

Texas Soft Matter Meeting: Full Program

August 21, 2015

Rice University

All scientific presentations will be held at McMurtry auditorium on the first floor of Duncan Hall. Lunch will either be at Duncan Hall or at the Rice Art Gallery (depending on the weather). Please refer to the attached information for directions and information on venue.

Schedule of Events

7:30 - 8:20: Breakfast and on-site registration
8:20 - 8:30: Introductory remarks: R. Verduzco
8:30 - 9:00: Invited Talk: Mihaela Stefan
9:00 - 10:00: Contributed Talks # 1: Biomaterials (Sponsor: Anton Parr)
10:00 - 10:30: Coffee Break
10:30 - 11:00: Invited Talk: Ron Hedden
11:00 - 12:00: Contributed Talks # 2: Colloids, Nanoparticles, and Interfaces (Sponsor: Kruss)
12:00 - 13:00: Lunch (Duncan Hall, in front of auditorium)
13:00 - 13:30: Invited Talk: Brian Habersberger
13:30 - 14:30: Contributed Talks # 3: Structure and Dynamics (Sponsor Malvern)
14:30 - 15:00: Coffee Break
15:00 - 15:30: Invited Talk: Haleh Ardebilli
15:30 - 16:30: Contributed talks # 4: Applications and Devices
16:30 - 17:00: Invited Talk: Peter Wolynes
17:00 - 17:45: Reception/Happy Hour (Sponsored by CHBE GSA and Rice School of Engineering)

Registration

Participants are advised to register as soon as possible to help in planning for food and space. Registration can be completed online through the conference website:

<http://texassoftmatter.rice.edu/> Registration is \$10 for all participants and includes lunch.

For those that register in advance, a set of name badges will be available upon check-in. On-site registration (cash only) will also be available until the start of the meeting at 8:20 AM.

Directions to Campus

The Rice University campus is located south of downtown Houston near the Houston Medical Center. All technical events will be held at Duncan Hall, building #25 on the [campus map](#).

Google Maps address to Duncan Hall: [Anne and Charles Duncan Hall, Houston, TX 77005](#)

Google Maps address to Central Garage Parking: [Central Garage, Houston, TX 77005](#)

Parking and Parking Vouchers

A limited quantity of parking vouchers will be available on a first-come first-serve basis. Please request a voucher when you check in and pick up your name badge. You will still need a credit card to enter the parking lot, but the voucher will allow you to exit without charging your card.

Visitors parking in the Central garage is \$11 per day. Additional parking is available in the North Annex (\$11/day), near entrance #20 from Rice boulevard. Parking in the Greenbriar Lot (located through entrance #16 on Rice Boulevard) is \$1 per day. If you choose to park in the Greenbriar lot or West Lot, you can walk to the West Lot and ride a free campus shuttle to Duncan Hall.

Texas Soft Matter Meeting: Sponsors

We acknowledge the generous support of the conference sponsors: Malvern, Kruss, Anton Parr, and the Rice University School of Engineering. Industrial sponsors will give talks as part of the contributed session:

1. **Anton Parr**, Wesleyne Greer, "Rheo-Microscopy: Precise Rheological Data in Combination with Microscopy"
2. **Kruss**, Philip Jaeger and Mark McCarthy, "Interfacial properties under reservoir conditions"
3. **Malvern**, Carrie Schindler and Shawn Welch, "Latest developments in hardware and applications for advanced, multi-detector GPC/SEC"

Texas Soft Matter Meeting: Invited Abstracts

Nonuniform deuterium distribution in labelled polymers: direct measurement and SANS model

Brian M. Habersberger¹, Kyle E. Hart², David Gillespie³, Tianzi Huang³

¹Dow Chemical Company: ¹Elastomers R&D, ²Performance Plastics Materials Science R&D,

³Performance Plastics Characterization R&D

Catalytic hydrogen-deuterium exchange provides a facile method for labeling commercially available polyolefins to create contrast for neutron scattering experiments or other isotope-sensitive techniques. Unlike commonly reported model polymers, which have low dispersity and uniform microstructures, commercial polyolefins may be composed of a broad range of molecular weights with varying amounts of comonomer distributed heterogeneously among them. Exchange reactions performed on such complex resins may result in correspondingly nonuniform distributions of deuterium. Understanding the relative scattering contribution from different populations of chains is essential to interpretation of neutron scattering results. Here, a method is described that allows for semi-quantitative measurement of the distribution of deuterium across molecular weights using size exclusion chromatography with infrared detection. The Random Phase Approximation prediction for scattering from homogeneous polymer blends is adapted to model measured SANS patterns for a polymer of known deuterium distribution. Additionally, a Monte Carlo method is used to calculate the deuterium distribution that corresponds to the experimental SANS measurements. These methods provide powerful tools for probing the structure of non-ideal polymer architectures.

