing materials. R. Chatterjee1, D. Beysens2, S. Anand1; 1Mechanical and Industrial Engineering, University of Illinois at Chicago, Chicago, IL, 2Physique et mécanique des milieux hétérogènes (PMMH), École Supérieure de Physique et de Chimie Industrielles (ESPCI), Paris, FRANCE.

2:40 PM 99. Explaining evaporation-triggered wetting transition using local force balance model and contact line fraction. R. ANNAVARAPU, S. Kim, M. Wang, A. Hart, K. Gleason, H. Sojoudi; 1MIME, The University of Toledo, TOLEDO, OH, 2Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA, 3Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, MA.

******************************************************************************

**Active and Adaptive Matter**

*Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 104*

3:20 PM 100. Motion of patchy particle swimmers in the vicinity of a liquid/liquid interface. Z. Jalilvand, I. Kretzschmar; Chemical Engineering, City College of New York, New York, NY.

3:40 PM 101. Microwheels on a microroad: enhanced translation on topographic surfaces. T. Yang, D. Marr, N. Wu; Colorado School of Mines, Golden, CO.

4:00 PM 102. Active motion of LC-in-LC emulsions. K. Nayani, N. L. Abbott; Chemical and Biological Engineering, University of Wisconsin, Madison, WI.

4:20 PM 103. Colloidal shuttles for programmable cargo delivery. A. F. Demiroers, A. R. Studart; ETH Zurich, Zurich, SWITZERLAND.

Colloidal and Surface Forces

Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 105


3:40 PM  106. kT-scale interactions and stability of colloids with adsorbed zwitterionic copolymers. **M. G. Petroff1**, E. Garcia1, M. Herrera-Alonso2, M. A. Bevan1; 1Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD, 2Materials Science and Engineering, Johns Hopkins University, Baltimore, MD.

4:00 PM  107. Encoding van der Waals interactions with complex symmetries into colloids by using liquid crystallinity. **H. A. Fuster**, N. L. Abbott; Chemical and Biological Engineering, University of Wisconsin - Madison, Madison, WI.


Connecting the Dots in Industry

Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 206

3:20 PM  110. KEYNOTE. Elucidating patents for the academic scientist. **T. Hodgdon**; PG Ventures, Procter & Gamble, Mason, OH.

4:00 PM  111. Panel Q&A on Intellectual Property. **H. Jerri**; Firmenich, Plainsboro, NJ.
Directed Assembly of Molecules and Particles

Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 208

3:20 PM 112. Controlling anisotropic colloidal assembly. I. Torres Diaz, A. Mishra, M. A. Bevan; Johns Hopkins University, Baltimore, MD.

3:40 PM 113. Two-step nucleation of colloidal clathrate crystal driven by entropy. S. Lee, M. Engel, S. Glotzer, 48109; University of Michigan, Ann Arbor, MI.

4:00 PM 114. Colloidal assembly on reconfigurable electric field mediated energy landscapes. J. Zhang, J. Yang, Y. Zhang, M. Bevan; Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD.

4:20 PM 115. Necessity of non-specific interactions for protein self-assembly. J. Glaser, V. Ramasubramani, S. Glotzer; Chemical Engineering, University of Michigan, Ann Arbor, MI.

4:40 PM 116. Influence of Interaction Softness on Binary Superlattice Stability. R. A. LaCour, C. Adorf, S. Glotzer, 48109; Chemical Engineering, University Of Michigan, Ann Arbor, MI.

Emulsions, Bubbles and Foams

Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 107

3:20 PM 117. Controllable internal mixing in coalescing droplets induced by the solutal Marangoni convection of surfactants with distinct headgroup architectures. J. J. Nash1, P. T. Spicer2, K. A. Erk1; 1School of Materials Engineering, Purdue University, West Lafayette, IN, 2School of Chemical Engineering, The University of New South Wales, Sydney, AUSTRALIA.

3:40 PM 118. Effect of Triblock Copolymer Surfactant Composition on Flow Induced Phase Inversion Emulsification in a Tapered Channel. G. Duan1, S. Li2, C. Cheng3, D. Lee1; 1Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA, 2Toner Technology Area, Toner Development &
Manufacturing Group, Xerox Corporation, Webster, NY.

4:00 PM 119. Mixing time, inversion and multiple emulsion formation in a limonene and water Pickering emulsion. L. Sawiak¹, K. Bailes², D. Harbottle², P. S. Clegg¹; ¹School of Physics and Astronomy, University of Edinburgh, Edinburgh, UNITED KINGDOM, ²School of Chemical and Process Engineering, University of Leeds, Leeds, UNITED KINGDOM.

4:20 PM 120. Assessing equilibrium surfactant thermodynamics at elevated pressures. Z. Hinton, N. Alvarez; Chemical and Biological Engineering, Drexel University, Philadelphia, PA.

4:40 PM 121. Synergism in energy and surfactant in the formation of w/o nanoemulsion. H. Kumar, V. Kumar; Chemical Engineering, Indian Institute of Technology Roorkee, Roorkee, INDIA.

Environmental Systems

Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 218

3:20 PM 122. Fluorinated Surfactants: Micellization and Binding to Polymers in Aqueous Solutions. S. Kancharla¹, D. Bedrov², P. Alexandridis¹; ¹University at Buffalo, The State University of New York (SUNY), Buffalo, NY, ²University of Utah, Salt Lake City, UT.

3:40 PM 123. The increased drag of a rising oil droplet induced by the attachment of extracellular polymeric streamers produced by bacteria. A. White, M. Jalali-Mousavi, J. Sheng; Texas A&M Univ.-Corpus Christi, Corpus Christi, TX.

4:00 PM 124. Biophysical inhibition of pulmonary surfactant by metal nanoparticles. Y. Yang¹, L. Xu¹, S. Dekkers², F. R. Cassee²,³, Y. Y. Zuo¹;¹University of Hawaii at Manoa, Honolulu, HI, ²National Institute for Public Health and the Environment, Bilthoven, NETHERLANDS, ³Utrecht University, Bilthoven, NETHERLANDS.

4:20 PM 125. Design of Ecofriendly Surfactant Chemical Herders for Maritime Oil Spill Remediation. H. Zhou; City College of New York, NEW YORK, NY.
4:40 PM  126. Impact of UV-mediated TiO$_2$ photoreactivity on *Daphnia magna*. **J. Farner Budarz**, E. Mahé, N. Tufenkji; Chemical Engineering, McGill University, Montreal, QC, CANADA.

**General Papers**

*Monday, June 11, 2018, 3:20 PM - 5:00 PM*

**Location: Room 204**

3:20 PM  127. Brownian Dynamics Simulations of Hydrodynamic Interactions Between Hydrophobic Brownian Colloids at a Air-Liquid Interface. **A. Dani**, **S. Das**, J. Koplik, P. Somasundaran, C. Maldarelli; 1Levich Institute and Department of Chemical Engineering, City University of New York, New York, NY, 2Langmuir Center of Colloids and Interfaces, Columbia University, New York, NY, 3Levich Institute and Department of Physics, City University of New York, New York, NY.

3:40 PM  128. Industrial scale manufacturing of microfluidic based emulsions by massively parallelizing microfluidic droplet generators. **S. Yadavali**, H. Jeong, D. Lee, D. Issadore; 1Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, 2Department of Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA, 3Department of Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, PA.

4:00 PM  129. Normal stress-based description of mixing dynamics in size segregated suspensions. **S. Pednekar**, J. Chun, J. Morris; 1Chemical Engineering, City College of New York, New York, NY, 2Benjamin Levich Institute, New York, NY, 3Pacific Northwest National Laboratory, Richland, WA.

4:20 PM  130. Fluorocarbon Hydrocarbon Surfactant Mixtures in Fire-fighting Foam Formulations. **C. Hill**, J. Eastoe; University of Bristol, Bristol, UNITED KINGDOM.

Molecules and Particles at Fluid Interfaces
Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 205

3:20 PM 132. Towards realistic large area cell membrane mimics: Excluding oil, controlling composition and including ion channels. P. J. Beltramo¹, L. Scheidegger², J. Vermant²; ¹Chemical Engineering, University of Massachusetts Amherst, Amherst, MA, ²ETH Zurich, Zurich, SWITZERLAND.

3:40 PM 133. pH-modulated self-assembly of colloidal nanoparticles in a dual-droplet inkjet printing process. K. N. Al-Milaji, H. Zhao; Mechanical and Nuclear Engineering, Virginia Commonwealth University, Richmond, VA.

4:00 PM 134. Bicontinuous biphasic emulsion gels for reactive separation. G. Di Vitantonio; chemical and biomolecular engineering, University of Pennsylvania, Philadelphia, PA.

4:20 PM 135. Using the Assembly of 2D Particles at Fluid-Fluid Interfaces to Architect Composite Materials. E. Pentzer, P. Wei, Q. Luo, K. Edgehouse; Case Western Reserve university, Cleveland, OH.

4:40 PM 136. Directed assembly of cuboidal particles through shape induced interface deformations. T. G. Anjali, M. G. Basavaraj; Chemical Engineering, Indian Institute of Technology Madras, Chennai, INDIA.

Rheology
Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 207

3:20 PM 137. Pinch-off Dynamics, Extensional Rheology and Printability of Polyelectrolyte Solutions. V. Sharma, L. N. Jimenez, J. Dinic; Chemical Engineering, University of Illinois at Chicago, Chicago, IL.

3:40 PM 138. Dynamics, rheology, and breakup of droplets with interfacial viscosity. V. Narsimhan; Chemical Engineering, Purdue University, West Lafayette, IN.

4:00 PM 139. Predicting nonlinear shear rheology of soft interfaces. A. Raghunandan¹, P. T. Underhill², J. M. Lopez³, A. H. Hirsa¹²; ¹Mechanical Engr., Rensselaer Polytechnic Institute, Troy, NY,
4:20 PM  140. Curvature effects on the lung surfactant monolayer. S. Barman, J. Zasadzinski; Chemical Engineering and Material Science, University of Minnesota-Twin Cities, MINNEAPOLIS, MN.

4:40 PM  141. Effects of finite surface shear viscosity in spherical systems. S. Gulati¹, F. P. Riley², A. H. Hirsa¹³, J. M. Lopez⁴; ¹Mechanical Engr., Rensselaer Polytechnic Institute, Troy, NY, ²Mathematics, Rensselaer Polytechnic Institute, Troy, NY, ³Chemical Engr., Rensselaer Polytechnic Institute, Troy, NY, ⁴Mathematics, Arizona State University, Tempe, AZ.

Wetting and Adhesion

Monday, June 11, 2018, 3:20 PM - 5:00 PM
Location: Room 106


3:40 PM  143. Probing the wetting behavior of polymers under nanoconfinement. D. Ring; Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA.

4:00 PM  144. Spontaneous rise of rivulets in square capillaries. V. Thammanna Gurumurthy¹, D. Rettenmaier¹, I. V. Roisman¹, C. Tropea¹, S. Garoff²; ¹Institute of Fluid Mechanics and Aerodynamics, Technische Universität Darmstadt, Darmstadt, GERMANY, ²Carnegie Mellon University, Pittsburgh, PA.

4:20 PM  145. KEYNOTE. Applications of Kramers Theory for Wetting and Adhesion. C. E. Colosqui¹, D. Nandyala²; ¹Mechanical Engineering, Applied Mathematics & Statistics, Stony Brook University, Stony Brook, NY, ²Mechanical Engineering, Stony Brook University, Stony Brook, NY.
General Posters

Monday, June 11, 2018, 5:30 PM - 7:30 PM
Location: Presidents Hall

146. Drainage of Liquid from a Small Circular Hole in a Vertical Wall. **C. Extrand**; Technology Development, CPC, St. Paul, MN.

147. Dynamics of active particles near a curved wall: Guided and trapped locomotions. **P. G. Diaz-Hyland**¹, U. M. Cordova-Figueroa¹, N. Sharifi-Mood²; ¹Department of Chemical Engineering, University of Puerto Rico-Mayaguez, Mayaguez, PR, ²Siemens PLM Software, Bellevue, WA.

149. Synthesis and characterization of core-shell metal-organic framework particles. **A. Fujiwara**, S. Watanabe, M. Miyahara; Department of Chemical Engineering, Kyoto University, Kyoto city, JAPAN.

150. On the role of nanoparticles in binary convective self-assembly. **N. Arai**, S. Watanabe, M. T. Miyahara; Chemical Engineering, Kyoto University, Kyoto, JAPAN.


152. Application of particle deposition concepts to chemical-mechanical planarization slurries. **D. Mosley**¹, Y. Guo², N. K. Penta², R. Auger²; ¹Dow Electronic Materials, Collegeville, PA, ²Dow Electronic Materials, Newark, DE.


154. Self-propelled droplets. **M. Vasei**; R&D, Avmor, Laval, QC, CANADA.

155. Thermodynamics of surface phase transitions. **L. Xu**, Y. Y. Zuo; University of Hawaii at Manoa, Honolulu, HI.

156. Biophysical assessment of pulmonary surfactant predicts the lung toxicity of nanomaterials. **Y. Yang**¹, S. Liu², Y. Zuo¹; ¹University of Hawaii at Manoa, Honolulu, HI, ²Chinese Academy of Sciences, Beijing, CHINA.

157. Pickering emulsions stabilized by the hetero-aggregation of mixture of oppositely charged hematite ellipsoids and spherical silica nanoparticles. **U. Siliveru**, E. Mani, B. Madivala Gurappa; Chemical Engineering, Indian Institute of Technology Madras, Chennai, INDIA.
158. Natural product gel of liquidambaric acid: Gelation behaviors, driving force, and self-healing ability. K. Zhi; school of Chemistry and Chemical Engineering, Harbin Institute of Technology, Harbin, CHINA.

159. Self-assembled particles nanocomplexes comprising Ursolic Acid and Paclitaxel for alleviateside effects of chemotherapy and combination chemotherapy in cancer. J. Wang; School of Chemistry and Chemical Engineering, Harbin Institute of Technology, Harbin, CHINA.

160. Enzyme encapsulation in porous silica nanoparticles to eliminate immune response and extend functional half-life. A. Yang, P. Huang, R. F. Mattrey, J. Lux; Radiology, UT Southwestern Medical Center, Dallas, TX.

161. CO₂ conversion to hierarchical porous carbons for electrochemical energy storage. Y. Kim, J. Park, J. Lee; Department of Chemical and Biomolecular Engineering, KAIST, Daejeon, KOREA, REPUBLIC OF.


163. Iridescent cellulose nanocrystal films with tunable reflection wavelength for colorimetric sensors. H. YANG¹, S. Choi¹, J. Kim²; ¹Bionano Technology, HANYANG UNIVERSITY, Seoul, KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF, ²Chemical and Molecular Engineering, HANYANG UNIVERSITY, Seoul, KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF.

164. 4-Mercaptophenylboronic acid-conjugated conductive colloidal microparticles for a high-performance glucose sensor. S. Choi, H. Yang, J. Kim; Hanyang University, Seoul, KOREA, REPUBLIC OF.

165. Characterization of Thermo-Responsive Polymer-Liquid Crystal Nonwovens. S. L. Levit¹, R. Stwodah¹, M. Gillard¹, K. Swana², C. Tang³; ¹Chemical and Life Science Engineering, Virginia Commonwealth University, Richmond, VA, ²Natick
Soldier Research, Development & Engineering Center, Natick, MA.

166. Encapsulation of Weakly Hydrophobic Drugs into pH-Responsive Nanoparticles. S. L. Levit, C. Tang; Chemical and Life Science Engineering, Virginia Commonwealth University, Richmond, VA.

167. Swelling of pH-responsive weak polyelectrolyte brush grafted nanoparticles with varying brush characteristics. D. Iqbal1, J. Yan2, K. Matyjaszewski2, R. Tilton1; 1Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, 2Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA.


169. Active colloids swimming in free solution vs. under strong confinement: a case study with Janus microswimmers undergoing induced charge electrophoresis (ICEP). L. Zhang1, S. Granick2, W. Wang1; 1School of Materials Science and Engineering, Harbin Institute of Technology (Shenzhen), Shenzhen, CHINA, 2Center for Soft and Living Matter, Institute of Basic Science, Ulsan, KOREA, REPUBLIC OF.

170. Active propulsion of particles with engineered structure, powered by AC electric fields. K. Han1, C. W. Shields IV2, F. Ma3, G. Yossifon4, T. Miloh5, O. D. Velev1; 1Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC, 2Wyss Institute for Biologically Inspired Engineering, Harvard University, Cambridge, MA, 3Energy Storage and Distributed Resources, Lawrence Berkeley National Laboratory, Berkeley, CA, 4Mechanical Engineering, Technion – Israel Institute of Technology, Haifa, ISRAEL, 5Mechanical Engineering, Tel Aviv University, Ramat Aviv, ISRAEL.

171. The curious case of misbehaving sedimenting colloidal sheets. R. Dong1, W. Wang2, S. Granick1; 1Center for Soft and Living Matter, Institute of Basic Science, Ulsan, KOREA, REPUBLIC OF, 2School of Materials Science and Engineering, Harbin Institute of Technology (Shenzhen), Shenzhen, CHINA.

