A Message from SFI Vice President for Science

Greetings from sunny, warm, windy Santa Fe. The rapid pace of vaccinations in the U.S. is encouraging, and New Mexico has been a leader in getting shots into arms. SFI re-opened at 50% capacity with social distancing and mask requirements a few weeks ago. If the variants don't throw a big monkey wrench into pandemic and vaccination dynamics we hope to fully re-open by early July, with a vaccine requirement for being on campus. This would be just in time for our first "post-pandemic" cohort of visitors in July and August, comprised mostly of a handful of external faculty who are eager to get back to their regular summer visits to SFI.

Regarding meetings, we are asking organizers of scheduled in-person meetings later this year to confer with us two months prior to decide whether to go ahead as planned, to reschedule, or to hold an initial virtual meeting coupled with a later campus-based meeting. Please do reach out to sfisceince@santafe.edu about proposing future meetings and visits. Look for revised proposal and budget forms in your email in the next couple of weeks.

This quarter, we have one virtual workshop. The "Workshop on Stochastic Thermodynamics II" organized by **David Wolpert** (May 17-21). It is a follow-on to a successful virtual meeting hosted by the Complexity Science Hub in Vienna in May 2020. WOST is expected to be an annual meeting that considers the theoretical and experimental aspects of this fast-developing field.

The postdocs (both SFI and JSMF) continue to take advantage of online meetings organized by **Hilary Skolnik** (Program Manager, Postdoctoral Fellows Program), including recent workshops on "Grant Getting" led by **Susan Carter** (SFI Research Development Director) and one on "Collaborating Across Disciplines" led by **Carrie Cowan** (SFI Director for Education). On April 29, **Deborah Motton** (University of California, Office of the President) will lead a workshop on "Research Ethics" for postdocs, faculty, and anyone else who want to participate. The postdocs are also holding their second in-person retreat (with appropriate Covid-19 precautions) April 16-23 at a beautiful house near Madrid, NM.

We've had two new program postdocs join us since the last Matrix went out. **Tyler Millhouse** joined us in February; he has a PhD in Philosophy from the University of Arizona. He is working with **Melanie Mitchell** (SFI) and **Melanie Moses** (UNM, SFI) under the auspices of a new NSF grant to study the nature of intelligence in natural and artificial systems and will also facilitate interdisciplinary workshops and outreach efforts on the subject. **Maell Cullen** joined us on April 1; his PhD is in Engineering Mathematics from the University of Bristol. Maell will work with **David Krakauer** (SFI), **John Krakauer** (Johns Hopkins, SFI) and **Adrian Haith** (Johns Hopkins), focusing on the acquisition and loss of skills and cognitive ability. He also hopes to identify and explore behavioral phenotypes that underlie expert-level performance in model systems such as Go, Chess, and the Rubik's Cube. He is funded through SFI's grant from JSMF that supports the Adaptation, Aging, and the Arrow of Time research theme.

Our External Faculty profile this edition is of **Michael Hochberg**, CNRS/University of Montpelier. He is an evolutionary biologist and ecologist by training and expertise, but his already broad interests have expanded even more in recent years, encompassing cancer, aging, social complexity, and scientific publishing — he was the founder and Editor-in-Chief of the top ecological research journal *Ecology Letters* from 1997-2008. He's been spending a summer month at SFI for many years and will be back this July as a part of our first post-pandemic visitor cohort. Mike is also a great hiker; we trekked the southern half of the Robert Louis Stevenson trail in France several years ago, reading *Travels with a Donkey in the Cévennes* along the way.

Cheers,

Jennifer Dunne
Vice President for Science

Updates and trends

The Office of Sponsored Research and Research Development is open virtually! We encourage all SFI PIs who would like discuss research funding strategies, submit research grant proposals, who have questions about existing grant management, or who would just like to say 'hello' to **Susan Carter** at scarter@santafe.edu or **Lori Kam** at lkam@santafe.edu. We can also arrange virtual meetings, and hope to hear from you soon.

Save the Date! The SRO Office will be sponsoring a zoom Workshop on **Research Ethics** on Wednesday, April 29th from 10 am to 11: 30 am MDT. The speaker for the Workshop will be **Deborah Motton**, Executive Director of Research Policy Analysis and Coordination at the University of California Office of the President. Dr. Motton will discuss case scenarios involving the ethics of human subjects and animal subjects research, ethics and issues of research misconduct, and conflicts of interest. A Save the Date notice and reminder with Zoom links will be sent out to all SFI researchers within the next week.

