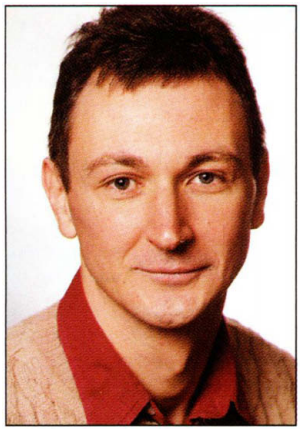
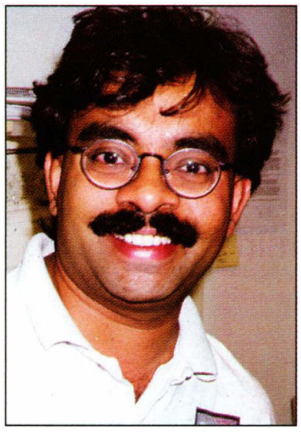
under very specific conditions. "A very strange thing about the Langlands Program is that it is so beautiful, that it is so seductive, that what it sets forth is so simple, and that it puts together so many different phenomena," says Lafforgue. "Since the formulation by Langlands, everybody is absolutely convinced that the set of conjectures is true."





Honored. Fields medalists Voevodsky (*left*) and Lafforgue took laurels for finding hidden connections in mathematics; Nevanlinna winner Sudan (*right*), for wedding probability to proof.

In 1999, Lafforgue won mathematical acclaim by proving the Langlands Conjecture for a very broad class of objects known as function fields (*Science*, 4 February 2000, p. 792). "I knew that it was an important result. For the following 2 years, many mathematicians around me thought that it would receive the Fields, but I preferred not to think about that," says Lafforgue. "Today, of course, I feel deeply honored and happy to obtain so much recognition for my work."

The other new Fields medalist, 36-year-old Vladimir Voevodsky, toiled at the intersection of two other mathematical subjects: topology, which studies shapes in space, and algebra, which studies the symmetries and relations of abstract mathematical operations. Mathematicians have had remarkable success in trying to teach the two fields to speak the same language, but some areas still can't communicate, even though they seem to have similar structures. In 1970, mathematician John Milnor of the State University of New York, Stony Brook, conjectured that two such uncommunicative realms—ways of describing properties of different kinds of surfaces known as Galois cohomology and K-theory—were in fact related. The Milnor Conjecture remained the biggest problem in that area of mathematics until 1996, when Voevodsky created new mathematical tools that enabled him to solve the conjecture.

The Rolf Nevanlinna Prize honors MIT's Madhu Sudan, age 35, for his work on the very concept of mathematical proof. A proof is a series of logical statements, each linked to the next according to strict rules of inference. If the statements are correct and the links obey the rules, the proof is valid; otherwise it is flawed.

Sudan added shades of gray to this black-and-white dichotomy by showing that, in theory, a mathematician could figure out the probability that a new proof is correct. He knew that, in a sense, valid proofs are points floating in an abstract space that describes all logical statements. "Distance" makes sense in the abstract space of logical statements, just as it does in familiar geometric space.

Sudan was among the first to realize that the concept of logical distance could be used to measure how far from truth a putative proof might be. "You can show whether any proof is completely correct, [whether it] can be formulated into one that is completely correct, or whether it is so distant from correctness that it is unfixable," Sudan says. And although the idea isn't going to lead to automatic proof-checkers, it has helped Sudan make inroads against the most important question in computer science, the P = NP problem (*Science*, 26 May 2000, p. 1328).

–CHARLES SEIFE

CREDITS: (LEFT TO RIGHT) CLIFF MOORE; MIT LABORATORY FOR COMPUTER SCIENCE; NOAA

EVOLUTIONARY BIOLOGY

Cool Cats Lose Out In the Mane Event

The image of a roaring male African lion with full flowing mane is for many people the very icon of wild nature. But precisely why lions have manes has never been nailed down. On page 1339, researchers provide evidence for the often-cited assumption that the mane is a signal advertising the animal's condition, which females use to choose mates and males use to assess rivals.

