



## A Message from SFI Vice President for Science

Summer greetings from SFI! I'm sure you're all well into your summer adventures by now, and we look forward to seeing several of you here the next 2 months.

Some of you have already joined us to teach at the June Complex Systems Summer School (CSSS) – now in its 29th year! – and we are extremely grateful to you.

In addition to 80 CSSS students, we have an amazing group of 13 undergraduate students in residence for the summer, most of whom are funded by NSF through our Research Experiences for Undergraduates (REU) program.

They are working on novel research projects with our resident researchers. We look forward to hearing about their projects at the end of the 10-week program later this summer.

In addition to being at capacity with visitors, under **Looking Ahead** you will see we have a full slate of workshops and working groups, particularly in August. July 12-14 we will have our second "Postdocs in Complexity" workshop, funded by the James S. McDonnell Foundation. This bi-annual gathering at SFI is geared to develop a cohort of early career complexity science scholars and provide them with tools and opportunities to enhance their research and careers. The July meeting will focus on research jams led by SFI and JSMF fellows.

In August we have three back-to-back NSF-funded workshops. The "Harold Morowitz Symposium," August 10-11, co-organized by **Rob Axtell**, **Fred Cooper** and **Eric Smith**, will honor Morowitz both on a personal and professional level, recognizing his contributions to the launch of several new scientific fields. That is followed by two overlapping workshops related to thermodynamics and computation: "Thermodynamics of Computation in Chemical and Biological Systems," August 14-16, co-organized by **David Wolpert**, **Chris Kempes** and **Peter Stadler**; and "Thermodynamics and Computation: Toward a New Synthesis," August 16-18, co-organized by **David Wolpert** and **Josh Grochow**. In July and August, SFI is also hosting a number of smaller working groups, as well as an NSF Ideas Lab.

Under **Funding and People** we highlight External Professor and Science Steering Committee member **Jessika Trancik**. Jessika began her SFI relationship as an Omidyar Fellow and has maintained a close connection with us since joining the MIT faculty.

Finally, SFI is searching for a **program manager** for our new 5-year program on "Adaptation, Aging and the Arrow of Time," funded by the James S. McDonnell Foundation. This is a wonderful opportunity for an advanced graduate student or postdoctoral fellow who may have decided academic life is not for them, but who wants to remain close to the research enterprise in a support capacity. We are looking for someone who is knowledgeable in one or more of the following areas: biological and cultural time, biological clocks, circadian rhythms, chronobiology, or adaptation and aging research. Please send any potential candidates our way.

Have a great summer and we hope to see you soon!

**Jennifer Dunne**  
*Vice President for Science*

## Updates and trends

The American Academy for the Advancement of Science (AAAS) held a webinar June 21, 2017 on the current discretionary budgeting process - this is the portion of the federal budget that supports basic and applied research. While it's still early in the process, presenters were relatively optimistic in their comments, indicating many in Congress are supportive of the funding agencies in particular DOD, NASA, and NIH. There was some suggestion, however, that there may be a continuing resolution (i.e. no final budget) that will last for the entire 2018 federal fiscal year. For anyone interested, the **slides** are posted on the **AAAS website** with some useful historical graphs for context.



The social, behavioral and economic sciences (SBE) has been in the news with two reports released recently. The National Academy of Sciences is conducting a **decadal survey** on SBE in areas relevant to national security. Such surveys are carried out periodically to shape future research initiatives. The first meeting was held in



October 2016 and resulted in a report: *The Social and Behavioral Sciences for National Security: Proceedings of a Summit (2017)* which seeks to identify and define SBE research needs of the intelligence community. There are opportunities for members of the research community to submit white papers.

The other recently released report is on the **Value of Social, Behavioral, and Economic Sciences to National Priorities: A Report for the National Science Foundation**. The report affirms the value of SBE to NSF's mission and makes a number of recommendations for the future including continued development of tools, methods and research teams to support SBE and systematic efforts to communicate results and value.

## Funding and people

### RECENT PROPOSALS

**Cristopher Moore**, NSF, *Convergence QL: Ideas Lab Workshop: Practical Fully - Connected Quantum Computer Challenge*, Santa Fe Institute, August 28 - September 1, 2017. \$98,750 for one year.

**Mirta Galesic**, NSF Workshop, *Integrating Different Perspectives on Social Learning*. \$76,505 for one year.

**Chris Kempes**, NSF, *RCN for Exploration of Life's Origins*. \$500,000 over five years.

### RECENT AWARDS

**Jessica Flack**, Enterprise Holdings Foundation, *Santa Fe Institute's 2017 Community Lecture Series*. \$2,000 for one year.

