



Newsletter,  
March 2022



## Message from the Chair

As I write this, your Executive Committee is busy preparing for the imminent March Meeting in Chicago, my home town. Like you, we're eager to revive the vitality of an in-person meeting for the first time in 3 years. Preparations began last spring and summer as our Program Chair, Cynthia Reichhardt adroitly and pro-actively assembled an exciting series of focus and invited sessions, as detailed below. Our common drive to discover, understand and celebrate will make this meeting memorable. Thank you for making this happen by your participation and by your GSNP membership.

Statistical and nonlinear physics lies at the core of the work of much of condensed matter physics, especially soft matter, biological physics, polymer physics and physics of fluids. Our GSNP connection strengthens the impact of our work in DSOF or DBIO or DPOLY or DFD. GSNP. It's core importance has only strengthened with the rise of subjects like big data, far-from-equilibrium phenomena, machine learning and network-based phenomena. We who appreciate these benefits of GSNP membership are the best advocates to encourage others to join us. This will strengthen the impact of our field within the APS and beyond.

As the burdens of the pandemic lift, we're eager to revitalize the Executive Committee's work in the coming year. Leading this work will be the incoming Chair, Cynthia Reichhardt. Her plans to organize the Committee are already underway. Danielle Bassett will be the next program chair, responsible for preparing GSNP's part of the March 2023 meeting. Our election just finished, organized by Mark Shattuck and Dvora Perahia, brings many new faces to the Executive Committee. See the Elections section below for the new slate of members. We also report on the winner of GSNP's Kadanoff Prize and the Onsager prize, co-sponsored by GSNP as well as our three new APS Fellows and our three awards for deserving young scientists.

GSNP's greatest impact on the community at large has been the *klogW* remote seminar described below. This was the brainchild of three inspired members-at-large: John Bechhoefer, Shubha Terawi and Daphne Klotz. They deserve our gratitude for invigorating statistical and nonlinear physics in a new way.

As I move into the role of past chair, I thank all you GSNP members for sustaining and advancing our work in science, in developing new scientists and enabling one another.

Here's to a great 2022.

Tom Witten

## klogW Virtual Seminar Series



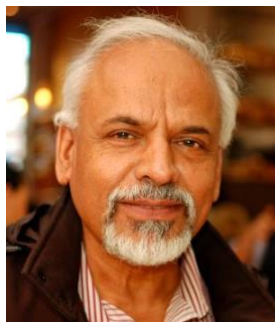
In August 2020, APS-GSNP launched a monthly virtual Zoom seminar series for participants from around the world. Our featured speakers have joined us from a variety of countries and time zones, and their topics reflect the diversity of interests shared by the GSNP community. Recent talks have attracted audiences of up to 300. Just in the past year, **Yuhai Tu** and **Lenka Zdeborova** addressed different aspects of machine learning, **Daniel Rothman** spoke about the nonlinear behavior of Earth's carbon cycle, **Sidney Nagel** spoke about memory formation in materials, **Jean-Philippe Bouchaud** applied statistical physics to financial systems, and **Juan Garrahan** connected ideas in classical non-equilibrium to quantum phenomena. The first APS-GSNP Young Scientists Day featured talks by **Cacey Bester** and **Jie Ren**. A planned offshoot series, named **klogW Futures**, will feature talks that focus on career pathways. The most recent set of talks by the newest APS Fellows elected by GSNP begin an annual tradition: **Jean Carlson**, **Denis Bartolo**, and **Yamir Moreno**.

The [klogW website](#) announces upcoming events and offers recordings of past talks. Our mailing list currently has 1350 members; to sign up, fill in [this google form](#).

## 2022 Prizes and Awards

### Leo P. Kadanoff Prize

The [Kadanoff Prize](#), first awarded in 2019, recognizes scientists whose work has opened up new vistas in statistical physics and/or nonlinear science. The prize comes with \$10,000, the Kadanoff Medal, and a certificate



**Katepalli R. Sreenivasan** New York University,

*For pioneering experimental, theoretical, and numerical research on the nonlinear and multifractal foundations of turbulent flows.*

The prize talk will be presented in [session B29](#) in the Monday noontime session, where he'll be introduced by past GSNP chair Greg Huber. The All-APS prize and award ceremony is [session E73](#) on Monday evening.

We are grateful to the [selection committee](#), Sidney Redner, Stephan Fauve, Cynthia Reichhardt, Stephan Herminghaus, Greg Huber, and Herbert Levine, Chair, for their conscientious work.

