



# GSNP Newsletter

Topical Group on Statistical and Nonlinear Physics

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

## Letter from the Chair

Statistical and Nonlinear Physics is a unique field of physics, which employs techniques in statistical and nonlinear physics to study grand challenges in soft matter, biological systems, materials science, complex networks, and many other areas. With 1025 members or 2.05% of the total APS membership, the Group on Statistical and Nonlinear Physics (GSNP) has shown steady growth and is one of the largest of the APS Topical Groups. Our Chair-Elect, Sue Coppersmith, has assembled an engaging and broad program of GSNP sessions (see p. 3) through her leadership of our March Meeting Program Committee. This year's program is largest in terms of contributed abstracts and focus sessions in recent years. This year's committee also revamped the GSNP sorting categories to accurately represent the current research areas of the membership (see p. 3). GSNP (as the primary sponsor) will host 30 sessions from our standard sorting and focus topics with more than 400 abstracts as well as 5 invited sessions. In addition, GSNP will co-sponsor 12 focus sessions with more than 100 abstracts and 2 invited sessions. As always, we were dependent on the high quality proposals advanced by our membership to insure a strong program. Watch your e-mail this summer for details of the process for submitting proposals for Focus Sessions and Invited Symposia at the 2013 APS March Meeting.

**All are invited to the GSNP Business Meeting:**

Tuesday, February 28  
5:45 p.m. - 6:45 p.m.  
Convention Center 153C  
Refreshments Provided

The GSNP will also sponsor several special events at the 2012 March Meeting. First, we will host the Student Speaker Award Session (Session D52, Monday 2:30pm, 153C). Five students are selected annually to present in this special March Meeting session. The winner receives a cash prize of \$1000 and each of the other finalists receives \$300, plus \$500 to support March Meeting expenses. The talks in these sessions have been excellent in the past few years, and we expect no less this year. Please consider attending! The GSNP will also sponsor "Lunch with the Experts" that provides undergraduate students the opportunity to meet with GSNP experts over a complimentary lunch. Prof. Jane Kondev from Brandeis University will host a discussion on *Physical Biology* and Dr. Charles Reichhardt from Los Alamos National Laboratory will host a discussion on *Granular Jamming*. This year, instead of the Gallery of Images, GSNP is soliciting proposals support to conferences and workshops on GSNP-related research topics. This is an excellent way to advertise the GSNP and support the research of its members. The deadline for the application is February 24, 2012, so submit your applications as soon as possible. (See p. 2 for application details.) Another important role of the GSNP is to sponsor nominations for APS fellowships. The deadline is May 1, 2012 for 2012 fellowships—more details can be found on p. 3 of this newsletter or at <http://aps.org/programs/honors/fellowships/nominations.cfm>. Please consider nominating outstanding colleagues for this honor.

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Any comments or suggestions for the GSNP are most welcome, and both Sue Coppersmith and I would be happy to hear from you about new ideas you may have for the GSNP. Also, please send announcements of relevant meetings to our secretary/treasurer Jon Machta ([machta@physics.umass.edu](mailto:machta@physics.umass.edu)); we will post events of GSNP interest on our website.

## 2012 Student Speaker Award Finalists

The GSNP sponsors a Student Speaker Award at the APS March Meeting. From 24 nominations, the GSNP chose 5 finalists to speak in the award session. Members of the GSNP executive committee select a winner at the meeting. The winner will receive a cash prize of \$1000 and each finalist receives \$300. In addition, March meeting expenses up to \$500 will be covered for each finalist. The finalists this year are:

- Gary Hunter, Emory University
- Jie Ren, Duke University
- Shiladitya Banerjee, Syracuse University.
- Benjamin Machta, Cornell University
- Bryan Chen, University of Pennsylvania

Hear them at the **Student Prize Session D52, Monday 2:30pm, 153C**. Congratulations and good luck to all of the finalists!