172. Controlling disorder by electric field directed reconfiguration of nanowires to tune random lasing. J. R. Miller1, P. P. Donahue1, C. Zhang2, N. Nye3, C. Wang2, R. Tang2, D. Christodoulides3, C. D. Keating1, Z. Liu2,4; 1Chemistry, Pennsylvania State University, University Park, PA, 2Electrical Engineering, Pennsylvania State University,
173. Signatures of physical aging in Carbopol microgel. **M. Agarwal**, Y. M. Joshi; Department of Chemical Engineering, IIT Kanpur, KANPUR, INDIA.

174. “Formulation Engineering”: a new Chemical Engineering course in the Carnegie Mellon Colloids, Polymers and Surfaces Program. **R. D. Tilton**; Department of Chemical Engineering and Department of Biomedical Engineering, Carnegie Mellon University, Pittsburgh, PA.

175. Programmable self-assembly and suspension rheology in light-responsive colloidal systems. **S. Pradeep**, A. Kramer, L. C. Hsiao; Chemical & Biomolecular Engineering, North Carolina State University, Raleigh, NC.

176. Scale-up of Moringa coated sand filters to remove bacteria from wastewater. **H. Wang**\(^1\), A. Pei\(^1\), R. Dickey\(^1\), L. Samineni\(^1\), B. Xiong\(^2\), D. Velegol\(^1\), M. Kumar\(^1\), S. Velegol\(^1\); \(^1\)Department of Chemical Engineering, The Pennsylvania State University, State College, PA; \(^2\)Department of Civil and Environmental Engineering, The Pennsylvania State University, State College, PA.

177. Directed self assembly of composite metal-dielectric particles. **N. Famularo**\(^1\), S. Boehm\(^1\), X. Guo\(^2\), C. Keating\(^1\), T. Mayer\(^2\); \(^1\)Chemistry, Penn State University, University Park, PA; \(^2\)Electrical Engineering, Penn State University, University Park, PA.

178. Microrheological characterization of covalent adaptable hydrogels during pH dependent degradation. **N. Wu**, K. M. Schultz; Chemical and Biomolecular Engineering, Lehigh University, Bethlehem, PA.

179. Coacervation-based experimental model systems for intracellular organization. **A. Marianelli**\(^1\), B. Miller\(^1\), M. Sherman\(^2\), C. Keating\(^1\); \(^1\)Chemistry, Pennsylvania State University, University Park, PA; \(^2\)Biochemistry and Molecular Biology, Pennsylvania State University, University Park, PA.

180. Spontaneous emulsification with surface active star polymers. **Y. Huang**\(^1\), R. D. Tilton\(^2\); \(^1\)Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA; \(^2\)Chemical Engineering and Biomedical Engineering, Carnegie Mellon University, Pittsburgh, PA.

Alexandridis; University at Buffalo, The State University of New York (SUNY), Buffalo, NY.

182. Reorganization of colloidal crystals via electric fields for controlled optical properties. A. K. Hendrickson-Stives, C. Keating; Chemistry, The Pennsylvania State University, University Park, PA.

183. Aqueous Benzyl Alcohol Oxidation using Polymer Nanoreactors. A. Harrison¹, M. Nguyen², T. Vuong¹, C. Tang¹; ¹Chemical and Life Sciences Engineering, Virginia Commonwealth University, Richmond, VA, ²Chemistry, Virginia Commonwealth University, Richmond, VA.

184. Development of dendrimeric polymer particles for biomedical membrane applications. H. Gadhia¹, A. Williams¹, S. Roh¹, T. Nelson², O. D. Velev¹; ¹Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC, ²Air Force Research Laboratory, Wright-Patterson Air Force Base, OH.

185. Liquid-liquid phase separation systems for prebiotic compartmentalization. S. Choi, C. D. Keating; Department of Chemistry, Pennsylvania State University, State College, PA.

186. Solutal Marangoni spreading in the presence of pre-deposited insoluble surfactant monolayers. M. Sauleda; Carnegie Mellon University, Pittsburgh, PA.

187. Effect of dispersants on adhesion of bacteria on oil/water interfaces. N. K. Dewangan; ChBE, University of Houston, Houston, TX.

188. Patchy Interactions and Ordering in Concentrated Suspensions. S. Razavi¹, J. Glaser², S. Glotzer², M. Solomon²; ¹University of Oklahoma, Norman, OK, ²University of Michigan, Ann Arbor, MI.

189. Active colloidal motion by two different propulsion mechanisms studied at high particle concentrations. K. T. Saud, M. J. Solomon; University of Michigan, Ann Arbor, MI.


191. Quantification & characterization of iron-bearing colloids in abandoned mine drainage. N. Fretz¹, E. K. Herman², M. M. McGuire¹; ¹Department of Chemistry, Bucknell University, Lewisburg, PA, ²Department of Geology, Bucknell University, Lewisburg, PA.
192. Direct and local measure of patchy particle cap thickness. A. Rashidi¹, S. Razavi², A. Avishai³, C. L. Wirth¹; ¹Cleveland State University, Cleveland, OH, ²University of Oklahoma, Norman, OK, ³Swagelok Center of Surface Analysis and Microscopy, CWRU, Cleveland, OH.

193. Role of organic carbon in abandoned mine drainage colloids. K. N. Ambruso¹, E. K. Herman², M. M. McGuire¹; ¹Chemistry, Bucknell University, Lewisburg, PA, ²Geology, Bucknell University, Lewisburg, PA.

194. Reversible deposition of responsive colloids. T. A. Prileszky, E. M. Furst; Chemical and Biomolecular Engineering, University of Delaware, Newark, DE.

195. Thermal stability of Pickering emulsions stabilized by a mixture of oppositely charged particle and polyelectrolyte. S. SHAHID; Chemical Engineering Department, Indian Institute of Technology Madras, Chennai, INDIA.

196. Dynamics of Filamentous Phage in Polymer Solutions. M. W. Smith, R. Poling-Skutvik, R. Willson, J. Conrad; Chemical Engineering, University of Houston, HOUSTON, TX.


198. Pinch-off dynamics, printability and dripping-onto-substrate (DoS) rheometry of complex fluids. J. Dinic, L. N. Jimenez, V. Sharma; Univ of Illinois - Chicago, Univ of Illinois - Chicago, Chicago, IL.

199. Nanoparticle Synthesis via Bubbling Vapor Precursors in Bulk Liquids. D. Kang, S. Anand; Department of Mechanical & Industrial Engineering, University of Illinois at Chicago, Chicago, IL.


201. Directed assembly and reconfiguration of high-energy colloidal structures. J. Lee; Chemical Engineering, Louisiana State University, Baton Rouge, LA.

202. kT-scale interactions and colloidal stability between zwitterionic polymer coatings and biomaterials. M. G. Petroff¹, E. Garcia¹, J. Jumai'an¹, M. Herrera-Alonso², M. A. Bevan¹; ¹Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD, ²Materials Science and Engineering, Johns Hopkins University, Baltimore, MD.
203. Antibacterial nanocrystalline cellulose using natural antibacterial agents for wound dressing applications. M. Tavakolian, M. Okshevsky, T. van de Ven, N. Tufenkji; McGill University, Montreal, QC, CANADA.


205. Janus particles with varying amphiphilicity for hierarchical Pickering emulsions. Y. Lan, K. J. Stebe, D. Lee; Department of Chemical & Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA.

206. Continuous roll-to-roll manufacturing of surface wrinkles. X. A. Zhang, K. Stebe, S. Yang, D. Lee; Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA.

207. Impact of dispersion stability on asphaltenes in bulk and at oil-water interfaces. J. Ma, L. Walker; Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA.

208. Lyotropic liquid crystalline phases of a phytosterol ethoxylate in amide solvents. X. Yue, X. Chen, Q. Li, Z. Li; Key Laboratory of Colloid and Interface Chemistry, Shandong University, Jinan, CHINA, The Xinjiang Technical Institute of Physics & Chemistry, CAS, Urumqi, CHINA, Institute of High Energy Physics, CAS, Beijing, CHINA.

209. Connecting Structure and Rheology of Therapeutic Protein-Surfactant Complexes at the Air-Water Interface. Y. S. Tein, M. Zhang, Y. Liu, A. M. Woys, I. E. Zarraga, N. J. Wagner; Chemical and Biomedical Engineering, University of Delaware, Newark, DE, Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, MD, Department of Late Stage Pharmaceutical Development, Genentech Inc, San Francisco, CA.

210. Probing the electronic structure of small metal nanoparticles using Conduction Electron Spin Resonance. S. S. Cruz, A. Silakov, B. J. Lear; Chemistry, Pennsylvania State University, State College, PA.

211. Off flavor compound adsorption study of mucilage based beads. T. Peng, N. Alcantar, D. Stebbins; Chemical Engineering, University of South Florida, Tampa, FL.
212. Two-step nucleation of colloidal clathrate crystal driven by entropy. **S. Lee**, M. Engel, S. Glotzer, 48109; University of Michigan, Ann Arbor, MI.

213. Rheology of Colloidal Fumed Silica Nanoparticle Dispersions under High Shear. **E. Fakhrabadi**; University of Toledo, University Park, PA.

214. Surface-grafted mixed polymer brushes. **M. Li**; Penn State University, University Park, PA.

************************************

**Plenary Lecture 2**

*Tuesday, June 12, 2018, 8:30 AM - 9:30 AM*

*Location: Presidents Hall*

8:30 215. The colloidal glass transition, engineering entropic bonds, and inverse design of colloidal crystals. **S. Glotzer**; University of Michigan, Ann Arbor, MI.

************************************

**Active and Adaptive Matter**

*Tuesday, June 12, 2018, 10:00 AM - 12:00 PM*

*Location: Room 104*

10:00 216. KEYNOTE. Convective self-sustained motion in mixtures of chemically active and passive particles. O. Shklyaev, H. Shum, V. V. Yashin, **A. C. Balazs**; Chemical Engineering, University of Pittsburgh, Pittsburgh, PA.

10:40 217. Aggregation and fragmentation of active superparamagnetic colloidal chains. **U. M. Córdova-Figueroa**¹, R. DeLaCruz-Araujo¹, L. Rivera-Rivera²; ¹Department of Chemical Engineering, University of Puerto Rico - Mayaguez, Mayaguez, PR, ²Department of Chemical Engineering, University of Michigan, Ann Harbor, MI.

11:00 218. Emergence of traveling waves in linear arrays of electromechanical actuators. **S. Pandey**¹, Y. Dou¹, C. Cartier², O. Miller², K. Bishop¹; ¹Columbia
university, New York, NY, 2PennState, State college, PA.


11:40 220. Active atoms and interstitials in two-dimensional colloidal crystals. K. Dietrich1, G. Volpe2, M. Sulaiman3, D. Renggli1, I. Buttinoni3, L. Isa1; 1Department of Materials, ETH Zürich, Zürich, SWITZERLAND, 2University of Gothenburg, Göteborg, SWEDEN, 3University of Oxford, Oxford, UNITED KINGDOM.

Colloidal and Surface Forces

Tuesday, June 12, 2018, 10:00 AM - 12:00 PM
Location: Room 105

10:00 221. KEYNOTE. Interaction forces and nanotribology of surfaces modified with bioinspired polymer coatings. M. Ruths; Department of Chemistry, University of Massachusetts Lowell, Lowell, MA.

10:40 222. Evaluation of the cactus based-mucilage as an alternative natural dispersant to be incorporated in oil spill response strategies. F. Guo1, S. Thomas2, R. Toomey1, N. Alcantar1; 1Department of Chemical & Biomedical Engineering, University of South Florida, Tampa, FL, 2Department of Electrical Engineering, University of South Florida, Tampa, FL.

11:00 223. Mechanics at the nanoscale: Local stress calculations of biomolecular interfaces. J. M. Vanegas1, C. Winkeljohn1, A. Torres-Sanchez2, M. Arroyo2; 1Physics, University of Vermont, Burlington, VT, 2Universitat Politècnica de Catalunya-BarcelonaTech, Barcelona, SPAIN.

11:20 224. Wettability alteration of oil-wet carbonate minerals using low salinity-nonionic surfactant: A mechanistic study. M. Souayeh1, R. S. Al-Maamari1, M. Aoudia1, M. Karimi1, M. Hadji2; 1Sultan Qaboos University, Muscat, OMAN, 2Sonatrach, Algiers, ALGERIA.
Connecting the Dots in Industry

Tuesday, June 12, 2018, 10:00 AM - 12:00 PM
Location: Room 206

10:00 225. KEYNOTE. Connecting the Dots – Examples from Past and Present. M. Alger; Penn State University, University Park, PA.

10:40 226. KEYNOTE. Microfluidic particle factories: A tale of 2 startups spun out of the lab. P. S. Doyle; Chemical Engineering, MIT, Cambridge, MA.

11:20 227. KEYNOTE. From the spare bedroom to the board room: Growing a service company from the ground up. G. Braithwaite; Cambridge Polymer Group, Inc., Cambridge, MA.

11:40 228. KEYNOTE. To be determined. J. Adair; Penn State University, University Park, PA.

Directed Assembly of Molecules and Particles

Tuesday, June 12, 2018, 10:00 AM - 12:00 PM
Location: Room 208

10:00 229. KEYNOTE. Alkanes + Cavitands: Some-Assembly Required. H. Ashbaugh; Chemical and Biomolecular Engineering, Tulane University, New Orleans, LA.

10:40 230. Non-equilibrium close-packed block copolymer micelles. S. Lee, L. Chen; Rensselaer Polytechnic Institute, Troy, NY.

11:00 231. Nanoscale self-assembly of organic molecules using noncovalent monolayers on 2D materials as polyfunctional templates. S. Claridge; Chemistry, Purdue University, West Lafayette, IN.


11:40 233. Ionic liquid mediated self-aggregation of cationic gemini surfactant in solution. S. Mondal¹, A. Pan¹, A. Patra², R. K. Mitra², S. Ghosh¹; ¹Department of Chemistry, Jadavpur University, KOLKATA, INDIA, ²Department of Chemical, Biological & Macromolecular Sciences, S. N. Bose
Emulsions, Bubbles and Foams

Tuesday, June 12, 2018, 10:00 AM - 12:00 PM
Location: Room 107

10:00 234. KEYNOTE. Phase-change emulsions for use in photo-acoustic imaging and therapy. D. Li¹, Y. Lee¹, M. O’Donnell², L. D. Pozzo¹; ¹Chemical Engineering, University of Washington, Seattle, WA, ²Bioengineering, University of Washington, Seattle, WA.

10:40 235. Microbubble-generating hydrophobic porous nanoparticles as robust ultrasound contrast agents. N. T. Blum; Chemical and Biological Engineering, University of Colorado at Boulder, Boulder, CO.

11:00 236. Voltage-Sensitive Ultrasound Enhancing Agent: In Vivo and In Vitro Analysis. M. Cimorelli¹, B. Andrien¹, K. Barrett¹, B. Angel², A. Fafarman¹, A. Kohut³, S. Wrenn¹; ¹Chemical and Biological Engineering, Drexel University, Philadelphia, PA, ²Cardiology, Drexel University, Philadelphia, PA, ³Cardiology, University of Pennsylvania, Philadelphia, PA.

11:20 237. Thrombin-activatable nano- and microbubbles as potential ultrasound contrast agents for the detection of acute thrombosis. J. Lux, A. M. Armstrong, C. de Gracia Lux, W. Grozinger, R. F. Mattrey; Radiology, UT Southwestern Medical Center, Dallas, TX.

11:40 238. Effect of Temperature on Microbubble Elasticity. M. Borden, J. Lum, T. Murray; Mechanical Engineering, University of Colorado, Boulder, CO.

General Papers

Tuesday, June 12, 2018, 10:00 AM - 12:00 PM
Location: Room 204

10:00 239. KEYNOTE. Interaction of Proteins with Polyelectrolytes. M. Ballauff¹,²; ¹Soft Matter and Functional Materials, Helmholtz-Zentrum Berlin, Berlin, GERMANY, ²Dept. Physics, Humboldt University, Berlin, GERMANY.
10:40 240. Role of Anions in Adsorbate-induced Anchoring Transitions of Liquid Crystals on Surfaces with Discrete Cation Binding Sites. N. Bao, T. Szilvási, H. Yu, R. J. Twieg, M. Mavrikakis, N. L. Abbott; 1Department of Chemical and Biological Engineering, University of Wisconsin-Madison, Madison, WI, 2Department of Chemistry and Biochemistry, Kent State University, Kent, OH.


11:20 242. Electrostatically induced reorientation of cytochrome c on silica nanoparticles. J. Meissner, Y. Wu, W. A. Shelton, G. H. Findenegg, B. Bharti; 1Physical Chemistry, Technical University, Berlin, GERMANY, 2Cain Department of Chemical Engineering, Louisiana State University, Baton Rouge, LA.


Molecules and Particles at Fluid Interfaces

Tuesday, June 12, 2018, 10:00 AM - 12:00 PM
Location: Room 205

10:00 244. KEYNOTE. Deciphering the structure of peripheral membrane-bound proteins and their sensitivity to the membrane context for binding. K. C. Lee; Chemistry, The University of Chicago, Chicago, IL.

