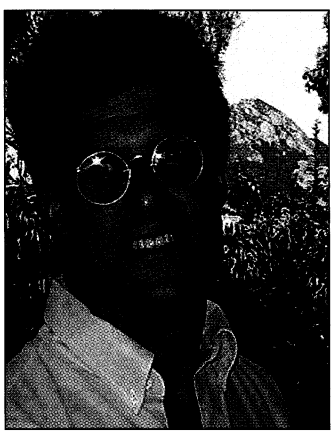
Indeed, one of the more promising recent studies using adult stem cells turned out to be less so, according to the researcher, developmental biologist Margaret Goodell of Baylor College of Medicine in Houston. In December 1999 she reported that muscle tissue contained stem cells that could become blood—raising the hope that adult tissues might harbor versatile stem cells that could, if prompted, become a variety of tissues. But in subsequent research she has found that muscle contains two distinct stem cell types, one destined to become blood and another destined to become muscle. The work has just been submitted for publication, Goodell says, but it suggests that scientists and policy-makers "can't yet leap to assumptions that we can use [adult-derived] cells for everything." **–GRETCHEN VOGEL**

SCIENCE PUBLISHING

Lab Chief, Postdoc Clash Over Nanotech Paper

Peter Schwartz says he knew he was getting into trouble when he clashed with his lab director last year over a nanotechnology problem that Schwartz claims to have solved. But he didn't realize how much trouble. Now, Schwartz says, he has been blocked from publishing his results, and he claims it's a classic example of a senior scientist clamping a lid on a junior colleague. But his former boss, Chad Mirkin, a chemistry professor at Northwestern University (NU) in Evanston, Illinois, and leader of a world-class nanotechnology group, strongly disagrees. Schwartz did some research "under my guidance," says Mirkin, then "he left the lab and tried to pass the work off as his own."



Would-be author. Authorship dispute blocks Schwartz's paper at *Langmuir*.

Mirkin and Schwartz do agree on this: A prestigious chemistry journal—*Langmuir*—was ready to publish Schwartz's report on a method of nanoscale DNA printing until Mirkin intervened in March. The publisher, the American Chemical Society (ACS), rejected an appeal from Schwartz on 14 June, effectively spiking the paper. This spat, which has generated several news stories, illustrates how academic differences in science increasingly involve commercial and legal battles as well.

The disagreement began more than a year ago in Mirkin's NU lab, according to Schwartz's records. The 37-year-old physicist says Mirkin hired him to work on a process developed by Mirkin and postdoc Seunghun Hong called "dip-pen" nanolithography (DPN) for printing molecular "ink" (*Science*, 29 January 1999, p. 661). Schwartz says his task was to improve the lab's method of printing DNA, which might be valuable for mass-producing DNA chips or, eventually, molecular electronic applications. Schwartz says, however, that he was unable to reproduce the lab's earlier DNA printing results. He began experimenting with a different technique called "nanografting," developed by Gang-yu Liu of Wayne State University in Detroit. Eventually, Schwartz says, he developed "meniscus-force nanografting" and used it to print lines of DNA as small as 15 nanometers wide.

Schwartz claims that relations with the lab soured after Mirkin ignored his informal critiques of DPN, prompting Schwartz to talk about the matter more publicly at a lab meeting. After that session, Schwartz received a letter from Mirkin, dated 1 July 2000, reprimanding him for "insubordinate behavior" and "belligerence" toward his colleagues. Mirkin also reminded Schwartz in the letter that his contract was about to expire and that he should turn over his notebooks to Hong, whose results Schwartz had challenged. Instead, Schwartz continued his research with the help of another lab member. Starting in July, Schwartz also had several talks with Lydia Villa-Komaroff, NU's vice president for research, explaining that he wanted to complete his own experiment, file a provisional patent, and publish the results. At the time he was looking for an academic job and is now an instructor at California Polytechnic State University in San Luis Obispo.

Schwartz left NU in August 2000, and, he says, after Mirkin stopped communicating with him, he submitted a manuscript on his own—first to *Nature*, which rejected it, then to *Langmuir*. Four independent reviewers vetted the manuscript for *Langmuir*, and an associate editor accepted it. Liu, who has read the paper, says it is "a very nice piece of work" that others in the field should see. She adds: "We need as many flowers as possible in the garden" of nanolithography.

