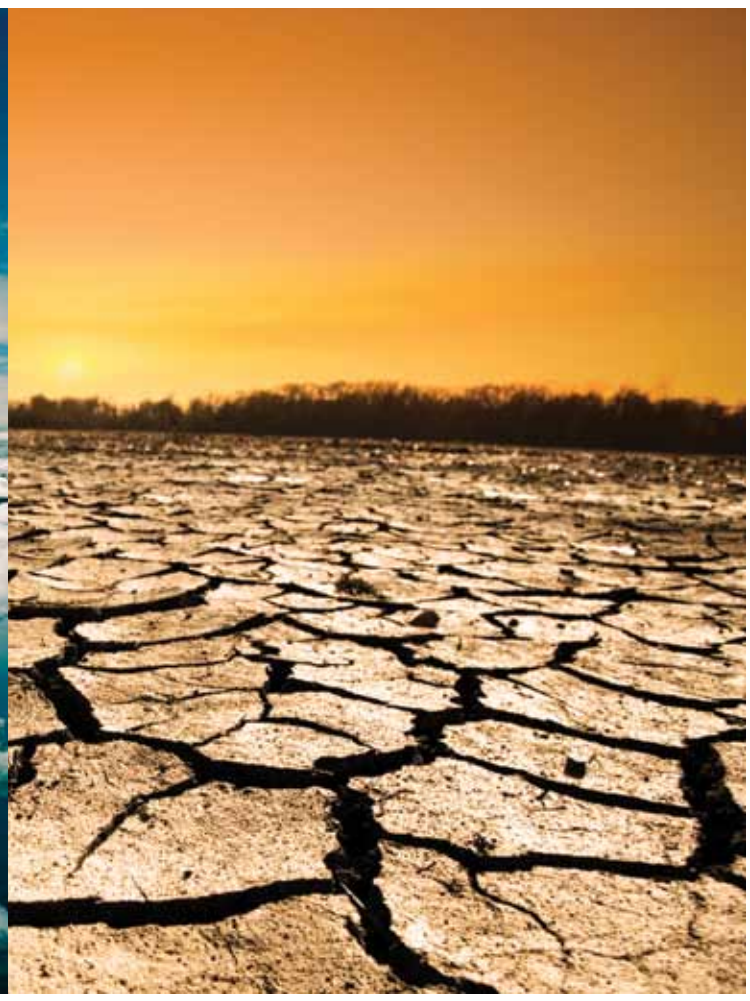
SANTA FE INSTITUTE

Update

September/October 2009

BUSINESS NETWORK NEWS

Theme week: The future is not what it used to be



Just how accurate are today's predictions of the future? (Images iStockphoto.com/MIenny Photography [left]/Clint Spencer [right])

It's easier to predict that societal surprises will occur than it is to predict what those surprises will be and when they will occur. What if, for example, life expectancy becomes significantly longer than expected in the not-too-distant future?

"That's one of the potential surprises that may occur when you least expect it," says SFI Postdoctoral Fellow Béla Nagy. He and SFI Professor Doyne Farmer are co-organizers of a September 14-17 Business Network theme week held at SFI called "The future is not what it used to be." During the week, nearly 20 participants will hear SFI researchers and veteran futurists review past attempts to predict the future, assess lessons learned, and, of course, consider what the future holds.

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RESEARCH NEWS

Expert group seeks systems perspective on aging

Mice live on the order of years; humans, a century; and mysticetes longer still. Somehow, very similar chunks of tissue – near copies of each other, whether they find themselves in a shrew or a horse – age and degenerate at rates based on their organismic containers. Why?

Two dozen specialists in genomics, molecular dynamics, and the evolutionary aspects of aging met at SFI July 27-29 to explore these and other mysteries of growing old. The workshop, "Systems biology and the physical foundations of aging," brought together researchers with contrasting areas of expertise and common interests.

"People had to give an elevator speech about what they're doing," says co-organizer and SFI Distinguished Professor Geoffrey West. "Everybody, no matter how distinguished they were, was given 15 minutes. Then

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Old woman in Ravangla market, India (Image iStockphoto.com/Sukanto Debnath)

IN THIS ISSUE

RESEARCH NEWS

Conflict curves: Formulating a mathematics of terrorism

When scientists study political violence, they usually focus on qualitative factors, such as the perpetrators' psychological motivations and the local political environment.