10:40 245. Repelling and ordering: How polymers affect protein adsorption. G. Gonella; Max Planck Institute for Polymer Research, Mainz, GERMANY.

11:00 246. The static and dynamic properties of dipeptide hydrogels on interfaces. F. Aviño, A. B. Matheson, D. J. Adams, C. Mounteux, P. S. Clegg; 1Physics and Astronomy, The University of Edinburgh, Edinburgh, UNITED KINGDOM, 2Chemistry, The University of Glasgow, Glasgow,
11:20  247. Connecting Structure and Rheology of Therapeutic Protein-Surfactant Complexes at the Air-Water Interface. Y. S. Tein¹, M. Zhang¹², Y. Liu¹², A. M. Woys³, I. E. Zarraga³, N. J. Wagner¹; ¹Chemical and Biomolecular Engineering, University of Delaware, Newark, DE, ²Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, MD, ³Department of Late Stage Pharmaceutical Development, Genentech Inc, San Francisco, CA.

11:40  248. Melting of the dipalmitoylphosphatidylcholine monolayer. L. Xu, Y. Y. Zuo; University of Hawaii at Manoa, Honolulu, HI.

Rheology

Tuesday, June 12, 2018, 10:00 AM - 12:00 PM
Location: Room 207

10:00  249. KEYNOTE. The curious dynamics and thermodynamics of soft particle glasses. R. T. Bonnecaze; Department of Chemical Engineering, The University of Texas at Austin, Austin, TX.

10:40  250. Roughness-dependent tribology effects on discontinuous shear thickening. C. Hsu, S. N. Ramakrishna, M. Zanini, N. D. Spencer, L. Isa; Department of Materials, ETH Zurich, Zurich, SWITZERLAND.

11:00  251. Rheology of non-Brownian particles suspended in a shear thickening matrix. Y. Madraki¹, G. Ovarlez², S. Hormozi¹; ¹Mechanical Engineering, Ohio University, Athens, OH, ²University of Bordeaux, CNRS, Solvay, LOF, Pessac, FRANCE.

11:20  252. Investigation of the shear-induced microstructure of carbon black suspensions for energy storage applications. J. B. Hipp¹, J. J. Richards², N. J. Wagner¹; ¹University of Delaware, Newark, DE, ²NIST Center for Neutron Research, Gaithersburg, MD.

11:40  253. Modeling thixotropy, viscoelasticity, and slip layer formation in human blood rheology. J. S. Horner, A. N. Beris, N. J. Wagner; Chemical & Biomolecular Engineering, University of Delaware, Newark, DE.
Wetting and Adhesion

Tuesday, June 12, 2018, 10:00 AM - 12:00 PM
Location: Room 106

10:00 254. KEYNOTE. Pattern Formation in Soft Elastic Films and its Relevance to Adhesion. **M. Chaudhury**, Lehigh University, Bethlehem, PA.

10:40 255. Correlating Stickiness to Pinch-off Dynamics and Extensional Rheology Response of Polymer Solutions. **J. Dinic**, L. N. Jimenez, V. Sharma; Chemical Engineering, University of Illinois at Chicago, Chicago, IL.

11:00 256. Strain-dependent surface stress in soft adhesion. **K. Jensen**, Williams College, University Park, PA.

11:20 257. Impact of morphological changes on adhesion hysteresis of polystyrene films. **G. D. Degen**, T. R. Cristiani, N. Cadirov, J. N. Israelachvili; Chemical Engineering, University of California, Santa Barbara, Santa Barbara, CA.

11:40 258. Adhesion and debonding of a pressure sensitive adhesive under water. **J. Frechette**, Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD.

************************************

Active and Adaptive Matter

Tuesday, June 12, 2018, 1:20 PM - 3:00 PM
Location: Room 104

1:20 PM 259. KEYNOTE. Light powered artificial microswimmer: towards better controllability and biocompatibility. **J. Tang**, X. Zhan, J. Wang, J. Zheng, Z. Xiong; Chemistry, University of Hong Kong, Hong Kong, HONG KONG.

2:00 PM 260. Light powered nanoheaters for fluid pumping and assembly. **B. M. Tansi**, M. Peris, A. Sen; Chemistry, The Pennsylvania State University, State College, PA.
2:20 PM 261. Light-driven microswimmers: Pushing, pulling and shaping materials from within. H. Vutukuri; ETH, Zurich, SWITZERLAND.

2:40 PM 262. Binary and Mixed Brushes for Adaptive Surfaces. C. W. Pester1, M. Li1, K. M. Mattson2, D. Lunn3, G. Su4, M. Brady4; 1The Pennsylvania State University, University Park, PA, 2The Dow Chemical Company, Midland, MI, 3University of Oxford, Oxford, UNITED KINGDOM, 4Lawrence Berkeley National Laboratory, Berkeley, CA.

Colloidal and Surface Forces

Tuesday, June 12, 2018, 1:20 PM - 3:00 PM
Location: Room 105

1:20 PM 263. Ionic liquids and dilute electrolytes: the surprising connection. M. A. Gebbie1, J. N. Israelachvili2; 1Materials Science & Engineering, Stanford University, Stanford, CA, 2Chemical Engineering, University of California, Santa Barbara, Santa Barbara, CA.

1:40 PM 264. Nanorheology, Dynamics, and Interactions of Confined Ionic Liquids. Y. Zhang, Y. MIN; Polymer Engineering, University of Akron, Akron, OH.

2:00 PM 265. Diffusing probe measurements of colloidal forces in polymer hydrogels. S. Shabaniverki, J. Juarez; Mechanical Engineering, Iowa State University, Ames, IA.

2:20 PM 266. Molecular insight into the carboxylic acid - alkali metal cations interactions: reversed affinity and ion pair formation. A. P. Sthoer1, J. Hladilková2, M. Lund2, E. C. Tyrode1; 1Surface and Corrosion, KTH Royal Institut of Technology, stockholm, SWEDEN, 2Theoretical Chemistry, Lund University, Lund, SWEDEN.

2:40 PM 267. The backbone's role in mussel-inspired peptide and peptoid adhesion. T. R. Cristiani1, W. Wonderly2, G. Degen3, K. Cunha e Silva2, J. Shea2, H. Waite4, J. Israelachvili3; 1Materials, University of California Santa Barbara, Santa Barbara, CA, 2Chemistry, University of California Santa Barbara, Santa Barbara, CA, 3Chemical Engineering, University of California Santa Barbara, Santa Barbara, CA, 4Molecular, Cellular, and Developmental Biology, University of California Santa Barbara, Santa Barbara, CA.
Connecting the Dots in Industry

Tuesday, June 12, 2018, 1:20 PM - 3:00 PM
Location: Room 206

1:20 PM 268. KEYNOTE. Scaling up innovation throughput for Chemical R&D. D. Velegol; Chemical Engineering, Penn State University, University Park, PA.

2:00 PM 269. KEYNOTE. Achieving broader impacts of university research through a start-up. N. Abbott; Department of Chemical and Biological Engineering, University of Wisconsin-Madison, Madison, WI.

2:20 PM 270. KEYNOTE. To be determined. A. Agarwal; Imbed Biosciences, University Park, PA.

2:40 PM 271. KEYNOTE. Translating academic research and innovation to practical nanomanufacturing, or: How do you find the (nano)nails for your science hammer? O. D. Velev; Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC.

Directed Assembly of Molecules and Particles

Tuesday, June 12, 2018, 1:20 PM - 3:00 PM
Location: Room 208

1:20 PM 272. Phase behavior and salt partitioning in polyelectrolyte complex coacervates. S. Srivastava¹, L. Li², M. Andreev², A. Marciel², J. de Pablo², M. Tirrell²; ¹Chemical and Biomolecular Engineering, University of California, Los Angeles, Los Angeles, CA, ²IME, University of Chicago, Chicago, IL.

1:40 PM 273. Structure of polyelectrolyte complex coacervates. A. B. Marciel¹, S. Srivastava², M. V. Tirrell¹; ¹IME, The University of Chicago, Chicago, IL, ²Chemical and Biomolecular Engineering, University of California, Los Angeles, Los Angeles, CA.

2:00 PM 274. Coexisting coacervate systems as model non-membranous organelles. G. Mountain, C. Keating; Chemistry, The Pennsylvania State University, University Park, PA.
2:20 PM  275. Electrohydrodynamic flow induced assembly of plasmonic nanoparticles in oscillatory electric fields. **T. J. Woehl**, A. Ferrick, M. Wang; Chemical and Biomolecular Engineering, University of Maryland, College Park, College Park, MD.

2:40 PM  276. Reconfigurable self-assembly: Structural colloids of nematic liquid crystal polymer and elastomer. **W. Wei**¹, Y. Xia², S. Ettinger¹, S. Yang², A. G. Yodh¹; ¹University of Pennsylvania, Department of Physics and Astronomy & LRSM, Philadelphia, PA, ²University of Pennsylvania, Department of Materials Science and Engineering, Philadelphia, PA.

---

**Emulsions, Bubbles and Foams**

*Tuesday, June 12, 2018, 1:20 PM - 3:00 PM*

**Location:** Room 107

1:20 PM  277. Ultrasound-induced interactions between bilayers and bubbles. **M. Walsh**¹, S. Alborzi², R. Tikekar², N. Nitin³, S. Wrenn¹; ¹Chemical and Biological Engineering, Drexel University, Philadelphia, PA, ²Nutrition and Food Science, University of Maryland, College Park, MD, ³Food Science and Technology, University of California, Davis, Davis, CA.

1:40 PM  278. On the stability of bulk nano bubbles. **A. J. Jadhav**, M. Barigou; School of Chemical Engineering, University of Birmingham, Birmingham, UNITED KINGDOM.

2:00 PM  279. Perfluorocarbon nanoscale emulsions: New formulation and applications as activatable ultrasound contrast agents. **C. de Gracia Lux**, J. Lux, A. M. Armstrong, W. Grozinger, R. F. Mattrey; Radiology, UT Southwestern Medical Center, Dallas, TX.

2:20 PM  280. An Ouzo Method for Preparing Phase-Change Contrast Agents. **D. Li**, S. Schneewind, L. Pozzo; Chemical Engineering, University of Washington, Seattle, WA.

2:40 PM  281. Effects of Polyelectrolytes Content in Complex Coacervates over Interactions with Vesicles and Vesicle Assemblies and Partitioning of Biomolecules. **F. Pir Cakmak**, A. T. Grigas, C. D. Keating; Chemistry, Penn State, University Park, PA.
General Papers

Tuesday, June 12, 2018, 1:20 PM - 3:00 PM
Location: Room 204

1:20 PM 282. Polymer dynamics at the solid-aqueous interface as a function of surface coverage. G. Morrin, D. Schwartz; Chemical & Biological Engineering, University of Colorado-Boulder, Boulder, CO.

1:40 PM 283. Probing mixtures of lipids at the air-water interface using reflectometry. N. Elstone¹, K. J. Edler², T. Arnold³; ¹Centre for Sustainable Chemical Technologies, University of Bath, Bath, UNITED KINGDOM, ²Chemistry, University of Bath, Bath, UNITED KINGDOM, ³European Spallation Source, Lund, SWEDEN.

2:00 PM 284. Understanding the effects of sample preparation choices on methacrylate-based polymer thin films. A. Kruse, N. Adhikari, U. Premadasa, K. A. Cimatu; Chemistry and Biochemistry, Ohio University, Athens, OH.

2:20 PM 285. Mechanochemistry of adsorbed molecules at tribological interfaces. X. He, S. Kim; Chemical engineering, Pennsylvania State University, State College, PA.

2:40 PM 286. Complex Structured Molecules Probed at Different Interfaces. N. Adhikari¹, U. Premadasa¹, M. Khan¹, U. Erasquin¹, J. Nonkumwong¹², K. A. Cimatu¹; ¹Chemistry and Biochemistry, Ohio University, Athens, OH, ²Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai, THAILAND.

Molecules and Particles at Fluid Interfaces

Tuesday, June 12, 2018, 1:20 PM - 3:00 PM
Location: Room 205

1:20 PM 287. Capillary Forces on a Nanoparticle at a Liquid-Vapor Interface: Analytical Theory, Numerical Solution, and Molecular Modeling. S. CHENG, Y. TANG; Physics, Virginia Tech, Blacksburg, VA.

1:40 PM 288. Binding of lignin nanoparticles at oil-water interface: Ecofriendly approach to oil spill clean up.
2:00 PM 289. Effect of Hydrodynamic Interaction on the Pairwise Dielectrophoretic Attraction of Colloids Straddling a Fluid Interface. S. das1, J. Koplik2, C. Maldarelli3, P. Somasundaran1; 1Langmuir Center of Colloids and Interfaces, Columbia University, New York, NY, 2Levich Institute and Department of Physics, City College of The City University of New York, New York, NY, 3Levich Institute and Department of Chemical Engineering, City College of The City University of New York, New York, NY.

2:20 PM 290. Controlling nanoparticle adsorption and surface pressure at the oil-water interface via competitive adsorption. X. Hua, M. Bevan, J. Frechette; Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD.

2:40 PM 291. Interaction between nearly hard sphere colloidal spheres at an Oil Water interface. I. Muntz1, J. H. Thijsse1, D. Marenduzzo1, F. Waggett2, P. Bartlett2; 1School of Physics and Astronomy, University of Edinburgh, Edinburgh, UNITED KINGDOM, 2School of Chemistry, University of Bristol, Bristol, UNITED KINGDOM.

Rheology

Tuesday, June 12, 2018, 1:20 PM - 3:00 PM
Location: Room 207

1:20 PM 292. Microrheology and kinematics of a drying paint. S. M. Varghese1, R. M. Rock2, J. F. Gilchrist3, C. L. Wirth1; 1Chemical and Biomedical Engineering, Cleveland State University, Cleveland, OH, 2PPG Industries, Allison Park, PA, 3Chemical and Biomolecular Engineering, Lehigh University, Bethlehem, PA.

1:40 PM 293. Branching and alignment in reverse worm-like micelles studied with simultaneous dielectric spectroscopy and RheoSANS. J. Riley1, J. Richards1, N. Wagner2, P. Butler1; 1Center for Neutron Research (NCNR), National Institute of Standards and Technology, Gaithersburg, MD, 2Chemical and Biomolecular Engineering, University of Delaware, Newark, DE.
2:00 PM 294. Effect of confinement on flow profiles of shear banding fluids. P. Salipante, V. Dharmaraj, S. Hudson; Polymers and Complex Fluids Group, National Institute of Standards and Technology, Gaithersburg, MD.

2:20 PM 295. Shear-induced structural transitions and vesicle formation of biphasic microemulsions. J. S. Weston¹, K. Weigandt², S. Hudson³; ¹Georgetown University/NIST, Gaithersburg, MD, ²NIST Center for Neutron Research, Gaithersburg, MD, ³NIST Materials Science and Engineering Division, Gaithersburg, MD.

2:40 PM 296. Monitoring evolution of micellar structure and dynamics with active release. S. Amin¹, D. Guadino², M. Reufer², F. Scheffold³; ¹Chemical Engineering Department, Manhattan College, Riverdale, NY, ²LS Instruments, Fribourg, SWITZERLAND, ³Department of Physics, University of Fribourg, Fribourg, SWITZERLAND.

---

Wetting and Adhesion

Tuesday, June 12, 2018, 1:20 PM - 3:00 PM
Location: Room 106


1:40 PM 298. Dynamics of viscous liquids impinging on superamphiphobic macrotextures. A. Raiyan, T. S. Mclaughlin, R. K. Annavarapu, H. Sojoudi; Mechanical, Industrial and Manufacturing Engineering, University of Toledo, Toledo, OH.

2:00 PM 299. Tuning underwater adhesion with cation-π interactions. M. A. Gebbie¹, J. N. Isrealachvili², J. Waite³; ¹Materials Science & Engineering, Stanford University, Stanford, CA, ²Chemical Engineering, University of California, Santa Barbara, Santa Barbara, CA, ³Molecular, Cellular, and Developmental Biology, University of California, Santa Barbara, Santa Barbara, CA.

2:20 PM 300. The role of DOPA in interfacial adhesion of mussel inspired adhesives. S. Kaur, A. Narayanan, A. Joy, A. Dhinojwala; Polymer Science, The University of Akron, Akron, OH.
2:40 PM 301. Proximal charge changes how hydrophobic adhesion depends on non-polar domains size. H. Yeon, C. Wang, S. H. Gellman, N. L. Abbott; University of Wisconsin-Madison, Madison, WI.

*******************************************************

**Active and Adaptive Matter**

*Tuesday, June 12, 2018, 3:20 PM - 5:00 PM*

*Location: Room 104*

3:20 PM 302. The effect of topography on bacterial surface motility. W. Ducker¹, Y. Chang¹, E. Weeks²; ¹Chemical Engineering, Virginia Tech, Blacksburg, VA, ²Physics, Emory University, Atlanta, GA.

3:40 PM 303. Enzyme chemotaxis: Comparison between theory and experiment. F. MOHAJERANI¹, X. Zhao², A. Somasundar¹, S. Ghosh², A. Sen², D. Velegol¹; ¹Chemical Engineering, Pennsylvania State University, State College, PA, ²Chemistry, Pennsylvania State University, State College, PA.

