The (scaling) laws of the jungle

A forest looks like a hotbed of randomness, with trees and plants scattered in wild and capricious diversity. But appearances can be deceiving, say a trio of complexity researchers at the Santa Fe Institute. Underneath that apparent messiness lurk extraordinary regularities, governed by the biological mechanisms that drive universal forces of growth, death, and competition.

In a paper published on April 13 in the journal PNAS, the SFI group, led by Program Postdoc and now Complexity Science Hub Vienna Postdoctoral Scientist Eddie Lee, describes a new framework that can reproduce those spatial and temporal patterns that emerge in places and spaces where plants grow together. The framework uses computational and statistical tools to connect metabolic principles, which control how an individual organism lives and thrives, to the diverse arrangements of trees, shrubs, and other vegetation readily observed in landscapes, forests and beyond.

“This paper goes a long way in showing how things that look arbitrary and capricious can in fact be understood within a mathematical framework,” says SFI Distinguished Shannan Professor and former President Geoffrey West, who collaborated with Lee and Chris Kempes, SFI Professor, on the model.

Scientists have long sought mathematical laws that connect the similar patterns that emerge at large and small scales of existence. “If you look at the microscopic structure of multicellular life, you see a lot of the same patterns playing out,” says Lee. The metabolic rate of an organism follows a power scaling law with its mass, for example. Previous attempts at establishing such mathematical laws for the assemblage of plants in a forest have been a source of vociferous debate.

In previous work, West and others have developed models that start with the metabolic constraints on a single, optimized tree to make predictions about patterns that might emerge in a community of such trees. The model accurately showed how features like growth rate or canopy size might change with plant size — and how those features might affect competition with other organisms or change the structure of the entire forest.

Kempes says that this idealized model paved the way for connecting biological principles like metabolism to mathematical, macro-level patterns, but over time researchers began to focus on how real-world situations differ in detail from that model. Not every tree or population follows the optimal rules, though, leading researchers like Lee to investigate new ways to generalize the core tenets.

> MORE ON PAGE 4

Insights for COVID-safe school reopening

Since early in the COVID-19 pandemic, parents, teachers, and school administrators have faced difficult questions regarding when and how to safely reopen for in-person learning. During the 2020-2021 fall semester, school districts around the United States navigated their reopening plans — many opting for exclusively online learning or hybrid models — with little data on how SARS-CoV-2 spreads among children or how in-person learning would impact transmission in the schools’ communities. A new study in The Journal of School Health joins a growing body of evidence that, with appropriate measures, there are ways for schools to safely reopen.

In this study, scientists analyzed data from two large, independent k-12 schools that reopened for in-person learning last fall. The results suggest that, with robust universal testing and mitigation measures, in-school transmission can remain low even as the surrounding community transmission rates rise.

The two schools in this study, one located in the southeastern United States and the other in the Mid-Atlantic, both conducted regular testing of all students and staff and required mitigation measures like mask wearing, social distancing, and ventilation and air filtering. When positive cases were detected, the schools and local health authorities did contact tracing to determine how the person was likely exposed.

Throughout the semester, both schools saw cases, but the rate of transmission was 0.5 or lower. “Because each infection causes less than one additional infection on average, an infec- tion doesn’t spread much within the school,” says SFI Professor Michael Lachmann, who co-authored the study with SFI External Professor Laurens Ancel Meyers (University of Texas at Austin), Daria Long Collespie, Stephen Redd, and Jonathan Zenilman. “If we could get a rate of 0.5 in the community, that...”

> MORE ON PAGE 4

About 30 years ago, economist Kenneth Arrow and physicist Philip Anderson brought together a small group of economists and scientists at the then-new Santa Fe Institute to discuss the economy as an evolving, complex system. Stanford’s W. Brian Arthur (now an SFI External Professor) was one of them.

The group, which developed a year later into a research program led by Arthur, suspected something was amiss with conventional, neo-classical economics. The problem wasn’t in the math or the models, rather, they worried that the discipline was simplistic in its worldview.