In October 2000, Schwartz filed a provisional patent application, he says, listing NU and Mirkin as co-inventors. He claims he did this to protect the university's interests before he began giving public talks in labs where he was seeking employment. Schwartz says he notified Villa-Komaroff and separately wrote

CREDITS: (TOP TO BOTTOM) DAVID LONGSTREATH/AP; COURTESY OF PETER SCHWARTZ

ScienceScope

Environmental Reparations Five Middle Eastern countries will soon get unprecedented payments to conduct studies of the environmental damage caused by the 1990–91 Persian Gulf War, when Iraqi troops set fire to hundreds of Kuwaiti oil wells, shrouding the region in smoke for months. The money is part of reparations being drawn from the Iraq "oil for food" fund run by the United Nations (U.N.).

Last week, the U.N. Compensation Commission (UNCC) council approved distributing $243 million from the fund for environmental impact research, with the lion's share going to Saudi Arabia and Kuwait and smaller amounts to Iran, Jordan, and Syria. The nations have UNCC approval for 107 studies, including surveying coastlines for spilled oil, studying smoke damage to archaeological sites, and following health effects in people who inhaled the smoke.

Julia Klee of UNCC says "as far as we're aware, this is the first time" a country has paid environmental damages after a war. The money should be disbursed within a month.

Channeling Science China Central Television (CCTV), China's leading TV network, is starting a channel devoted to science. It debuts on 10 July and will air programs on nature, history, geography, ecology and environment, hot issues in science and education, and interviews with prominent scientists.

The channel is part of the government's strategy to "rejuvenate China by relying on science and education," says Gao Feng, director of CCTV's Department of Society and Education, which is spending $12.5 million to get the channel off the ground. Programs from National Geographic and the Discovery Channel imported by local TV stations "have cultivated an audience for our new channel," he says. Some 300 people are involved in the effort, which will include 7 hours of new programming as part of every 18-hour broadcast day.

The scientific community welcomes the new outlet, which will be broadcast via satellite on Channel 10. "It may serve as a bridge between the scientists and the public," says Yang Linzhang, deputy director of the Nanjing Institute of Soil Science under the Chinese Academy of Sciences. "But it will be a challenge for the TV workers to make their programs appealing to different kinds of audiences."

To manipulate these spins, Awschalom's group fired a second 100-femtosecond pulse, this one containing photons of blue-green light. Individually, such lower energy photons are too weak to be absorbed by the electrons in the semiconductor. But as they passed through the semiconductor, Awschalom explains, their collective presence effectively created a brief magnetic field. This field tapped the electron spins into a new orientation, much as the flick of a finger alters the precession of a spinning top. In a final step, the group used a third 100-femtosecond pulse to spot the electron spins in their new state.

The UCSB–Penn State team's success marks the first-ever all-optical processing of electron spins in a solid. But it still falls short of being a quantum computer. To stake that claim, the researchers must clear two more hurdles. First, they must create qubits. The key to that, Awschalom says, may be creating specks of semiconductors called quantum dots, capable of trapping single electrons that can harbor spins in two directions. Then the team must learn to manipulate at least two qubits, so that changes to the state of one qubit affect the state of the second—a necessity for performing quantum computations. Each feat, say researchers, will mark a major stride on the road to quantum computing.

–ROBERT F. SERVICE

CELL BIOLOGY

NO Helps Make Fireflies Flash

Incandescent and fleeting, the firefly embodies sultry summer nights. Light is the firefly's language of love. Each evening, males take flight, emitting telltale flashes. From the ground or bushes, females beckon with their own bursts of light. Long the object of study, fireflies have yielded many secrets of this mating ritual. But a key step in triggering the burst of light has defied elucidation. Now, neurobiologists have identified that missing link. And much to their surprise, it turns out to depend on nitric oxide (NO)—a versatile cell-signaling molecule that our cells use to make blood vessels dilate, reports Barry Trimmer of Tufts University in Medford, Massachusetts, on page 2486.