4:00 PM 304. Controlling the direction of motion of enzyme-coated liposomes. A. Somasundar¹, F. Mohajerani¹, S. Ghosh², D. Velegol¹, A. Sen²; ¹Chemical Engineering, Penn State University, State College, PA, ²Chemistry, Penn State University, State College, PA.

4:20 PM 305. Impulsive Enzymes: A New Force in Mechanobiology. X. Zhao, A. Sen; The Pennsylvania State University, State College, PA.

4:40 PM 306. Thermo- and pH-responsive thin films made from the mucilage of *Opuntia ficus-indica*cactus. Z. Veisi, N. Alcantar, R. Toomey; University of South Florida, Tampa, FL.

**Connecting the Dots in Industry**

*Tuesday, June 12, 2018, 3:20 PM - 5:00 PM*

*Location: Room 206*

3:20 PM 307. KEYNOTE. From Academics to Applications: How to interact with industry and startups. D. Weitz; Harvard University, Cambridge, MA.
4:00 PM 308. Panel on Starting Up & Spinning Off. D. S. Miller; Core R&D, Formulation Science, The Dow Chemical Company, Collegeville, PA.

Directed Assembly of Molecules and Particles

Tuesday, June 12, 2018, 3:20 PM - 5:00 PM
Location: Room 208

3:20 PM 309. Controlling Stratification of Polydisperse Nanoparticles in Drying Suspensions Using Temperature Gradients. S. CHENG1, Y. TANG1, G. S. GREST2; 1Physics, Virginia Tech, Blacksburg, VA, 2Sandia National Laboratories, Albuquerque, NM.


4:00 PM 311. Whiskey webs: self-assembled micro-webs from evaporated drops as unique identifiers of bourbon whiskey. S. Williams1, S. Islam2, O. Velev2; 1Mechanical Engineering, University of Louisville, Louisville, KY, 2Chemical Engineering, North Carolina State University, Raleigh, NC.


4:40 PM 313. Bi-modal polyolefin dispersion for hydrophobic coatings with high water vapor transport. D. Malotky1, M. Crimmins1, J. Romick2; 1Core R&D Formulation Science, The Dow Chemical Company, Midland, MI, 2Dow Coating Materials, Ret., The Dow Chemical Company, Midland, MI.

Emulsions, Bubbles and Foams

Tuesday, June 12, 2018, 3:20 PM - 5:00 PM
Location: Room 107

3:20 PM 314. Pickering Nanoemulsions via Self-Assembly of Particles on Condensing Droplets. D. Kang, H. Bararnia, S. Anand; Department of
3:00 PM 316. Effect of increasing concentrations of Sodium Caseinate on the interfacial rheological properties of foams obtained from emulsions of avocado oils *Persea americana*. **S. Cabrera, Sr.**, A. Sandoval1, F. Forero1; 1SENNOVA, SENA, Fusagasugá, COLOMBIA, 2Universidad del Tolima, Ibagué, COLOMBIA, 3Universidad de Antioquia, Medellín, COLOMBIA.

4:20 PM 317. Segregation and margination in dilute polydisperse emulsions. **S. M. Hashmi**, R. Reboucas, M. Loewenberg; Chemical & Environmental Engineering, Yale University, New Haven, CT.

4:40 PM 318. Aqueous emulsion droplets as artificial mineralization vesicles (AMVs): Structural, compositional and nanomechanical characterization of minerals formed in AMVs. **N. Pulati**, C. Keating, A. Rowland; Chemistry, Penn State University, University Park, PA.

**General Papers**

*Tuesday, June 12, 2018, 3:20 PM - 5:00 PM*
*Location: Room 204*

3:20 PM 319. Molecular insight into the carboxylic acid - alkali metal cations interactions: reversed affinity and ion pair formation. **A. P. Sthoer**1, J. Hladilková2, E. Tyrode1; 1Surface and Corrosion, KTH Royal Institute of Technology, Stockholm, SWEDEN, 2Theoretical Chemistry, Lund University, Lund, SWEDEN.


4:00 PM 321. The effect of hexadecanol and trace cholesterol on model monolayers - phase behavior, morphology, and shear viscosity. **C. Valtierrez-Gaytan**1, S. Patton1, I. Williams2, M. Kohler1, T. Squires2, J. Zasadzinski1; 1Chemical Engineering and Materials Science, University of Minnesota,
Minneapolis, MN, 2Chemical Engineering, University of California Santa Barbara, Santa Barbara, CA.


Molecules and Particles at Fluid Interfaces

Tuesday, June 12, 2018, 3:20 PM - 5:00 PM
Location: Room 205

3:20 PM 324. Particle collection by emulsion drops with permeable interfaces. R. H. Davis; Chemical and Biological Engineering, University of Colorado, Boulder, CO.

3:40 PM 325. Formation mechanisms and structural evolution of STRIPS bijels. S. Boakye-Ansah; Chemical Engineering, Rowan University, Glassboro, NJ.

4:00 PM 326. Effects of diblock carbon nanotubes on the adhesion between immiscible polymers. F. Ide Seyni; Chemical Engineering, University of Oklahoma, Norman, OK.


4:40 PM 328. Separation of functionalized nanoparticles on polymer-grafted porous substrates. K. P. Santo1, A. Vishnyakov1, Y. Brun2, A. V. Neimark1; 1Chemical and Biochemical Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ, 2DuPont Central Research & Development, Wilmington, DE.

Rheology

Tuesday, June 12, 2018, 3:20 PM - 5:00 PM
Location: Room 207

3:20 PM 329. Microfluidic rheology of viscoelastic fluids using digital holography microscopy. S. Gupta, S. A. Vanapalli; Chemical Engineering, Texas Tech University, Lubbock, TX.
3:40 PM 330. Morphological and rheological properties of metal-complexed polymer solutions studied using a dissipative particle dynamics model. K. P. Santo, A. Vishnyakov, R. Kumar, A. V. Neimark; Chemical and Biochemical Engineering, Rutgers, The state University of New Jersey, Piscataway, NJ.

4:00 PM 331. High pressure linear viscoelasticity measurements of polymer solutions and gels. K. A. Dennis¹, Y. Gao², A. Phatak³, E. M. Furst¹; ¹Chemical and Biomolecular Engineering, University of Delaware, Newark, DE, ²Schlumberger, Sugar Land, TX.

4:20 PM 332. Confinement-induced slowdown of unentangled polymer during capillary rise infiltration in nanoparticle packing. J. Hor¹, H. Wang², Z. Fakhraai², D. Lee¹; ¹Department of Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA, ²Department of Chemistry, University of Pennsylvania, Philadelphia, PA.

4:40 PM 333. Intermolecular Association in the in-situ formed physically cross-linked poly (vinyl alcohol) cryogels. N. JOSHI, Y. M. Joshi; CHEMICAL ENGINEERING, INDIAN INSTITUTE OF TECHNOLOGY, kanpur, INDIA.

Wetting and Adhesion

Tuesday, June 12, 2018, 3:20 PM - 5:00 PM
Location: Room 106

3:20 PM 334. BREATH FIGURES DYNAMICS ON SMOOTH POLYCARBONATE SURFACES: EFFECTS OF RELATIVE HUMIDITY AND REPELLENT WATER DROPLET. S. VALETTE, N. PIONNIER, E. CONTRAIRES, S. BENAYOUN; Ecole Centrale de Lyon, Université de Lyon, Lyon, FRANCE.

3:40 PM 335. The effect of subphase depth on surfactant-driven Marangoni flow. S. V. Iasella¹,², R. D. Tilton¹,²,³, T. M. Przybycien¹,²,³, S. Garoff²,⁴, T. E. Corcoran⁵; ¹Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, ²Center for Complex Fluids Engineering, Carnegie Mellon University, Pittsburgh, PA, ³Department of Biomedical Engineering, Carnegie Mellon University, Pittsburgh, PA, ⁴Department of Physics, Carnegie Mellon University, Pittsburgh, PA,
5Department of Medicine, University of Pittsburgh, Pittsburgh, PA.

4:00 PM 336. Mapping the thickness of a lubricant film on a randomly rough surface. S. Peppou-Chapman, C. Neto; School of Chemistry, The University of Sydney, Sydney, AUSTRALIA.


4:40 PM 338. Inline process control of wettability by means of contact angle measurement on moving surfaces. R. Sanedrin1, M. Jin2, D. Frese3, N. Hearn4, T. Willers2; 1KRUSS USA, Matthews, NC, 2KRUSS GmbH, Hamburg, GERMANY, 3KRUSS USA, Hamburg, GERMANY, 4KRUSS France, Villebon-sur-Yvette, FRANCE.

*****************************************************************************

Unilever Award Lecture

Tuesday, June 12, 2018, 5:15 PM - 6:15 PM
Location: Presidents Hall

5:15 PM 339. PLENARY. Direct nanoscopic imaging: from crystallizing of nanoparticles to crumpling of polymer films. Q. Chen; Materials Science and Engineering, University of Illinois, Urbana, IL.

ABSTRACT. The research in my group focuses on understanding the organization of complex materials and biological systems in space and time. In this talk, I will discuss two types of systems imaged using electron microscopy-based methods. The first type of systems concerns crystallization kinetics of a series of nanoparticle superlattices formed in solution. We monitor, for the first time, the initial nucleation of crystallites on the fly in real-time and real-space using low-dose liquid-phase transmission electron microscopy. Single-particle tracking, statistical mechanics-based analysis and Monte Carlo simulation reveal unexpected crystallization kinetics due to inherent many-body coupling and discreteness of building blocks at the nanoscale. In the second system, we investigate the crumpling of a polymer filtration membrane used for water desalination. Their
nanoscopic three-dimensional morphology has intricate indications on their performances, particularly solvent permeation and solute retention. Both systems serve to achieve our common goal of deciphering fundamental rules of organization from “seeing is believing”.

Victor K. LaMer Award Lecture

Wednesday, June 13, 2018, 8:30 AM - 9:30 AM
Location: Presidents Hall

8:30 340. PLENARY. Engineered colloidal nanostructures for carrier and photon managements in solar energy conversion. K. Wu; Chinese Academy of Sciences, University Park, CHINA.

ABSTRACT. The nature of solar energy conversion is light-matter interaction. High conversion efficiencies can be achieved by managing solar photons in the sunlight and/or managing charge carriers in the matter. The optical and electronic properties of colloidal nanostructures can be controllably engineered using simple-yet-versatile synthesis, enabling an ideal platform for exploring the physical principles of photon and carrier managements. In this talk, I will cover our recent progress on both aspects. I will first introduce our efforts of carrier management using various colloidal semiconductor-semiconductor and semiconductor-metal nano heterostructures, with the general goal of facilitating charge separation and suppressing charge recombination. Efficient (near unity yield) and long-lived (microsecond timescale) charge separations have indeed been achieved through rational design of donor-acceptor-catalyst like heterostructures. In the second part, I will introduce the use of colloidal nanostructures in luminescent solar concentrators for advanced photon management. Specially-designed colloidal core/shell or doped nanocrystals can absorb solar photons, efficiently emit luminescence photons and guide them to the edges of a planar concentrator. This can potentially enhance the efficiencies of edge-attached photovoltaic (PV) cells, and meanwhile, decrease the cost of modern PV devices. In parallel with introducing the photon and carrier management concepts, I will also discuss the underpinning fundamental physics, such as light absorption and emission, charge transfer, and energy transfer, studied by a variety of steady-state and ultrafast time-resolved spectroscopic techniques.
Colloidal Nanoparticle Synthesis and Characterization

Wednesday, June 13, 2018, 10:00 AM - 12:00 PM
Location: Room 104

10:00 341. KEYNOTE. Atomic Electron Tomography: Adding a New Dimension to See Single Atoms in Materials. J. Miao; UCLA, Los Angeles, CA.

10:40 342. KEYNOTE. Spatial Mapping of Surface-Mediated Nanocrystal Transformations. M. R. Jones; Chemistry, Rice University, Houston, TX.

11:20 343. Analytical ultracentrifugation determination of alkane packing density inside single-wall carbon nanotubes. J. Fagan; Materials Science and Engineering, National Institute of Standards and Technology, Gaithersburg, MD.

11:40 344. Properties and applications of hairy nanocellulose. T. van de Ven, Sr.; Chemistry, McGill University, Montreal, QC, CANADA.

Connecting the Dots in Industry

Wednesday, June 13, 2018, 10:00 AM - 12:00 PM
Location: Room 206

10:00 345. KEYNOTE. Soft materials in industry: Designing delivery systems for low molecular weight payloads. P. Erni; Corporate Research Division, Firmenich SA, Meyrin - Geneva, SWITZERLAND.


11:00 347. KEYNOTE. To be determined. J. Ferreira; Estee Lauder Company, University Park, PA.

11:20 348. KEYNOTE. A Beauty Products Journey from Lab to Shelf: Lessons from Formulation to Scale-Up. A. S. Zahr; R&D, Revision Skincare, Irving, TX.
Directed Assembly of Molecules and Particles

Wednesday, June 13, 2018, 10:00 AM - 12:00 PM
Location: Room 208

10:00 349. Self-assembly of particle brush materials. J. Lee¹, Z. Wang², T. Deng³, R. F. Davis¹, K. Matyjaszewski², M. R. Bockstaller¹; ¹Department of materials science and engineering, Carnegie Mellon University, PITTSBURGH, PA, ²Department of chemistry, Carnegie Mellon University, PITTSBURGH, PA.

10:20 350. Directional growth of a cubic superlattice assembled from nanoparticles. B. Luo¹, Z. Ou¹, Z. Wang², Q. Chen¹; ¹Materials Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, ²Northwestern University, Evanston, IL.

10:40 351. Colloids and their defect structures near wavy walls. Y. Luo¹, D. A. Beller², F. Serra³, K. J. Stebe¹; ¹Department of Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA, ²School of Engineering, Brown University, Providence, RI, ³Department Physics and Astronomy, Johns Hopkins University, Baltimore, MD.

11:00 352. Tunable assembly of gold nanorods in semidilute polymer solutions. R. Poling-Skutvik, R. Krishnamoorti, J. C. Conrad; Chemical and Biomolecular Engineering, University of Houston, Houston, TX.

11:20 353. Nonclassical Crystallization of a Nanoparticle Superlattice. Z. Ou¹, Z. Wang², E. Luijten², Q. Chen¹; ¹Materials Science and Engineering, Univ of Illinois - Urbana, Urbana, IL, ²Materials Science and Engineering, Northwestern University, Evanston, IL.

Electrokinetics and Microfluidics

Wednesday, June 13, 2018, 10:00 AM - 12:00 PM
Location: Room 105

10:00 359. KEYNOTE. Order and Chaos*: Collective Behavior of Crowded Drops in Microfluidic Systems. S. K. Tang; Mechanical Engineering, Stanford University, Stanford, CA.
10:40 355. Dispersion in steady two-dimensional flows through a parallel-plate channel. H. C. Chu¹, S. Garoff², T. M. Przybycien³, R. D. Tilton³, A. S. Khair¹; ¹Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, ²Department of Physics, Carnegie Mellon University, Pittsburgh, PA, ³Department of Chemical Engineering and Department of Biomedical Engineering, Carnegie Mellon University, Pittsburgh, PA.

11:00 356. Solute gradients induce density driven flows in microfluidic systems. Y. Gu, V. Hegde, K. J. Bishop; Chemical Engineering, Columbia University, New York, NY.

11:20 357. Hydrodynamic mobility and rupture of vesicles in microfluidic channels. S. Ahmmed, S. Vanapalli; Chemical Engineering, Texas Tech University, Lubbock, TX.

11:40 358. Electric fields, microfluidics, and protein crystallography. S. L. Perry; Chemical Engineering, University of Massachusetts Amherst, Amherst, MA.

Emulsions, Bubbles and Foams

Wednesday, June 13, 2018, 10:00 AM - 12:00 PM
Location: Room 107

10:00 360. Foamability and foam stability of aqueous sodium naphthenate solutions. V. Sharma, C. Ochoa, W. Yang, S. Yilixiati, Y. Zhang; Chemical Engineering, University of Illinois at Chicago, Chicago, IL.

10:20 361. Influence of Salt on Supramolecular Oscillatory Structural Forces and Stratification in Micellar Foam Films. S. Yilixiati, R. Rafiq, Y. Zhang, V. Sharma; Chemical Engineering, University of Illinois at Chicago, Chicago, IL.

10:40 362. A simple unifying relationship for interfacial properties of alkyl-polyoxide surfactants. Z. Hinton, N. Alvarez; Chemical and Biological Engineering, Drexel University, Philadelphia, PA.

11:00 363. Instability of Bulk Dielectric Liquid under Unipolar Charge Induced Atmospheric Air Corona. M. Haque¹, H. Sojoudi¹, H. Marwan², M. Shahbaz²; ¹Mechanical, University of Toledo, Toledo, OH, ²Electrical, University of Toledo, Toledo, OH.
Energy Systems

Wednesday, June 13, 2018, 10:00 AM - 12:00 PM
Location: Room 106

10:00 365. KEYNOTE. Chemical Reactions on Bimetal Catalysts Revealed with Ambient Pressure Surface Techniques and Hot Electron Detection. J. Y. Park; KAIST/IBS, Daejeon, KOREA, REPUBLIC OF.