For the last 50 years, economic theory has depended on assumptions — made mostly for mathematical convenience — that consumers and investors think hyper-rationally — they respond to well-defined problems using opti- mal strategies.

This approach treats the economy like a well-oiled machine. It’s elegant but not realistic, Arthur argues in an essay published recently in Nature Reviews Physics. The economy runs more like an ever-evolving ecology of beliefs, principles, and behaviors, Arthur writes, popu- lated with actors whose decisions — often necessarily based on incomplete information — feedback into the system itself. It’s neither neat nor deterministic; it’s dynamic and com- plex. It’s “always creating itself, alive and full of messy vitality.”

In those early days, SFI was a community of researchers exploring complexity in its many guises. In the dynamics of traffic or the behaviors of individual cells in the immune system. In these systems, individual elements interact and pro- duce patterns, which in turn influence systems and cause the elements to change or adapt.

Such characteristics describe economies as well, Arthur recognized. Over the years, he and his colleagues developed the core tenets of com- plexity economics, which eschews the idea that people act rationally, or that the economy has an equilibrium state. By using tools including agent-based, computational modeling and...
In an article about diversifying and modernizing the teaching of economics, The Economist cited a paper by SFI Professor Sam Bowles and co-author Professor Wendy Carlino. It lauded their CORE economics curriculum, which they created with fellow SFI contributor Simon Denisov (External Professor), Marion Dumas (former Omidyar Post-doctoral Fellow), Luciano (External Professor), and Rajiv Sethi (External Professor).

Melanie Mitchell, SFI Davis Professor of Complexity, was interviewed by NPR WHYY in a podcast about her anthropological work, and the impact it has on her philosophical research. In the interview, Mitchell describes an early AI that she and her fellow SFI postdocs created in the 1990s to generate publication titles for the fictional SFI student “Last Alcousin,” from the Jurassic Park series.

SFI External Professor Richard Sole’s recent paper on using synthetic biology to create Turing patterns, the subject of an SFI workshop (group see, p.6), was featured in Arts in Tech. Science reported a new paper on the post-parenthood productivity gap between women and men in academia. The paper’s co-authors included SFI External Professor Aaron Clauset, Professor Mirta Galesic, and lead author Allison Morgan at CU Boulder.

SFI Professor Cris Moore and External Professor Melanie Moses were featured in the Santa Fe New Mexican, Yahoo News, the Santa Fe Reporter, and KSFR’s Living on the Edge radio show for their virtual discussion of the film “Debriamining,” in partnership with Center for Contempory Arts Santa Fe.

SFI Professor Michael Lachmann was quoted in the Los Angeles Times and in Yahoo News in articles about COVID-19 mitigation strategies for schools.

Distinguished Shannon Professor Geoffrey West appeared on the BBC’s “Pyrotechnic History of Humanity” to discuss how cooking food over fire allowed humans to grow their metabolically intensive brains.

Bloomberg featured work by External Professor Simon DeDeo on conspiracy theories, and his team's Bayesian framework for evaluating explanations.

Smart thinking about intelligence

What makes something intelligent? Where is intelligence found? How is intelligence studied? SFI researchers Melanie Mitchell and Melanie Moses organized a virtual conference in March that aimed to answer questions about the foundations of intelligence from areas as diverse as philosophy, cognitive science, and artificial intelligence and complex information processing.

“We’re trying to get a sense of where people are when thinking about what intelligence is, what’s important to study, what are the big open questions,” says Mitchell, who is SFI’s Davis Professor of Complexity.

Mitchell cites AI pioneer Marvin Minsky, who referred to intelligence as “a suite of tools” — one filled with all kinds of definitions. There’s human intelligence and the artificial intelligence of robots, but there’s also intelligence in swarms of ants and maybe even a kind of intelligence in something like a market. There’s evolutionary intelligence as well as social intelligence.

