State of the Institute 2011: Jerry Sabloff on SFI’s budget, science, and special responsibility to complexity science

At the turn of the new year, SFI President Jerry Sabloff gave the Update his thoughts on SFI’s status and future.

Update: SFI had another tough budget year. In August you drastically cut expenditures, including salary reductions for SFI’s people, and redoubled fundraising efforts. What does 2011 look like, and how is SFI adapting to what might be the new fiscal norm?

Jerry: Clearly 2010 was a tough budget year, not just for SFI but for all nonprofits. A host of issues, most notably the economy, led to many of our best philanthropic donors being more careful with their giving this year than in the past. By all accounts 2011 will be a tight year as well. We’re hopeful some of the uncertainties will pass, particularly if the economy continues to improve, but there are still a lot of ifs. We’ll have to wait and see.

We’ve gone through incredible belt tightening, and there is no fat in our current budget. The faculty, postdocs, and staff have been terrific in examining every dollar we spend and eliminating unnecessary costs. The science is going strong. But this austerity is only a short-term tactic to get us past this difficult time. If we want to keep SFI’s character intact, our revenue base is the fundamental issue.

In particular we’re looking for new sources to fund our research. Part of our research budget comes from grants from the National Science Foundation, but we need to be broader because NSF also has tight budgets. We’re looking at the possibility of working with other government agencies, acknowledging that they too have tight budgets.

We also are looking at a much broader range of private foundations. This year, for example, we have a new grant from the Rockefeller Foundation, and we are evaluating proposals relating to complexity science for the Templeton Foundation. And, of course, our Business Network is growing with the addition of the exploratory membership [see article on page 3]. We had a great set of meetings in 2010 and that is another area where we are looking for even more interaction.

Finally, we’re looking at drastically revising our business model in some areas. Education is a good example, where Ginger Richardson is taking on the challenge I presented of finding ways education can be a break-even operation and, in the future, actually bringing in revenues. For the first time in 2011 we will be charging tuition to attend our very popular Complex Systems Summer School, but we’ll reserve funds to offer scholarships to about one-third of the students.

RESEARCH NEWS

Having trouble saving for the future? It’s only human

Savings for the future is difficult. Having a new car now always somehow seems more important than saving for a house later.

Now SFI External Professor Matthew Jackson (Stanford) and coauthor Lesse Yariv (Caltech) have shown that groups of people, from families to Congress, have the same problem, and there’s almost no way around it.

We all would rather have a car, a vacation, or an ice cream cone today rather than tomorrow. Economists call this discounting; we discount the value of something in the future because we are impatient, which, after all, counts for something.

But things get interesting when time scales change: when you consider, say, the car in ten years versus the house in eleven years. Rational people, economists often assume, have time-consistent preferences. That is, they’ll have the same preferences no matter how far into the future the relative payoffs are. In reality, people don’t have time-consistent preferences. People will say they want the house ten years from now but as that decision comes into the future the relative payoffs are.

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RESEARCH NEWS

Market simulations in high definition

A new National Science Foundation grant is allowing SFI researchers to model financial markets in greater detail than before, potentially helping uncover factors that have seemingly eluded investors and policymakers.

The recent economic crisis revealed how poorly economists understand dynamics of the economy. In some important models, for example, corporations and banks were assumed to have acted independently and without impact, but they actually exerted influences that collectively cause patterns.

Business Network News

Healthcare as a complex system

Humana Inc. and SFI’s Business Network are co-hosting a February meeting to focus on the latest developments in healthcare economics and new approaches to health and disease.

The percentage of the U.S. economy associated with healthcare is 16 percent and rising, says SFI VP for Administration Chris Wood, who manages the Business Network. Employee health and healthcare expenses have become major concerns of American businesses.

The meeting will examine the notion of health as the integrity of a complex system; improved medical intervention using social network-based models of disease spread, behavioral economics and the paradox of incentives, and agent-based modeling approaches to large-scale economic models, among other topics.

Attendees also will have an opportunity to take part in a role-playing simulation, Humana’s Health Economy Simulator, in which participants will develop a shared view of the health system and an understanding of the perspectives and interplay among key stakeholders.
SFI has many volunteer opportunities. Volunteers work alongside SFI staff and researchers to provide valuable assistance in an intellectually vigorous environment. If you are interested in volunteering at SFI, please contact volunteer coordinator Melissa Williams at volunteer@santafe.edu.

RESEARCH NEWS

Scientists + Google + Facebook = better climate modeling

Creating a comprehensive model of global climate change involves much more than mapping out new patterns in the world's forests, oceans, or atmosphere.

To learn about the complex way the earth is transforming, you need to build a dynamic planetary picture that includes policy decisions, human behavior, and technological strategies, according to SFI External Professor Jim Crutchfield, director of the Complexity Sciences Center at UC Davis. But assembling a large-scale model that pulls all those facets together requires a massive amount of computer and brain power — not just from one place, but from all over the world. And that’s led Jim to link Google and Facebook for network-enabled solutions, he says.