But a handful of research teams are examining the problem from a different angle, using tools from statistics and ideas from physics to uncover mathematical patterns in these conflicts – in the frequencies and severities of individual terrorist acts, for example, or in the strategic decisions terrorists or governments make.

An August 31-September 2 working group at SFI brought three of these teams together, along with representatives of the defense

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INSIDE SFI

2009 Ulam Lectures to honor SFI's Murray Gell-Mann

This year, SFI's Ulam Lectures will be served with a twist. Typically, a single speaker delivers a set of lectures over three nights. But in celebration of Nobel laureate and SFI co-founder Murray Gell-Mann's 80th birthday, three distinguished scientists will give talks related to his major interests.

On September 15, Sir Chris Llewellyn Smith, Chairman of the Council at ITER and former Director General of CERN, will speak about our quest to understand the nature of matter. He will describe what we know about the basic constituents of matter and the forces acting on them, flaws in our understanding, and where this search may take us.

SFI External Professor Mark Pagel, an evolutionary biologist at the University of Reading, England, will speak September 16 on language evolution. He will discuss how languages evolve like biological species, how we can trace the evolution of some common

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LIT BITS

Metabolic-network-driven analysis of bacterial ecological strategies; Freilich, S.; Kreimer, A.; **Borenstein, Elhanan [SFI Postdoctoral Fellow]**; Yosef, N.; Sharan, R.; Gophna, U.; Ruppin, E.; *Genome Biology* 10 (6), 2009, pp. 63-70

Hierarchical models, marginal polytopes, and linear codes; Kahle, T.; Wenzel, W.; **Ay, Nihat [SFI External Professor]**; *Kybernetika* 45 (2), 2009, pp. 189-207

Comment on "Ergodicity and central-limit theorem in systems with long-range interactions" by A. Figueiredo et al.; Pluchino, A.; Rapisarda, A.; **Tsallis, Constantino [SFI External Professor]**; *EPL* 85 (6), March 2009, pp. 30-31

Escort mean values and the characterization of power-law-decaying probability densities; **Tsallis, Constantino [SFI External Professor]**; Plastino, A.R.; Alvarez-Estrada, R.F.; *Journal of Mathematical Physics* 50 (4), April 2009, pp. 375-386

Closer look at time averages of the logistic map at the edge of chaos; Tirnakli, U.; **Tsallis, Constantino [SFI External Professor]**; Beck, C.; *Physical Review* E 79 (5 PT 2), May 2009, pp. 262-267

HIV evolution in early infection: Selection pressures, patterns of insertion and deletion, and the impact of APOBEC; Wood, N.; **Bhattacharya, Tanmoy [SFI Professor]**; Keele, B.F.; Giorgi, E.; Liu, M.; Gaschen, B.; Daniels, M.; Ferrari, G.; Haynes, B.F.; McMichael, A.; Shaw, G.M.; Hahn, B.H.; **Korber, Bette [SFI Research Professor]**; Seoighe, C.; *PLOS Pathogens* 5 (5), May 2009, pp. 505-520

Discovering cis-regulatory modules by optimizing barbecues; Mosig, A.; Biyikoglu, T.; Prohaska, S.J.; **Stadler, Peter [SFI External Professor]**; *Discrete Applied Mathematics* 157 (10 SP ISS), May 28, 2009, pp. 2458-2468

A refinement of the common cause principle; **Ay, Nihat [SFI External Professor]**; *Discrete Applied Mathematics* 157 (10 SP ISS), May 28, 2009, pp. 2439-2457

A note on fundamental, non-fundamental, and robust cycle bases; Klemm, K.; **Stadler, Peter [SFI External Professor]**; *Discrete Applied Mathematics* 157 (10 SP ISS), May 28, 2009, pp. 2432-2438