Flexible Thin-Film Battery based on Solid Polymer Nanocomposite Electrolyte

Haleh Ardebili, Mejd Kammoun, Sean Berg

University of Houston, Department of Mechanical Engineering

The prevalence of flexible electronics including the ubiquitous touch-screens and wearable devices has galvanized the development of high performance and safer flexible energy storage devices. A key imperative in fabricating flexible thin-film batteries is the replacement of the traditional organic liquid electrolyte with high performance solid electrolyte. Solid polymer electrolytes (SPEs) offer many advantages including enhanced safety, flexibility, stability, and thin film manufacturability. However, the lower ion conductivity of SPEs at room temperature remains a challenge. Nanoscale fillers have been shown to enhance the ion conductivity of SPEs without compromising the mechanical properties.

In this study, we have developed a high performance flexible Li ion battery based on solid polymer nanocomposite electrolyte, specifically composed of 1% graphene oxide nanosheets embedded in polyethylene oxide matrix. The flexible battery exhibits a capacity of 0.13 mAh cm⁻², good cycling stability over 100 charge/discharge cycles, and a relatively high maximum operating voltage of 4.9 V. The laminated battery shows robust mechanical flexibility over 6000 bending cycles and excellent electrochemical performance in both flat and bent configurations.

Finite element analysis (FEA) of the LIB provides critical insights into the evolution of mechanical stresses during lamination and bending.

Combinatorial Screening of Pervaporation Membrane Materials

Ronald C. Hedden, Rutvik Godbole, Lan Ma

Texas Tech University, Department of Chemical Engineering

Pervaporation membranes have recently received attention for energy-efficient recovery of biofuels (ethanol or n-butanol) derived from fermentations. Our group is designing highly swelling polyacrylate gel membranes that offer tunable performance and provide high alcohol flux. Because acrylates are available with a variety of functional groups, co-polymerization produces innumerable material compositions. To accelerate screening of possible membrane materials compositions, we have developed a high throughput, combinatorial screening methodology. A matrix of samples is prepared with orthogonal gradients in two variables of interest such as monomer composition and crosslinker concentration. Samples are subjected to gravimetric swelling experiments to characterize their affinities for water and alcohols. In mixed-solvent swelling tests, HPLC analysis of the liquid phase permits estimation of the solubility selectivities and distribution coefficients for water and alcohol. Diffusivities of water and alcohol are estimated by a gravimetric desorption technique. After screening solubility selectivity, selected membrane materials are tested for permeability selectivity using a porous glass frit as a support. The performance of different polyacrylates in ethanol-water separations will be discussed.

Functional Polycaprolactones for Micellar Delivery of Anticancer Drugs

Mihaela Stefan

University of Texas at Dallas, Department of Chemistry

Libraries of biodegradable thermoresponsive polycaprolactones for drug delivery of anticancer drugs and histone deacetylase (HDAC) inhibitors were synthesized by the ring-opening polymerization of various γ -substituted- ϵ -caprolactone monomers. The combination of biocompatibility, biodegradability, and tunable thermoresponsive behavior is ideal for drug delivery of anticancer drugs and HDAC inhibitors. The synthesis of functional thermoresponsive polycaprolactones containing masked HDAC inhibitors has the potential to create a new paradigm in cancer treatment.

Amphiphilic thermoresponsive polycaprolactone block copolymers with tunable thermoresponsive behavior were synthesized. The amphiphilic block copolymers self-assembled in water to form micelles with a hydrophobic core that was employed to load and deliver hydrophobic anticancer drugs. The fine tuning of the ratio between hydrophobic and hydrophilic blocks provided polymers with tunable lower critical solution temperatures (LCST) in the range of 37-55 °C. The functional groups of the hydrophobic block were varied to adjust the size of micelles which allowed the tunability of drug loading capacity.

