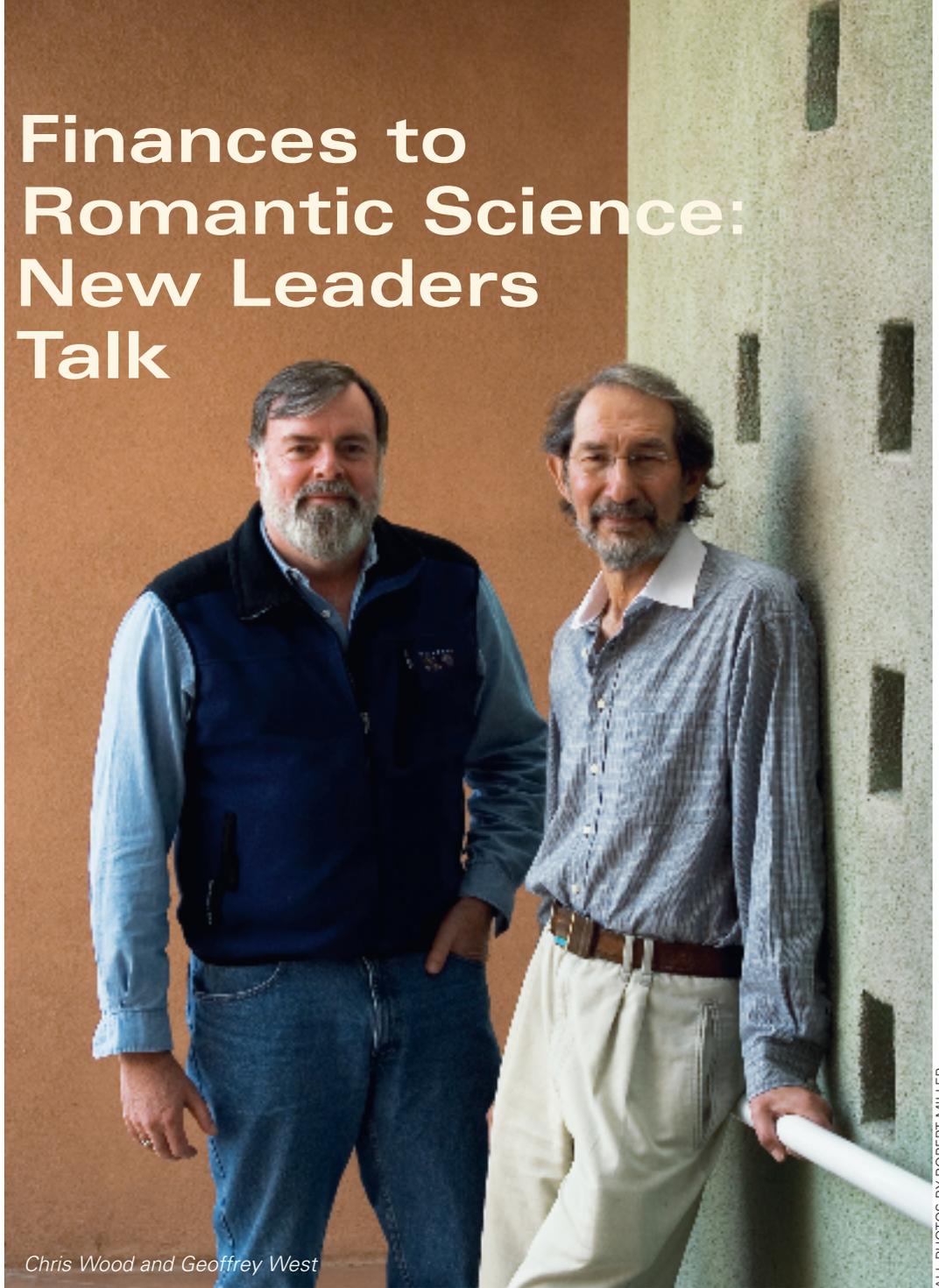


# From Finances to Romantic Science: SFI's New Leaders Talk

By  
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Chris Wood and Geoffrey West

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**In the summer of 2005, the Santa Fe Institute took a new strategic direction** by naming as president one of its key scientists Distinguished Professor Geoffrey West, whose current work involves exploring universal scaling laws in biology and social systems. At the same time, the Institute named neuroscientist Chris Wood as vice

president, with responsibilities covering both academic affairs and the administration of the Institute. In this conversation, West and Wood mull over some of the issues facing their new posts and SFI as a whole.