For three hours every morning during the week of March 15, presenters at the meeting discussed these topics, trying to puzzle together just what intelligence means. Each presenter spoke for 30 minutes, followed by 20 minutes of discussion and questions, to facilitate the kinds of conversations that would usually happen outside of labs at an in-person conference. Speakers included SFI External Professors, Resident Faculty, Postdocs, and researchers from beyond SFI — researchers like Daniel Dennett, Ricard Sole, Stephanie Forrest, and Alison Gopnik, whose fields of study span philosophy, physics, biology, computer science, and psychology.

“We’re inviting basically everyone in the SFI community,” says Mitchell. She hoped the meeting would get people out of their narrow research areas and think about the big picture. The goal of this meeting was not to settle the matter and find answers to all of these questions about intelligence, but to forge interdisciplinary collaborations. The meeting was designed to deal with a world where the value of bigger data is in doubt.

A famous saying, often attributed to the early-twentieth-century economist John Maynard Keynes, is “the market can remain irrational longer than you can remain solvent.”

That’s where seasoned investors find themselves in an ever-increasing rock market recovering from a pandemic-induced crash to reach record highs and amateur investors on Reddit doodle their way to the Domino’s up 100% over a two-week period. The unfortunate reality is that the regulations governing today’s financial markets weren’t designed to deal with a world where a form of GameStop, AMC, Nokia, and other equities could be challenged by a coordinated effort on the part of amateurs.

“The Wall Street Bets phenomena is just the latest in a series of events that show how communities formed through new technologies are altering our belief dynamics.”

— Wll Tracy

The Wall Street Bets phenomenon is just the latest in a series of events that show how communities formed through new technologies are altering our belief dynamics.

While their example may seem simple at first glance, designing systems that excel under uncertainty is not easy. One of the major challenges is developing a greater understanding of why people in a network, such as the users of the Wall Street Bets subreddit, make the decisions that they do. This is an area of investigation particularly suited to the study of “belief dynamics,” another emerging field of complexity science that SFI researchers are advancing by creating quantitave frameworks to make sense of social survey data on a wide array of topics.

At the 12th annual meeting on Risk and Applied Complexity, co-hosted by SFI and the Swiss UBS, SFI Professor Simon DeDeo discussed how recent work in cognitive science has uncovered a diversity of explanatory values, or dimensions along which people judge explanations as better or worse. His work in the area could ultimately help scientists paint a clearer picture of the drivers behind the Wall Street Bets incident, and is already shedding light on the formation of conspiracy theories and extremist narratives.

“...no one sticks $10,000 of their money into the stock market in the way that these people do.”

— Simon DeDeo

Roundtable grapples with market volatility

The intersection of belief dynamics and emergent field of complexity science that SFI has longed to investigate for nearly 30 years. The first Foresight working group (see p.6), was featured in the SFI Park series. At the 12th annual meeting on Risk and Applied Complexity, co-hosted by SFI and the Swiss UBS, SFI Professor Simon DeDeo discussed how recent work in cognitive science has uncovered a diversity of explanatory values, or dimensions along which people judge explanations as better or worse. His work in the area could ultimately help scientists paint a clearer picture of the drivers behind the Wall Street Bets incident, and is already shedding light on the formation of conspiracy theories and extremist narratives.

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— Simon DeDeo

In a campaign kicked off with a very generous multi-million matching gift provided by Jim Palmer, followed by Riza Patel, Michael and his wife, Jerry Moran, and several other members of the SFI Board of Trustees, we are now hiring faculty for the Melinda and Bill Gates First SFI Professor. I am delighted that Sean Carrillo will be joining us soon as the second faculty member, and there are several wonderful fraternities lining up along the horizon.

It is always nice when the problems that one studies and their solutions can be recruited to serve as a basis for one’s understanding of an organization. SFI has long lived according to the principles of discrete geometry designing networks of nodes, and we are putting the fractal to work as a model for a scale-free researcher.

— David Krakauer
President, Santa Fe Institute
Accounting for the gaps in ancient food webs

If you want to understand an ecosystem, look at what the species within it eat. In studying food webs — how animals and plants in a community are connected through their dietary preferences — ecologists can piece together how biomass and energy flow through an ecosystem. Studying ancient food webs can help scientists reconstruct communities of species, many long extinct, and even use those insights to figure out how modern-day communities might change in response to climate change and other disturbances. That’s just one problem: only some species left enough of a trace for scientists to find eons later, leaving large gaps in the fossil record — and in researchers’ ability to piece together the food webs from the past.