The National Science Foundation has released a **Request for Information (RFI)**; NSF 21- O56 asking for input from the community regarding on the specific needs related to collecting, sharing, and utilizing public or private datasets for networking and computer systems research, and any challenges associated with each. The input could identify requirements for datasets that may include, but are not limited to, spectrum data, physical layer data, network and Internet measurement data, workload data, power/performance data, and other systems data. NSF is interested in assessing where research progress is slowed due to the lack of datasets that may either already exist or can be generated using existing infrastructure (including NSF-funded infrastructure). NSF may use the responses to this RFI to inform and refine future investments. Responses in the format indicated in the RFI are requested by **May 21, 2021**.

Funding and people

Recent Proposals

Vicky Chuqiao Yang, *NSF Understanding the effect of individual decision-making strategies on collective decision outcomes.* $476,231 over three years.

David Wolpert & Manfred Laubichler, *NSF Fitting Markov process models to social science time series.* $392,730 over two years.

David Kinney, *NSF Understanding and Improving Scientific Consensus.* $141,637 for one year.

Michael Hochberg, Research Director, CNRS / University of Montpellier.

1) How did you first get involved with SFI?

I worked near Jemez Springs in the summer of 1982 and made several visits to Santa Fe, and so had some idea of the environment when I first heard of SFI in the 1990s. I met Jennifer Dunne at a conference in 2003 and described my sense of SFI-mystique based on published work only (the website then was not what it is today). Jennifer invited me to visit in 2004 and the rest is history.

2) What does SFI mean to you?

A family — the people, the culture, the intellectual environment. Always looking forward to the next visit.

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

Yes, I am currently co-organizing a working group seeking to integrate the functional layers and temporal scales of aging as part of SFI's "Complex Time: Adaptation, Aging, Arrow of Time" theme. Is aging inevitable? Can it be slowed or even reversed? How are endogenous and exogenous environments involved?

4) What are you working on now?

I'm both actively blogging (**https://mehochberg.wixsite.com/blog**) and writing a book centered on commons issues, perhaps the most heard of being the Tragedy of the Commons. Both blog and book take a bird's eye view of societal issues, and how biology (and sometimes physics) can help elucidate. The blog posts monthly and I hope to complete the book in a few years.

Opportunities

Please contact **Susan Carter**, SFI Research Development Director, at scarter@santafe.edu or **Lori Kam** at lkam@santafe.edu, Sponsored Research Administrator for more information or assistance with these opportunities.

National Science Foundation

Broadening Participation in Computing (BPC); NSF 21-571

The Broadening Participation in Computing program (BPC) aims to significantly increase the number of U.S. citizens and permanent residents receiving post-secondary degrees in the computing disciplines, and to encourage participation of other underrepresented groups in the discipline. The BPC program seeks to engage the computing community to develop and implement innovative methods, frameworks, and strategies to improve recruitment and retention of these students through undergraduate and graduate degrees. Projects that target stages of the academic pipeline through faculty ranks are encouraged. The BPC program will support three categories of awards: Alliances, Demonstration Projects, and Supplements. Researchers with current NSF CISE Awards should consider an application for a supplement to engage more members of the computing research community in significant broadening participation efforts.

Deadlines: June 14, 2021 and January 20, 2022.

Stimulating Collaborative Advances Leveraging Expertise in the Mathematical and Scientific Foundations of Deep Learning (SCALE MoDL); NSF 21-561.

The National Science Foundation Directorates for Mathematical and Physical Sciences (MPS), Computer and Information Science and Engineering (CISE), Engineering (ENG), and Social, Behavioral and Economic Sciences (SBE) will jointly sponsor new research collaborations consisting of mathematicians, statisticians, electrical engineers, and computer scientists. Research activities should be focused on explicit topics involving some of the most challenging theoretical questions in the general area of Mathematical and Scientific Foundations of Deep Learning. Each collaboration should conduct training through research involvement of recent doctoral degree recipients, graduate students, and/or undergraduate students from across this multi-disciplinary spectrum. A wide range of scientific themes on theoretical foundations of deep learning may be addressed in these proposals.

Deadline: May 12, 2021.

Mathematical and Physical Sciences Ascending Postdoctoral Research Fellowships (MPS-Ascend); NSF 21-573.