Percolation in insect nest networks: Evidence for optimal wiring; **Valverde, Sergi [SFI Postdoctoral Researcher]**; Corominas-Murtra, B.; Perna, A.; Kuntz, P.; Theraulaz, G.; **Solé, Ricard [SFI External Professor]**; *Physical Review E* 79 (6 PT 2), June 2009, pp. 143-150 The role of environmental context in the dynamics and control of alcohol use; Mubayi, A.; Greenwood, P.; Wang, X.; **Castillo-Chavez, Carlos [SFI External Professor]**; Gorman, D.M.; Gruenewald, P.; Saltz, R.F.; *Alcoholism - Clinical and Experimental Research* 33 (6 SP ISS S1), June 2009, p. 61A

Nonadditive entropy: The concept and its use; **Tsallis, Constantino [SFI External Professor]**; *European Physical Journal A* 40 (3), June 2009, pp. 257-266

The first T cell response to transmitted/founder virus contributes to the control of acute viremia in HIV-1 infection; Goonetilleke, N.; Liu, M.K.P.; Salazar-Gonzalez, J.F.; Ferrari, G.; Giorgi, E.; Ganusov, V.V.; Keele, B.F.; Learn, G.H.; Turnbull, E.L.; Salazar, M.G.; Weinhold, K.J.; Moore, S.; Letvin, N.; Haynes, B.F.; Cohen, M.S.; Hraber, P.; **Bhattacharya, Tanmoy [SFI Professor]**; Borrow, P.; **Perelson, Alan [SFI External Professor and**

PEOPLE

Ed Knapp, 1932-2009

Former SFI President Ed Knapp passed away at his home in Santa Fe on August 17. Ed served as SFI's President from 1991-1995, and as an SFI Research Professor from 1995-1997.

Ed also served as Director of the National Science Foundation and was President of the Universities Research Association. He worked for many years as an experimental physicist and senior fellow at Los Alamos National Laboratory.

Gifts in Ed's memory may be sent to Pancreatic Cancer Research, Mayo Clinic, 13400 E. Shea Blvd., Scottsdale, AZ 85259. ■

> *Ulam Lectures*

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Murray Gell-Mann

words like "you," "I," "two," "we," and "three" back tens of thousands of years, and how language evolution gives clues to population history and migration.

Dan Schrag, SFI External Professor and geochemist at Harvard, will explore the effects of climate change on humans today and how previous episodes have affected past civilizations.

SFI's Ulam Lectures are named for Polish mathematician and Manhattan Project contributor Stanislaw Ulam (1909-1984).

This year's lecture series – "Adventures in the simple and complex: A tribute to Murray Gell-Mann" – will be held at the James A. Little Theatre, New Mexico School for the Deaf. The lectures are free and open to the public. The series is supported in part by funding from Los Alamos National Bank. ■

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> *Mathematics of terrorism*

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industry, to develop a long-term research program of quantitative analysis, modeling, and prediction of terrorist activities.

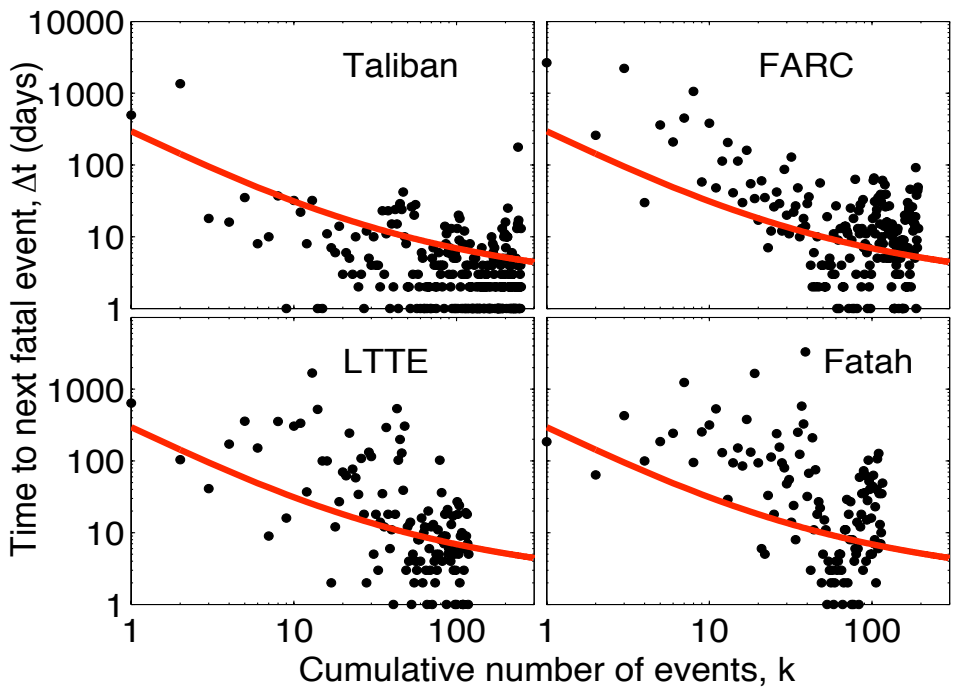
Co-organizers Aaron Clauset (SFI Omidyar Fellow) and Brian Tivnan (MITRE Corporation) believe such a program ultimately could shed new light on how to forecast and interdict terrorism.

