Message from the Chair

It is a pleasure to bring you the latest news from our Topical Group. GSNP bridges a variety of areas, including statistical physics, nonlinear dynamics, and networks, and has close connections with other interdisciplinary areas of physics, such as soft matter and biological physics. Its diverse membership of over 1200 comprises physical scientists from academic institutions, industry, and government organizations in the U.S. and abroad and at various stages of their careers, including a vibrant group of postdoctoral researchers and students.

One of GSNP’s main activities is the sponsorship of sessions at the APS March Meeting. This year’s planning was led by David Egolf, who served as GSNP’s Program Committee Chair for the March Meeting. GSNP members proposed a variety of timely sessions and speakers, which thanks to David’s dedication resulted in a record number of 72 invited, focus, and contributed sessions sponsored or co-sponsored by GSNP. Here is a list of this year’s invited sessions:

- Physics of Collective Cell Migration
- From Isometry to Reality: Geometric Principles, Mechanics, and Morphology of Thin Solid Structures
- Active Matter: Recent Theoretical Advances
- Mesoscale Structure in Particulate-based Systems
- Jamming of Frictional and Non-spherical Particles
- Patterns of Network Synchronization
- Extreme Events in a Changing Climate
- Soft Excitations in Glasses and Jammed Solids
- Physics of Neural Network Dynamics in the Brain
- Prize/Award Frontiers in Theory: Joint DCMP/DCOMP/GSNP Prize Session
- Soft Tribute to John Cahn
- Mechanics in Morphogenesis
- Nanothermodynamics and Quantum Information
- Statistical Physics of On-line Reputation
- The Butterfly Plot Turns 40
- Robot Scientists and Machine Learning for Automated Modeling and Control of Complex Systems

As in previous years, GSNP will also host a Speaker Award Session featuring five student finalists. These are always outstanding talks and represent the broad variety of work being done by GSNP student members. Starting this year, the Speaker Award Session will also feature a selection of five talks by postdoctoral researchers and a separate award for the postdoctoral speakers. The Speaker Award Session will be on Monday 11:15AM in room 273, where refreshments will be provided. All members are invited to attend these talks.

Our activities at the March Meeting also include a social component. You are all invited to the GSNP business meeting in New Orleans, Tuesday evening (5:45 - 6:45PM) in room 274, where we will, as always, provide refreshments. At the business meeting, we will celebrate the six newest
APS fellows coming from GSNP and announce the student and postdoctoral speaker awardees. A full list of all GSNP sessions at the March Meeting, along with location and time, appears at the end of this newsletter.

Next year’s March Meeting GSNP organization will be led by Greg Huber. In the spring, he will circulate a call for session proposals and information about planning for the 2018 meeting. Everyone is encouraged to think of potential session topics and speakers. We rely on high-quality proposals from our members to keep the meeting at the highest level.

On a different note, I am pleased to inform that the GSNP is working on the creation of a Dissertation Award in Statistical and Nonlinear Physics. This will provide a much-needed recognition to exceptional young scientists who have performed original doctoral thesis work of outstanding scientific quality and achievement in the area. As we work through the process, we welcome suggestions from the community on how the award can be enhanced through external sponsorship.

I am now completing my year as GSNP Chair, having served the prior two years as Vice Chair and Chair-Elect. I am delighted to be able to pass the baton now to my successor, David Egolf, to whom you are encouraged to send any new ideas you may have for GSNP. You are also encouraged to send announcements of relevant meetings to our secretary-treasurer, Chris Santangelo; events of GSNP interest will be posted on our website and distributed via email to our members.

Finally, I would like to welcome the new members of the GSNP executive committee (Dan Lathrop, Arshad Kudrolli, and Lisa Manning), and to offer my sincerest thanks to Katja Lindenberg (Past Chair), Michelle Girvan (Member-at-Large), and Benjamin Vollmayr-Lee (Member-at-Large)—GSNP Executive Committee members who have contributed significantly to our Topical Group and whose terms are ending.