“Specialists are experts in their domains, but it’s hard to get them to talk to each other and speak the same language,” he says. “So one response is to explore technological tools that bring people together. That brought me to Google. They love this kind of thing. A network-based collective modeling platform is exactly how Google thinks.”

Google has immense technological strengths, and Jim has been collaborating with SFI Trustee Graham Spanier, Google’s engineering director, on the project. A key design element involves collective models generated at scientists and others that help them interact in ways similar to social networks like Facebook and the game Second Life, Jim says.

“Right now we’re assessing what technology is out there and who’s interested in working on it,” Graham says. “It’s a couple of years away, but in the end the system could really enable a conversation between many different sorts of experts.”

SFI book news

Ants, networks, diversity, and culture change

A book-length, single-author manuscript in Pueblos rise at about the same time? The book, based on his PhD dissertation, looks to explore the interface between science and culture from the complex systems perspective. The second volume, Diversity Networks and Colony Behavior by SFI Science Board Member Deborah Gordon, provides an accessible look into ant behavior and loss alike. It can drive economic growth, and complexity lens, might inform U.S. policy makers as they encourage long-term sustainable development in conflict-prone nations such as Afghanistan and Pakistan.

“Developing foreign policy is a very complex endeavor, and policy makers need more tools to lend focus to the challenges of sustainable development,” says meeting organizer Bill Frey, a former United States Agency for International Development (USAID) mission director for Afghanistan, who is spending a year as SFI’s first Diplomat in Residence. “I think SFI and the academic community can be a positive force in looking at policy problems through the lens of scientific, evidence-based, responsible lenses than in the past.”

The February 23-25 meeting, “Frontiers of data analysis: Foreign policy as a complex system,” brings together leading scholars and senior-level policy makers and practitioners from the U.S., Afghanistan, and Pakistan. SFI researchers will lead discussions about data analysis, collection, and potential application to policy issues.

SFI update

An SFI working group in future will explore how data, examined through a complexity lens, might inform U.S. policy makers as they encourage long-term sustainable development in conflict-prone nations such as Afghanistan and Pakistan.

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Cooperation, norms, and revolutions: A unified game-theoretic approach, Dirk Helbing, Ioannis A., PLoS Computational Biology 6 (10), October 2010

Current demographics suggest future energy supplies will be a serious issue. Delong, J.P.; Burgess, O.; Marcus Hamilton, P.; Power, T.; and the Urban Ecology Research Group. Better living through physics, David Krakauer; Jessica Flack;...[rest of the text is not shown]
SFI’s 2011 Public Lecture lineup

On November 10 New Scientist covered a recent study in which SFI External Professor Luis Bettencourt and Distinguished Professor Geoffrey West propose divulging traditional per capita measures of metropolitan areas in favor of more scientific metrics that take into account the natural advantages of larger cities. In a November 12 Science News cover story offering an overview of quantum mechanics, the contributions of SFI Distinguished Fellow Murray Gell-Mann and External Professor James Hartle are featured. SFI Professor Doyle Farmer and two SFI colleagues were featured in a November 30 Wall Street Journal article discussing the search for new kinds of economic models.

The Santa Fe New Mexican on December 3 featured Project GUTS, an SFI education program that engages middle school students in science. The article was written by a student who participated in Project GUTS in 2007.

Several Bay Area newspapers covered a December 7 Think Foundation event at which Silicon Valley investors heard presentations from philanthropists and scientists about the future of cities, information, and inclusion.

> Saving for the future continued from page 1

More people are saving for the future, but people who want to save generally go about it in different ways, according to a new study from the SFI Program on the Economics of Insecurity. The study found that people are more likely to save for the future if they are given a choice to do so, and if they are given information about the potential benefits of saving.

SFI’s Public Lectures for 2011 will continue to explore the frontiers of complex systems science and its relevance to many of human society’s most significant problems.

The series kicks off March 2 with SFI Diplomat in Residence Bill Frijt on the complexities of sustainable development in Afghanistan. All lectures are at the James A. Little Theater in Santa Fe and begin at 7:30 p.m.