In an apparent evolutionary tradeoff, however, manes also impose a cost on males by increasing their heat load. "This is one of the few cases of a sexually selected trait where a physiological cost has been demonstrated," says evolutionary biologist John Endler of the University of California, Santa Barbara.

Animal behaviorist Craig Packer of the University of Minnesota, Twin Cities, has studied lions at Serengeti National Park in Tanzania for 24 years, continuing the program that pioneering zoologist George Schaller began in the 1960s. Over the years,

ScienceScope

Rights Reconsidered The National Institutes of Health (NIH) has put on hold a controversial plan to curb foreign grantees from patenting and licensing their discoveries. Last March, NIH announced that it would limit foreign grantees to patenting discoveries only in their home nations. To make sure U.S. taxpayers reaped the benefits of federally funded research, all other rights would be held by U.S. collaborators or NIH. But critics—including the U.S.-based Association of University Technology Managers and Australian science officials—said the policy would hinder collaboration and discourage the development of discoveries (*Science*, 28 June, p. 2316).

On 8 August, NIH backed off, saying that it will take another year to "explore more fully the ramifications" of the policy, which was slated to take effect at the end of the year. "There's no point in rushing," says NIH extramural research chief Wendy Baldwin. Her office will consider arguments that, for example, most drugs end up being manufactured in the United States, so the profits end up there, too.

New Hire A top government science chief has agreed to oversee science programs at the beleaguered Smithsonian Institution, which has been shaken by the departures of senior administrators and controversial reorganization plans (*Science*, 13 July 2001, p. 194). Physical oceanographer David Evans (right), currently assistant administrator for research at the National Oceanic and Atmospheric Administration (NOAA), will become the Smithsonian's undersecretary for science on 9 September. He replaces Dennis O'Connor, who resigned in April. Evans, 56, has been at NOAA since 1993 and helped organize the government's climate research program. He also spent 5 years as a program manager at the Office of Naval Research.

Evans told *Science* that his experience will help him tackle the task of stabilizing the Smithsonian's science programs, including boosting budgets squeezed by construction and renovation expenses. "I've dealt with a lot of fiscal crises," he says, and he is "optimistic" that he can convince Congress or private donors to improve cash flows. He also needs to hire a new head of the natural history museum and hopes to smooth out currently rocky relations between some administrators and researchers. His past work, he says, "has taught me that you lead scientists, you don't push them around."

ANIMAL BIOTECHNOLOGY

Environmental Impact Seen as Biggest Risk

The biggest risk of developing genetically modified (GM) animals is that they might alter the environment, according to a new report from the National Research Council. The NRC panel also questioned the wisdom of having the Food and Drug Administration (FDA) be one of three federal agencies that are regulating the environmental impact of this emerging technology.

Wild card? Mobile GM animals, such as sterile pink bollworms, might harm ecosystems in unknown ways.

CREDIT: USDA

Last year, FDA asked NRC for a list of science-based concerns to consider when reviewing products of GM animals. The report identifies three main categories of potential risk. It places environmental hazards at the top of the list, followed by threats to human health from xenotransplantation (the placement of organs from GM animals into humans) and from the consumption of GM foods. By separating major and minor risks, "we hope we can help this technology be applied as safely as possible," says John Vandenbergh, a behavioral endocrinologist at North Carolina State University in Raleigh and chair of the NRC committee.

FDA officials sought advice because they are evaluating several GM animals, including salmon. Some of these animals are intended for the dinner table; FDA is regulating them because it considers the proteins expressed by their foreign genes to be new animal drugs. No transgenic animals have yet been approved for human consumption.

What most alarmed the committee was the prospect of GM animals entering the environment. "We don't know much about what those animals would do if released," Vandenbergh says. He points to fleet animals such as fish or insects that might compete with native populations or interbreed easily with wild relatives, introducing new genes.