"Our goals were to identify the big questions for this new field, and identify the common ground among the different teams," Aaron says.

Neil F. Johnson's (University of Miami) team has focused on conflicts like those in Iraq and Afghanistan, arguing for instance that the survey methods used to estimate the civilian casualty counts are highly biased. Johnson and his team also have argued that terrorism and civil wars are two sides of the same global phenomenon of political and civil violence.

Chris Danforth and Peter Dodds (both of the University of Vermont) study social networks, processes, and forecasting, and have applied these techniques to terrorism in a collaboration with MITRE.

Aaron's research on the mathematics of terrorism began in 2004 while he was a graduate student at the University of New Mexico. In 2007, he published a paper, "On the Frequency of Severe Terrorist Events," with Maxwell Young (University of Waterloo) and Kristian Skrede Gleditsch (University of Essex), showing that the severity of an attack is highly predictive of its frequency worldwide, and that the severity of attacks is roughly cyclical.



Development curves for the four most prolific terrorist groups in the world: the Taliban, Revolutionary Armed Forces of Colombia (FARC), Liberation Tigers of Tamil Eelam (LTTE), and al Fatah, showing that their attack rates (number of days between consecutive fatal attacks) accelerates in a fairly systematic manner as each group gains experience. (Courtesy Aaron Clauset)

(Image iStockphoto.com/Sean Warren)

In subsequent work conducted as an SFI Omidyar Fellow, Aaron has shown that the frequency and severity of attacks can depend strongly on competitive interactions between groups, as in the Israel-Palestine conflict, and on the size or maturity of a terrorist group.

"These patterns suggest that there may be something more fundamental going on here," he says, arguing that the possible relationships deserve greater scientific attention than they have thus far received. With better models, he contends, science may be able to explain and predict attack severity to a greater extent than is now possible.

The working group for the first time convened researchers who are working on just that – applying techniques from the natural and mathematical sciences to tease apart the dynamics of political violence. Future work will apply these new techniques to many other conflicts and will attempt to distill common causes and effects across conflicts.

Ultimately, Aaron says, the collaborations that grow out of the meeting could result in a much deeper understanding of the dynamics of terrorism. "Progress here offers the very real possibility of both understanding and helping to limit terrorism," he says. ■

> *Future theme week*

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Attendees will come from high-tech and telecommunication companies, government agencies, and financial institutions.

In addition to Béla, SFI speakers include Professor Doug Erwin, External Professor Luis Bettencourt, and Omidyar Fellow Jessika Trancik.

Also presenting are Peter C. Bishop, associate professor of Strategic Foresight and coordinator of the graduate program in Futures Studies, University of Houston; Robert J. Lempert, senior physical scientist at RAND and professor, Pardee RAND Graduate School; Scott Matthews, associate technical fellow, The Boeing Company; Anna Salamon, researcher, Singularity Institute for Artificial Intelligence; and John Smart, president, Acceleration Studies Foundation.