Nominations for the 2023 Leo P. Kadanoff Prize are due by Monday, June 1, 2022. [Please nominate a deserving scientist or scientists](#), be they experimentalists, theorists, or computational scientists, who have pushed the boundaries of statistical or nonlinear science.

## Lars Onsager Prize

The Lars Onsager Prize was established to recognize outstanding research in theoretical statistical physics including the quantum fluids. The prize consists of \$10,000 as well as a certificate citing the contribution made by the recipient. It has been presented annually since 1997.



**Boris Altshuler**



**David Huse**



**Igor Aleiner**

The 2021 prizewinners were Boris Alshuler Columbia University, David Huse, Princeton University and Igor Aleiner, Columbia University. They were recognized for "*foundational work on many-body localization, its associated phase transition, and implications for thermalization and ergodicity.*" Their prize talks will be given on Wednesday afternoon in [session Q45](#).

The All-APS prize and award ceremony is [session E73](#) on Monday evening.

We are grateful to the [selection committee](#), Leo Radzihovsky, Leticia Cugliandolo, Alexander Balatsky, Daniel Friedan and Greg Huber (chair), for their conscientious work.

Nominations for the 2023 Lars Onsager Prize are due by Monday, June 1, 2022. [Please nominate a deserving scientist or scientists](#),

## New APS Fellows



**Denis Bartolo**



**Jean Carlson**



**Yamir Moreno**

Each year, the GSNP Fellowship Committee reviews nominations for APS Fellowship and makes recommendations to the APS. The total number of APS Fellows who may be elected each year is limited to one-half of one percent of the total APS (non-student) membership. Obviously, the selection process is quite competitive. The 2021 GSNP fellowship committee, chaired by Arshad Kudrolli selected three new Fellows.

**Denis Bartolo**, Ecole Normale Supérieure, Lyon, France, "For pioneering experimental and theoretical contributions to the field of active matter." (2021)

**Jean Carlson**, University of California, Santa Barbara, USA, "For the development of mathematically rigorous, physics-based models of nonlinear and complex systems that have significantly impacted a broad range of fields including neuroscience, environmental science, and geophysics." (2021)

**Yamir Moreno**, University of Zaragoza, Spain, "For seminal contributions to interdisciplinary aspects of statistical and nonlinear physics in the areas of complex systems and networks, including spreading and synchronization dynamics, as well as for leadership in community building." (2021)

Congratulations to GSNP newest Fellows!

The nomination process is already open for the next class of APS Fellows, and the deadline is June 1, 2022. We encourage you to [nominate deserving colleagues](#)

## Dissertation Award in Statistical and Nonlinear Physics



The GSNP Dissertation Award, established in 2017, recognizes exceptional young scientists who have performed original doctoral thesis work of outstanding scientific quality in the area of statistical and nonlinear physics. This annual award consists of \$2,000, a certificate, travel, and a registration waiver to receive the award and give an invited talk at the March Meeting. This year's winner is **Yuanzhao Zhang**. His thesis with Adilson Motter at Northwestern University *For an outstanding doctoral thesis that advances our understanding of emergent collective behavior and symmetry phenomena in heterogeneous network systems*. Yuanzhao is now at the Santa Fe Institute.

We're grateful the selection committee, Cynthia Reichhardt, Daniel Rothman, Gary Grest, Jürgen Kurths and Dvora Perahia.

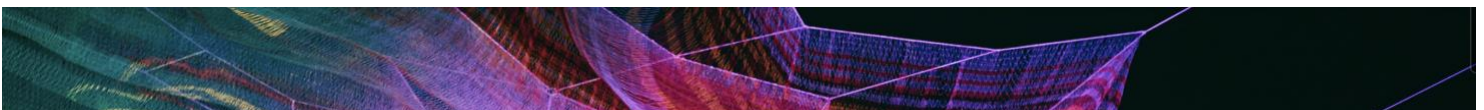
[Nominations for next year's award](#) are due August 17, 2022.

## Student and Postdoctoral Speaker Awards

Each year the GSNP awards a Student Speaker Award and a Postdoctoral Speaker Award for the best contributed talks at the March Meeting by a graduate student and a post-doc, respectively, in the area of statistical and nonlinear physics. Up to five finalists are chosen for each award, and all finalists receive travel support of \$500 to attend the March Meeting. Winners are chosen after the finalists give their talks at the meeting. The winner will also receive a \$1,000 award and each of the other four finalists will receive \$500 awards. This year's finalists will speak in [Session D08](#) on Monday afternoon.

