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11th Southeast Meeting on Soft Materials
Wednesday, May 23, 2018, Emory University
Registration, breakfast, and talks – Psychology (PAIS) Room 290
Lunch, and posters – Math and Science (MSC) Atrium

PROGRAM

8:30 am – 8:50 am

Registration and breakfast (PAIS 290)

8:50 am – 9:00 am

Welcome and opening remarks

9:00 am – 9:50 am

Keynote Talk (chair: Justin Burton)

Karen Daniels (North Carolina State University)

Stardusts and flowers: when spreading droplets break bad

9:50 am – 10:30 am

Contributed Talks (10 min talk + 2 min questions) (chair: Justin Burton)

Jonathan Michel (Georgia Institute of Technology, Peter Yunker's group)

Why is structural hierarchy so common in biological tissues?

Xiaokun Zhang (Emory University, James Kindt's group)

Extraction of cluster free energies from simple simulations of OPC micelle formation

Roxanne Glazier (Emory University, Khalid Salaita's group)

Molecular tension and protrusion at the cell-membrane interface

10:30 am – 10:50 am

Coffee and refreshments

10:50 am – 11:25 am

Invited Talk (chair: Connie Roth)

Jennifer Curtis (Georgia Institute of Technology)

Pressing Forward with Hyaluronan: Where polymer physics governs biology and biology helps polymer physics

11:25 am – 12:25 pm

Contributed Talks (10 min talk + 2 min questions) (chair: Connie Roth)

Mia Morrell (Emory University, Eric Weeks' group)
Soft particle clogging in 2D hoppers

Andrew Yee (Georgia Institute of Technology, Minami Yoda's group)
Near-wall colloidal particle structures in combined Poiseuille and electroosmotic flow: Partial banding and heterogeneous assembly

Daniel Kovari (Emory University, Laura Finzi's group)
Flexibility, melting, and over-stretching: How diaminopurine-substitution affects DNA mechanics

Dominic Robe (Emory University, Stefan Boettcher's group)
Rearrangement event rates in an aging colloidal glass

Michael Thees (Emory University, Connie Roth's group)
Effects of physical adsorption of polymer chains at an apparently neutral interface to glassy dynamics

12:30 pm – 2:30 pm

Lunch and posters (MSC Atrium)

2:30 pm – 3:05 pm

Invited Talk (chair: James Kindt)

David Lynn (Emory University)
Systems Chemistry, Dynamic Chemical Networks, and the Emergence of Macromolecular Function

3:05 pm – 3:45 pm

Contributed Talks (10 min talk + 2 min questions) (chair: James Kindt)

Jennifer Rieser (Georgia Institute of Technology, Daniel Goldman's group)
Scattering of an undulatory locomotor arises from persistent interactions with heterogeneities

Olga Shishkov (Georgia Institute of Technology, David Hu's group)
Collective motion of fly larvae during feeding

Xiaolei Ma (Emory University, Justin Burton's group)
Universal scaling of polygonal crack patterns in dried colloidal suspensions

3:45 pm – 4:05 pm

Coffee and refreshments

4:05 pm – 4:45 pm

Contributed Talks (10 min talk + 2 min questions) (chair: Eric Weeks)

Michael Masha (Georgia Gwinnett College, Ajay Mallia's group)

The design and studies of deep eutectic solvents

Adrien Saremi (Georgia Institute of Technology, Zeb Rocklin's group)

Controlling the softness of metamaterials: Corner modes via topology

Omotola Okesanjo (Georgia Institute of Technology, Sven Behrens' group)

Applications of capillary foams

4:45 pm – 5:20 pm

Invited Talk (chair: Eric Weeks)

Saad Bhamla (Georgia Tech)

Fast, Furious and Frugal: Exploring limits of soft materials in extreme organisms and low-cost tools

5:20 pm – 5:30 pm

Poster Award Winners and Closing Remarks

5:30 pm

Meeting Adjourn

Keynote Speaker



Professor Daniels received her PhD in 2002 from Cornell University and spent 2002-5 as a postdoctoral research associate at Duke University. She joined the faculty of North Carolina State University in 2005, and was promoted to Associate Professor in 2011. She was a 2007 recipient of an NSF Faculty Early Career Development Program (CAREER) Award, and a 2011 recipient of an Alexander von Humboldt Fellowship which provided support for a sabbatical leave to the Max Planck Institute for Dynamics and Self-Organization in Göttingen, Germany. Her main research interests center around experiments on the nonequilibrium and nonlinear dynamics of granular materials, fluids, and gels. These experiments have allowed her lab to address questions of how failure occurs, how non-trivial patterns arise, and what controls the transitions between different classes of behaviors. Several of these studies have used idealized systems to provide insight into biological and geological phenomena.