### EXTERNAL FACULTY PROFILE

**Jessika Trancik**, Associate Professor in Energy Studies at the Institute for Data, Systems and Society (IDSS) at the Massachusetts Institute of Technology.



#### 1) How did you first get involved with SFI?

I became involved with SFI when I joined as a postdoctoral fellow in 2006.

#### 2) What does SFI mean to you?

SFI provided the perfect intellectual environment for me to develop a new research area, on technological evolution and energy systems. Interacting across disciplines at SFI reveals the key ingredients of impactful scientific research, which was invaluable for developing a research area with little precedent. There's no other place like SFI, and my time there was hugely consequential for my research and career.

#### 3) How have you been involved with SFI recently? What are you working on now?

I am involved with SFI as an external professor and as a member of the science steering committee. It's a unique and special academic entity, and I'm always glad to contribute in any way that I can. Coming back to SFI is always enjoyable and helpful for stepping back and making sure my research is on the right course.

#### 4) What are you working on now?

I work on understanding the drivers of technological evolution, and using this knowledge to accelerate progress on low-carbon energy technologies and climate change mitigation. I've found that developing new fundamental understanding – for example of why technologies improve at different rates – is often most useful even in an applied context, for example when informing climate policy or energy technology development efforts.



## Opportunities

### FEDERAL AGENCIES

**DARPA Defense Sciences Office – Lagrange**  
**Deadline: August 30, 2017**

The Defense Sciences Office at the Defense Advanced Research Projects Agency (**DARPA**) is soliciting innovative research proposals to develop novel mathematical methods, on both the theoretical and algorithmic fronts, which will solve high-dimensional dynamic data-driven optimization and decision-making problems. Proposed research should fully address challenges that arise from the nonlinear, nonconvex, hybrid (continuous, discrete) nature of underlying modeling and optimization of realistic complex application problems. Specifically excluded is research that offers existing solutions and optimization methods for application areas.

### NSF NIGMS

**Deadline Window: September 1 - September 18, 2017**

Joint **DMS/NIGMS Initiative** to Support Research at the Interface of the Biological and Mathematical Sciences

The Division of Mathematical Sciences (DMS) in the Directorate for Mathematical and Physical Sciences (MPS) at the National Science Foundation (NSF) and the National Institute of General Medical Sciences (NIGMS) at the National Institutes of Health (NIH) plan to support research in mathematics and statistics on questions in the biological and biomedical sciences. Both agencies recognize the need for promoting research at the interface between the mathematical sciences and the life sciences. This program is designed to encourage new collaborations, as well as to support existing ones. **Anticipated Funding:**

Up to \$5,000,000 per year for new applications (up to \$2,000,000 from NSF and up to \$3,000,000 from NIGMS), subject to availability of funds and receipt of proposals of adequate quality. Award sizes are expected to range from \$100,000 to \$400,000 (total costs) per year with durations of 3-5 years.

## PRIVATE FOUNDATIONS

**Arnold and Mabel Beckman Foundation Young Investigators Program**  
**Deadline: August 14, 2017**

The **Beckman Young Investigator Program (BYI)** provides research support to the most promising young faculty members in the early stages of their academic careers in the chemical and life sciences, particularly to foster the invention of methods, instruments and materials that will open up new avenues of research in science. Projects proposed for the BYI program should be truly innovative, high-risk, and show promise for contributing to significant advances in chemistry and the life sciences. They should represent a departure from current research directions rather than an extension or expansion of existing programs. Proposed research that cuts across traditional boundaries of scientific disciplines is encouraged. Proposals that open new avenues of research in chemistry and life sciences by fostering the invention of methods, instruments and materials will be given additional consideration. Projects are normally funded for a period of four years. Grants are in the range of \$600,000 over the term of the project, contingent upon demonstrated progress after the second year of the award.



## Looking Ahead

### EVENTS

**WSWG, Colloquia and Seminars more...**

### VISITORS — JULY - AUGUST 2017

- Bowles, Sam**, 6/24/17–8/20/17, University of Massachusetts, Amherst; SFI Faculty. SFI Host: **Jennifer Dunne**.
- Brush, Eleanor**, 7/7-17/17, University of Maryland. SFI Host: **Jessica Flack**.
- Carlin, Wendy**, 6/24/17–7/16/17, University College London. SFI Host: **Sam Bowles**.
- Chen, Weikai**, 7/7-10/17, University of Massachusetts, Amherst. SFI Host: **Sam Bowles**.
- Daniels, Bryan**, 7/9-22/17, Arizona State University. SFI Host: **Jessica Flack**.
- de Boer, Rob**, 7/15/17–8/12/17, University of Utrecht; SFI External Professor. SFI Host: **Jennifer Dunne**.

