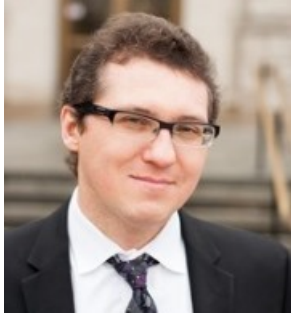


GSNP Newsletter

Topical Group on Statistical and Nonlinear Physics

<http://www.aps.org/units/gsnp/>

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

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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

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)
- Chryx X. Du (University of Michigan, Ann Arbor)

The postdoctoral finalists are:

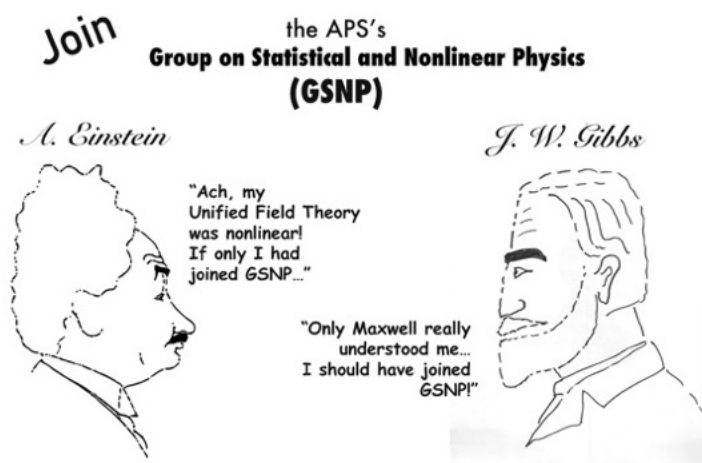
- Cecey S. Bester (Duke University)
- Matthias Merkel (Syracuse University)
- Oren Raz (University of Maryland, College Park)
- Dibyendu Mandal (University of California, Berkeley)
- Edward Banigan (Northwestern University)

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.



Visit the GSNP membership table at the March Meeting or add it now to your existing APS membership.
(Students and post-docs can join GSNP for free!)

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)
- B15. Mechanics of Granular Materials (Room: 274)
- 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 Programmable Matter II (Room: 277)

V21. **Invited** Statistical Physics of On-line Reputation (Room: 281-282)

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)