Best wishes,

Adilson E. Motter

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**Student and Postdoctoral Speaker Awards**

GSNP sponsors a Student Speaker Award at the APS March Meeting, and this year, for the first time, will also sponsor a Postdoctoral Speaker Award. GSNP received 14 nominations for the student award and 14 nominations for the postdoctoral award. Five finalists were chosen for each to speak in the award session. Members of the GSNP executive committee will select a student and a postdoctoral winner at the meeting. The winners will receive a prize of $1000 and each finalist will receive $500. In addition, March meeting expenses up to $500 will be covered for each finalist.

This year’s student finalists are:

- Grant Rotskoff (University of California, Berkeley)
- Lisa Tran (University of Pennsylvania)
- Meng Fan (Yale University)
- Jie Zhang (University of Illinois at Urbana-Champaign)
- Chrisy X. Du (University of Michigan, Ann Arbor)

The postdoctoral finalists are:

- Cecey S. Bester (Duke University)
- Matthias Merkel (Syracuse University)
- Oren Raz (University of Maryland, College Park)
- Dibyendu Mandal (University of California, Berkeley)
- Edward Banigan (Northwestern University)

Hear them at the GSNP Speaker Awards Session B14, Monday, March 13, 11:15AM - 1:27PM, in room 273. Congratulations and good luck to all of the finalists, and many thanks to Cynthia Reichhardt for chairing the Selection Committee.

**Join GSNP**

Encourage your students and postdocs to become members of the GSNP. Please approach the GSNP Table at the March Meeting for a free first year membership.
New 2016 APS Fellows in the GSNP

Each year, the GSNP Fellowship Committee reviews nominations for APS Fellows and makes recommendations to the APS. The total number of APS Fellows who may be elected in a given year is limited to one-half of one percent of the APS membership. In 2016, six candidates were recommended by GSNP and selected for Fellowship in the American Physical Society:

Raissa M. D’Souza, UC Davis
Citation: For seminal contributions to the statistical physics of complex systems, including self-organization in jamming phenomena and cascades, abrupt percolation transitions, and interdependence in network systems.

Felix M. Izrailev, BUAP, Mexico
Citation: For elucidation of ideas of classical and quantum chaos and their broad applications to many-body physics.

Wouter-Jan Rappel, UCSD
Citation: For the innovative development and application of nonequilibrium physics methods to living and nonliving systems.

Robin Selinger, Kent State University
Citation: For fundamental contributions in theory/simulation of morphology and microstructural evolution in materials, with applications in liquid crystals, nematic elastomers, lipid membranes, chiral symmetry breaking, and fracture/plasticity of crystalline solids, as well as for exceptional service and outreach.

Mason Porter, UCLA
Citation: For fundamental contributions to the development of new methods and applications in complex networks, including novel measures and techniques for the analysis of multilayer interconnected systems, and for work in nonlinear waves in granular crystals, optical media, and atomic Bose-Einstein condensates.

Jeffrey Urbach, Georgetown University
Citation: For pioneering experiments that illuminated the nonequilibrium statistical mechanics of thin granular layers.

Special thanks to Hermann Riecke for chairing the 2016 Fellowship Committee.

2017 Fellow Nominations

APS Fellowship nomination instructions are outlined at http://aps.org/programs/honors/fellowships/nominations.cfm. The Fellowship Committee generally looks for sustained contributions to the field over a period of time rather than a single, even brilliant, piece of research. Supporting letters that provide specific details about the candidate’s work, its impact, and the breadth of her/his contributions are particularly useful.

The nomination deadline for GSNP is June 1, 2017. Nominations on which no favorable action is taken are generally reconsidered the following year. Sponsors may, however, resubmit the nomination with updated supporting material prior to the deadline for the following year.

GSNP Fall 2016 Election Results

Congratulations to the newly elected officers of the GSNP!