## On Leadership

**West:** We've gone through many changes in the past months. Chris and I have

stepped into our new positions, and also the leadership of the Board of Trustees has changed. It seemed a natural time to reexamine SFI, both in terms of its science and its operations. We also hired three new resident faculty members and eight new postdoctoral fellows at the start of this academic year, so that began the process of rebuilding the science side of the Institute.

Diffusion

It's all part of rethinking the way we do science here and how we carry out the SFI mission. We're reaching out to the larger community, creating a more effective, integrated external faculty, getting the programs more active, and getting more workshops on board.

**Wood:** One of Bill Miller's actions as new chair of the Board of Trustees was to initiate an "operational review" of the Institute to evaluate the administrative, financial, and operational systems supporting the Institute's scientific programs. The result has been an intense addition to our normal activity. Three members of the board or their associates; Doug Erwin, SFI professor and chair of the Science Steering Committee; plus Geoffrey and I have been busy with it since mid-August. Board Chair Bill Miller and Vice Chair Ford Rowan, and Trustee Jim Rutt have been especially active in the process. Elizabeth Hughes, senior vice president of Legg Mason Capital Management, headed up the project for Bill Miller. We spent a full week here interviewing absolutely everybody who wanted to be interviewed with respect to answering the following question: If today's SFI had not evolved over a 20-year period but instead were created new out of whole cloth, how would we organize it to enable it to run effectively?

This is not a question of what science we are doing. That was off the table in the review and remains in the hands of our

faculty. But every non-scientific question about the Institute is on the table. Some of the questions include, Who are our sources of funding and how do we cultivate them? How do we maintain them? How do we organize our visitor programs and our workshops? Exactly what steps do we need to go through in order to insure that a visitor has an office, has the computing resources that she or he needs, and has the support from all of us? What are the strategic goals of SFI's educational and international programs? How do we most effectively achieve them? So the entire "business end" of our operation has been under scrutiny. We expect that the review will have a lasting effect on the Institute, one that improves our support of the Institute's science and scientists.

### The Journey to SFI

**Wood:** I spent 16 years before I came here in a scientific leadership role at Los Alamos National Laboratory, and I had a job there that required scientific judgment and leadership, as well as organizational and administrative skills. Over those years, the climate of Los Alamos changed from a place where science was primary to one in which the science became increasingly secondary to other considerations. That experience, among others, helped prepare me to understand the balance that's needed between science, organization, and administration in any effective scientific organization.

**West:** I also originally came through Los Alamos, which traditionally was a unique and highly supportive environment to do science. Unfortunately, over the last ten years or so, this situation has deteriorated so that, unwittingly in some ways, the lab has almost become hostile to basic science, in spite of itself. The reality was that if you were leading a basic research group, you had to spend a significant amount of your time defending the very existence of that group and trying to raise funds to keep it alive. I felt my role of running a successful group was to provide a highly supportive environment for them to do excellent science. This is very much the attitude that I brought with me when I came here.