“When things die and get preserved as fossils, it’s extraordinary how...”

A new paper by paleoecologist Jack Shaw, a Ph.D. student at Yale University who led the study, Dunne, and other researchers shines a light on those gaps and points the way forward on how to account for them. “The missing components of the fossil record — such as soft-bodied organisms — represent huge gaps in understanding ancient ecology, but we haven’t thought extensively about how those gaps are affecting our inferences,” Shaw says. “We’re taking the fossil record at face value without critically thinking about how face value might not be robust and accurate.”

Focusing on the absence of soft-bodied taxa in the fossil record, the study, published in Paleobiology on January 14, notes that accounting for these data gaps is vital for forming a more accurate picture of ancient food webs. By only looking at fossilized taxa, without accounting for the loss of soft-bodied organisms to the sands of time, for example, researchers might make the mistake of assuming the ecological community was structured differently, and was less stable, than it actually was.

But by drawing on network theory, the researchers were able to show that the inclusion of soft-bodied organisms is vital for realistic depictions of ancient food webs. They found that ecological differences between soft- and hard-bodied taxa appear in the record of an Early Eocene food web, but not in much older Cambrian food webs, suggesting that the differences between the groups have existed for at least 48 million years.

“Geologists and biologists assume that soft-bodied things were not in the fossil record, the study, published in 2019 SFI Complex Systems Summer School project, will help strengthen future research in the burgeoning field of ancient food web reconstruction.”

This work is based on a data-driven model created to analyze how workers move through an academic career. The first law, “sublinear scaling,” is for systems that deliver resources. It means a city with a population of a million produces ~150% more wealth, patents, crime, pollution, and disease than a city with a half its size. The second, “superlinear scaling,” applies to outputs of socioeconomic activity. It means a large city produces two or three times more wealth, patents, crime, pollution, and disease than a city per person’s half its size. To investigate, Molinero and Turinon used open data on the height of buildings from more than 4,700 cities in Europe to map where people live. The scientists assigned a dot to every person living in a building. Together, these dots form a sort of “human cloud” — a self-similar fractal within a city.

Using the human cloud, the researchers were then able to determine the fractal dimension of a city’s population. They retrieved a number that describes the human cloud in every city. Similarly, they calculated the fractal dimension of cities’ road networks.

The paper, by Carlos Molinero and SFI External Professor Stefan Thurner of Complexity Science Hub Vienna, explains the fractal origins of two types of urban scaling laws, first documented by SFI researchers in 2007.

The first law, “sublinear scaling,” is for systems that deliver resources. It means a city with a population needs only ~80% as many roads, power lines, and gas stations per person as a city with a half its size. The second, “superlinear scaling,” applies to outputs of socioeconomic activity. It means a large city produces two or three times more wealth, patents, crime, pollution, and disease than a city per person’s half its size.

In a study published in the Journal of the Royal Society Interface, SFI External Professor Donge Farmer, first author Maria del Rio-Chanona, and their colleagues at the University of Oxford explore the impact of automation on low-wage workers. The COVID-19 pandemic is accelerating the pace of automation, and they determined that low-wage workers face a double whammy of being more likely to lose their jobs to automation and less likely to have the skills to switch to newly created jobs.

This work is based on a data-driven model created to analyze how workers move through an academic career. Despite strides in family-leave offerings, and men taking a greater role in parenting, women in academia still experience about a 20% drop in productivity after having a child, while their male counterparts generally do not, according to new research.

A study in the Journal of Science Advances, co-authored by SFI Professor Mirza Galesic, External Professor Aaron Clauset, former Omidyar Fellow Daniel Larremore, first author Allison Morgan, and collaborators at CU Boulder suggests that persistent differences in parenting roles are the key reason that men tend to publish more research papers than women. Because publishing is closely linked to promotion, this gender gap could have long-term impacts on what academic fields look like in the future.