Vice-Chair:
• Dan Lathrop (University of Maryland, College Park)

Members-at-Large:
• Arshad Kudrolli (Clark University)
• Lisa Manning (Syracuse University)

Many thanks to Michelle Girvan for chairing the Election Committee.
GSNP Executive Committee 2017-2018

Chair:
David Egolf (03/17-03/18)
Georgetown University
dae3@georgetown.edu

Chair-Elect:
Greg Huber (03/17-03/18)
University of California, Santa Barbara
huber@kitp.ucsb.edu

Vice Chair:
Dan Lathrop (03/17-03/18)
University of Maryland, College Park
lathrop@umd.edu

Secretary-Treasurer:
Chris Santangelo (03/16-03/19)
University of Massachusetts, Amherst
csantang@physics.umass.edu

Past Chair:
Adilson E. Motter (03/17-03/18)
Northwestern University
motter@northwestern.edu

2018 Program Committee Chair for the March Meeting:
Greg Huber

Members-at-Large:
Cynthia Reichhardt (03/15-03/18)
Los Alamos Natl Laboratory

Uwe Tauber (03/15-03/18)
Virginia Tech

Aparna Baskaran (03/16-03/19)
Brandeis University

Laura Clarke (03/16-03/19)
North Carolina State University

Arshad Kudrolli (03/17-03/20)
Clark University

Lisa Manning (03/17-03/20)
Syracuse University

GSNP Sessions at the March Meeting

MONDAY, MARCH 13

Session A (8:00AM)
A3. Physics of Liquids I – Multicomponent Liquids and Solvation (Room: 262)
A6. **Focus** Self-organization in Bacteria Colonies and Suspensions (Room: 265)
A14. **Focus** Jamming of Particulate Matter I (Room: 273)
A15. **Focus** Geometry and Topology in Mechanics (Room: 274)
A46. **Focus** Entanglement in Open Quantum Systems (Room: 393)
A49. **Invited** Physics of Collective Cell Migration (Room: 396)

Session B (11:15AM)
B14. **Prize/Award** GSNP Student and Post-doctoral Speaker Awards Session (Room: 273)
B16. Mechanical Singularities in Soft Matter I (Room: 275)
B23. **Invited** From Isometry to Reality: Geometric principles, Mechanics, and Morphology of Thin Solid Structures (Room: New Orleans Theater B)
B49. **Invited** Active Matter: Recent Theoretical Advances (Room: 396)

Session C (2:30PM)
C14. **Focus** Statistical Mechanics of Active Matter (Room: 273)
C15. **Focus** Extreme Mechanics of Shells (Room: 274)
C16. **Focus** Mechanical Singularities in Soft Matter II (Room: 275)
C29. **Invited** Mesoscale Structure in Particulate-based Systems (Room: 292)
TUESDAY, MARCH 14

Session E (8:00AM)
E3. Physics of Liquids II – Multicomponent and Charged Fluids (Room: 262)
E9. Focus Glass Formation and Dynamics in Nanostructured Polymers and Glasses I (Room: 268)
E14. Focus Symmetries, Spatiotemporal Patterns and Synchronization (Room: 273)
E15. Extreme Mechanics (Room: 274)
E29. Invited Jamming of Frictional and Non-spherical Particles (Room: 292)

Session F (11:15AM)
F4. Focus Physics of Genome Organization: from DNA to Chromatin I (Room: 263)
F10. Focus Ion Containing Polymers - The Role of Structure and Dynamics I (Room: 269)
F12. Focus Natural Pattern Formation and Earth's Climate System (Room: 271)
F14. Jamming of Particulate Matter II (Room: 273)
F15. Focus Population Ecology and Evolutionary Dynamics (Room: 274)
F17. Focus Organization of Soft Materials Far from Equilibrium (Room: 276)
F40. Invited Patterns of Network Synchronization (Room: 387)