Neurobiologists have long known that the firefly's abdomen contains a lantern made of specialized cells, called photocytes, filled with a protein called luciferin. An enzyme called luciferase activates luciferin; oxygen then causes the protein to emit light. A nerve signal called octopamine controls the flash pattern, which varies from species to species. But how it does so has been unclear, as the nerve ending isn't in direct contact with the photocytes.

In 1998, while listening to a graduate student discuss his thesis on firefly sexual behavior, Trimmer, who studies NO in the caterpillar brain, was struck by the similarity between the cell types that control the lantern and the cells he worked with, which release NO. That summer, he and his colleagues collected fireflies from local fields. Initial biochemical tests determined that the enzyme that makes NO, nitric oxide synthetase, was both present and active in the lantern. "Elegant," is how Shireen Davies, an integrative physiologist at the University of Glasgow in Scotland, describes the experiments.

To show that NO is actually involved in flashing, Trimmer's team then analyzed the molecule's role in intact fireflies. When they exposed fireflies in a closed container to increasing concentrations of NO, the fireflies glowed nonstop. The researchers still didn't know, however, whether NO was working in the lantern or simply affecting the nerves that trigger the flashing. So Trimmer's team devised a way to remove the nerves going into the lantern but leave much of the abdomen intact, enabling them to test where NO was acting.

When they added NO to this stand-alone lantern, it glowed. But when they added a chemical that sopped up NO as fast as it was produced, the flashing stopped—even when they were stimulating the lantern with the nerve signal. "That implies that NO is the mediator," Trimmer explains.

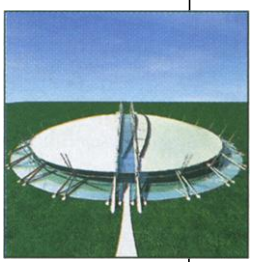
The arrangement of cells in the lantern provides clues about how NO likely works, he adds. The lantern consists of air ducts called trachea, whose cells are encircled by photocytes. The nerve endings from the top of the abdomen reach the tracheal cells but do not contact the photocytes. Inside each photocyte, mitochondria are clustered along

CREDIT: (BOTTOM) GREGORY K. SCOTT/PHOTO RESEARCHERS

Night light. Nitric oxide plays a role in enabling fireflies to brighten the evening sky.

ScienceScope

Synchro Wars The race to build Australia's first synchrotron is heating up. The Victoria state government said last week that it has found $82 million to build an x-ray facility that researchers can use to probe the atomic structure of everything from proteins to new materials. The announcement surprised and upset officials in Queensland and New South Wales, two other states that are fiercely competing to host the device.



Last May, the three states submitted proposals to the federal government to win $15 million in synchrotron start-up funds, with a decision due in August. But Victoria premier Steve Bracks upstaged the competition by saying that his state will pony up $52 million for its planned device (right), with industry and research institutes adding $30 million more.

The preemptive strike took federal science minister Nick Minchin "totally unawares," says a spokesperson. Minchin cautiously praised the initiative but noted that the government will still evaluate the pending proposals. Queensland premier Peter Beatty says Victoria's move was unsporting and that his state will stick to its "more honorable approach." He urged the warring parties to meet soon to sort things out.

Warning Shot For months, the Department of Energy (DOE) has been fielding questions about how *PubSCIENCE*, its free Web index of scientific journals and articles (*Science*, 8 October 1999, p. 195), might compete with private businesses. Now, Congress has gotten into the act. On 25 June, a House appropriations committee decided that *PubSCIENCE* poses a threat to private vendors of scientific information.

The House energy and water appropriations subcommittee voted to cut $730,000 from the current funding of DOE's Office of Scientific and Technical Information, in the name of cutting waste. In a report accompanying the bill, the committee notes that DOE "should carefully review its information services such as *PubSCIENCE* to be sure that such efforts remain focused on appropriate scientific journals and do not compete improperly with similar services from the private sector." It is not yet known whether the Senate will include a similar warning in its version of the funding bill, to be considered later this year.

Contributors: Jocelyn Kaiser, Xiong Lei, Elizabeth Finkel, Eliot Marshall