Doyne recalls the days when the world was terrified by the prospect of a nuclear war. Now some find themselves more concerned with climate change, he says, prompted in part by sophisticated computer models that simulate dire scenarios. These and other planning tools, such as agent-based models to evaluate economic policies, could become prediction tools of the future.

"Through these models," says Béla, "we may be able to gain some insight into the potential impact – and unintended consequences – of various policies or regulations before they are implemented."

According to Béla, many empirical regularities in technology (the most famous of which is probably Moore's Law) suggest the possibility of long-term predictability in several key industries, including information technology and energy.

Paradoxically, he says, these long-term trends lead some to speculate about the possibility of a concept known as "technological singularity," which posits that within a few decades, technological change will be so fast that all models break down – and with that our forecasting ability.

A traveling Smithsonian exhibition called "Yesterday's tomorrows" will provide a backdrop for the meeting. It features depictions of America's past visions of the future.

According to Béla, such past forecasts serve to emphasize the importance of asking the same question today: How accurate will today's ideas of the future seem decades from now?

"If history is any guide to the future, we shouldn't be surprised if it turns out that again we find we were either too worried or overly enthusiastic about the wrong things, and ignored the most important issues that will shape our tomorrows." ■

LIT BITS (cont.)

Science Board Member]; Hahn, B.H.; Shaw, G.M.; **Korber, Bette [SFI Research Professor]**; McMichael, A.J.; *Journal of Experimental Medicine* 206 (6), June 8, 2009, pp. 1253-1272

Random hypergraphs and their applications; Ghoshal, G.; Zlatic, V.; Caldarelli, G.; **Newman, Mark [SFI External Professor and Science Board Member]**; *Physical Review E* 79 (6 PT 2), June 2009, pp. 244-253

Did warfare among ancestral hunter-gatherers affect the evolution of human social behaviors? **Bowles, Sam [SFI Professor];** *Science* 324 (5932), June 5, 2009, pp. 1293-1298

Theory of topological edges and domain walls; **Bais, Sander (F.A.) [SFI External Professor]**; Slingerland, J.K.; Haaker, S.M.; *Physical Review Letters* 102 (22), June 5, 2009, pp. 13-16

Multiple ecological pathways to extinction in mammals; Davidson, A.D.; Hamilton, M.J.; Boyer, A.G.; **Brown, Jim [SFI External Professor and Science Steering Committee Member]**; Ceballos, G.; *Proceedings of the National Academy of Sciences* 106 (26), June 30, 2009, pp. 10702-10705

Scientific discovery and topological transitions in collaboration networks; **Bettencourt, Luis [SFI External Professor]**; Kaiser, D.I.; Kaur, J.; *Journal of Informetrics* 3 (3), July 2009, pp. 210-221

The ontogeny of scale-free syntax networks: Phase transitions in early language acquisition; Corominas-Murtra, B.; Valverde, S.; **Solé, Ricard [SFI External Professor]**; *Advances in Complex Systems* 12 (3), June 2009, pp. 371-392

On the bias of traceroute sampling: Or, power-law degree distributions in regular graphs; Achlioptas, D.; **Clauset, Aaron [SFI Omidyar Fellow]**; Kempe, D.; **Moore, Cristopher [SFI Professor]**; *Journal of the ACM* 56 (4), June 2009, pp. 53-80

Population stability, cooperation, and the invisibility of the human species; Hamilton, M.J.; Burger, O.; DeLong, J.P.; Walker, R.S.; Moses, M.E.; **Brown, Jim [SFI External Professor]**; *Proceedings of the National Academy of Sciences* 106 (30), July 28, 2009, pp. 12255-12260

An economic model of friendship: Homophily, minorities, and segregation; Currarini, S.; **Jackson, Matthew [SFI External Professor]**; Pin, P.; *Econometrica* 77 (4), July 2009, pp. 1003-1045

Revolution in organic chemistry and its implication in biogenesis; **Morowitz, Harold [SFI Science Board Chair Emeritus]**; Srinivasan, V.; **Smith, Eric [SFI Professor]**; *Complexity* 14 (6), July-August 2009. pp. 7-8