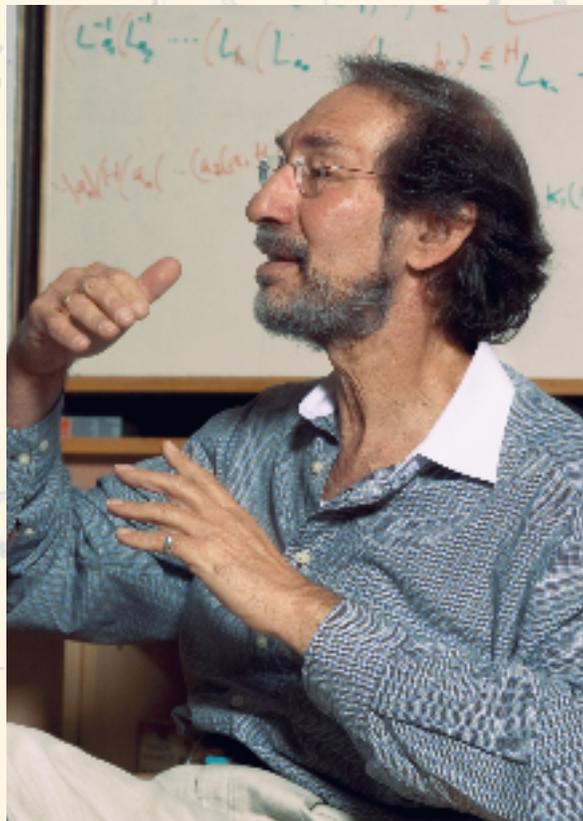
### Rethinking SFI Science

**West:** My own strong propensity is that it's very important for an institution like the Santa Fe Institute to be driven from the bottom up. We cannot impose our version of science on anyone here. We see our role primarily as facilitators, ensuring always that there is a flux of excellent people thinking about deep, fundamental problems at all scales, who also have interests that cross traditional disciplinary boundaries. In addition, we also help to guide the Institute in making decisions, not only about issues such as how many resident faculty members, post-docs, etc., we should have here, but we might also ask of each area of research or each pro-

gram: Is this an area of science that we should be involved in? How should that be carried out? Who should be involved? Who else should get involved? Where is it going and what is its impact, and over what time scale? These sorts of questions are really part of the continuous dialogue among SFI researchers.

Primarily I'm excited by new ideas, new ways of thinking, and different twists on old problems that people can bring to the table. SFI can play a significant role in doing things that wouldn't normally or easily be done in a university or a national lab—though obviously there's often significant overlap. Identifying the serious mavericks or risk-takers who might make the difference is an enormous challenge.

An example is new work we're initiating in biology. One of the more qualitative fields of biology is ecology and it's one of the most important. It involves questions of sustainability, questions about the future of the environment, and so on. There are, however, relatively few quantitative, predictive aspects to that field. Much ecology tends to be characterized by investigations on specific sets of organisms in specific ecosystems. These investigations might look at a specific pasture, or a square mile on some prairie



and analyze it to death—and this is very important to do—but if you're interested in the big picture of what the underlying principles might be, if there are any, and whether there are commonalities connecting ecosystems across the globe—then a much broader approach is required. Ultimately much of the power of science is its search for universality and commonality.

Recently we helped sponsor a small working group in Chile. It was made up of people who have begun to think in these bigger terms; they brought different expertise to the table. Some have thought a lot about questions of the origin and dynamics of the diversity of species, trying to determine the underlying principles. Another group has thought a lot about the questions of the distributions of various quantities like

energy and resources in an ecosystem. What was realized was that there was surprising commonality of thinking and there was the potential of forming a unified theory of ecology, if we can bring all these ideas together and integrate them. So there was a tremendous amount of excitement generated, and the result is a more dedicated workshop at SFI in the fall. This is the sort of effort that has been difficult to put together anywhere else but the Santa Fe Institute.

Clearly, on the one hand, we want and need to be involved in some of the big questions that sit at the center of science but tend to get neglected because of the pressures and the nature of science as now practiced in universities. On the other hand, we'd also like and need to be involved in problems that are really at the edges, that are quite speculative, and maybe can't be taken very far, but it's important that they are investigated. An example is a recent workshop led by David Krakauer exploring the science of history.

### On Finances

**West:** Another goal, which we're just beginning to address, is to really get the Santa Fe Institute on a deeply sound financial footing. Without having that real base core of funding to provide a cushion, wherever it

comes from, our science potentially suffers, and the ability to attract truly outstanding people and put together the kinds of workshops or working groups we'd like becomes so much of a labor that it doesn't happen. This is becoming particularly crucial as federal budgets for science tighten and the focus of awards becomes ever more narrow. So it's very important.