10:40 366. Composite Electrolytes from Cold Sintering for Lithium Metal Batteries. W. LEE¹, C. Randall², E. Gomez¹; ¹Chemical Engineering, Penn State Univ., University Park, PA, ²Materials Science and Engineering, Penn State Univ., University Park, PA.

11:00 367. CO₂ oxidation from Mo₂CTₓ (MXene) to molybdenum oxide/carbon composites for lithium ion battery anode materials. J. Park¹, A. Byeon¹, C. Hatter², C. Ahn², Y. Gogotsi², J. Lee¹; ¹Department of Chemical and Biomolecular Engineering, KAIST, Daejeon, KOREA, REPUBLIC OF, ²Department of Materials Science and Engineering, Drexel University, Philadelphia, PA, ³National Nanofab Center (NNFC), Daejeon, KOREA, REPUBLIC OF.


General Papers

Wednesday, June 13, 2018, 10:00 AM - 12:00 PM
Location: Room 204

10:00 370. Using Stable Close-Packed Vesicular Dispersions (CPVDs) of a Cationic Surfactant in Aqueous Salt Solutions for Stabilizing Suspensions of Dense Particles Against Sedimentation. A. Hsieh, D. Corti, E. Franses; School of Chemical Engineering, Purdue University, West Lafayette, IN.

10:20 371. Aqueous nonaqueous hybrid bitumen extraction process: a pilot study. F. Lin, Y. Xu; Natural Resources Canada, Devon, AB, CANADA.
10:40  372. Waterflooding of Surfactant Solutions in a Porous Media Micromodel. **H. Yeh, J. J. Juarez; Mechanical Engineering, Iowa State University, Ames, IA.**

11:00  373. The Shape and Dynamics of Deformations of Viscoelastic Fluids by Water Drops. **D. Seo 1,2, A. M. Schrader 3, S. Chen 1, S. Page 3, P. H. Koenig 3, Y. Gizaw 4, J. N. Israelachvili 1; 1Chemical Engineering, University of California, Santa Barbara, Santa Barbara, CA, 2Chemical Engineering, Brigham Young University, Provo, UT, 3Modeling and Simulation/Computational Chemistry, The Procter & Gamble Co., West Chester, OH, 4Winton Hill Business Center, The Procter & Gamble Co., Cincinnati, OH.**

11:20  374. Smart soaps: Stimulus responsive soap-hydrogel bead composites for controlled dissolution and release of actives. **B. Thompson 1, M. Rutkevicius 2, T. Horozov 2, S. D. Stoyanov 3, V. N. Paunov 2; 1Chemical and Biomolecular Engineering, University of Maryland, College Park, College Park, MD, 2School of of Mathematics and Physical Sciences (Chemistry), University of Hull, Hull, UNITED KINGDOM, 3Unilever R&D Vlaardingen, Vlaardingen, NETHERLANDS.**

11:40  375. Directly measuring the diamond nucleation landscape to test classical nucleation theory. **M. A. Gebbie, N. A. Melosh; Materials Science & Engineering, Stanford University, Stanford, CA.**

---

**Rheology**

*Wednesday, June 13, 2018, 10:00 AM - 12:00 PM*

*Location: Room 207*

10:00  376. Unusual filler effect in polymer hydrogels. **I. Dellatolas, T. Divoux, M. Guo, I. Bischofberger; MIT, Cambridge, MA.**

10:20  377. From Hindered to Promoted Settling in Dispersions of Attractive Colloids. **J. Swan, A. Fiore; MIT, Cambridge, MA.**

10:40  378. Rheological characterization of dynamic re-engineering of the pericellular region by human mesenchymal stem cell-secreted enzymes in well-defined synthetic hydrogel scaffolds. **M. Daviran 1, S. M. Longwill 2, K. M. Schultz 1; 1Chemical**
Engineering, Lehigh University, Bethlehem, PA,

11:00 379. Determination of macroscopic rheological properties of human mesenchymal stem cell-laden poly(ethylene glycol) hydrogels. M. S. Mazzeo\textsuperscript{1}, T. Chai\textsuperscript{2}, K. M. Schultz\textsuperscript{2}; \textsuperscript{1}Bioengineering, Lehigh University, Bethlehem, PA, \textsuperscript{2}Chemical and Biomolecular Engineering, Lehigh University, Bethlehem, PA.

11:20 380. Structure and electrical properties of concentrated block copolymer/water/oil microemulsions under flow. J. Riley\textsuperscript{1}, N. Wagner\textsuperscript{2}, P. Butler\textsuperscript{1}; \textsuperscript{1}Center for Neutron Research (NCNR), National Institute of Standards and Technology, Gaithersburg, MD, \textsuperscript{2}Chemical and Biomolecular Engineering, University of Delaware, Newark, DE.

11:40 381. Determining the rheological properties of an evolving hydrogenated castor oil colloidal gel during consecutive phase transitions. M. D. Wehrman\textsuperscript{1}, S. Lindberg\textsuperscript{2}, K. M. Schultz\textsuperscript{1}; \textsuperscript{1}Department of Chemical and Biomolecular Engineering, Lehigh University, Bethlehem, PA, \textsuperscript{2}Process and Engineering Development, Procter & Gamble Co., West Chester, OH.

Colloidal Nanoparticle Synthesis and Characterization

\textit{Wednesday, June 13, 2018, 1:20 PM - 3:00 PM}
\textit{Location: Room 104}

1:20 PM 382. KEYNOTE. Dopants and Defects in Colloidal Semiconductor Nanocrystals. D. R. Gamelin; Chemistry, University of Washington, Seattle, WA.

2:00 PM 383. Surface-templated inorganic nanocrystal growth using 1-nm wide functional patterns on noncovalently functionalized 2D materials. S. Claridge; Chemistry, Purdue University, West Lafayette, IN.

2:20 PM 384. KEYNOTE. Chiral Inorganic Nanostructures: Design strategies and their properties. J. Yeom; Massachusetts Institute of Technology (MIT), Boston, MA.
Connecting the Dots in Industry
Wednesday, June 13, 2018, 1:20 PM - 3:00 PM
Location: Room 206

1:20 PM 385. KEYNOTE. Diffusion of Colloidal Science Theory to Social Systems to Create Better Sleep Solutions. R. Walters^1, D. Madden^2, T. Lipoma^3, M. Hamilton^3, J. Mindell^4, E. Leichman^4; ^1Johnson & Johnson, Philadelphia, PA, ^2Rest Devies, Boston, MA, ^3Wellspring, Chicaho, IL, ^4St Joes, Philadelphia, PA.


2:20 PM 387. KEYNOTE. Demystifying air in oil - Scaling innovation from laboratory to industrial application. A. Kar^1, W. Cates^2, P. Savage^3, S. Remmert^1, V. C. Suja^4, G. Fuller^4; ^1Lubricants Discovery Hub, Shell Global Solutions US Inc, Houston, TX, ^2Industrial Oils, Shell Global Solutions US Inc, Houston, TX, ^3Factory Plant Maintenance Oils, Shell Global Solutions US Inc, Houston, TX, ^4Department of Chemical Engineering, Stanford University, San Francisco, CA.


Directed Assembly of Molecules and Particles
Wednesday, June 13, 2018, 1:20 PM - 3:00 PM
Location: Room 208

1:20 PM 389. Synergistic self-assembly of scaffolds and building blocks for directed synthesis of organic
nanomaterials. S. Dergunov, E. Pinkhassik; Chemistry, University of Connecticut, Storrs, CT.

1:40 PM 390. BLUX2X2. R. Ragan; Materials Science, UC Irvine, Irvine, CA.

2:00 PM 391. Microenvironment Effect on Reaction Kinetics Within Self-Assembled Polymer Nanoreactors. A. Harrison, T. Vuong, M. Zeevi, C. Tang; Chemical and Life Sciences Engineering, Virginia Commonwealth University, Richmond, VA.

2:20 PM 392. Optically Active Liquid Crystal Films. F. Mondiot; Laboratory Surface du Verre et Interfaces, Saint-Gobain Recherche, Aubervilliers, FRANCE.

2:40 PM 393. Change in the orientation of cellulose nanocrystals suspended in an amorphous matrix can be revealed by sum frequency generation vibrational spectroscopy (SFG). M. Makarem1, I. Chae1, S. Haung1, D. Sawada2, Y. Nishiyama3, S. Kim1; 1Pennsylvania State University, University Park, PA, 2Aalto University, Helsinki, FINLAND, 3CEntre de Recherches sur les MAcromolécules Végétales, Gières, FRANCE.

Electrokinetics and Microfluidics

Wednesday, June 13, 2018, 1:20 PM - 3:00 PM
Location: Room 105

1:20 PM 394. Frequency-selective electrokinetic enrichment of nanocolloidal biomarkers based on polarization dynamics of their ion cloud. N. Swami, A. Rohani, J. Moore; Electrical & Computer Engineering, University of Virginia, Charlottesville, VA.

1:40 PM (Withdrawn)

2:00 PM 395. Mechanisms of DNA electrophoresis in entangled micelle networks. L. Yan, R. Gamble, J. Schneider; Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA.

2:20 PM 396. KEYNOTE. Electrohydrodynamics and breakup of prolate drops. A. S. Khair; Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA.
Energy Systems

Wednesday, June 13, 2018, 1:20 PM - 3:00 PM
Location: Room 106

1:20 PM  398. Self-assembling redox mediators that lower charge recombination during light energy harvesting. N. Abbott, T. Smith; Department of Chemical and Biological Engineering, University of Wisconsin-Madison, Madison, WI.

1:40 PM  399. Using conjugated block copolymers to examine chain length effects on exciton dissociation. M. P. Aplan, E. D. Gomez; Chemical Engineering, The Pennsylvania State University, University Park, PA.

2:00 PM  400. Colloidal engineering of trimodal nanoporous adhesive coatings of algae and latex for highly efficient light harvesting. A. D. Wallace, M. C. Flickinger, O. D. Velev; Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC.

2:20 PM  401. Characterizing the molecular weight of conjugated polymers used in energy applications. R. Fair¹, E. Gomez¹,²; ¹Materials Science and Engineering, Penn State University, University Park, PA, ²Chemical Engineering, Penn State University, University Park, PA.

General Papers

Wednesday, June 13, 2018, 1:20 PM - 3:00 PM
Location: Room 204

1:20 PM  402. KEYNOTE. Instabilities in toroidal droplets. A. Fernandez-Nieves; Georgia Tech, Atlanta, GA.

2:00 PM  403. Nanoscale rheology and plasma membrane fluctuations with single gold nanorods. J. C. Crocker, M. Molaei; University of Pennsylvania, Philadelphia, PA.

2:20 PM  404. Encapsulation of rare earth and transition metal nanoparticles at the graphite surface. A. Lii-Rosales¹,², P. A. Thiel¹,²,³; ¹Ames Laboratory, Ames, IA, ²Chemistry, Iowa State University, Ames, IA, ³Materials Science & Engineering, Iowa State University, Ames, IA.

2:40 PM  405. A control of shell conformation in p-h heterostructured water-borne semiconducting
colloids for ultra-fast and stable charge separation property. **Y. Kim**; Center for Nanoscale Materials, Argonne National Laboratory, Lemont, IL.

Colloidal Nanoparticle Synthesis and Characterization

*Wednesday, June 13, 2018, 3:20 PM - 5:00 PM*

**Location: Room 104**

3:20 PM **406.** Formation of iron oxide nanoparticles in deep eutectic solvents: From A to Fe. **O. S. Hammond**¹, D. T. Bowron², L. de Campo³, S. Diaz-Moreno⁴, S. Eslava⁵, K. J. Edler¹; ¹Centre for Sustainable Chemical Technologies, University of Bath, Bath, UNITED KINGDOM, ²STFC ISIS Neutron & Muon Source, Harwell, UNITED KINGDOM, ³Australian Nuclear Science & Technology Organisation, Sydney, AUSTRALIA, ⁴Diamond Light Source, Harwell, UNITED KINGDOM, ⁵Department of Chemical Engineering, University of Bath, Bath, UNITED KINGDOM.


4:00 PM **408.** Kinetic control of the synthesis of silver nanodisks. **C. Gestraud**¹, Y. Hallez¹, J. Morris², M. Meireles¹; ¹Laboratoire Génie Chimique, Toulouse, FRANCE, ²Levich Institute, City College of New York, NY.

4:20 PM **409.** Flow Synthesis and Inline Optical Measurements of Gold Nanoshells. **S. Watanabe**, J. Hosokawa, M. T. Miyahara; Department of Chemical Engineering, Kyoto University, Kyoto, JAPAN.

4:40 PM **410.** Light-triggered mRNA delivery via hollow gold nanoparticles. **J. Shin**, J. A. Zasadzinski, A. Veeren; Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN.
Connecting the Dots in Industry

Wednesday, June 13, 2018, 3:20 PM - 5:00 PM
Location: Room 206

3:20 PM 411. KEYNOTE. Moringa-coated sand filters for sustainable water purification. S. Velegol; Chemical Engineering, Penn State University, University Park, PA.

3:40 PM 412. KEYNOTE. Programmable Fibers for Eliminating Microfiber Pollution. M. Demirel; Penn State University, University Park, PA.

4:00 PM 413. KEYNOTE. To be determined. K. Velikov; Unilever, University Park, PA.

Directed Assembly of Molecules and Particles

Wednesday, June 13, 2018, 3:20 PM - 5:00 PM
Location: Room 208

3:20 PM 414. KEYNOTE. Specific and Non-Specific Ion Effects in the Formation of Abeta and Sup35NM Based Amyloids. A. Sharma¹, S. H. Behrens¹, Y. O. Chernoff², A. S. Bommarius¹; ¹School of Chemical & Biomolecular Engineering, Georgia Institute of Technology, Atlanta, GA, ²School of Biological Sciences, Georgia Institute of Technology, Atlanta, GA.

4:00 PM 415. Micelle-laden hydrogels as a means to synthesize and deliver nanocrystalline hydrophobic drugs. P. D. Godfrin, H. Lee, J. Lee, P. S. Doyle; Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, MA.

4:20 PM 416. Capillary binding as a tool for making magnetically responsive and self-repairing gels. N. I. Castellanos¹, S. Roh¹, B. Bharti², O. D. Velev¹; ¹Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC, ²Cain Department of Chemical Engineering, Louisiana State University, Baton Rouge, LA.

4:40 PM 417. Amidine nanoparticles, viral capsid proteins and phospholipid vesicles: assembly driven by nanobubbles. M. Zhang, S. G. Lemay; MESA+ Institute for Nanotechnology, University of Twente, Enschede, NETHERLANDS.
Electrokinetics and Microfluidics

Wednesday, June 13, 2018, 3:20 PM - 5:00 PM
Location: Room 105

3:20 PM 418. Lowering the interfacial tension of liquid metal to near zero using electrochemical reactions. M. Song, M. Dickey; NC State University, Raleigh, NC.

3:40 PM 419. Transport of ionic liquids near electrified interfaces. P. S. Gil, A. A. Riet, B. E. Gurkan, D. J. Lacks; Case Western Reserve University, Cleveland Heights, OH.

4:00 PM 420. Conductivity and charge carrier concentration of surfactant doped nonpolar liquids under ambient and dried conditions. K. Xu, J. Oh, P. J. Sides, J. W. Schneider, D. C. Prieve; Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA.

4:20 PM 421. Collective behavior of electrohydrodynamic colloidal motors. X. Yang, N. Wu; Colorado School of Mines, Golden, CO.

4:40 PM 422. Sculpting diffusiophoretic migration with reactive solutes. X. Tang; University of California (Santa Barbara), Santa Barbara, CA.

Energy Systems

Wednesday, June 13, 2018, 3:20 PM - 5:00 PM
Location: Room 106


4:00 PM 425. Generating a state diagram of Langmuir film of quantum dots. C. Nguyen, J. Weimer; Chemistry, The University of Alabama in Huntsville, Huntsville, AL.
General Papers

Wednesday, June 13, 2018, 3:20 PM - 5:00 PM
Location: Room 204

3:20 PM  426. Lipid Oxidation Induced by Transition Metal Ion Binding. V. R. Greenberger, M. F. Poyton, T. S. Yang, P. S. Cremer; Chemistry, Pennsylvania State University, University Park, PA.

3:40 PM  427. A reaction cascade framework for modeling the time-dependent particle size distribution during nanoparticle formation. M. Wang, T. J. Woehl; Chemical and Biomolecular Engineering, University of Maryland, College Park, College Park, MD.

4:00 PM  428. Assembly of novel tripeptides hydrogels. L. Thursch; Chemical and Biological Engineering, Drexel University, Philadelphia, PA.