Invited Speakers



Saad Bhamla is an Assistant Professor in the School of Chemical and Biomolecular Engineering at Georgia Tech, where he runs a curiosity-driven lab that explores research questions in organismic biophysics, soft matter and frugal science. Prior to joining Georgia Tech, Saad was a Dean's Postdoctoral Fellow in Bioengineering at Stanford University, where he also completed his doctoral work in Chemical Engineering. Saad's most notable invention includes a 20-cent paper centrifuge that is currently undergoing field tests in resource-limited countries. Saad is also an Accel Innovation Scholar, recipient of the Innovation in MedTech Award, INDEX: Design to Improve Life Award and Stanford's Centennial Teaching Award. For further information, please visit <https://www.bhamlab.com>



Dr. Jennifer Curtis is an Associate Professor in the School of Physics at Georgia Institute of Technology. Jennifer received her B.A. in Physics at Columbia University (New York, NY) in 1997, and her PhD in Physics at the University of Chicago in 2002. There her research focused on soft matter physics and optical manipulation. She helped pioneer the development of holographic optical tweezers, a powerful method to generate dynamic optical traps and optical vortices in three dimensions. During her postdoctoral research at the University of Heidelberg, Germany, Jennifer began to study the role of physics in biological systems, particularly at the cell and tissue level. During that time she was an Alexander Humboldt Fellow and eventually an independent group leader before she became a faculty member at Georgia Tech in 2007. In 2010 she received an NSF CAREER Award and in 2014 she became an Editorial Board Member of the Biophysical Journal. Her active research interests fall in the area of Physics of Living Systems / Biological Physics, and include cell adhesion and motility, phagocytosis, the polymer generating molecular machine hyaluronan synthase, and how the large carbohydrate polymer hyaluronan organizes tissues and mediates cell-cell and cell-matrix interactions. In her free time, she enjoys running, reading, learning the ukulele, attending live music events and spending time with her husband and two children, a eleven-year old boy and a 3 year old girl.



David G. Lynn is contributing broadly to the areas of systems chemistry, molecular recognition, synthetic biology and chemical evolution, and is developing chemical and physical methods for the analysis of supramolecular self-assemblies, defining signal regulation for cellular development and pathogenesis, designing molecular skeletons for storing and reading information, and creating systems for the evolution of functional order. He holds a Howard Hughes Medical Institute Professorship and is the Asa Griggs Candler Professor in Chemistry and Biology at Emory University.

Posters

Aaron Blanchard (Emory University, Khalid Salaita's group)
DNA micromotors powered by molecular tension

Jonas Cuadrado (Georgia Institute of Technology, Alberto Fernandez-Nieves's group)
Internal mass segregation in pNIPAM microgels

Thomas Day (Georgia Institute of Technology, Peter Yunker's group)
The Role of Physics in the Early Evolution of Multicellularity

Michael Dimitriyev (Georgia Institute of Technology, Sabetta Matsumoto 's group)
Geometry and mechanics of knitted fabric

Bahnisikha Dutta (Georgia Institute of Technology, Daniel Goldman's group)
Collective dynamics of fire ants

Yannic Gagnon (Emory University, Connie Roth's group)
Crosslinking PDMS to vary modulus and its effect on the local T_g profile in neighboring polystyrene

Guram Gogia (Emory University, Justin Burton's group)
Emergent bistability in nonequilibrium crystal

Louis Han (Emory University, Connie Roth's group)
Specific volume changes in thin polymer films and potential correlations with glass transition temperature

Andras Karsai (Georgia Institute of Technology, Daniel Goldman's group)
Wheeled locomotion and intrusion dynamics in dry granular media

Shengkai Li (Georgia Institute of Technology, Daniel Goldman's group)
Active matter mimics general relativity

Chen Liang (Emory University, David Lynn's group)
Conformational evolution of polymorphic amyloid assemblies

Shashank G. Markande (Georgia Institute of Technology, Sabetta Matsumoto 's group)
The QTZ-QZD surfaces: a family of triply-periodic chiral minimal surfaces

Marguerite E. Matherne (Georgia Institute of Technology, David Hu's group)
The physics of honey bee pollen suspensions

James McInerney (Georgia Institute of Technology, Zeb Rocklin's group)
How hidden geometric symmetries reveal novel origami folding mechanisms

Maritza Mujica (Georgia Institute of Technology, Sven Behrens' group)
Advanced emulsion-templating of microreactors for the scalable production of semiconductor nanowires

Yasemin Ozkan Aydin (Georgia Institute of Technology, Daniel Goldman's group)
Design of a soft robophysical earthworm model

Jessica Petree (Emory University, Khalid Salaita's group)
Site-selective RNA splicing nanozyme: DNAzymes and RtcB conjugates on a gold nanoparticle

Gokul Raghunath (Emory University, Brian Dyer's group)
Kinetics of membrane bending by protein crowding

Perrin E. Schiebel (Georgia Institute of Technology, Daniel Goldman's group)
Sand swimming of a fast-moving desert snake

Gabi Steinbach (Georgia Institute of Technology, Peter Yunker's group)
Gamble vs. strategy of microbial competitors – Interfaces and confinement in biofilms with T6SS contact-killing

Han Su (Emory University, Khalid Salaita's group)
Light-responsive polymer particles as force clamps for the mechanical unfolding of target molecules

Michael Tennenbaum (Georgia Institute of Technology, Alberto Fernandez-Nieves's group)
Non-linear mechanical properties of fire ant aggregations

Skanda Vivek (Georgia Institute of Technology, Peter Yunker's group)
Emergent collective risks when connected vehicles are hacked

Ki Tae Wolf (Georgia Institute of Technology, Alexander Alexeev's group)
The effect of lymphatic valve morphology on fluid flow

David Yanni (Georgia Institute of Technology, Peter Yunker's group)
Life in the coffee ring

Farzana Zerín (Georgia Gwinnett College, Ajay Mallia's group)
Design and synthesis of ninhydrin based unnatural α -amino acids

Jing Zhao (Emory University, Khalid Salaita's group)
Ultrafast dynamics of optomechanical actuator revealed via transient absorption spectroscopy and heat transfer simulations

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