The 2011 lineup includes:

- **Wednesday, March 3** - “Conflict to sustainable development: The complexities of a way forward in Afghanistan,” SFI Diplomat in Residence Bill Frijt, career minister in the United States Foreign Service and former USAID mission director in Afghanistan.
- **Wednesday, April 13** - “Post-quantum cryptography,” SFI Professor Cris Moore, professor of computer science, physics, and astronomy, University of New Mexico.
- **Wednesday, May 18** - “Risk in financial markets,” Andrew Lo, Harris & Harris Group, professor in the MIT Sloan School of Management and director of the MIT Laboratory for Financial Engineering.
- **Wednesday, June 29** - “Collective behavior: From cells to animals to us,” Iain Couzin, assistant professor of ecology and evolution by biology, Princeton University.
- **Wednesday, August 17** - “The ecology of indoor environments,” SFI External Professor Jessica Green, University of Oregon assistant professor, Center for Ecology and Evolutionary Biology, and director, Biology and the Built Environment Center.
- **Tuesday, Wednesday, and Thursday, September 13, 14, & 15** - SFI’s 2011 Lumen Memorial Lectures: “The emergence of intelligence on Earth,” SFI Professor David Krakauer.
- **Wednesday, October 12** - “Copyright in the digital age,” Molly Van Houweling, faculty director, Berkeley Center for Law & Technology, UC Berkeley.

**SFI Online**

Multimedia and supplementary content available at www.santafe.edu

**Video:** Why anthropologists should ‘go public or perish’

In the distinguished lecture at the American Anthropological Association’s 2010 annual meeting, SFI President Jerry Sabloff examines the importance of communication between anthropologists and the public.

**Video:** SFI’s promise to science & society

At a December 7 Thiel Foundation event highlighting the work of several cutting-edge scientific nonprofits, SFI VP for Administration Chris Wood gives Silicon Valley investors an overview of SFI’s research, and its potential impact.

**Video:** The path forward in Afghanistan and Pakistan

SFI Diplomat in Residence Bill Frijt describes his exploration of the interface between science and national policy, especially relating to Afghanistan, Pakistan, Iraq, and the Middle East.

**Q&A:** Statistical mechanics meets earthquake modeling

In an online interview, SFI External Professor John Rundle discusses his work to apply statistical mechanics to earthquake modeling.

**Video:** Why cities survive and companies die

In a Yahoo! Labs “Big Thinkers” presentation, SFI’s Geoffrey West explains why cities survive and companies die.

**Audio:** Looking back on progress in quantum physics

A November 12 NPR Science Friday interview, Science News editor Tom Siegried highlights the contributions to quantum mechanics by SFI Distinguished Fellow Murray Gell-Mann and External Professor James Hartle.

**Q&A:** Dispatches from the frontiers of complexity science

In an online interview with the Beta Kappa Society, SFI External Professor Melanie Mitchell discusses complexity science, surprises from her research, and her award-winning book Complexity: A Guided Tour.

**Video:** Murray Gell-Mann on challenging accepted ideas

Nobel laureate and SFI Diplomat in Residence Murray Gell-Mann discusses the difficulties physicists had accepting his quark scheme in light of the prevailing ideas of the time.

**Video:** Moving to an intelligent, adaptive power grid

In an SFI seminar, SFI Miller Scholar Seth Lloyd of MIT presents a simple statistical mechanical model of how financial systems become unstable due to debt and draws a parallel between the mathematical “collapse” conditions that give rise to both bankruptcy and black holes.

**Video:** How debt collapses into financial black holes

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Jenne Britell: SFI fosters a ‘life of the mind’

Jenne Britell is Chairman of the Board of United Rent- als, Inc., the world’s largest equipment rental company. She is also a director of Crown Holdings, Inc., Quest Diagnostics, Inc., the U.S. Russia Investment Fund, and the U.S. Russia Foundation for Entrepreneurship and the Rule of Law. In March 2010 she was named a senior managing director of Brook Capital Group LLC. She has held senior management positions at several major corporations and has served on many boards of directors. She was just named one of six Outstanding Directors of public companies for 2011 by the Outstanding Directors Exchange, a division of the Financial Times. Her thoughts follow:

Update: When did you first hear about SFI?

Britell: I’ve known about the Institute for years, but it came to my attention just over a year ago when I sat next to SFI Science Board member Liz Bradley at the 10th anniversary of the Radcliffe Institute for Advanced Study. Liz told me about the research going on at SFI, the colloquia, the lectures that are open to the public, and I was intrigued. I later visited with SFI VP for Development Nancy Deustch and got to meet some of the researchers and leadership.

Update: Why is SFI’s work meaningful to you?

Britell: I have always been interested in a “life of the mind,” and I think there is great opportunity for research that crosses disciplines. I know SFI doesn’t use the word “applied” very often, but I think there is enormous potential to translate its work into outcomes that are good for civilization. In particular, I think the exciting thing about the work is important. Also, I started my career as a historian, so the historiography work that SFI Faculty Chair David Kaiser is doing is interesting to me. And I’m struck by the Institute’s science and math education programs for young people. The more I learn about SFI, the more of its work I find fascinating.

Update: What are the most important contributions SFI has made?

Britell: The Institute attracts outstanding scholars from many different fields to work on a variety of problems, which is important in its own right. The knowledge we have today is a result of such thinking in the past. If we want society to move forward, we need to have places where a life of the mind flourishes. There are so many compelling needs and questions right now. Places like SFI must be supported.