## Student Lunch with the Experts

Student Lunch with the Experts will be held Tuesday, February 28, 1:00 pm– 2:30 pm, at the Convention Center in the Ballroom East. GSNP is sponsoring two topics: *Physical Biology* with Prof. Jane Kondev from Brandeis University and *Granular Jamming* with Charles Reichhardt from Los Alamos National Laboratory. Students can sign up to enjoy a complimentary box-lunch while participating in an informal discussion with Prof. Kondev and Dr. Reichhardt. Sign-up will open Monday, February 27, at 7:00 a.m., near the APS Registration Desk. Attendance is limited to eight students per topic.

## Grant for Conference/Workshop Support

The Topical Group on Statistical and Nonlinear Physics (GSNP) of the American Physical Society announces a new grant opportunity of up to \$1500 per award to support travel costs of conference and workshop attendees. The organizer of the conference/workshop who submits the grant application must be a primary organizer and GSNP member by the due date of the application, February 24, 2012. Awards will be announced shortly after the March Meeting 2012. GSNP funding should be acknowledged on the conference/workshop website and speaker/participant invitations. See <http://www.aps.org/units/gsnp/support/index.cfm> for complete application details. Email completed applications as a single PDF to [gsnpmail@gmail.com](mailto:gsnpmail@gmail.com).

## GSNP Fall 2011 Election Results

Congratulations to the newly elected officers of GSNP!

Vice-Chair:

*Bulbul Chakraborty (Brandeis University)*

Members-at-large:

*Katia Bertoldi (Harvard University)*

*Francis Starr (Wesleyan University)*

## New 2011 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 total APS membership. In 2011, six candidates were recommended by GSNP and selected for Fellowship in the American Physical Society:

**Chertkov, Michael**, Los Alamos National Laboratory

*For fundamental theoretical contributions in statistical hydrodynamics and physics of information and algorithms.*

**Fineberg, Jay**, Hebrew University of Jerusalem

*For his clever experiments and analyses of the dynamics of non-equilibrium systems, particularly concerning the propagation and instabilities of cracks in solids and gels, the dynamics of friction and earthquakes, and instabilities in oscillated liquid layers.*

**Machta, Jonathan**, Univ. of Massachusetts, Amherst

*For his many contributions to understanding the statistical physics of disordered and complex systems and for the development, analysis and application of algorithms for simulating these systems.*

**Politi, Antonio**, Institute Nazionale Ottica

*For his innovative studies of the nonlinear dynamics of complex systems, including characterization of space-time chaos, theory of stable chaos, microscopic foundations of heat conductivity of nonlinear lattices.*

**Tsimring, Lev**, Univ. of California, San Diego

*For significant contributions to the physics of non-equilibrium systems and applications of nonlinear dynamics to broad physical and biological problems.*

**Weeks, Eric**, Emory University

*For innovative experiments and significant contributions in nonlinear dynamics and soft condensed matter physics, including the colloidal glass transition, soft matter rheology, and development of confocal microscopy dynamic imaging.*

## 2012 Fellow Nominations

Nominators must ensure that the case they prepare for the Fellowship Committee is well documented, following the guidelines and requirements outlined at <http://aps.org/programs/honors/fellowships/nominations.cfm>. In general, the Fellowship Committee looks for sustained contributions to the field over a period of time rather than a single, even brilliant, piece of research. Supporting letters which provide specific details about the candidate's work, its impact, and the breadth of her/his contributions are particularly useful. Nominations may be made at any time during the year, but only those received by the GSNP deadline, currently May 1, 2012, will be considered for action in the same year. Nominations are submitted online at <http://www.aps.org/programs/honors/fellowships/>. 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.

Special thanks to Thomas Halsey for chairing the 2011 Fellowship Committee.

## 2012 GSNP Focus Topics

- 03.1.1 Complex and Co-evolving Networks
- 03.1.2 Extreme Mechanics (DFD)
- 03.1.3 Jamming: Nonlinear Acoustics, Vibrational Response, and Soft Modes (DFD)
- 03.1.4 Spin Glasses: Advances, Algorithms and Applications (DCOMP)
- 03.1.5 Common Features of Soft Materials: Polymers, Colloids, and Granular Media
- 03.1.6 Stochastic Population Dynamics (DBIO)
- 03.1.7 Designed Protein-protein Interactions (DBIO)