4:20 PM  429. Engineered silica nanoparticles interact differently with lipid monolayers compared to lipid vesicles. A. Asghari Adib1, S. Nazemidashtarjandi1, A. Kelly2, A. Kruse3, K. Cimatu3, A. E. David2, A. M. Farnoud1; 1Chemical and Biomolecular Engineering, Ohio University, Athens, OH, 2Chemical Engineering, Auburn University, Auburn, AL, 3Chemistry and Biochemistry, Ohio University, Athens, OH.
Author Index
Abbott, N. .......... 269, 398
Abbott, N. L. .......... 25, 102, ..........107, 240, 241, 301
Abdelaal, A. .......... 98
Abedi, S. ............ 23
Adair, J. ............. 228
Adams, D. J. ........ 246
Adams, M. .......... 32
Adhikari, N. .......... 284, 286
Ador, C. .......... 116
Agarwal, A. ......... 270
Agarwal, M. ......... 173
Ahmed, S. .......... 357
Ahn, C. ............... 367
Akel, M. .......... 21
Alborzi, S. .......... 277
Alcantar, N. .......... 211, 222, ......................................306
Alem, N. .......... 162
Alexandridis, P. .... 83, ........122, 181, 190, 232
Alger, M. ............. 225
Al-Maamari, R. S. .... 224
Al-Milaji, K. N. ..... 18, 133
Altemose, A. ........ 4
Alvarez, N. .......... 68, 120, 362
Alvarez, N. J. ........ 369
Alwusaydi, H. A. ... 42
Ambrosu, K. N. ..... 193
Amin, S. .......... 65, 296
Anand, S. .......... 49, 97, ......................................... 199, 314
Andreev, M. ......... 272
Andrien, B. .......... 236
Angel, B. .......... 236
Anjali, T. G. ......... 76, 136
Anna, S. L. ........ 197
Annavarapu, R. ..... 99
Annavarapu, R. K. ... 298
Antonoupolou, M. N. ......310
Aoudia, M. .......... 224
Aplan, M. P. ........ 399
Arar, N. .......... 150
Aranson, I. S. ........ 53
Armstrong, A. M. ... 237, ...................................... 279
Arnold, T. .......... 283
Arroyo, M. .......... 223
Ashghari Adib, A. ... 429
Ashbaugh, H. .......... 229
Auger, R. .......... 152
Avino, F. .......... 246
Avishai, A. .......... 192
Ayan, B. .......... 109
Bacosa, H. .......... 87
Badding, J. V. ....... 162
Baier, G. .......... 16
Bailes, K. .......... 119
Baker, R. D. .......... 53
Balazs, A. C. .......... 216
Balcunait, A. .......... 59
Ballau, M. .......... 239
Bao, N. .......... 240, 241
Barmaria, H. .......... 314
Barigou, M. .......... 278
Barman, S. .......... 140
Barrett, K. .......... 236
Bartlett, P. .......... 291
Basavaraj, M. G. ..... 76, .........................................136
Bedrov, D. .......... 122
Behrens, S. H. .......... 414
Belgovskiy, A. I. .... 42
Beller, D. A. .......... 351
Beltramo, P. J. ...... 132
Benayoun, S. .......... 334
Bennick, R. .......... 78
Berger, R. .......... 48
Bergis, A. N. .......... 253
Beroz, J. .......... 312
Bevan, M. .......... 12, 72, ........................................ 114, 290
Bevan, M. A. .......... 106, ......................................... 112, 202
Beysens, D. .......... 97
Bharti, B. .......... 3, 5, 242, 416
Binks, B. P. .......... 73
Bischofberger, I. ...... 92, ......................................... 376
Bishop, K. .......... 218
Bishop, K. J. ....... 54, 86, ......................................... 356
Biswa, S. L. .......... 17
Bleier, B. J. .......... 197
Blum, N. T. .......... 235
Blusewicz, J. M. .... 168, ......................................... 322
Boakye-Ansah, S. .... 325
Bockstaller, M. R. ... 349
Bodratti, A. M. ...... 232
Boehm, S. .......... 177
Boeker, A. .......... 81
Bohling, J. .......... 66
Bommarius, A. S. .... 414
Bonnczape, R. T. .... 249
Borden, M. .......... 238
Borkovec, M. .......... 80
<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boschitsch, B.</td>
<td>50</td>
</tr>
<tr>
<td>Bowron, D. T.</td>
<td>406</td>
</tr>
<tr>
<td>Brady, M.</td>
<td>262</td>
</tr>
<tr>
<td>Braithwaite, G.</td>
<td>227</td>
</tr>
<tr>
<td>Briscoe, W. H.</td>
<td>58</td>
</tr>
<tr>
<td>Brooks, A. M.</td>
<td>54</td>
</tr>
<tr>
<td>Brun, Y.</td>
<td>328</td>
</tr>
<tr>
<td>Bu, W.</td>
<td>41</td>
</tr>
<tr>
<td>Bufalini, L.</td>
<td>190</td>
</tr>
<tr>
<td>Burrows, N. D.</td>
<td>19</td>
</tr>
<tr>
<td>Butler, P.</td>
<td>293, 380</td>
</tr>
<tr>
<td>Butt, H.-J. J.</td>
<td>48</td>
</tr>
<tr>
<td>Buttinoni, I.</td>
<td>220</td>
</tr>
<tr>
<td>Byeon, A.</td>
<td>367</td>
</tr>
<tr>
<td>Cabrera, S.</td>
<td>316</td>
</tr>
<tr>
<td>Cadirov, N.</td>
<td>257</td>
</tr>
<tr>
<td>Canales, E.</td>
<td>190</td>
</tr>
<tr>
<td>Cao, T.</td>
<td>80</td>
</tr>
<tr>
<td>Carnes, E.</td>
<td>204</td>
</tr>
<tr>
<td>Cartier, C.</td>
<td>218</td>
</tr>
<tr>
<td>Cassee, F. R.</td>
<td>124</td>
</tr>
<tr>
<td>Castellanos, N. I.</td>
<td>416</td>
</tr>
<tr>
<td>Cates, W.</td>
<td>387</td>
</tr>
<tr>
<td>Chae, I.</td>
<td>320, 393</td>
</tr>
<tr>
<td>Chai, T.</td>
<td>379</td>
</tr>
<tr>
<td>Chaikin, P. M.</td>
<td>86</td>
</tr>
<tr>
<td>Chang, Y.-R.</td>
<td>302</td>
</tr>
<tr>
<td>Charan, H.</td>
<td>81</td>
</tr>
<tr>
<td>Chatterjee, R.</td>
<td>97</td>
</tr>
<tr>
<td>Chaudhury, M.</td>
<td>254</td>
</tr>
<tr>
<td>Chen, C.-C.</td>
<td>23</td>
</tr>
<tr>
<td>Chen, L.</td>
<td>230</td>
</tr>
<tr>
<td>Chen, Q.</td>
<td>69, 339, 350, 353</td>
</tr>
<tr>
<td>Chen, S.-Y.</td>
<td>373</td>
</tr>
<tr>
<td>Chen, V.</td>
<td>27</td>
</tr>
<tr>
<td>Chen, X.</td>
<td>208</td>
</tr>
<tr>
<td>Cheng, C.-M.</td>
<td>118</td>
</tr>
<tr>
<td>Cheng, H.</td>
<td>162</td>
</tr>
<tr>
<td>Cheng, J.</td>
<td>232</td>
</tr>
<tr>
<td>Cheng, L.-C.</td>
<td>91</td>
</tr>
<tr>
<td>Cheng, S.</td>
<td>287, 309</td>
</tr>
<tr>
<td>Cheong, F. C.</td>
<td>168, 322</td>
</tr>
<tr>
<td>Cheong, R.</td>
<td>31</td>
</tr>
<tr>
<td>Chernoff, Y. O.</td>
<td>414</td>
</tr>
<tr>
<td>Cho, J.</td>
<td>92</td>
</tr>
<tr>
<td>Choi, S.</td>
<td>164, 185</td>
</tr>
<tr>
<td>Choi, S.-E.</td>
<td>163</td>
</tr>
<tr>
<td>Chow, M. R.</td>
<td>232</td>
</tr>
<tr>
<td>Christodoulides, D.</td>
<td>172</td>
</tr>
<tr>
<td>Chu, H. C.</td>
<td>355</td>
</tr>
<tr>
<td>Chun, J.</td>
<td>129</td>
</tr>
<tr>
<td>Cimatu, K.</td>
<td>429</td>
</tr>
<tr>
<td>Cimatu, K. A.</td>
<td>284, 286</td>
</tr>
<tr>
<td>Cimorelli, M.</td>
<td>236</td>
</tr>
<tr>
<td>Claridge, S.</td>
<td>51, 231, 383</td>
</tr>
<tr>
<td>Clegg, P. S.</td>
<td>119, 246</td>
</tr>
<tr>
<td>Clement, E.</td>
<td>29</td>
</tr>
<tr>
<td>Collins, M.</td>
<td>62</td>
</tr>
<tr>
<td>Colosqui, C. E.</td>
<td>145</td>
</tr>
<tr>
<td>Confer, M.</td>
<td>426</td>
</tr>
<tr>
<td>Conrad, J.</td>
<td>43, 196</td>
</tr>
<tr>
<td>Conrad, J. C.</td>
<td>44, 352</td>
</tr>
<tr>
<td>Contraires, E.</td>
<td>334</td>
</tr>
<tr>
<td>Corcoran, T. E.</td>
<td>335</td>
</tr>
<tr>
<td>Cordova-Figueroa, U. M.</td>
<td>147, 217</td>
</tr>
<tr>
<td>Corsetti, M.</td>
<td>297</td>
</tr>
<tr>
<td>Corti, D.</td>
<td>370</td>
</tr>
<tr>
<td>Cosgrove, D. J.</td>
<td>35</td>
</tr>
<tr>
<td>Coughlan, A.</td>
<td>12</td>
</tr>
<tr>
<td>Cremer, P. S.</td>
<td>426</td>
</tr>
<tr>
<td>Crimmins, M.</td>
<td>313</td>
</tr>
<tr>
<td>Cristiani, T. R.</td>
<td>257, 267</td>
</tr>
<tr>
<td>Crocker, J. C.</td>
<td>403</td>
</tr>
<tr>
<td>Crowe, C. D.</td>
<td>24</td>
</tr>
<tr>
<td>Cruz, S. S.</td>
<td>210</td>
</tr>
<tr>
<td>Cunha e Silva, K.</td>
<td>267</td>
</tr>
<tr>
<td>Dagastine, R.</td>
<td>63</td>
</tr>
<tr>
<td>Dai, X.</td>
<td>95</td>
</tr>
<tr>
<td>Dani, A.</td>
<td>127</td>
</tr>
<tr>
<td>Das, S.</td>
<td>34, 127, 289</td>
</tr>
<tr>
<td>David, A. E.</td>
<td>429</td>
</tr>
<tr>
<td>Davidson, M. L.</td>
<td>40</td>
</tr>
<tr>
<td>Daviran, M.</td>
<td>378</td>
</tr>
<tr>
<td>Davis, R. F.</td>
<td>349</td>
</tr>
<tr>
<td>Davis, R. H.</td>
<td>324</td>
</tr>
<tr>
<td>de Campo, L.</td>
<td>406</td>
</tr>
<tr>
<td>Degen, G.</td>
<td>267</td>
</tr>
<tr>
<td>Degen, G. D.</td>
<td>257</td>
</tr>
<tr>
<td>de Gracia Lux, C.</td>
<td>237, 279</td>
</tr>
<tr>
<td>Dekkers, S.</td>
<td>124</td>
</tr>
<tr>
<td>DeLaCruz-Araujo, R.</td>
<td>217</td>
</tr>
<tr>
<td>Dellarotolas, I.</td>
<td>376</td>
</tr>
<tr>
<td>Demirel, M.</td>
<td>412</td>
</tr>
<tr>
<td>Demiroers, A. F.</td>
<td>103</td>
</tr>
<tr>
<td>Deng, T.</td>
<td>349</td>
</tr>
<tr>
<td>Dennis, K. A.</td>
<td>331</td>
</tr>
<tr>
<td>de Pablo, J.</td>
<td>272</td>
</tr>
<tr>
<td>de Pablo, J. J.</td>
<td>25</td>
</tr>
<tr>
<td>Dergunov, S.</td>
<td>389</td>
</tr>
<tr>
<td>De Tommaso, J.</td>
<td>31</td>
</tr>
<tr>
<td>Dewangan, N. K.</td>
<td>187</td>
</tr>
<tr>
<td>Dharmaraj, V.</td>
<td>294</td>
</tr>
<tr>
<td>Dhinojwala, A.</td>
<td>300</td>
</tr>
<tr>
<td>Name</td>
<td>Pages</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Diaz-Hyland, P. G.</td>
<td>147</td>
</tr>
<tr>
<td>Diaz-Moreno, S.</td>
<td>406</td>
</tr>
<tr>
<td>Dickey, M.</td>
<td>418</td>
</tr>
<tr>
<td>Dickey, R.</td>
<td>176</td>
</tr>
<tr>
<td>Dietrich, K.</td>
<td>220</td>
</tr>
<tr>
<td>Dinic, J.</td>
<td>137, 198, 255</td>
</tr>
<tr>
<td>Di Vitantonio, G.</td>
<td>134</td>
</tr>
<tr>
<td>Divoux, T.</td>
<td>376</td>
</tr>
<tr>
<td>Donahue, P. P.</td>
<td>172</td>
</tr>
<tr>
<td>Dong, R.</td>
<td>6, 171</td>
</tr>
<tr>
<td>Dou, Y.</td>
<td>55, 218</td>
</tr>
<tr>
<td>Doyle, P. S.</td>
<td>84, 91, 226, 415</td>
</tr>
<tr>
<td>Drapaca, C.</td>
<td>109</td>
</tr>
<tr>
<td>Driscoll, M. M.</td>
<td>86</td>
</tr>
<tr>
<td>Duan, G.</td>
<td>118</td>
</tr>
<tr>
<td>Ducker, W.</td>
<td>8, 302</td>
</tr>
<tr>
<td>Eastoe, J.</td>
<td>130</td>
</tr>
<tr>
<td>Edgehouse, K.</td>
<td>135</td>
</tr>
<tr>
<td>Edler, K. J.</td>
<td>283, 406</td>
</tr>
<tr>
<td>Elstone, N.</td>
<td>283</td>
</tr>
<tr>
<td>Engel, M.</td>
<td>113, 212</td>
</tr>
<tr>
<td>Erasquin, U.</td>
<td>286</td>
</tr>
<tr>
<td>Erk, K. A.</td>
<td>117</td>
</tr>
<tr>
<td>Ersi, P.</td>
<td>345</td>
</tr>
<tr>
<td>Eslava, S.</td>
<td>406</td>
</tr>
<tr>
<td>Ettinger, S.</td>
<td>276</td>
</tr>
<tr>
<td>Extrand, C.</td>
<td>142, 146</td>
</tr>
<tr>
<td>Fafarman, A.</td>
<td>236</td>
</tr>
<tr>
<td>Fafarman, A. T.</td>
<td>20</td>
</tr>
<tr>
<td>Fagan, J.</td>
<td>343</td>
</tr>
<tr>
<td>Fair, R.</td>
<td>401</td>
</tr>
<tr>
<td>Fakhraai, Z.</td>
<td>332</td>
</tr>
<tr>
<td>Fakhraibadi, E.</td>
<td>213</td>
</tr>
<tr>
<td>Famularo, N.</td>
<td>177</td>
</tr>
<tr>
<td>Farmer Budarz, J.</td>
<td>31, 126</td>
</tr>
<tr>
<td>Farnoud, A. M.</td>
<td>85, 429</td>
</tr>
<tr>
<td>Fei, W.</td>
<td>86</td>
</tr>
<tr>
<td>Fernandez-Nieves, A.</td>
<td>402</td>
</tr>
<tr>
<td>Fernandez-Rodriguez, M. A.</td>
<td>310</td>
</tr>
<tr>
<td>Ferreira, J.</td>
<td>347</td>
</tr>
<tr>
<td>Ferrick, A.</td>
<td>275</td>
</tr>
<tr>
<td>Findenegg, G. H.</td>
<td>242</td>
</tr>
<tr>
<td>Fiore, A.</td>
<td>377</td>
</tr>
<tr>
<td>Fischer, P.</td>
<td>2</td>
</tr>
<tr>
<td>Flickinger, M. C.</td>
<td>400</td>
</tr>
<tr>
<td>Forero, F.</td>
<td>316</td>
</tr>
<tr>
<td>Franses, E.</td>
<td>370</td>
</tr>
<tr>
<td>Frechette, J.</td>
<td>72, 200, 258, 290</td>
</tr>
<tr>
<td>Frese, D.</td>
<td>338</td>
</tr>
<tr>
<td>Frett, N.</td>
<td>191</td>
</tr>
<tr>
<td>Fujiwara, A.</td>
<td>149</td>