### On The Board

**Wood:** Absolutely critical to Geoffrey's and my ability to do our jobs is the very strong and vocal commitment of our new board leadership. Bill Miller and Ford Rowan have taken on their

there are other places like it, but in particular SFI—is really crucial in the academic landscape. It is a place that is not constrained by the conventional academic tenure process, the kinds of delivery systems that major universities demand of their faculty, and the sorts of constraints imposed by the funding agencies, which all point towards greater and greater narrowness and less and less concentration on some of the bigger questions. I should hasten to add that there is no question that the vast majority of research should, in fact, be disciplinary oriented and highly focused. However, it should not

and are thinking about some of the bigger questions, both intellectually and in terms of societal needs. And yet, by and large, that's not happening very much at the grassroots level within departments or in governmental agencies, so it's very important that SFI remains at the level of excellence that it is, and that it has the sort of feedback and enthusiasm that it garnishes from some parts of the academic community.

**Wood:** Geoffrey's right about the irony. One of the great successes of this institution in its 20 plus-year history is that SFI science and scientists are influential all over the world. There are

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new roles with a vigor and a degree of commitment both intellectually and financially that sets really high standards for us and is a great encouragement because it's clear that they, on behalf of the board, are genuinely committed to this institution. Without that kind of commitment from the board it would be very difficult, if not impossible, to do the kind of job that Geoffrey and I want to do and plan to do for the Institute.

### The Scientific Landscape

**West:** I believe that the existence of an institute like the Santa Fe Institute—and maybe

be at the expense of totally excluding the broader view that acts across traditional boundaries. I see SFI as a haven for nurturing such activities.

That narrowness was a problem perceived 20 years ago by the founding fathers of this institution, and they had tremendous foresight in seeing it, but one of the great ironies is that the situation has worsened over the intervening 20 years. Today more and more presidents, provosts, deans, and directors of funding agencies are speaking in favor of doing interdisciplinary work, getting involved with complex systems,

growing complex systems efforts in Europe, South America, and the Far East, all of which can trace influence, if not direct lineage, to work that's been done here at SFI in the past.

**West:** It is interesting how many people contact us from all over the world telling us about new centers that they are forming—derivations of SFI—and that they'd like to have some formal association with SFI.

**Wood:** We do need to consider licensing, Geoffrey. (laughter)

**West:** It's a very schizophrenic landscape, especially in terms of the funding. For example, we get generously funded by the

National Science Foundation, but they warn us that when the budgets get tight the first things to go are things that don't fit into the normal disciplinary boxes, despite the fact that the highest levels—the administrators and directors—are strongly encouraging agencies to get more and more involved in opportunities like this.

### Threats to the Institute

**West:** One major threat is that we're not going to rise to the challenge of really taking risks and doing exciting things. The pressure to do things that are safe is very strong. We need to facilitate new programs, take on collaborations that are a little bit out of the ordinary—take risks. And yet we have to make sure the ideas are not flakey, but instead have serious intellectual content, value, and potential.

**Wood:** Another threat would be the temptation to bask in our own success. As important as SFI has been, we cannot succeed by reinventing or revisiting those specific days or scientific efforts of the past. We need to invent the SFI science of the future. The rest of the world, whether we like it or not, is using what we've done and inventing their own

versions. Many key scientific questions remain unanswered, and it is clear that the old ways of approaching them will not be adequate.

### Romantic Science

**West:** There's no question that the traditional structure of universities is undergoing examination, especially in regard to crossing disciplinary boundaries, but it's still awfully difficult to accomplish change, and we flourish because of that. And I suppose—and maybe I shouldn't say this—but I would love to see a time come when there's no need for SFI. It would be wonderful if the philosophy of SFI were integrated into the canoni-

cal structure of universities. In fact, I often say the following and it resonates: The Santa Fe Institute is the place many of us thought we were going to when we were very young and contemplating academic life. We thought in our naiveté, that that's what universities were, a community of scholars from varying backgrounds with multiple talents and interests thinking about the great and deep issues of our time.

It was a totally romantic, unrealistic image of possibly what might have existed in the middle of the 19th century in some places—I don't know. And possibly it still does, somewhere. There might be remnants in a few Oxford and Cambridge colleges, but basically I don't think it exists now, if it ever actually did. Nevertheless, it's a wonderful and exciting fantasy. And I like to think that such a community of broad-thinking scholars following their noses in the search of a deeper understanding of the important intellectual issues and challenges of the day is what we are trying to approximate at SFI. I think it's a wonderful goal and I feel blessed that in my waning years, I can actually do what I wanted to do when I was sixteen years old. ◀