Towards an Energy Landscape Theory of Chromosomes

Peter Wolynes

Rice University, Department of Chemistry, Materials Science and NanoEngineering, Physics & Astronomy

Texas Soft Matter Meeting: Full Agenda

7:30 - 8:20: Breakfast and registration

8:20 - 8:30: R. Verduzco, opening remarks

8:30 - 9:00: Mihaela Stefan, UT Dallas: *Functional Polycaprolactones for Micellar Delivery of Anticancer Drugs*

9:00 - 10:00: Contributed Talks, Session # 1

1. Angela M. Wagner, Balark Chetan, and Nicholas A. Peppas (University of Texas at Austin, angelamwagner@utexas.edu), *Intelligent Nanogels for Concurrent Delivery of Hydrophilic and Hydrophobic Chemotherapeutic Agents*
2. Brian J. Engel, Pamela E. Constantinou, Lindsey K. Sablatura, Nathaniel J. Doty, Daniel D. Carson, Mary C. Farach-Carson, Daniel A. Harrington, Thomas I. Zarembinski (Rice University, brian.j.engel@rice.edu), *A Multi-Layer Hyaluronic Acid Hydrogel System for 3D Drug Screening of Cancer-Stromal Co-Cultures*
3. Hanna Hlushko, Victoria Albright, Iryna Zhuk, Svetlana Sukhishvili (Texas A&M, hanna.hlushko@tamu.edu), *Exploration of the local acidification induced by bacteria as a trigger for antimicrobial release*
4. Lauren Popp, Laura Segatori (Rice University, lbk3@rice.edu), *Understanding the autophagy-inducing properties of engineered nanomaterials*
5. Guozhen Yang, Hiruy Tesefay, Megan L. Robertson (University of Houston, gyang5@uh.edu), *Biobased Soft Crosslinked Polymer Films from Phenolic Acids*
6. J. Kim, J. Trabuco, U. Patil, H. Goux, M. Crum, U. Pandya, K. Kourentzi, R. C. Willson, J. C. Conrad (University of Houston, kim76@uh.edu), *Engineering temperature-tolerant M13 bacteriophage as lateral-flow assay reporters*
7. Tiffany N. Vo, Adam K. Ekenseair, and Antonios G. Mikos (Rice University, tiffany.n.vo@rice.edu), *Dual Thermally and Chemically Crosslinkable Hydrogels for Craniofacial Bone Tissue Engineering*
8. Michael Byington, Maria Vorontsova, Jacinta C Conrad, Peter G Vekilov (University of Houston, mcbbyington@uh.edu), *Shearing Lysozyme Solutions Increases Size and Decreases Volume Fraction of Pre-Nucleation Clusters*

9. Katy N. Olafson, Jeffrey D. Rimer, Peter G. Vekilov (University of Houston, kolafson@central.uh.edu), *Classification of Antimalarial Drug Inhibition in Hematin Crystallization*

10. Ilse Nava Medina, Zhengdong Cheng (Texas A&M, inavamed@tamu.edu), *Iron-based Belousov Zhabotinsky gelatin*

11. Na Li, Zhuo Chen, Jeremiah J. Gassensmith* (University of Texas at Dallas, gassensmith@utdallas.edu), *Multivalent Viral Nanocapsids*

12. N. Li, Z. Chen and J. J. Gassensmith. (University of Texas at Dallas, gassensmith@utdallas.edu), *Virus-Directed Synthesis of Metallic Nanoparticles*

13. Mohammad S. Safari, Peter G. Vekilov, Jacinta C. Conrad (University of Houston, msafari@uh.edu), *Applying Differential Dynamic Microscopy to Study Protein Crystallization*

14. Yuly A. Jaimes-Lizcano¹, Sumedha Sharma¹ and Jacinta Conrad (University of Houston, yajaimelizcano@uh.edu), *Motility of biofilm-forming bacteria on silanized glass surfaces.*

15. Sumedha Sharma, Jacinta C. Conrad (University of Houston, ssharma13@uh.edu), *Study of bacterial adhesion and motility on silanized glass surfaces*

16. Hao Shen, Lawrence J. Tauzin, Wenxiao Wang, Lydia Kisley, Margaret H. Roddy, and Christy F. Landes (Rice University, haoshen528@gmail.com), *Single-molecule fluorescence microscopy of analyte interaction at the polymer interface*

17. B. Zhu, H. Kim, H. Chen, and R. Verduzco (bohan.zhu@rice.edu), *Reversible liquid crystal elastomer networks for dynamic cell culture*