The purpose of the Mathematical and Physical Sciences Ascending Postdoctoral Research Fellowship (MPS-Ascend) program is to support postdoctoral Fellows who will broaden the participation of groups that are underrepresented in MPS fields in the U.S. including Blacks or African Americans, Hispanics, Latinos, and Native Americans (to include Alaska Natives, Native Hawaiians or other Native Pacific Islanders) as future leaders in MPS fields. The program is intended to recognize beginning investigators of significant potential and provide them with experience in research that will broaden perspectives, facilitate interdisciplinary interactions and help broadening participation within MPS fields. The program funds postdoctoral Fellows in postdoctoral research environments that will have maximal impact on their future scientific development and facilitates their transition into a faculty appointment. Fellowships are awards to individuals, not institutions, and are administered by the Fellows.

Deadline: June 15, 2021

Science of Science: Discovery, Communication, and Impact (SoS:DCI); NSF 19-125Y

The Science of Science: Discovery, Communication, and Impact (SoS:DCI) program is designed to increase the public value of scientific activity. The program pursues this goal by supporting basic research in three fundamental areas: how to increase the rate of socially beneficial discovery; how to improve science communication outcomes; and how to expand the societal benefits of scientific activity. Proposals should develop data, models, indicators, and associated analytical tools that constitute and enable transformative advances rather than incremental change as well as Identify ethical challenges and mitigate potential risks to people and institutions.

Deadline: Full proposal target date September 9, 2021.

NSF Conferences and Workshops in the Mathematical Sciences; NSF 21-541

Conferences, workshops, and related events (including seasonal schools and international travel by groups) support research and training activities of the mathematical sciences community. Proposals for conferences, workshops, or conference-like activities may request funding of any amount and for durations of up to three years.

Deadline: Proposals Accepted Anytime; however, proposals must be submitted to the appropriate NSF/DMS disciplinary program in accordance with the lead-time requirements, submission windows, or deadlines posted on the DMS Programs page.

Long Term Research in Environmental Biology (LTREB); NSF 21-544

The Long Term Research in Environmental Biology (LTREB) Program supports the generation of extended time series of data to address important questions in evolutionary biology, ecology, and ecosystem science. Research areas include, but are not limited to, the effects of natural selection or other evolutionary processes on populations, communities, or ecosystems; the effects of interspecific interactions that vary over time and space; population

or community dynamics for organisms that have extended life spans and long turnover times; feedbacks between ecological and evolutionary processes; pools of materials such as nutrients in soils that turn over at intermediate to longer time scales; and external forcing functions such as climatic cycles that operate over long return intervals. The Program intends to support decadal projects. Funding for an initial, 5-year period requires submission of a proposal that includes a 15-page project description containing two essential components: a decadal research plan and a description of core data. Proposals for the second five years of support (renewal proposals) are limited to a ten-page project description.

Deadline: Full proposals accepted anytime.

National Science Foundation and National Institutes of Health

[Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science](#) (SCH); NSF 21-530.

The purpose of this interagency program solicitation is to support the development of transformative high-risk, high-reward advances in computer and information science, engineering, mathematics, statistics, behavioral and/or cognitive research to address pressing questions in the biomedical and public health communities. Transformations hinge on scientific and engineering innovations by interdisciplinary teams that develop novel methods to intuitively and intelligently collect, sense, connect, analyze and interpret data from individuals, devices and systems to enable discovery and optimize health. Solutions to these complex biomedical or public health problems demand the formation of interdisciplinary teams that are ready to address these issues, while advancing fundamental science and engineering.

Deadlines: November 10, 2021 and November 10, 2022.

NASA

[The NASA Research Opportunities in Earth and Space Sciences](#) (ROSES 2021)

This broad agency general opportunity was released Feb 12th, with a number of opportunities in space and earth sciences both upcoming and between now and April 2022. [Table 2](#) in the announcement lists program opportunities and due dates.

Deadlines: Vary by program.

United States Department of Agriculture (USDA) National Institute of Food and Agriculture

[Agriculture and Food Research Initiative (AFRI) - Foundational and Applied Science Program](#)

The AFRI Foundational and Applied Science Program supports grants in six priority areas to advance knowledge in both fundamental and applied sciences important to agriculture. The six priority areas are: Plant Health and Production and Plant Products; Animal Health and Production and Animal Products; Food Safety, Nutrition, and Health; Bioenergy, Natural Resources, and Environment; Agriculture Systems and Technology; and Agriculture Economics and Rural Communities. Research-only, extension-only, Conference, and integrated research, education and/or extension projects are solicited in this Request for Applications (RFA).

Deadlines: Vary by sub-program; most deadlines between May and July 2021.