The review, titled “The golden age of social science,” was penned by Caltech researchers Anasasia Nikolakaya, Marcus Gallo, and Colin Camerer. They argue that the interdisciplinarity of the golden age, evidenced by citations to and from outside fields and by multiple leaders on NSF grants, is enabling scientists to explore more difficult questions than were previously possible.

“Scholars will increasingly focus on difficult questions — ones that may have been avoided historically because their complexity made them impossible to tackle from one discipline alone — and social science will be more impactful together than the sum of any one subspecialty working on its own.”

Bowles credits much of SFI’s contributions to the social sciences to a decision by the late SFI President and co-founder George S. Cowan, who in 2003 endowed the Institute’s Behavioral Sciences Program.

“That was 18 years ago,” says Bowles, “and I wish George were around today. SFI is on the map as a place that does top-level social science, punching way above our weight compared to the big universities.”

The Burger’s Shade food web is one of eight ancient food webs that were analyzed for similarities. (Figure 1: Dunne)
Mauboussin retires as Chair of SFI Board of Trustees

Hailed as “one of Wall Street’s most creative and influential minds,” investment strategist Michael Mauboussin, Head of Conceptual Research at Counterpoint Global, Morgan Stanley Investments, has stepped down from his role as Chair of the SFI Board of Trustees following the board’s bi-annual meeting in May. Mauboussin, who has been a prolific speaker and media interviewee, credited complex systems science for inspiring his view of market behavior. During his tenure as Chair, which began in November 2012, he helped keep that science afloat in the aftermath of an economic recession, and more recently through a global pandemic.

“I could not wish for a more thoughtful and caring collaborator than Michael as we worked through the financial and institutional complexities of life in 2020. Michael is a thoughtful person who both understands the mysteries of economic systems and someone who cares deeply about the basic science at SFI in the ways it intersects with business strategy. Without Michael things could have worked out very differently last year,” says Charles Kracka, SFI’s president, who is also the William H. Miller Professor of Complex Systems. Under Mauboussin’s leadership, SFI’s Board of Trustees has significantly enhanced its financial sustainability, helping SFI to weather the financial challenges of the past decade; it has flourished under them. In partnership with Kracka, Mauboussin has helped guide SFI’s expansion to a second campus in Tusquea, N.Y., and helped strengthen the financial health of the board so as to avoid a potential revenue shortcoming, as he had planned since 2012.

He has worked tirelessly to eliminate “to be-raised” funds in the Institute’s budget, and by managing its investments and keeping it financially healthy, has helped maintain SFI as a haven where researchers can focus on big ideas rather than on securing funding. Even as he retires from his chairmanship, Mauboussin remains an active Trustee on the Board. He has pledged to support Katherine Collins and Ian McKinnon as they transition into their new roles as Chair and Vice Chair. Kracka is quick to point out that “just as SFI science is fundamentally collaborative, so is running an institute. As far as I am concerned, Michael has been my partner from day one, and we spoke frequently about both challenging and positive developments. I have worked with someone with the intellectual caliber and professional ethics of a Michael Mauboussin. I have learned a great deal through our relationship.”

“SFI science has deeply influenced me personally and professionally and it has been an honor to serve SFI board and community as Chair. As President, David Krakauer has infused the institute with vision, energy, and rigor, and it has been my pleasure to work closely with him and the rest of the leadership team. I look forward to continuing as an engaged board member, and have every confidence that Katherine and Ian will build on the Institute’s strength.”

Mauboussin replaced former Chair Jim Rats, who helped to see the Institute through the Great Recession.

Katherine Collins has been elected Chair and has appointed Ian McKinnon as Vice Chair of the Santa Fe Institute’s Board of Trustees. Their three-year appointments began May 3, 2021, following the board’s bi-annual meeting.

Katherine Collins is the first Head of Sustainable Investing at Putnam Investments and Founder of Honeybee Capital, the predecessor to Honeybee Capital Foundation. She is also the first woman to chair SFI’s Board of Trustees since the institute’s founding in 1984.