</tr>
<tr>
<td>Fuller, G.</td>
<td>387</td>
</tr>
<tr>
<td>Furst, E.</td>
<td>94</td>
</tr>
<tr>
<td>Furst, E. M.</td>
<td>33, 71, 194, 315, 331</td>
</tr>
<tr>
<td>Fyta, S.</td>
<td>71</td>
</tr>
<tr>
<td>Gabitto, J.</td>
<td>28</td>
</tr>
<tr>
<td>Gaddam, P.</td>
<td>8</td>
</tr>
<tr>
<td>Gadhia, H.</td>
<td>184</td>
</tr>
<tr>
<td>Gamble, R.</td>
<td>395</td>
</tr>
<tr>
<td>Gamelin, D. R.</td>
<td>382</td>
</tr>
<tr>
<td>Gao, Y.</td>
<td>331</td>
</tr>
<tr>
<td>Garcia, E.</td>
<td>106, 202</td>
</tr>
<tr>
<td>Garoff, S.</td>
<td>144, 335, 355</td>
</tr>
<tr>
<td>Gebbie, M. A.</td>
<td>263, 299, 375</td>
</tr>
<tr>
<td>Gellman, S. H.</td>
<td>301</td>
</tr>
<tr>
<td>Gestraud, C.</td>
<td>408</td>
</tr>
<tr>
<td>Ghosh, S.</td>
<td>62, 233</td>
</tr>
<tr>
<td>.................... 303, 304</td>
<td></td>
</tr>
<tr>
<td>Ghoshal, S.</td>
<td>79</td>
</tr>
<tr>
<td>Giasson, S.</td>
<td>7</td>
</tr>
<tr>
<td>Gibbs, J. G.</td>
<td>61</td>
</tr>
<tr>
<td>Giebink, N. C.</td>
<td>162</td>
</tr>
<tr>
<td>Gil, P. S.</td>
<td>419</td>
</tr>
<tr>
<td>Gilchrist, J. F.</td>
<td>46, 292</td>
</tr>
<tr>
<td>Gillard, M.</td>
<td>165</td>
</tr>
<tr>
<td>Giraud, L.</td>
<td>7</td>
</tr>
<tr>
<td>Gizaw, Y.</td>
<td>373</td>
</tr>
<tr>
<td>Glaser, J.</td>
<td>115, 188</td>
</tr>
<tr>
<td>Gleason, K.</td>
<td>99</td>
</tr>
<tr>
<td>Glebe, U.</td>
<td>81</td>
</tr>
<tr>
<td>Glotzer, S.</td>
<td>113, 115, 116, 188, 212, 215</td>
</tr>
<tr>
<td>Godfrin, P. D.</td>
<td>91, 415</td>
</tr>
<tr>
<td>Gogotsi, Y.</td>
<td>367</td>
</tr>
<tr>
<td>Gomez, A.</td>
<td>204</td>
</tr>
<tr>
<td>Gomez, E.</td>
<td>366, 401</td>
</tr>
<tr>
<td>Gomez, E. D.</td>
<td>35, 399</td>
</tr>
<tr>
<td>Gomez, E. W.</td>
<td>35</td>
</tr>
<tr>
<td>Gonella, G.</td>
<td>245</td>
</tr>
<tr>
<td>Gottlieb, M.</td>
<td>40</td>
</tr>
<tr>
<td>Granick, S.</td>
<td>6, 169, 171</td>
</tr>
<tr>
<td>Grayson, R.</td>
<td>8</td>
</tr>
<tr>
<td>Grede, A.</td>
<td>162</td>
</tr>
<tr>
<td>Greene, A.</td>
<td>204</td>
</tr>
<tr>
<td>Greenberger, V. R.</td>
<td>426</td>
</tr>
<tr>
<td>Grelet, E.</td>
<td>67</td>
</tr>
<tr>
<td>Grest, G. S.</td>
<td>309</td>
</tr>
<tr>
<td>Grigas, A. T.</td>
<td>281</td>
</tr>
<tr>
<td>Name</td>
<td>Page Numbers</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Grozinger, W</td>
<td>237, 279</td>
</tr>
<tr>
<td>Gu, Y</td>
<td>356</td>
</tr>
<tr>
<td>Guadino, D</td>
<td>296</td>
</tr>
<tr>
<td>Gulati, S</td>
<td>141</td>
</tr>
<tr>
<td>Guo, F</td>
<td>222</td>
</tr>
<tr>
<td>Guo, M</td>
<td>376</td>
</tr>
<tr>
<td>Guo, X</td>
<td>177</td>
</tr>
<tr>
<td>Guo, Y</td>
<td>152</td>
</tr>
<tr>
<td>Guo, Z</td>
<td>95</td>
</tr>
<tr>
<td>Gupta, S</td>
<td>329</td>
</tr>
<tr>
<td>Gurkan, B. E</td>
<td>419</td>
</tr>
<tr>
<td>Habdas, P</td>
<td>45</td>
</tr>
<tr>
<td>Hadimani, R. L</td>
<td>18</td>
</tr>
<tr>
<td>Hadji, M</td>
<td>224</td>
</tr>
<tr>
<td>Haliey, Y</td>
<td>408</td>
</tr>
<tr>
<td>Hamilton, M</td>
<td>385</td>
</tr>
<tr>
<td>Hammond, O. S</td>
<td>406</td>
</tr>
<tr>
<td>Han, K</td>
<td>5, 170</td>
</tr>
<tr>
<td>Haque, M</td>
<td>363</td>
</tr>
<tr>
<td>Harbottle, D</td>
<td>119</td>
</tr>
<tr>
<td>Harrison, A</td>
<td>183, 391</td>
</tr>
<tr>
<td>Harstad, S. M</td>
<td>18</td>
</tr>
<tr>
<td>Hart, A</td>
<td>99</td>
</tr>
<tr>
<td>Hart, A. J</td>
<td>312</td>
</tr>
<tr>
<td>Hashmi, S. M</td>
<td>317</td>
</tr>
<tr>
<td>Hatter, C</td>
<td>367</td>
</tr>
<tr>
<td>Haung, S</td>
<td>393</td>
</tr>
<tr>
<td>He, X</td>
<td>35, 285</td>
</tr>
<tr>
<td>Hearms, N</td>
<td>338</td>
</tr>
<tr>
<td>Hegde, V</td>
<td>356</td>
</tr>
<tr>
<td>Helgeson, M. E</td>
<td>15, 90</td>
</tr>
<tr>
<td>Henderson, I</td>
<td>204</td>
</tr>
<tr>
<td>Hendrickson-Stives, A. K</td>
<td>182</td>
</tr>
<tr>
<td>Henry, C. K</td>
<td>68</td>
</tr>
<tr>
<td>Hensley, A</td>
<td>70</td>
</tr>
<tr>
<td>Herman, E. K</td>
<td>191, 193</td>
</tr>
<tr>
<td>Herrera-Alonso, M.</td>
<td>106, 202</td>
</tr>
<tr>
<td>Higaki, T</td>
<td>407</td>
</tr>
<tr>
<td>Hill, C.</td>
<td>130</td>
</tr>
<tr>
<td>Hinton, Z</td>
<td>120, 362</td>
</tr>
<tr>
<td>Hipp, J. B</td>
<td>252</td>
</tr>
<tr>
<td>Hirsa, A. H</td>
<td>139, 141</td>
</tr>
<tr>
<td>Hladilková, J</td>
<td>266, 319</td>
</tr>
<tr>
<td>Hodgdon, T</td>
<td>110</td>
</tr>
<tr>
<td>Hor, J</td>
<td>332</td>
</tr>
<tr>
<td>Hormoz, S</td>
<td>251</td>
</tr>
<tr>
<td>Horner, J. S</td>
<td>253</td>
</tr>
<tr>
<td>Horozov, T</td>
<td>36, 374</td>
</tr>
<tr>
<td>Hosokawa, J</td>
<td>409</td>
</tr>
<tr>
<td>Hou, J</td>
<td>27</td>
</tr>
<tr>
<td>Hsiao, L.</td>
<td>94</td>
</tr>
<tr>
<td>Hsiao, L. C</td>
<td>175</td>
</tr>
<tr>
<td>Hsieh, A.-H</td>
<td>370</td>
</tr>
<tr>
<td>Hsu, C.-P</td>
<td>250</td>
</tr>
<tr>
<td>Hua, X</td>
<td>290</td>
</tr>
<tr>
<td>Huang, P</td>
<td>160</td>
</tr>
<tr>
<td>Huang, S</td>
<td>35</td>
</tr>
<tr>
<td>Huang, T. J</td>
<td>56</td>
</tr>
<tr>
<td>Huang, Y.-R</td>
<td>180</td>
</tr>
<tr>
<td>Hudson, S</td>
<td>294, 295</td>
</tr>
<tr>
<td>Hunter, E. E</td>
<td>34</td>
</tr>
<tr>
<td>Iasella, S. V</td>
<td>335</td>
</tr>
<tr>
<td>Ide Seyni, F</td>
<td>326</td>
</tr>
<tr>
<td>Iqbal, D</td>
<td>167</td>
</tr>
<tr>
<td>Isa, L</td>
<td>220, 250, 310</td>
</tr>
<tr>
<td>Islam, S</td>
<td>311</td>
</tr>
<tr>
<td>Israelachvili, J</td>
<td>267</td>
</tr>
<tr>
<td>Israelachvili, J. N</td>
<td>257, 263, 373</td>
</tr>
<tr>
<td>Jalali-Mousavi, M.</td>
<td>87, 123</td>
</tr>
<tr>
<td>Jalilivand, Z</td>
<td>100</td>
</tr>
<tr>
<td>Jensen, K</td>
<td>256</td>
</tr>
<tr>
<td>Jeong, H</td>
<td>128</td>
</tr>
<tr>
<td>Jerri, H</td>
<td>12, 111</td>
</tr>
<tr>
<td>Ji, C</td>
<td>27</td>
</tr>
<tr>
<td>Jimenez, L. N</td>
<td>137, 198, 255</td>
</tr>
<tr>
<td>Jin, M</td>
<td>338</td>
</tr>
<tr>
<td>Jin, R</td>
<td>407</td>
</tr>
<tr>
<td>Johnson, T</td>
<td>53</td>
</tr>
<tr>
<td>Jones, M. R</td>
<td>342</td>
</tr>
<tr>
<td>Joshi, K</td>
<td>388</td>
</tr>
<tr>
<td>Joshi, N</td>
<td>333</td>
</tr>
<tr>
<td>Joshi, Y. M</td>
<td>173, 333</td>
</tr>
<tr>
<td>Joy, A.</td>
<td>300</td>
</tr>
<tr>
<td>Juarez, J.</td>
<td>21, 265</td>
</tr>
<tr>
<td>Juarez, J. J</td>
<td>372</td>
</tr>
<tr>
<td>Jumai'an, J</td>
<td>202</td>
</tr>
<tr>
<td>Kaewpetch, T</td>
<td>46</td>
</tr>
<tr>
<td>Kalantar, T</td>
<td>388</td>
</tr>
<tr>
<td>Kamrin, K</td>
<td>312</td>
</tr>
<tr>
<td>Kancharia, S.</td>
<td>122, 190</td>
</tr>
<tr>
<td>Kang, D</td>
<td>199, 314</td>
</tr>
<tr>
<td>Kanthe, A</td>
<td>41</td>
</tr>
<tr>
<td>Kar, A.</td>
<td>387</td>
</tr>
<tr>
<td>Karimi, M</td>
<td>224</td>
</tr>
<tr>
<td>Kasimbeg, P</td>
<td>168, 322</td>
</tr>
<tr>
<td>Kaur, S</td>
<td>300</td>
</tr>
<tr>
<td>Kawy, M. T</td>
<td>181</td>
</tr>
</tbody>
</table>
| Keating, C            | 177, 179, 182, 274, 318
<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann, J. A.</td>
<td>42</td>
</tr>
<tr>
<td>Manohar, N.</td>
<td>327</td>
</tr>
<tr>
<td>Mantel, H.</td>
<td>31</td>
</tr>
<tr>
<td>Mao, Z.</td>
<td>56</td>
</tr>
<tr>
<td>Marcie, A.</td>
<td>272</td>
</tr>
<tr>
<td>Marcie, A. B.</td>
<td>273</td>
</tr>
<tr>
<td>Marenduzzo, D.</td>
<td>291</td>
</tr>
<tr>
<td>Marianelli, A.</td>
<td>179</td>
</tr>
<tr>
<td>Marinaro, R.</td>
<td>29</td>
</tr>
<tr>
<td>Marr, D.</td>
<td>101</td>
</tr>
<tr>
<td>Marwan, H.</td>
<td>363</td>
</tr>
<tr>
<td>Mason, T. G.</td>
<td>22</td>
</tr>
<tr>
<td>Matheson, A. B.</td>
<td>246</td>
</tr>
<tr>
<td>Mattrey, R. F.</td>
<td>160</td>
</tr>
<tr>
<td></td>
<td>237, 237</td>
</tr>
<tr>
<td>Mattson, K. M.</td>
<td>262</td>
</tr>
<tr>
<td>Matyjaszewski, K.</td>
<td>167,349</td>
</tr>
<tr>
<td>Mavrikakis, M.</td>
<td>240, 241</td>
</tr>
<tr>
<td>Mayer, T.</td>
<td>177</td>
</tr>
<tr>
<td>Mazzeo, M. S.</td>
<td>379</td>
</tr>
<tr>
<td>M. Bishop, K. J.</td>
<td>55</td>
</tr>
<tr>
<td>McAninch, P.</td>
<td>204</td>
</tr>
<tr>
<td>McDevitt, K.</td>
<td>368</td>
</tr>
<tr>
<td>McGuire, M. M.</td>
<td>191, 193</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>McKinley, G. H.</td>
<td>337</td>
</tr>
<tr>
<td>Mclaughlin, T. S.</td>
<td>298</td>
</tr>
<tr>
<td>Mears, R.</td>
<td>89</td>
</tr>
<tr>
<td>Meireles, M.</td>
<td>408</td>
</tr>
<tr>
<td>Meissner, J.</td>
<td>242</td>
</tr>
<tr>
<td>Melosh, N. A.</td>
<td>375</td>
</tr>
<tr>
<td>Merkel, S.</td>
<td>37</td>
</tr>
<tr>
<td>Merminod, S.</td>
<td>10</td>
</tr>
<tr>
<td>Merrill, M. H.</td>
<td>108</td>
</tr>
<tr>
<td>Meyer, W. V.</td>
<td>42</td>
</tr>
<tr>
<td>Miao, J.</td>
<td>341</td>
</tr>
<tr>
<td>Middleton, C.</td>
<td>74</td>
</tr>
<tr>
<td>Milam, V.</td>
<td>32</td>
</tr>
<tr>
<td>Miller, B.</td>
<td>179</td>
</tr>
<tr>
<td>Miller, D. S.</td>
<td>308, 388</td>
</tr>
<tr>
<td>Miller, J. R.</td>
<td>172</td>
</tr>
<tr>
<td>Miller, O.</td>
<td>218</td>
</tr>
<tr>
<td>Miloh, T.</td>
<td>170</td>
</tr>
<tr>
<td>MIN, Y.</td>
<td>264</td>
</tr>
<tr>
<td>Mindell, J.</td>
<td>385</td>
</tr>
<tr>
<td>Mishra, A.</td>
<td>112</td>
</tr>
<tr>
<td>Mitra, R. K.</td>
<td>233</td>
</tr>
<tr>
<td>Miyahara, M.</td>
<td>149</td>
</tr>
<tr>
<td>Miyahara, M. T.</td>
<td>150, 409</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Mohajerani, F.</td>
<td>62, 303, 304</td>
</tr>
<tr>
<td>Mohammadian, B.</td>
<td>98</td>
</tr>
<tr>
<td>Mohler, C.</td>
<td>388</td>
</tr>
<tr>
<td>Mohraz, A.</td>
<td>368</td>
</tr>
<tr>
<td>Molaei, M.</td>
<td>104, 403</td>
</tr>
<tr>
<td>Mondal, S.</td>
<td>233</td>
</tr>
<tr>
<td>Mondiot, F.</td>
<td>392</td>
</tr>
<tr>
<td>Moore, J.</td>
<td>394</td>
</tr>
<tr>
<td>Moradifar, P.</td>
<td>162</td>
</tr>
<tr>
<td>Morelly, S. L.</td>
<td>369</td>
</tr>
<tr>
<td>Morrin, G.</td>
<td>282</td>
</tr>
<tr>
<td>Morris, J.</td>
<td>129, 408</td>
</tr>
<tr>
<td>Morris, J. F.</td>
<td>52</td>
</tr>
<tr>
<td>Mosley, D.</td>
<td>152</td>
</tr>
<tr>
<td>Mountain, G.</td>
<td>274</td>
</tr>
<tr>
<td>Mout, D. R.</td>
<td>368</td>
</tr>
<tr>
<td>Muntz, I.</td>
<td>291</td>
</tr>
<tr>
<td>Murray, T.</td>
<td>238</td>
</tr>
<tr>
<td>Naik, R.</td>
<td>32</td>
</tr>
<tr>
<td>Nandyala, D.</td>
<td>145</td>
</tr>
<tr>
<td>Narayanan, A.</td>
<td>300</td>
</tr>
<tr>
<td>Narsimhan, V.</td>
<td>84, 138</td>
</tr>
<tr>
<td>Nash, J. J.</td>
<td>117</td>
</tr>
<tr>
<td>Nayani, K.</td>
<td>102, 241</td>
</tr>
<tr>
<td>Nazemidashtjarandi, S. ..</td>
<td>85, 429</td>
</tr>
<tr>
<td>Neibloom, D.</td>
<td>72</td>
</tr>
<tr>
<td>Neimark, A. V.</td>
<td>328, 330</td>
</tr>
<tr>
<td>Nelson, C.</td>
<td>388</td>
</tr>
<tr>
<td>Nelson, T.</td>
<td>184</td>
</tr>
<tr>
<td>Neto, C.</td>
<td>336</td>
</tr>
<tr>
<td>Nguyen, C.</td>
<td>425</td>
</tr>
<tr>
<td>Nguyen, M.</td>
<td>183</td>
</tr>
<tr>
<td>Nguyen, T.</td>
<td>90</td>
</tr>
<tr>
<td>Nims, D. K.</td>
<td>98</td>
</tr>
<tr>
<td>Nishiyama, Y.</td>
<td>393</td>
</tr>
<tr>
<td>Nitin, N.</td>
<td>277</td>
</tr>
<tr>
<td>Nonkumwong, J.</td>
<td>286</td>
</tr>
<tr>
<td>Nsengiyumva, E. M.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>181</td>