Early origin of the bilaterian developmental toolkit; **Erwin, Douglas [SFI Professor]**; *Philosophical Transactions of the Royal Society B-Biological Sciences* 364 (1527), August 12, 2009, pp. 2253-2261

Diversity sustains an evolving network; Mehrotra, R.; Soni, V.; **Jain, Sanjay [SFI External Professor]**; *Journal of the Royal Society Interface* 6 (38), September 6, 2009, pp. 793-799

To how many politicians should government be left?; Klimek, P.; Hanel, R.; **Thurner, Stefan [SFI External Professor]**; *Physica A-Statistical Mechanics and Its Applications* 388 (18), September 15, 2009, pp. 3939-3947

PEOPLE

Nathan Collins: Giving the social sciences a good dose of math

What political science needs is a good dose of mathematics, according to SFI Omidyar Fellow Nathan Collins.

How do people choose whether to vote? Why do they prefer one candidate over another? How do they form their beliefs about political candidates? Mathematical models, Nathan says, can help answer all these questions.

Nathan Collins

Take voting behavior, for example. Like a bowling ball, voters are subject to inertia: They tend to vote if they voted last time, and they tend not to vote if they didn't. Unless, that is, they're dissatisfied – then they switch strategies. When expressed mathematically, this principle alone can explain long-term trends in voter turnout remarkably well, Nathan found.

He created a super-simple model in which all voters are dedicated Republicans or dedicated Democrats, and they decide only whether or not to vote. Voters whose party consistently wins may decide voting isn't worth the bother. Conversely, non-voters whose party loses may get prodded into voting.

Of course big external events like a war or an economic collapse can impact voter satisfaction too, and Nathan's model can't predict those. During stable periods, though, he argues that his model captures much of the dynamics driving long-term trends.

To test the model he examined voting data from six countries during the relatively stable period between the end of World War II and the beginning the oil embargo. "Our model was a closer fit than any other reasonable model," Nathan says.

The spike in voter turnout in the U.S. in the last election, he says, may indicate that recent events have changed basic satisfaction rates, leading to a longer-term change in voter turnout.

Nathan earned a master's degree in physics at MIT before tackling political science for his PhD at Stanford. ■

RESEARCH NEWS

Logic language: Constructing knowledge the way scientists do

It could become a scientist's best friend: software that incorporates everything you read, write, speculate, and infer, along with the whole body of literature and data relevant to your field, and comes up with helpful suggestions, unseen connections, and even resource budgets to help guide your research.

The same kind of software could aid in non-science areas, too, from crop rotation planning for agriculture to decision support for logistics. SFI Visiting Scientist Stephen Racunas is leading work under a two-year U.S. Office of Naval Research grant, "Contradiction-based logic for information fusion," to develop the required theory and algorithms.

"Contradiction-based logic is a direct formalization of the scientific method," explains Stephen, who is also a senior research engineer at Stanford University's Medical School, where he is working toward biomedical applications of the technology. "[It] aims to find the relationships between new ideas, old ideas, and unexplained or unpublished data."

CBL is not a statistical model of scientific inference, nor is it an artificial intelligence scheme. "In a way it's the opposite of A.I.," he says. "In no way does it attempt to replace, model, or supplant human thought. At most it's Artificial Anti-Stupidity...it's more like a spell-checker for the realm of ideas."

Rather than attempt the Quixotic task of capturing the entire structure of scientific knowledge in an authoritative über-database or expert system, Stephen's approach is to glean that structure from the bottom up, using the questions scientists ask, the conjectures they pose, the data they collect, and the conclusions they favor as raw material.

By translating these myriad thoughts and observations into the formal language of model theory, CBL creates a mathematical mapping of the ever-evolving state of scientific knowledge. This mapping can then be plumbed using well-established mathematical optimization techniques.

"Because of the way this new logic is set up," Stephen says, "each optimal hypothesis is a boundary point" in an abstract space in which theories, data, and other constraints – "including time and budgetary concerns, if the scientist wishes" — are connected along high-dimensional surfaces.

"The best hypotheses are the ones on the border — where constraints meet possibilities," he says. ■

PEOPLE

Nathan Eagle named among world's top young innovators

SFI Omidyar Fellow Nathan Eagle has been named by MIT's *Technology Review* magazine as one of the world's top innovators under the age of 35 for his pioneering work on mining mobile phone data for the public good.