18. SPONSOR: Anton Parr, Wesleyne Greer (wesleyne.greer@anton-paar.com), *Rheo-Microscopy: Precise Rheological Data in Combination with Microscopy*

10:00 - 10:30: COFFEE BREAK

10:30 - 11:00: Ron Hedden, *Combinatorial Screening of Pervaporation Membrane Materials*

11:00 - 12:00: Contributed Session #2: Colloids, Nanoparticles, and Interfaces

19. L. Liberman, O. Kleinerman, Y. Talmon (Technion, lucyliber@gmail.com), *Cryo-EM Study of the Biphase Region of Super-Acid Solutions of Carbon Nanotubes*

20. E. A. Bengio, Robert Pinnick, Robert Headrick, D. E. Tsentalovich, Olga Kleinerman, Lucy Liberman, Judith Schmidt, Ellina Kesselman, Yeshayahu Talmon, Matteo Pasquali (Rice University, elie.a.bengio@rice.edu), *Buffon's noodle to extract CNT population statistics from cryo-TEM data*

21. Dorsa Parviz, Micah Green (Texas A&M, dparviz@tamu.edu), *Graphene Colloidal Dispersions and Composites*

22. Zhuan Zhu, Liqun He, Jian Ye, Min Shuai, Xifeng Zhou, Yanan Wang, Yang Li, Zhihua Su, Haiyan Zhang, Ying Chen, Zhaoping Liu, Zhengdong Cheng, Jiming Bao (Texas A&M University, zcheng@mail.che.tamu.edu, University of Houston, jbao@central.uh.edu), *Graphene Oxide Liquid Crystals for Reflective Display without Polarizing Optics*
23. Katherine R. Zodrow, Jinjian Wu, and Qilin Li (Rice University, katherine.r.zodrow@rice.edu), *Porous hydrogel coatings with photothermal carbon black for direct solar membrane distillation*
24. C. Cho, B. Stevens, O. Rege, C. Yu, J. C. Grunlan (Texas A&M, ccho78@tamu.edu), *Fully Organic Thermoelectric Nanocomposite Prepared using Layer-by-Layer Assembly*
25. S. De, J.L. Lutkenhaus (Texas A&M, s_de0001@tamu.edu), *Spray-assisted Layer-by-Layer (LbL) assembly of anisotropic materials*
26. Ryan Poling-Skutvik, Ramanan Krishnamoorti, and Jacinta C. Conrad (University of Houston, rpoling-skutvik@uh.edu), *Dynamics of nanoparticles in polymer solutions*
27. Dariya Reid, Avanti Kavarthapu and Jodie L. Lutkenhaus (Texas A&M, reid1805@tamu.edu), *The effect of multivalent ions on hydrated polyelectrolyte multilayers*
28. Vivek Yadav, Adrienne V. Harkin, Megan L. Robertson, and Jacinta C. Conrad (University of Houston, vyadav2@uh.edu) *Hysteretic Memory in pH-Response of Water Contact Angle on Poly(acrylic acid) Brushes*
29. Joon Hee Cho, Reika Katsumata, Sunshine X. Zhou, Austin R. Dulaney, Dustin W. Janes, and Christopher J. Ellison (University of Texas at Austin, jjhcho@utexas.edu), *Polydopamine-Assisted BCP Lithography on Soft Material Surfaces*
30. Austin R. Dulaney, Chae Bin Kim, Dustin W. Janes, Sunshine X. Zhou, and Christopher J. Ellison (University of Texas at Austin, austindulaney@utexas.edu), *Bidirectional Control of Flow in Thin Polymer Films by Photochemically Manipulating Surface Tension*
31. X. Huang, O. L. de Llargo, X. Wang, Z. Cheng (Texas A&M, sherry.huangxiayun@tamu.edu), *The orientation assembly of anisotropic zirconium phosphate nanoplate in polyionic salt matrix*
32. Qianhong Zhu, Stacy Pesek, Rafael Verduzco (Rice University, yz41@rice.edu), *Thermal Properties of Bottlebrush Nanocomposites.*
33. Yanpu Zhang, Erol Yildirim, Hanne S. Antila, Maria Sammalkorpi, Jodie L. Lutkenhaus (Texas A&M, yanpuzhang@tamu.edu), *Understanding colloidal stability in polyelectrolyte complexes*
34. L. Qi, J. Mann, H. ShamsiJazeyi, M Puerto, J. M. Tour, R. Verduzco, G. J. Hirasaki (Rice University, luqing.qi@rice.edu), *Interfacial behaviour of polymer coated nanoparticles*
35. SPONSOR: **Kruss**, Philip Jaeger and Mark McCarthy (mm@krussusa.com), *Interfacial properties under reservoir conditions*