Session G
G1: Poster Session I (2:00pm - 5:00pm, Exhibit Hall J)

Session H (2:30PM)
H4. Focus Specificity, Recognition and Coding in Biology (Room: 263)
H12. Swimming, Motility and Locomotion (Room: 271)
H14. Focus Collective Dynamics: Fluid Physics of Life (Room: 273)
H15. Complex Networks and their Applications (Room: 274)
H18. Focus Function from Geometry: 3D Printing to Programmable Matter I (Room: 277)
H21. Invited Extreme Events in a Changing Climate (Room: 281-282)
H40. Invited Soft Excitations in Glasses and Jammed Solids (Room: 387)

Session J
J15. GSNP Business Meeting (5:45PM - 6:45PM, Room: 274)

WEDNESDAY, MARCH 15

Session K (8:00AM)
K4. Active Living Matter (Room: 263)
K5. Focus Physical Properties of Bacterial Cytoplasm (Room: 264)
K9. Focus Glass Formation and Dynamics in Nanostructured Polymers and Glasses II (Room: 268)
K10. Focus Ion Containing Polymers - The Role of Structure and Dynamics II (Room: 269)
K14. Focus Mechanical Metamaterials I (Room: 273)
K15. Focus Complex phases: Colloids and Quasicrystals (Room: 274)
K49. Invited Physics of Neural Network Dynamics in the Brain (Room: 396)
K52. Focus Thermodynamics and Thermalization in Quantum Information Theory (Room: 399)

Session L (11:15AM)
L24. Invited Prize/Award Frontiers in Theory: Joint DCMP/DCOMP/GSNP Prize Session (Room: New Orleans Theater C)
L52. Statistics of Ensemble Quantum Systems (Room: 399)

Session P (2:30PM)
P5. Focus Non-equilibrium Dynamics of Neural Circuits (Room: 264)
P14. Mechanical Metamaterials II (Room: 273)
P15. Granular Matter (Room: 274)
P16. Active Matter Under Confinement I (Room: 275)
P21. Invited Soft Tribute to John Cahn (Room: 281-282)
THURSDAY, MARCH 16

Session R (8:00AM)
R14. Active Matter and Self-propelled Particles (Room: 273)
R15. Chaos and Nonlinear Dynamics (Room: 274)
R49. Invited Mechanics in Morphogenesis (Room: 396)

Session S (11:15AM)
S5. Focus Machine Learning for Modeling and Control of Biological Systems I (Room: 264)
S12. Turbulence and Multi-Phase Flows (Room: 271)
S14. Active Colloids (Room: 273)
S15. Spins and Complex Systems (Room: 274)
S16. Focus Physics of Liquids III – Glasses (Room: 275)
S19. Invited Nanothermodynamics and Quantum Information (Room: 278-279)

Session V (2:30PM)
V5. Focus Physics of Cellular Organization (Room: 264)
V14. Focus Noise and Stochastic Fluctuations in Biological Systems (Room: 273)
V15. General Statistical and Nonlinear Physics (Room: 274)
V16. Focus Active Matter Under Confinement II (Room: 275)
V18. Focus Function from Geometry: 3D Printing to Programable Matter II (Room: 277)

FRIDAY, MARCH 17

Session X (8:00AM)
X12. Focus Robophysics I (Room: 271)
X18. Focus Continuum Descriptions of Discrete Materials (Room: 277)
X29. Invited The Butterfly Plot Turns 40 (Room: 292)
X49. Invited Robot Scientists and Machine Learning for Automated Modeling and Control of Complex Systems (Room: 396)
X52. Many-Body Physics in Quantum Information Theory (Room: 399)

Session Y (11:15AM)
Y12. Focus Robophysics II (Room: 271)
Y14. Focus Machine Learning for Modeling and Control of Biological Systems II (Room: 273)
Y52. Non-equilibrium Thermodynamics in Quantum Information Theory (Room: 399)