Department of Defense

[Army Research Institute for the Behavioral and Social Sciences Broad Agency Announcement for Basic Scientific Research, Foundational Science Research Unit (2021-2022)](#); **W911NF-21-S-0007**

This Broad Agency Announcement (BAA) sets forth basic research areas of interest to the United States Army Research Institute for the Behavioral and Social Sciences. The U.S. Army Research Institute for the Behavioral and Social Sciences is the Army's lead agency for the conduct of research, development, and analyses for the improvement of Army readiness and performance via research advances and applications of the behavioral and social sciences that address personnel, organization, training, and leader development issues. Programs funded under this BAA include basic research that can improve human performance and Army readiness.

Deadlines: Vary by program; opportunity active until August 7, 2022.

National Endowment for the Humanities (NEH)/Andrew W. Mellon Foundation

[Fellowships for Digital Publication](#)

The NEH and The Andrew W. Mellon Foundation jointly support individual scholars pursuing interpretive research projects that require digital expression and digital publication. To be considered under this opportunity, an applicant's plans for digital publication must be integral to the project's research goals. All projects must advance a scholarly argument through digital means and tools. Anticipated products must be published in digital form and include, but are not limited to, monographs, peer-reviewed articles, websites, virtual exhibitions, translations with annotations or a critical apparatus, or critical editions. Projects may be at any stage of development.

Deadline: April 28, 2021; Optional draft narratives for Program comment and suggestions may be submitted by February 12. 2021.

The Russell Sage Foundation Core Programs and Special Initiatives

The Russell Sage Foundation (RSF) is dedicated to strengthening the methods, data, and theoretical core of the social sciences in order to better understand societal problems and develop informed responses. It is currently accepting Letters of Inquiry related to the following programs: Behavioral Economics; Decision Making & Human Behavior in Context; Future of Work; Social, Political and Economic Inequality. RSF will also accept inquiries relevant to any of its core programs that address at least one of the following issues: (1) Research on the Covid-19 pandemic and the resulting recession in the U.S. The Foundation priorities do not include analyses of health outcomes or health behaviors; or (2) Research focused on systemic racial inequality and/or the recent mass protests in the U.S.: specifically, research that investigates the prevalence of racial disparities in policing and criminal justice and their social, political, economic, and psychological causes and consequences; the effects of the current social protest movement and mass mobilization against systemic discrimination; the nature of public attitudes and public policies regarding policing, criminal justice, and social welfare; and the effects of those attitudes in the current political environment.

Deadline: Letters of Inquiry should be submitted by May 4, 2011; Full proposals are by invitation only and will be due August 11, 2011.

John Templeton Foundation Character through Community Opportunity

The John Templeton Foundation invites proposals from organizations that seek to strengthen their understanding and practice of character development through communities of practice.

Deadline: Interested applicants should submit an Online Funding Inquiry (OFI) per the Foundation instructions no later than June 11, 2021. Full proposals will be by invitation only.

The Alfred P. Sloan Foundation Economic Institutions, Behavior and Performance Program.

This program supports rigorous and objective research projects on U.S. economic structure, behavior, and performance whose findings inform and strengthen decision-making by regulators, policymakers, and the public. Sub-programs include Behavioral Economics Applications and Foundations; Empirical Economic Research Enablers; and Economic Analysis of Science and Technology.

Deadlines: No specific deadlines. Interested researchers with a relevant project idea should email a letter of inquiry of no more than two pages per the Program instructions, indicting which sub-program best fits the research project.

Looking Ahead
EVENTS

Science Talks

4/6/2021 Virtual Slice of Science Seminar by **Melanie Mitchell**, Portland State University; SFI, "How can we probe neural language models (like GPT-3) to make sense of their behavior?."

4/7/2021 Virtual Seminar by **Douglas Guilbeault**, University of California, Berkeley, "Network Experiments on the Emergence of Shared Categories across Cultures."

4/21/2021 Virtual Seminar by **Lauren Klein**, Emory University, "What Is Feminist Data Science?"

4/28/2021 Virtual Colloquium by **Sam Mehr**, Harvard University, "Principles of Music Perception."

5/5/2021 Virtual Seminar by **Sorelle Friedler**, Haverford College "TBA."

5/12/2021 Virtual Colloquium by **Lisa Feldman Barrett**, Northeastern University, "TBA."

Science Meetings

4/29/2021 Virtual Workshop "The Contributions of Research Ethics, Research Integrity, and Research Compliance to Complexity Science," organized by **Susan Carter** (SFI).
Speaker: **Deborah Motton**, University of California, Office of the President.

4/16-23/2021 Postdoc Retreat, organized by **Anjali Bhatt** and **Jonas Dalege** (SFI).

5/17-21/2021 Virtual Workshop "Stochastic Thermo-dynamics II," organized by **David Wolpert** (SFI).