Collins first came to SFI in the late 90s through SFI’s Applied Complexity Network. She was a new portfolio manager at Fidelity Investments, a member of the Applied Complexity Network (then known as the “Business Network”), when she attended a meeting on the topic of collective decision-making in honeybees. She was motivated by speaker Thomas Seeley’s account of how the honeybees dispatch their most senior members to gather information, then use that information to inform a collective democratic decision. This inspired an evolution in Collins’ life and her approach to investing.

After retiring from her position as the Head of Equity Research, Collins departed Fidelity. She went to work at the Harvard Graduate School of Education, starting her own investment research firm, Honeybee Capital, where she earned her degree. Honeybee also joined the Applied Complexity Network in 2015. Collins was elected to SFI’s Board of Trustees.

Collins now uses biomimicry and systems-thinking to inform her work at Putnam, where she has been leading sustainable investment research and ESG (Environmental, Social, and Governance) strategy since 2017.

“The deep understanding that’s come through my affiliation with SFI is not only about individuals, but how systems think, and the relationships between those systems,” Collins says. “Much of our professional work does the opposite — it pulls you to be more and more narrow over time. And so for me, in addition to the substance of the science at SFI, the SFI culture of exploration and connection has encouraged me to keep that broader interconnected view, no matter what the question or the context.”

— Katherine Collins

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Darla Moore joined SFI Trustees

Darla Moore has been elected to the Santa Fe Institute’s Board of Trustees, with a three-year appointment beginning in May 2021. Moore is the Founding President of the Palmetto Institute, a not-for-profit think tank that aims to raise per capita income in South Carolina. She is also the former Managing Director of Chemical Bank, the current CEO of Rainwater Inc., a private investment firm. She currently serves on the boards of The Boeing Company, New Mexico Supreme Court and a professional school of law in Columbia, South Carolina.

Moore shattered barriers to land on the cover of Scientific American, ranked among the world’s most influential women, named one of the Palmetto State’s most influential women, and someone who deserves to sit at the table with the world’s most powerful leaders. Moore is a transformative leader and someone who has worked with someone with the intellectual caliber and professional ethics of a Michael Mauboussin. Moore has a learned a great deal through her relationship with SFI.

“SFI science has deeply influenced me professionally and personally and it has been an honor to serve SFI board and community as Chair. As President, David Krakauer has infused the institute with vision, energy, and rigor, and it has been my pleasure to work closely with him and the rest of the leadership team. I look forward to continuing as an engaged board member, and have every confidence that Katherine and Ian will build on the Institute’s strength.”

Moore joined SFI’s Board of Trustees in 2019. In 2012, Moore shattered another glass ceiling as the first woman to chair the board’s membership to make it even more significantly enhanced his interdisciplinary view, no matter what the question or the context.”

— Ian McKinnon

Complexity approach to pandemic policy shows early benefits

As even as vaccines begin to roll out in large numbers, infectious disease researchers present strong challenges for leaders in setting health policy. With the TRACE (Testing Responses through Agent-based Computational Epidemiology) simulation model, the City of St. Louis now has help. Since we first reported on TRACE last July, SFI External Professor Ross Hammond, a senior fellow in Agent-based Computational Epidemiology (ABCE) at the University of Pittsburgh, has been using the model to help policymakers at different levels of scale manage the pandemic uncertainty — addressing both knowns and unknowns to produce multiple potential outcomes for any policy option. And early results of the model make clear the benefits of agent-based modeling clear.

A petri dish for policy

Hammond and his colleagues pitch TRACE as a petri dish for policy, allowing for all kinds of policy experiments you can’t do in the real world. For St. Louis, the team simulated approximately 10,000 policy combinations across 16 different epidemiological scenarios and looked at millions of discrete scenario simulations. While most other models do meta-analysis based on “average” values, the TRACE model shows that if you increase the number of people wearing masks and wearing the TRACE model shows that if you increase the number of people wearing masks and wearing

For Hammond, the value of working with policy makers has never been more obvious. “Working collaboratively from early in the process to build a model that actually represents their setting and...
When warm weather comes, researchers from around the world gather in Santa Fe for an unusual kind of summer school. For four weeks, experts from disciplines ranging from biology to social sciences learn the basis of complexity science. Along the way, they learn to think and work in new ways and make life-long connections with other researchers. Participants in the SFI Complex Systems Summer School describe it as “life-changing” and “magical.”