Nominations ([postdoc](#) or [student](#)) are due in November 2022

[Engage.aps.org](https://engage.aps.org) a web site for members



This year your Executive Committee has taken greater advantage of Engage, [aps.org's site for the GSNP](https://aps.org/site-for-the-GSNP). We've used it to publicize GSNP seminars and other events. We also use it to get the word out about changes in deadlines or requirements that affect us all. It keeps information (like this newsletter or GSNP policies) on file for when you need it. The Executive Committee can update this information directly to keep it timely.

The site has its drawbacks and has not gained wide acceptance so far. We welcome your advice and suggestions. How could we improve the value of Engage for you? [Follow this link](#) to give your comments

## GSNP EXECUTIVE COMMITTEE



from our working meeting in January

## 2021 Election Results



Jean Carlson



Daphne Klotsa



**Mary Silber**



**Tim Atherton**



**Enkeleida Lushi**



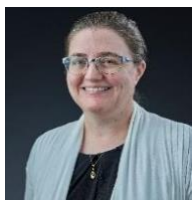
**Emma Zajdela**

We welcome and congratulate our just-elected vice chair **Jean Carlson** of University of California, Santa Barbara. We also welcome new Members-at-Large, **Mary Silber** University of Chicago, **Tim Atherton**, Tufts University and **Enkeleida Lushi** of New Jersey Institute of Technology, as well as new Early Career member, **Emma Zajdela** at Northwestern University.

This year we've elected **Daphne Klotsa** of the University of North Carolina at Chapel Hill for the vital and demanding three-year role as Secretary-Treasurer.

You chose these officers from a field of strong candidates assembled by Mark Schattuck's nomination committee with Greg Voth and Dvora Perahia. We're grateful for the Committee and to all the candidates for their generous willingness to serve.

## Ongoing members



Cynthia Reichhardt



Danielle Bassett



Greg Voth



Shubha Tewari



Cacey Bester

**Cynthia Reichhardt** is our new chair

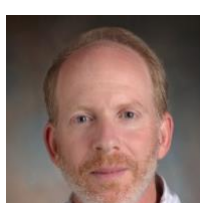
**Danielle Bassett** assumes the office of Chair Elect this year

Ongoing Members at large are **Greg Voth**, **Shubha Tewari** and **Cacey Bester**

## Departing members



[Mark Shattuck](#)



[John Bechhoefer](#)



[Mahesh Bandi](#)



[Tom Witten](#)



[Dvora Perahia](#)

We hope to draw on **Mark Shattuck's** wisdom as he leaves the chair line. His steady hand during good times and stressful ones deserves our lasting gratitude.

Outgoing member **John Bechhoefer** was a stalwart member during his three-year term, as noted above. We look forward to his expanding role in GSNP in coming years.

**Mahesh Bandi** had to resign and return to India to handle the devastating blows of Covid to his family. We hope he can return to his active role in GSNP in due course.

**Tom Witten** will continue in the office of Past Chair, where he will serve as needed.

We're all indebted to **Dvora Perahia** as she leaves three years of the constant demands of the Secretary/Treasurer office. Her perspective and wisdom, benefitted the GSNP in many ways, visible and less visible. We're grateful that she will continue to serve, transferring her hard-won knowhow to her successor Daphne.

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## 2021 APS March Meeting at a Glance

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This year, GSNP received a strong response to the call for focus and invited sessions, and is pleased to serve as the primary sponsor for six invited symposia, one prize session, 19 focus sessions led by an invited speaker, and 6 contributed sessions. GSNP is also cosponsoring dozens of sessions originating in other APS units. With the return to an in-person hybrid meeting, the number of directly GSNP-sponsored sessions was limited by room allocations, so all of our sessions are quite full with fascinating talks. We encourage all in-person participants to drop by the GSNP membership table that will be located near rooms W-179B and W-180. Be sure to join us for our GSNP business meeting Tuesday evening at 6:15pm, which will include a [reception](#).