12:00 - 1:00: Lunch @ Rice Art Gallery

1:00 - 1:30: Brian Habersberger, *Nonuniform deuterium distribution in labelled polymers: direct measurement and SANS model*

1:30 - 2:00: Contributed Session #3: Structure and Dynamics

36. Lee, Jongbok Lee; Rajeeva, Bharath Bangalore; Yuan, Tianyu; Guo, Zi-Hao Guo; Lin, Yen-Hao; Al-Hashimi, Mohammed; Zheng, Yuebing; Fang, Lei (Texas A&M, youngaelv@tamu.edu), *Defect-Free Ladder Polymer Synthesized via Ring-Closing Olefin Metathesis.*

37. Steve Kuei, Sibani Lisa Biswal (Rice University, kuei.steve@rice.edu), *Detailed dynamics of rotating semiflexible particle chains*

38. Reika Katsumata, Austin R. Dulaney, Chae Bin Kim, and Christopher J. Ellison (University of Texas at Austin, reika.katsumata@utexas.edu), *Nanoconfinement effects on polymer dynamics in different length scales*

39. Congzhi Zhu, Lei Fang, Tianyu Yuan (Texas A&M, zcz1990@tamu.edu), *Rational control on polymer conformation via intramolecular H bonds*

40. V. Sethuraman, D. Kipp, V. Ganesan (University of Texas at Austin, vaidya@utexas.edu), *Dynamic Properties of Diblock Copolymers in Lamellar Phases*

41. Vida Jamali, Natnael Behabtu, Bohdan Senyuk, J. Alex Lee, Ivan I. Smalyukh, Paul van der Schoot, and Matteo Pasquali (Rice University, vida.jamali@rice.edu), *Experimental realization of crossover in shape and director field of nematic tactoids*

42. Abhijeet Shinde, Jiyanyu Lee, Zhengdong Cheng (Texas A&M, abhi_tamu@tamu.edu), *Flow induced birefringence and its decay dynamics in isotropic suspensions of charged nanoplates*

43. N. Park, J. C. Conrad (University of Houston, nykim@uh.edu), *Normal Stresses in Depletion-Induced Attractive PMMA Colloidal Systems*

44. Elaa Hilou, Di Du, Sibani Lisa Biswal (Rice University, elaa.i.hilou@rice.edu), *Dynamics of Colloidal Droplets under Rotating Magnetic Fields*

45. B.J. Rohde, R. Krishnamoorti, M.L. Robertson (University of Houston, bjrohde@uh.edu), *Controlling Morphology of Tough Interpenetrating Polymer Networks via Addition of Block Copolymers*

46. C.B. Sweeney, M.J. Green, M.A. Saed (Texas A&M, charles.b.sweeney@tamu.edu), *Microwave Welding of CNT-Polymer Interfaces for Enhanced Mechanical Strength of 3D Printed Parts*

47. J. Zhao, D. Du, S.L. Biswal (Rice University, jz36@rice.edu), *Visualizing and Predicting the Higher Ordered Modes Buckling of Semiflexible Chains*

48. V. Selin, J. F. Ankner, S. A. Sukhishvili (Texas A&M vselin@tamu.edu), *Diffusional Response of Layer-by-Layer Assembled Polyelectrolyte Chains to Salt Annealing*

49. Chae Bin Kim, Dustin W. Janes, Sunshine X. Zhou, Austin R. Dulaney, and Christopher J. Ellison (University of Texas at Austin, kchaebin@utexas.edu), *Photodirecting Marangoni Convection to Pattern Thin Polymer Films*

50. SPONSOR: **Malvern**, Carrie Schindler and Shawn Welch, *Latest developments in hardware and applications for advanced, multi-detector GPC/SEC*

2:30 - 3:00: COFFEE BREAK

3:00 - 3:30: Haleh Ardebilli

3:30 - 4:30: Contributed Session #4: Applications and Devices

51. K.M. Holder, F. Xiang, J.C. Grunlan (Texas A&M, kevin.m.holder@gmail.com), *Polymer-based multilayer thin films for improved stretchable gas barrier*