Jacqueline Brown, an urban planning expert and McMasters University alum of the enthusiastic summer school alums. “It’s one of the top academic experiences of my life,” she says. “Everyone is so passionate and happy to be there, and there are people coming from around the globe. There are very cool opportunities to collaborate with other people you’ve dreamed of studying with.” Brown was so moved by her experience there that she was heartened to see that the school is achieving its goal of creating a collaborative, inspiring culture that attracts people from a variety of backgrounds and professional interests. She encourages anyone interested in SFI’s previous research on collaboration, to further improve the school. “We get a lot of anecdotal evidence that it’s successful — people say it’s life-changing,” says Cowan. “But in addition to that, it’s nice to have something quantitative that says we’re increasing certain kinds of metrics.”

By turning these “knobs” on the simulation, Lee West says the new approach will not only reveal the capabilities of the model, but allow for a widening of economic understanding biological complexity. “There is a naturalness to it, once you get it,” West says. “You can really see how it works.”

COVID-SAFE SCHOOLS (cont. from page 3) would be amazing — we would be rid of COVID already.” In addition, neither school observed any instance where a student was infected by a student or vice versa. While in-school transmission did occur, 72% of those in one school were associated with other hospitalized. No outbreaks at either school occurred in in-school transmission when mitigation measures were being followed. However, testing revealed a spike in cases at the start of the school year and following fall break — times when the students were out of school — and one school had an outbreak following an out-of-school football game. So, it is safe to reopen schools, and to do so before all teachers are vaccinated?

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THE MAGING BEHIND SFI’S COMPLEX SYSTEMS SUMMER SCHOOL, EXPLAINED

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Postdocs regroup for second ‘Pandemic Pod’

Last September, SFI’s postdocs launched a cutting-edge experiment. Its objective: to gather a quarantined cohort of SFI postdocs in one physical place. Its methodology: a combination of stringent COVID-19 testing and 14-day pre-retrait quarantine to ensure the “Pandemic Pod” would remain COVID-free. Its results? Roaring success.

“IT ‘worked’ at SFI for more than half a year, but the retreat was the first experience where I felt, ‘I really am at SFI,’” says Jonas Dalege, who arrived as a Program Postdoctoral Fellow in April 2020. Like several Pod-members, Dalege had never met any of his fellow postdocs in person, and the sense of community inspired him to help plan a sequel.

In April, as cases in New Mexico declined and the vaccination campaign was in swing, a second Pod ran from April 16–23. Like its predecessor, this second Pod involved strict testing and quarantine measures.

“We continue to play it extremely safe,” says Anjali Bhatt, an ASU-SFI Center Fellow who co-organized the first Pod and is running the second alongside Dalege.

Parts of the Pod, such as brainstorm sessions, were designed to mimic SFI’s campus life, and its location at a remote, spacious hacienda in the mountains offered even more outdoor workspaces than the Airbnb where Pandemic Pod 1.0 took place.

Still, Bhatt emphasizes, “the retreat offers a distinct and really additive component that goes beyond what could happen on campus.”

“We have held an annual postdoc retreat for many years, but it has become really clear that there has never been a time when it has had as much positive impact,” says Hilary Skolvik, SFI’s Postdoctoral Fellows Program Manager. “Anecdotally, almost everyone said that the retreat was the best thing about the program that happened in 2020, which is not a small thing.”

Dalege, who organized this year’s retreat, says the second Pod was a result of feedback from the first Pod.

“Pod members gave up a week of their lives, and many expressed the value of the experience and the opportunity to interact in a more personal way,” says Dalege. “We were very grateful and wanted to do it again.”

Bhatt emphasizes that the retreat is “like SFI on steroids,” generating feedback from a variety of disciplines, from chemistry to computer science.

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