GSNP offers special thanks to the organizers of this year's invited and focus sessions:

|                                     |                                |                                |
|-------------------------------------|--------------------------------|--------------------------------|
| Obinna Abah (Newcastle U.)          | Safa Jamali (Northeastern U.)  | Filippo Radicchi (Indiana U.)  |
| Alexia Auffeves (CNRS)              | Andrew Jordan (Chapman U.)     | Cynthia Reichardt (LANL)       |
| Sebastian Deffner (U. Maryland)     | Jan Korbel (U. Vienna)         | David Schwab (CUNY)            |
| Haim Diamant (Tel Aviv U.)          | Ying-Cheng Lai (Arizona State) | Ishan Srivastava (LBL)         |
| Guilherme Ferraz de Arruda (Torino) | Jeremy Lechman (Sandia)        | Stephen Teitworth (Duke U.)    |
| Tim Germann (LANL)                  | Yamir Moreno (U. Zaragoza)     | Yuhai Tu (IBM)                 |
| Gary Grest (Sandia)                 | Jeffrey Morris (CUNY)          | David Wolpert (Santa Fe Inst.) |
| Benjamin Huard (ENS-Lyon)           | Giovanni Petri (Torino)        |                                |

Here are highlights of the GSNP-sponsored portion of the meeting:

### MONDAY

8:00 am - 11:00 am

**A8** W-179B Focus: *Network Theory and Application to Complex Systems I*

**A9** W-180 Focus: *Nonlinear Response of Complex Granular Materials I*

11:30 am - 2:30 pm

**B8** W-179B Focus: *Network Theory and Application to Complex Systems II*

**B9** W-180 Focus: *Nonlinear Response of Complex Granular Materials II*

**B42** W-375A Invited Symposium: *Statistical Physics Meets Machine Learning*

3:00 pm - 6:00 pm

**D8** W-179B Focus: *GSNP Student and Postdoc Speaker and Thesis Awards, Heineman Prize*

### TUESDAY

8:00 am - 11:00 am

**F8** W-179B *Patterns and Flows*

**F9** W-180 Focus: *Physics of Machine Learning I*

11:30 am - 2:30 pm

**G8** W-179B *Statistics of Active Matter*

3:00 pm - 6:00 pm

**K8** W-179B Focus: *Steerable Particles I: New Ways to Manipulate Fluid-Mediated Forces*

**K9** W-180 Focus: *Physics of Machine Learning II*

**K42 W-375A** Invited Symposium: *Network Theory and Applications to Complex Systems*

6:15pm – 8:15 pm

**L09 W-180** *GSNP Business Meeting*

### **WEDNESDAY**

8:00 am - 11:00 am

**M8 W-179B** Focus: *Steerable Particles II: New Ways to Manipulate Fluid-Mediated Forces*

**M9 W-180** Focus: *Predicting Nonlinear and Complex Systems with Machine Learning I*

**M42 W-375A** Invited Symposium: *Quantum Heat Engines*

11:30 am - 2:30 pm

**N8 W-179B** *Systems Far from Equilibrium*

**N9 W-180** Focus: *Predicting Nonlinear and Complex Systems with Machine Learning II*

**N42 W-375A** Invited Symposium: *Network Physics of Particulate Systems*

3:00 pm - 6:00 pm

**Q8 W-179B** *Jamming and Glassy Behavior*

**Q9 W-180** Focus: *Predicting Nonlinear and Complex Systems with Machine Learning III*

### **THURSDAY**

8:00 am - 11:00 am

**S8 W-179B** Focus: *Network Physics of Particulate Systems*

**S9 W-180** Focus: *Noise-Driven Dynamics in Far-From-Equilibrium Systems I*

11:30 am - 2:30 pm

**T8 W-179B** Focus: *Statistical Physics of Disease Propagation*

**T9 W-180** Focus: *Noise-Driven Dynamics in Far-From-Equilibrium Systems II*

**T42 W-375A** Invited Symposium: *Thermodynamics of Quantum Information Processing*

3:00 pm - 6:00 pm

**W8 W-179B** *Chaos and Nonlinear Dynamics I*

**W9 W-180** Focus: *Stochastic Thermodynamics of Biological and Artificial Information Processing I*

### **FRIDAY**

8:00 am - 11:00 am

**Y8 W-179B** *Chaos and Nonlinear Dynamics II*

**Y9 W-180** Focus: *Stochastic Thermodynamics of Biological and Artificial Information Processing II*

**Y43 W-375B** Invited Symposium: *Flow and Packing of Dense Granular Materials*

11:30 am - 2:30 pm

**Z8 W-179B** Focus: *Fluid and Elasticity in Biomechanics*

**Z9 W-180** Focus: *Higher-Order Interactions: The Next Frontier of Complex Systems*

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