Selected from more than 300 nominees by a panel of expert judges and the magazine's editorial staff, the TR35 is an elite group of young innovators. Their work spans the fields of medicine, computing, communications, nanotechnology, and more.

Petabytes of data about human movements, transactions, and communication patterns are continuously and inadvertently being generated by modern technology, from mobile phones to credit cards. Nathan analyzes cell phone data sets that represent the social network topology and dynamics of entire countries within both the developed and developing worlds.

By coupling anonymized communication events from hundreds of millions of people with other regional sociopolitical and socioeconomic information, Nathan and his collaborators are developing machine learning and network analysis tools that will provide deeper insight into human societies. Ultimately his research agenda is to determine how to use these insights to improve the lives of the billions of people who generate this data.

Nathan and the other 2009 TR35 winners are being featured in the September/October issue of *Technology Review* and will be honored at the EmTech@MIT 2009 Conference September 22–24. ■

> *Aging workshop*

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we let them go at it" in unstructured, facilitated discussion.

The research programs represented at the conference have fleshed out understandings of individual layers, such as intercellular and molecular dynamics. Workshop participants combined these understandings of bio-systems into holistic networks touching on four themes: systems biology and genomics; trajectories of aging; complexity, robustness, frailty, and hierarchy; and developmental biology.

"In only a few days, we were able to see the possibility for synergy among many branches of science that will lead to new, large collaborative projects," says Aviv Bergman, a co-organizer who recently started a Systems Biology of Aging program at the Albert Einstein College of Medicine.

Other conference organizers included SFI External Professor and Science Board Member Walter Fontana, a systems biologist at Harvard Medical School who looks at aging as disintegration of information; Tulane University researcher Michal Jazwinski, who studies genetics of aging; and Anna McCormick, a National Institute on Aging researcher who studies molecular mechanisms of aging.

Geoffrey says participants are interested in creating a summer school on aging that would finish with a similar meeting.

The workshop was sponsored by the National Institute of Aging of the National Institutes of Health, the American Federation for Aging Research, and the Glenn Foundation for Medical Research. ■

(Image iStockphoto.com/ Elna Vegante)

SFI IN THE NEWS

SFI Postdoctoral Fellow Nathan Eagle's work to use cell phone usage data for the public good continues to receive coverage. On August 17, BBC News online covered a study led by Nathan to understand friend networks using cell phone data. "We gave out a set of phones that were installed with a piece of 'uber-spyware'," said Nathan. "It's invisible to the user but logs everything: communication, users' locations, people's proximity by doing continuous Bluetooth scans." The researchers compared the data with data from surveys of mobile phone users and found that users' actual behavior differed from what they self reported: Users dramatically overestimated the amount of time they spent with friends and dramatically underestimated the amount of time they spent with people they said were not friends. The researchers were able to guess from the mobile data alone, with 95 percent accuracy, if any given pair of users were friends. MIT's *Technology Review* reported that Nathan is working with city planners in Kenya and Rwanda to understand how slums grow and change in response to events such as natural disasters and declines in crop prices. And earlier this year, it said, Nathan began using phone-derived data to build a more accurate model of the spread of malaria in Africa.
http://news.bbc.co.uk/2/hi/technology/8205940.stm

A series of opinion pieces in the August 6 issue of *Nature* written by several SFI-affiliated researchers makes the case for the expanded use of agent-based modeling for a number of important problems. A piece by SFI Professor Doyne Farmer and SFI External Professor Duncan Foley criticizes traditional models used by economists to predict the performance of the economy, and proposes the greater use of agent-based models. The article notes the work of several SFI-affiliated researchers, including SFI External Professors Rob Axtell and Stefan Thurner and SFI External Professor, Science Board Member, and Science Steering Committee Chair John Geanakoplos. Another piece by SFI External Professor Josh Epstein says agent-based computational models can capture irrational behaviour, complex social networks, and global scale – all essential in confronting the H1N1 virus. Epstein describes his past work with Rob Axtell to model the spread of disease using an early epidemiological agent-based model. An editor's piece in the same issue says "the field [of economics] could benefit from lessons learned in the large-scale modeling of other complex phenomena, such as climate change and epidemics. Those lessons, taken together with lessons from the downturn, suggest an ambitious research agenda – not just for economists, but for psychologists, political and social scientists, computer researchers, and more." The editorial concludes that more development work is needed to bring computer simulations to a state of informing economic policy.
http://www.nature.com/nature/journal/v460/n7256/full/460685a.html