- de Nazelle, Audrey**, 7/10/17–8/25/17, Imperial College London. SFI Host: **Jennifer Dunne**.
- Farmer, Doyne**, 7/20/17–8/15/17, Institute for New Economic Thinking; SFI External Professor. SFI Host: **Jennifer Dunne**.
- Flamm, Christoph**, 8/6-23/17, Institute for Theoretical Chemistry. SFI Host: **Peter Stadler**.
- Gaxiola, Aurora**, 7/4/17–8/4/17, Catholic University of Chile. SFI Host: **Jennifer Dunne**.
- Gonzales, Laurence**, 7/16-22/17, SFI Miller Scholar. SFI Host: **David Krakauer**.
- Hartle, James**, 8/15-31/17, University of California, Santa Barbara; SFI External Professor. SFI Host: **Jennifer Dunne**.
- Hwang, Sung Ha**, 7/1-15/17, Korea Advanced Institute of Science and Technology (KAIST). SFI Host: **Sam Bowles**.
- Kao, Albert**, 7/9-22/17, Harvard University. SFI Host: **Jessica Flack**.
- Kirman, Alan**, 7/5-19/17, Institute for New Economic Thinking. SFI Host: **Sam Bowles**.
- Krzakala, Florent**, 7/30/17–8/3/17, École Normale Supérieure. SFI Host: **Cris Moore**.
- Kunisky, Dmitri (Tim)**, 7/7-15/17, New York University. SFI Host: **Cris Moore**.
- Lansing, Steve**, 7/10-24/17, Nanyang Technological University; SFI External Professor. SFI Host: **Jennifer Dunne**.
- Lee, Edward**, 7/9-22/17, Cornell University. SFI Host: **Jessica Flack**.
- Lupia, Arthur**, 7/23-25/17, University of Michigan. SFI Host: **Marion Dumas**.
- Marquet, Pablo**, 7/4/17–8/4/17, Catholic University of Chile; SFI External Professor. SFI Host: **Jennifer Dunne**.
- Mertens, Stephan**, 7/31/17–8/25/17, Otto-von-Guericke University; SFI External Professor. SFI Host: **Cris Moore**.
- Oh, Seung-Yun**, 7/1-15/17, Sogang University. SFI Host: **Sam Bowles**.
- Parthasarathi, Prasannan**, 7/22-29/17, Boston College. SFI Host: **Marion Dumas**.
- Pepper, John**, 8/1-21/17, National Cancer Institute. SFI Host: **Jennifer Dunne**.
- Prohaska, Sonja**, 8/6-23/17, University of Leipzig. SFI Host: **Peter Stadler**.
- Putti, Mario**, 7/27/17–8/1/17, University of Padova. SFI Host: **Caterina De Bacco**.
- Rasmussen, Steen**, 8/2-9/17, University of Southern Denmark; SFI External Professor. SFI Host: **Jennifer Dunne**.

**Seabright, Paul**, 7/11-22/17, University of Toulouse. SFI Host: **Sam Bowles**.

**Sethi, Rajiv**, 7/7-15/17, Columbia University. SFI Host: **Sam Bowles**.

**Schor, Juliet**, 7/22-29/17, University of Massachusetts. SFI Host: **Marion Dumas**.

**Smith, D. Eric**, 6/20/17–7/1/17, Tokyo Institute of Technology; SFI External Professor. SFI Host: **Jennifer Dunne**.

**Stadler, Peter**, 8/5-23/17, University of Leipzig; SFI External Professor. SFI Host: **Jennifer Dunne**.

**Starostin, Georgiy**, 7/25/17–8/25/17, Russian State University for the Humanities. SFI Host: **Murray Gell-Mann**.

**Thoron, Sylvie**, 7/5-19/17, University of Paris. SFI Host: **Sam Bowles**.

**Thurner, Stefan**, 8/5-18/17, Medical University of Vienna. SFI Host: **Jennifer Dunne**.

**Trancik, Jessika**, 7/10-16/17, MIT; SFI External Professor. SFI Host: **Jennifer Dunne**.

**Zdeborova, Lenka**, 7/30/17–8/3/17, Institut de Physique Théorique. SFI Host: **Cris Moore**.