</tr>
<tr>
<td>Nye, N.</td>
<td>172</td>
</tr>
<tr>
<td>Ochoa, C.</td>
<td>360</td>
</tr>
<tr>
<td>O'Donnell, M.</td>
<td>234</td>
</tr>
<tr>
<td>Oh, J.</td>
<td>420</td>
</tr>
<tr>
<td>Okshevsky, M.</td>
<td>203</td>
</tr>
<tr>
<td>Osborn, M. J.</td>
<td>37</td>
</tr>
<tr>
<td>Ou, Z.</td>
<td>69, 350, 353</td>
</tr>
<tr>
<td>Ounaies, Z.</td>
<td>320</td>
</tr>
<tr>
<td>Ovarlez, G.</td>
<td>251</td>
</tr>
<tr>
<td>Ozbolat, I.</td>
<td>109</td>
</tr>
<tr>
<td>Padmanabhan, P.</td>
<td>90</td>
</tr>
<tr>
<td>Page, S.</td>
<td>373</td>
</tr>
<tr>
<td>Palmese, G.</td>
<td>68</td>
</tr>
</tbody>
</table>
Pan, A. ................ 233
Panchanathan, D. .... 337
Pandey, S. ........... 218
Parajuli, S. .......... 74
Park, J........ 47, 161, 367
Park, J. Y. .......... 365
Park, N. ........ 44
Patra, A. ........ 233
Patton, S. ....... 321
Pei, A. .............. 176
Peng, T. ........ 211
Penta, N. K. ....... 152
Pentzer, E. ....... 135
Peppou-Chapman, S. ...
.......................... 336
Peris, M. ............. 260
Perry, S. L. ....... 358
Pester, C. W. ..... 262
Petroff, M. G. .... 106, 202
Phatak, A. .......... 331
Philips, L. A. ... 168, 322
Pichowicz, B. ....... 29
Pinkhassik, E. .... 389
Pionnier, N. .......... 334
Pir Cakmak, F. .. 281
Poling-Skutvik, R. ... 196, ...
.......................... 352
Povilianskas, A. .... 109
Poyton, M.F. ....... 426
Pozzo, L. .......... 280
Pozzo, L. D. ....... 234
Pradeep, S. ....... 175
Premadasa, U. .. 284, 286
Prieve, D. C. .... 420
Prileszky, T. A. .. 194, 315
Przybycien, T. M. .. 335, ...
.......................... 355
Pulati, N. .......... 318
Qi, W. ............... 33
Quigg, A. ........ 87
Rafiq, R. .......... 361
Ragan, R. .......... 390
Raghubandan, A. .. 139
Rahim, A. A. ...... 79
Rai, P. ............. 241
Raiyan, A. ....... 98, 298
Rajappan, A. ....... 337
Ramakrishna, S. N. ....
........................... 250
Ramasubramani, V. ....
........................... 115
Randall, C. ....... 366
Rashidi, A. ....... 60, 192
Rathore, P. ....... 39
Razavi, S. ...... 188, 192
Razinkov, V. I. .... 33
Reboucas, R. .... 317
Reinicke, S. ..... 81
Remmert, S. .... 387
Ren, L. .......... 56
Renggli, D. ...... 220
Rettenmaier, D. ... 144
Reufer, M. ....... 296
Richards, J. .... 293
Richards, J. J. .... 252
Riet, A. A. ....... 419
Riley, F. P. ...... 141
Riley, J. ...... 293, 380
Ring, D. ....... 143
Rivera-Rivera, L. ... 217
Roberts, C. J. .... 33
Rock, R. M. ...... 292
Rodrigues, A. .... 74
Rogers, J. ...... 1
Rogers, S. A. ..... 47
Rogers, W. B. ... 10, 70
Roh, S.......... 96, 184, 416
Rohani, A. ...... 394
Roisman, I. V. ... 144
Romick, J. ...... 313
Rowland, A. .... 75, 318
Ruffner, D. B. ... 322
Ruths, M. ....... 221
Rutkevicius, M. ... 374
Sabrina, S. ....... 54
Salipante, P. .... 294
Samaniuk, J. ....... 11
Samineni, L. ....... 176
Sandoval, A. ..... 316
Sanedrin, R. ..... 338
Saneie, N. ....... 49
Santo, K. P. .... 328, 330
Santore, M. M. ... 59
Santschi, P. ....... 87
Sarayloo, M. .... 98
Saud, K. T. ....... 189
Sauleda, M. .... 186
Savage, P. ....... 387
Sawada, D. ...... 393
Sawiak, L. ....... 119
Schegloff, F. .... 296
Scheidegger, L. ... 132
Schmitt, A. .... 388
Schneewind, S. ... 280
Schneider, J. .... 395
Thomas, F. ................ 52
Thomas, S. ................ 222
Thompson, B. .......... 36, 374
Thursch, L. .......... 428
Tikekar, R. .......... 277
Tilton, R. .......... 167
Tilton, R. D. ....... 38, 105, ....... 174, 180, 335, 355
Tirrell, M. .......... 272
Tirrell, M. V. ..... 273
Toomey, R. ....... 222, 306
Torres, I. ........ 12
Torres Diaz, I. ......... 112
Torres-Sanchez, A......
................................ 223
Trefalt, G. ........ 80
Tribe, L. .......... 78
Tropea, C. ....... 144
Tsiyanou, M. ...... 83, 181,
................................ 190, 232
Tsouris, C. .......... 28, 423
Tsuei, M. A. ........ 25
Tu, R. ............ 41
Tucker, C. ........ 388
Tufenkji, N. .... 31,
................................ 126, 203
Twieg, R. J. ..... 240, 241
Tyowua, A. T. .... 73
Tyrode, E. .......... 319
Tyrode, E. C. .... 266
Uliana, A. .......... 29
Underhill, P. T. .... 139
Urena-Benavides, E. ...... 74
Vaccari, L. ........ 104
Valette, S. .......... 334
Valtierrrez-Gaytan, C......
................................ 321
Vanapalli, S. ...... 23, 357
Vanapalli, S. A. .... 329
van de Ven, T. ...... 203,
................................ 344
Vanegas, J. M. .......... 223
Van Haute, D. .... 151
Varanasi, K. K. .... 337
Varga, Z. .......... 94
Varghese, S. M. .... 292
Vasei, M. .......... 154
Veeren, A. .......... 37, 410
Veisi, Z. .......... 306
Velegol, D. ....... 30, 54, 62,
............... 176, 268, 303, 304
Velegol, S. ...... 29, 30,
................................ 176, 411
Velev, O. .......... 311
Velev, O. D. .... 5, 96, 170,
.......... 184, 271, 400, 416
Velikov, K. ........ 413
Venkatesh, R. B. ... 327
Vernant, J. ....... 132
Vishnyakov, A. .......... 328,
................................ 330
Vollmer, D. .......... 48
Volpe, G. ........ 220
Vuong, T. .... 183, 391
Vutukuri, H. ....... 57, 261
Waggett, F. .......... 291
Wagner, N. .......... 293, 380
Wagner, N. J. .. 209, 247,
................................ 252, 253
Waite, H. ........ 267
Waite, J. ........ 299
Walker, L. ........ 207
Walker, L. M. .... 40,
................................ 153, 197
Walker, T. W. .... 93
Wallace, A. D. .... 400
Walsh, M. ...... 277
Walters, R. .......... 385
Wang, C.-Y. ........ 172
Wang, C. ........ 301
Wang, G. .......... 131
Wang, H. ...... 176, 332
Wang, J. .......... 159, 259, 297
Wang, L. ........ 297
Wang, M. ....... 99, 275, 427
Wang, W. ....... 6, 169, 171
Wang, X. ........ 25
Wang, Z. ....... 29, 349,
................................ 350, 353
Wasserman, E. P. .... 346
Watanabe, S. ........ 149,
................................ 150, 409
Weber, S. ........ 48
Weeks, E. ........ 302
Wehrman, M. D. .... 381
Wei, P. .......... 135
Wei, W.-S. ....... 276
Weigandt, K. ...... 295
Weimer, J. ...... 425
Weitz, D. ....... 307
Weston, J. S. .... 295
Whitaker, K. .... 94, 388
White, A. ........ 87, 123
Willers, T. .......... 338
Williams, A. ...... 96, 184
Williams, I. ........ 321
Williams, S. ........ 311
<table>
<thead>
<tr>
<th>Name</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willson, R.</td>
<td>196</td>
</tr>
<tr>
<td>Winkeljohn, C.</td>
<td>223</td>
</tr>
<tr>
<td>Wirth, C. L.</td>
<td>60,</td>
</tr>
<tr>
<td></td>
<td>192, 292</td>
</tr>
<tr>
<td>Woehl, T. J.</td>
<td>275, 427</td>
</tr>
<tr>
<td>Wonderly, W.</td>
<td>267</td>
</tr>
<tr>
<td>Wong, P.</td>
<td>297</td>
</tr>
<tr>
<td>Wong, T.</td>
<td>297</td>
</tr>
<tr>
<td>Wood, C. V.</td>
<td>33</td>
</tr>
<tr>
<td>Woys, A. M.</td>
<td>209, 247</td>
</tr>
<tr>
<td>Wrenn, S.</td>
<td>236</td>
</tr>
<tr>
<td>Wrenn, S.</td>
<td>277</td>
</tr>
<tr>
<td>Wu, H.</td>
<td>58</td>
</tr>
<tr>
<td>Wu, K.</td>
<td>340</td>
</tr>
<tr>
<td>Wu, N.</td>
<td>101, 178, 421</td>
</tr>
<tr>
<td>Wu, Y.</td>
<td>242</td>
</tr>
<tr>
<td>Xia, Y.</td>
<td>276</td>
</tr>
<tr>
<td>Xiong, B</td>
<td>29, 30, 176</td>
</tr>
<tr>
<td>Xiong, Z.</td>
<td>259</td>
</tr>
<tr>
<td>Xu, C.</td>
<td>39, 87</td>
</tr>
<tr>
<td>Xu, K.</td>
<td>420</td>
</tr>
<tr>
<td>Xu, L.</td>
<td>124, 155, 248</td>
</tr>
<tr>
<td>Xu, P.</td>
<td>56</td>
</tr>
<tr>
<td>Xu, Y.</td>
<td>371</td>
</tr>
<tr>
<td>Yadavali, S.</td>
<td>128</td>
</tr>
<tr>
<td>Yan, J.</td>
<td>167</td>
</tr>
<tr>
<td>Yan, L.</td>
<td>395</td>
</tr>
<tr>
<td>Yang, A.</td>
<td>160</td>
</tr>
<tr>
<td>Yang, D.</td>
<td>197</td>
</tr>
<tr>
<td>Yang, H.</td>
<td>163, 164</td>
</tr>
<tr>
<td>Yang, J.</td>
<td>114</td>
</tr>
<tr>
<td>Yang, S.</td>
<td>206, 276</td>
</tr>
<tr>
<td>Yang, T.</td>
<td>101</td>
</tr>
<tr>
<td>Yang, T.S.</td>
<td>426</td>
</tr>
<tr>
<td>Yang, W.</td>
<td>360</td>
</tr>
<tr>
<td>Yang, X.</td>
<td>421</td>
</tr>
<tr>
<td>Yang, Y.</td>
<td>124, 156</td>
</tr>
<tr>
<td>Yashin, V. V.</td>
<td>216</td>
</tr>
<tr>
<td>Ye, D.</td>
<td>35</td>
</tr>
<tr>
<td>Yeh, H.-L.</td>
<td>372</td>
</tr>
<tr>
<td>Yeom, J.</td>
<td>384</td>
</tr>
<tr>
<td>Yeon, H.</td>
<td>301</td>
</tr>
<tr>
<td>Yi, G.-R.</td>
<td>82</td>
</tr>
<tr>
<td>Yiacoumi, S.</td>
<td>28, 423</td>
</tr>
<tr>
<td>Yiase, S. G.</td>
<td>73</td>
</tr>
<tr>
<td>Yilixiati, S.</td>
<td>360, 361</td>
</tr>
<tr>
<td>Yodh, A. G.</td>
<td>45, 276</td>
</tr>
<tr>
<td>Yossifon, G.</td>
<td>170</td>
</tr>
<tr>
<td>Yu, H.</td>
<td>240, 241</td>
</tr>
<tr>
<td>Yue, X.</td>
<td>208</td>
</tr>
<tr>
<td>Zacharia, N. S.</td>
<td>88</td>
</tr>
<tr>
<td>Zahr, A. S.</td>
<td>348</td>
</tr>
<tr>
<td>Zanini, M.</td>
<td>250</td>
</tr>
<tr>
<td>Zarraga, I. E.</td>
<td>209, 247</td>
</tr>
<tr>
<td>Zasadzinski, J.</td>
<td>140,</td>
</tr>
<tr>
<td></td>
<td>321</td>
</tr>
<tr>
<td>Zasadzinski, J. A.</td>
<td>37,</td>
</tr>
<tr>
<td></td>
<td>410</td>
</tr>
<tr>
<td>Zeervi, M.</td>
<td>391</td>
</tr>
<tr>
<td>Zeininger, L.</td>
<td>26</td>
</tr>
<tr>
<td>Zhan, X.</td>
<td>259</td>
</tr>
<tr>
<td>Zhang, C.</td>
<td>172</td>
</tr>
<tr>
<td>Zhang, J.</td>
<td>114</td>
</tr>
<tr>
<td>Zhang, L.</td>
<td>169</td>
</tr>
<tr>
<td>Zhang, M.</td>
<td>209,</td>
</tr>
<tr>
<td></td>
<td>247, 417</td>
</tr>
<tr>
<td>Zhang, X. A.</td>
<td>206</td>
</tr>
<tr>
<td>Zhang, Y.</td>
<td>9, 45, 83,</td>
</tr>
<tr>
<td></td>
<td>114, 264, 360,</td>
</tr>
<tr>
<td></td>
<td>361, 424</td>
</tr>
<tr>
<td>Zhang, Z</td>
<td>109</td>
</tr>
<tr>
<td>Zhao, H.</td>
<td>18, 133</td>
</tr>
<tr>
<td>Zhao, X.</td>
<td>303, 305</td>
</tr>
<tr>
<td>Zheng, J.</td>
<td>259</td>
</tr>
<tr>
<td>Zheng, S.</td>
<td>41</td>
</tr>
<tr>
<td>Zheng, Y.</td>
<td>35</td>
</tr>
<tr>
<td>Zhi, K.</td>
<td>158</td>
</tr>
<tr>
<td>Zhong, W.</td>
<td>27</td>
</tr>
<tr>
<td>Zhou, C.</td>
<td>6</td>
</tr>
<tr>
<td>Zhou, D.</td>
<td>56</td>
</tr>
<tr>
<td>Zhou, H.</td>
<td>125</td>
</tr>
<tr>
<td>Zhou, Y.</td>
<td>25</td>
</tr>
<tr>
<td>Zia, R. N.</td>
<td>90</td>
</tr>
<tr>
<td>Zoyhofski, N. A.</td>
<td>190</td>
</tr>
<tr>
<td>Zuo, Y.</td>
<td>156</td>
</tr>
<tr>
<td>Zuo, Y. Y.</td>
<td>124,</td>
</tr>
<tr>
<td></td>
<td>155, 248</td>
</tr>
</tbody>
</table>
2019 ACS CSSS Symposium

93rd COLLOID & SURFACE
SCIENCE SYMPOSIUM

Georgia Institute of Technology, Atlanta, Georgia
June 16 – 19, 2019

The 93rd Colloid & Surface Science Symposium of the American Chemical Society will continue a long tradition of bringing together academic and industrial researchers from across the globe to celebrate diverse experiences and common interests in colloidal systems, interfacial phenomena and soft matter topics.

We hope that you can join us from June 16th to 19th, 2019 at Georgia Tech for a memorable symposium.

See you in Atlanta!

Jennifer Lewis
Harvard University

Juan de Pablo
University of Chicago

Valeria Milam
Georgia Tech

Sven Behrens
Georgia Tech

Seth Marder
Georgia Tech

www.colloids2019.org