52. Kelly M. Meek, Alice M. Savage, Frederick L. Beyer, Yossef A. Elabd (Texas A&M, kellymmeek@tamu.edu), *Stability and Ion Transport in Polymerized Ionic Liquid Block Copolymer Anion Exchange Membranes*

53. R.P. Welch, S. Li, J.J. Gassensmith (University of Texas at Dallas, rpw031000@utdallas.edu), *Growing metal organic frameworks inside three dimensional ordered macroporous structures*

54. Shaobo Li, Raymond Welch (University of Texas at Dallas, sxl132830@utdallas.edu), *Construction of multi-porous polymer-MOF hybrid material*

55. M M Haile, M Leistner, A Abu-Odeh, S Rohmer, J Grunlan (Texas A&M, merid_haile@tamu.edu), *Water-soluble polyelectrolyte complexes as flame retardant nanocoating for nylon-cotton fabric*

56. Z.-H. Guo, T. Yuan and L. Fang* (Texas A&M, zi-hao.guo@mail.tamu.edu), *Solvent-Resistant Organic Field Effect Transistor by Post-Thermal Treatment*

57. Fei Li and Jodie L. Lutkenhaus (Texas A&M, fli@tamu.edu), *In-situ Mechanistic Investigation of a Radical Polymer Cathode on Interfacial Charge Transport*

58. J.W. Mok, D. Kipp, V. Ganesan, and R. Verduzco (Rice University, jorge.w.mok@rice.edu), *Design of Thermally Stable Bicontinuous PTB7/PCBM Bulk-heterojunctions for Organic Photovoltaics*

59. A Pimpinelli*, J.R Morales-Cifuentes, T.L. Einstein (Rice University, ap19@rice.edu), *Deposition and growth of organic thin films: On the role of "hot" precursors.*

60. Margaret S. Cheung (University of Houston, mscheung@uh.edu), *Molecular Dynamics Simulations of a Light-Harvesting Triad Using Polarizable Force Field*

61. Se Ra Kwon, Ju-Won Jeon, Jodie L. Lutkenhaus (Texas A&M, kwonsera@tamu.edu), *Sprayable, paintable layer-by-layer polyaniline nanofiber/graphene electrodes*
62. H. An, J. Mike, K. A. Smith, L. Swank, Y. Lin, S. Pesek, R. Verduzco, and J. L. Lutkenhaus (Texas A&M, qcan17pp@tamu.edu), *Highly Flexible Self-Assembled V₂O₅ Cathodes Enabled by Conducting Diblock Copolymers*
63. Carol Ly, Ryan McFeron, Audrey Zaleski, Ben Ricard, and Christopher P. Rhodes (Texas State University, carolly15@gmail.com), *The Effect of Magnetic Fields on the Structure and Properties of 2D Vanadium Pentoxide*
64. Venkata Vasiraju, Sreeram Vaddiraju (Texas A&M, vvravikiran@tamu.edu), *Thermoelectric properties of large-scale inorganic-organic nanowire assemblies*
65. Peng He, Yu-Jiun Lin, Francisco M. Vargas, and Sibani Lisa Biswal (Rice University, ph21@rice.edu). *Particle Aggregation and Deposition from Destabilized Crude Oil in Porous Microfluidic Channel*
66. Yu-Jiun Lin, Mohammad Tavakkoli, Peng He, Sun Ji, Sang Ji, Francisco M. Vargas, and Sibani Lisa Biswal (Rice University, yu-jiun.lin@rice.edu), *Asphaltene Aggregation and Deposition in a Porous Micromodel*
67. Jack Deodato C. Jacob, Scott Retterer, Jacinta Conrad, Ramanan Krishnamoorti (University of Houston, jjacob4@uh.edu), *Nanoparticle Transport Through Spatially Periodic Media*
68. Qiqi Xiang, Yongchao Zeng, Charles Conn, Lisa Sibani Biswal (Rice University, qiqi.xiang@rice.edu), *Visualization of Foam Flow in Porous Media and its Implications for Enhanced Oil Recovery*
69. D. J. Vecchiolla & S. L. Biswal (Rice University, daniel.j.vecchiolla@rice.edu), *Dynamic crystalline structures of flowing 2-D foams in microfluidic devices*

4:30 - 5:00: Peter Wolynes, *Towards an Energy Landscape Theory of Chromosomes*

5:00 - 5:45 Reception sponsored by CHBE GSA and Rice School of Engineering