## 2012 GSNP Standard Sorting Categories

- 03.2 Fluctuation Theorems and Fluctuation-dissipation Relations Applied to Non-equilibrium Systems
- 03.3 Complex Networks and Their Applications
- 03.4 Statistical Mechanics of Active Matter and Biological Systems
- 03.5 Statistical Mechanics of Social Systems Such as Economics, Finance, Traffic Flow, and Crowd Dynamics
- 03.6 Statistical Mechanics of Frustrated Systems, Including Constraint Satisfaction, Satisfiability, and NP-complete Problems
- 03.7 Disordered and Glassy Systems, Including Jamming
- 03.8 Granular Materials (DFD)
- 03.9 General Statistical and Nonlinear Physics

## 2012 GSNP Primary Sponsored Contributed Sessions

- Session A52: Using Chaos to Control Quantum Systems, Monday 8:00am (Pecora; 153C)
- Session A53: Disordered and Glassy Systems I, Monday 8:00am (153B)
- Session B52: Granular Media: Flow and Structure, Monday 11:15am (153C)
- Session B53: Disordered and Glassy Systems II, Monday 11:15am (153B)
- Session D52: General Statistical and Nonlinear Physics and GSNP Student Prize Talks Monday 2:30pm (153C)
- Session J53: Disordered Systems: Jamming Tuesday 11:15am (153B)
- Session L53: Frontiers of Statistical Physics (DCMP) Tuesday 2:30pm (Affleck, Jona-Lasinio; 153B)
- Session P53: Disordered Systems: Packing Wednesday 8:00am (153B)
- Session T52: Non-equilibrium Systems, Especially using Fluctuation Theorems and Fluctuation-Dissipation Relations Wednesday 2:30pm (153C)
- Session V53: Wet and Cohesive Granular Materials Thursday 8:00am (153B)
- Session Y53: Nonlinear Dynamics of Coupled Systems Friday 8:00am (153B)

## 2012 GSNP Primary Sponsored Focus Sessions

- Session A54: Focus Session: Complex and Co-evolving Networks - Cascades in Networks, Monday 8:00am (152)
- Session B54: Focus Session: Complex and co-evolving networks - Modeling Social and Biological Networks, Monday 11:15am (152)
- Session D53: Focus Session: Jamming -- Nonlinear Acoustics and Vibrational Response (DFD) Monday 2:30pm (Schreck; 153B)
- Session D54: Focus Session: Complex and co-evolving networks - Foundations in Complex Networks Monday 2:30pm (152)
- Session H52: Focus Session: Extreme Mechanics – Rods (DFD) Tuesday 8:00am (Audoly, 153C)
- Session H53: Focus Session: Continuum Descriptions of Discrete Materials Tuesday 8:00am (Langer, 153B)
- Session H54: Focus Session: Complex and co-evolving networks - Dynamics on Networks Tuesday 8:00am (Korniss, 152)
- Session J52: Focus Session: Extreme Mechanics – Plates (DFD) Tuesday 11:15am (153C)
- Session J54: Focus Session: Complex and Co-evolving Networks - Empirical Studies of Social Networks Tuesday 11:15am (Barrat; 152)
- Session L52: Focus Session: Extreme Mechanics - Origami, Creasing, and Folding (DFD) Tuesday 2:30pm (Demaine, 153C)
- Session P52: Focus Session: Extreme Mechanics - Structures for Form and Function (DFD) Wednesday 8:00am (Majidi; 153C)
- Session Q52: Focus Session: Extreme Mechanics - Shells & Snapping (DFD) Wednesday 11:15am (153C)
- Session T53: Focus Session: Wave Propagation in Strongly Scattering Media Wednesday 2:30pm (Genack; 153B)
- Session V52: Focus Session: Extreme Mechanics - Biological Systems and Structures (DFD) Thursday 8:00am (Fang, 153C)
- Session W52: Focus Session: Extreme Mechanics - Fluid-Structure Interactions and Swelling (DFD) Thursday 11:15am (153C)
- Session W53: Focus Session: Common Features of Soft Materials: Polymers, Colloids and Granular Media I Thursday 11:15am (Karayiannis, 153B)
- Session X52: Focus Session: Extreme Mechanics - Fracture, Friction, and Frequencies (DFD) Thursday 2:30pm (153C)
- Session X53: Focus Session: Common Features of Soft Materials: Polymers, Colloids and Granular Media II Thursday 2:30pm (153B)
- Session Y52: Focus Session: Spin Glasses: Advances, Algorithms, and Applications Friday 8:00am (Katzgraber, 153C)