http://www.nature.com/nature/journal/v460/n7256/full/460687a.html

http://www.nature.com/news/2009/090805/full/460680a.html

http://www.nature.com/nature/journal/v460/n7256/full/460667a.html

An August 6 post in the *Chicago Tribune* business blog "Burns on Business" by Greg Burns notes the tendency of new technology companies to leave the Chicago area, typically for the West Coast, and take their innovations with them. It quotes SFI External Professor Brian Arthur: "Rather than springing from individual breakthroughs, new technologies increasingly arise by combining existing ones. The advantage goes to regions with the scale and know-how to fit together many small advances. 'That principle applies anywhere,' said W. Brian Arthur. Parlaying local knowledge into the next big thing becomes tougher given the increasing complexity of today's scientific ventures, said Arthur, who explores the subject in a new book, "The Nature of Technology."
http://newsblogs.chicagotribune.com/burns-on-business/2009/08/chicagos-future-as-a-tech-center-in-jeopardy.html

An August 4 article in the *Ethiopian Review* about genetic imprinting quotes SFI Professor Jon Wilkins in a discussion of major shifts in the way geneticists think about genetic inheritance.
http://www.ethiopianreview.com/articles/20588

A July 24 Science Careers article in *Science* online mentions SFI in a discussion of the growing need for researchers working in network science. "Some researchers have jump-started network research careers by taking summer courses at the Santa Fe Institute. As network science has gained momentum, a number of interdisciplinary centers dedicated to network science have emerged – for example, at Northeastern University, the University of Michigan, Indiana University, the University of Notre Dame, and in non-university settings such as the Santa Fe Institute and Los Alamos National Laboratory." The article quotes SFI External Professor and Science Board Member Mark Newman.
http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2009_07_24/caredit.a0900091

New York Times science blogger Andrew Revkin, in a two-part "Dot Earth" blog entry on July 17 and 20, discusses several issues raised at the first Summer School on Global Sustainability at SFI, attended by several dozen graduate students and researchers and co-sponsored by SFI and the National Renewable Energy Laboratory. Revkin attended a portion of the school and took part in a panel discussion on sustainability issues as covered by the media.
http://dotearth.blogs.nytimes.com/

Wall Street Journal blogger Carl Bialik in a June 30 post in "The Numbers Guy" quotes SFI Omidyar Fellow Aaron Clauset in a story about the potential use of Benford's law to detect election fraud in Iran's recent presidential election. The law states that in numerical listings, tables of statistics, etc., digits tend to occur with regular probabilities, and anomalies can, in certain situations, indicate problems. "But why not make up numbers that conform to Benford's Law? Aaron Clauset, a computer scientist at the Santa Fe Institute, said, 'People are very strategic in their behavior, and they can use it to game the system. It sets up a co-evolutionary arms race between the detector and the evader.'"
http://blogs.wsj.com/numbersguy/statistical-sleuthing-on-the-iran-election-747

A June 29 Physorg.com article describes the work of scientists at the intersections of epidemiology, mathematics, modeling, and statistics to monitor the spread of 2009's first wave of the H1N1 influenza (swine flu) virus. "The researchers found that in Japan, more than 90 percent of the cases were in school-aged children and teens. Quick action was taken to contain the disease through school closures and other social distancing measures, such as avoiding use of public transportation and the use of face masks. In addition, Japan employed active surveillance at airports, using recently developed sensors to detect passengers with fevers for additional screening. The disease was contained within two to three weeks, with only about 500 cases and no fatalities." SFI External Professor Carlos Castillo-Chavez is listed as a member of the research team.
http://www.physorg.com/news165516530.html

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