The ability of transplanted organs to spread disease to humans is another concern. Pigs carry about 50 retroviruses in their genome, which could become pathogenic and contagious in a human host. The panel also worried that people might accidentally eat animals engineered to produce potentially harmful industrial compounds in their milk, or eat GM products containing a substance that could produce an allergic reaction.

Although the NRC committee wasn't asked to comment on regulatory policy, it did question FDA's authority to evaluate environmental effects. The Federal Food, Drug, and Cosmetic Act, which covers the "health of man or animal," is not an environmental law and might not cover impacts on ecosystems, the committee says. The panel worried that FDA does not have relevant in-house expertise and that its mandate might not hold up if outside groups challenge future regulations.

FDA declined to comment until the report was publicly released, which occurred as *Science* went to press. But Sanford Miller, a food safety expert at the Center for Food and Nutrition Policy in Alexandria, Virginia, predicts that the report "is going to get the FDA thinking much harder about what priorities they're going to put their money into—or realize they can't do everything."

—ERIK STOKSTAD

ELECTRONIC PUBLISHING

DOE Cites Competition In Killing PubSCIENCE

A free 3-year-old government information service and Web site for the physical sciences has lost out to commercial publishers in a battle for eyeballs. On 7 August the Department of Energy (DOE) announced that it was pulling the plug on PubSCIENCE, which provided access to bibliographic records in the physical sciences, because it overlapped with similar projects by private publishers.

DOE created PubSCIENCE in 1999 as part of an effort to disseminate and improve access to scientific information (*Science*, 6 August 1999, p. 811). But Walter Warnick, director of DOE's Office of Scientific and Technical Information, says it quickly became superfluous. "We think that portion of our mission is adequately filled by Infotrieve and Scirus," two privately run, free-to-search databases owned by the Los Angeles–based Infotrieve corporation and Amsterdam-based Elsevier Science.

PubSCIENCE was modeled after PubMED, the National Institutes of Health's popular online collection of journal citations and abstracts. Although publishers such as Elsevier Science, the American Physical Soci-

ScienceScope

Board Strikes Back A Senate proposal to give the National Science Board its own bank account and staff met stiff resistance last week from its target audience. Members of the presidentially appointed board, which oversees the National Science Foundation (NSF), questioned why legislators would want to change their status and agreed that "if it ain't broke, don't fix it."

"There must be something else at work here," University of Arkansas Chancellor John White opined during an impassioned discussion at the board's regular meeting. White later speculated that the language, in a 2003 spending bill drawn up last month (*Science*, 2 August, p. 753), might be a veiled attack on NSF Director Rita Colwell, which he feels is unwarranted. But a congressional staffer says that it is simply intended to strengthen the board's capacity to oversee the growing agency. "There's no hidden political agenda," the aide says.

Board chair Warren Washington of the National Center for Atmospheric Research in Boulder, Colorado, says he is eager to explain the board's position to Congress and hopes to resolve the matter before final passage of the spending bill later this year.

Security Risk? Does one of the world's largest collections of dead animals pose a threat to Washington, D.C.? Yes, argue congressional lawmakers, who recently added a provision to an emergency security spending bill that would give the Smithsonian Institution $2 million to plan a new facility in Suitland, Maryland, to relocate its vast collection of fish, sponges, corals, worms, and insects. Stored in almost 3 million liters of alcohol at the National Museum of Natural History on the capital's Mall, the collection amounts to a massive bomb, lawmakers say.

But President George W. Bush last week rejected the request, which was part of a larger $5.1 billion spending package that he vetoed, arguing that it included too many nonsecurity projects. To make his point, Bush singled out for derision the "new facility for storing the government's collection of bugs and worms."

The Smithsonian says it needs the extra space badly, if only to comply with the local fire code—and it might get the space anyway, because the Bush Administration itself requested the new storage pod in its 2003 budget. But museum scientists agree that the collection would be difficult to turn into a weapon because the alcohol, stored in jars and vials, is not highly combustible.

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