## 2012 GSNP Primary Sponsored Invited Symposia

- Session H20: Hydrodynamics and Microstructure: From Single Self-Propelled Particles to Active Soft Matter (DFD) Tuesday 8:00am (Arratia, Sanchez, Marchetti, Jung, Liu; 253C)
- Session J43: Stochastic Geometry and Conformal Invariance in Non-Equilibrium and Disordered Systems (DFD) Tuesday 11:15am (Falkovich, Gruzberg, Kennedy, Stefanus, Thalabard; 157AB)
- Session L33: Frontiers of Granular Physics (DFD) Tuesday 2:30pm (Torquato, Girvan, Goldman, Franklin, Brown; 106)
- Session P2: Large Fluctuations Far From Equilibrium Wednesday 8:00am (Levine, Chaudhury, Kamenev, Khasin, Redner; 204AB)
- Session Z43: Applications of Jamming (DFD) Friday 11:15am (Jaeger, Vitelli, Haxton, Medina-Noyola, Henkes; 157AB)

## 2012 GSNP Co-Sponsored Focus Sessions

- Session B51: Focus Session: Evolutionary Systems Biology I - Evolutionary Dynamics and Rugged Fitness Landscapes (DBIO) Monday 11:15am (Kussell; 154)
- Session D40: Focus Session: Systems Biology and Biochemical Networks I (DBIO) Monday, 2:30pm (Wiggins, Zheng; 156A)
- Session H26: Focus Session: Friction, Fracture and Deformation Across Length Scales - Friction Across Length Scales (DCOMP) Tuesday 8:00am (Goldsby; 257B)
- Session J42: Focus Session: Stochastic Population Dynamics I - Cyclic competition and population stability (DBIO) Tuesday 11:15am (Zia, 156C)
- Session L26: Focus Session: Friction, Fracture and Deformation Across Length Scales - Dislocations and Fracture (DCOMP) Tuesday 2:30pm (Szlufarska; 257B)
- Session L40: Focus Session: Systems Biology and Biochemical Networks II (DBIO) Tuesday 2:30pm (Vetsigian; 156A)
- Session P26: Focus Session: Friction, Fracture and Deformation Across Length Scales - Friction and Geometric Effects (DCOMP) Wednesday 8:00am (257B)
- Session P42: Focus Session: Evolutionary Systems Biology II - From molecules to cells (DBIO) Wednesday 8:00am (Bundschuh, Suel; 156C)
- Session Q40: Focus Session: Systems Biology and Biochemical Networks III (DBIO) Wednesday 11:15am (Lu; 156A)
- Session Q42: Focus Session: Stochastic Population Dynamics II - Games and Spatial Dynamics (DBIO) Wednesday 11:15am (Frey, Gore; 156C)
- Session T42: Focus Session: Evolutionary Systems Biology III - Evolutionary Games (DBIO) Wednesday 2:15pm (Eldar, You; 156C)
- Session Z41: Focus Session: Non-Covalent Protein Interactions (DBIO) Friday 11:15am (Hoff, Fleishman, Regan; 156B)

## 2012 GSNP Co-Sponsored Invited Symposia

- Session D43: Invited Session: Recent Advances in the Physics of Fractures (DCMP) Monday, 2:30pm (Keten, Fineberg, Daniels, Shekhawat, Zapperi; 157AB)
- Session Y20: Invited Session: New Anisotropy-Driven Phenomena in Colloidal Suspensions (DCMP) Friday 8:00am (Glotzer, Pine, Han, Yunker, Gerbode; 253C)

**Visit the GSNP Meetings page** at <http://www.aps.org/units/gsnp/meetings/index.cfm> This webpage contains links to upcoming events and conferences of interest to the statistical and nonlinear physics community.

## GSNP Executive Committee 2011-2012

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