

► Baylor College of Medicine in Houston.

The team working on the malaria parasite *Plasmodium falciparum* was angered when other researchers tried to publish studies of sequence data before the project was complete (see *Nature* **405**, 601–602; 2000). But Collins believes this risk is a small price to pay to ensure the immediate release of data. “We will be scooped on a few occasions,” agrees Jonathan Eisen of The Institute for Genome Research in Rockville. “We’ll just have to deal with it.”

The guidelines could also hamper international collaborations. “While we as scientists are willing to release the data, the funding agencies in Japan may not support data release without restrictions,” says Yoshiyuki Sakaki of the RIKEN Genomic Sciences Center in Yokohama City, Japan. “Chinese agencies will face a dilemma,” adds Huanming Yang, head of the Beijing Genomics Institute. “Why should they invest the money if they can get data for free from the United States?”

But some question whether there will be a rush to publish ahead of the sequence centres. “I would much rather the annotation be done at the sequencing centre, rather than a third party who doesn’t know how the data were generated,” says Sean Eddy, a bioinformatician at Washington University School of Medicine in St Louis, Missouri. “We can’t be biting the hand that feeds us.” ■

## Physicists fail to find saving grace for falsified research

**Philip Ball**

In the furor that followed last year’s revelation that Jan Hendrik Schön had fabricated data in a string of high-profile papers, one question remained unanswered: was there a nugget of truth in any of his reported findings? Two teams have now attempted to replicate some of Schön’s key results, and find that little of use can be salvaged from them.

The two groups recreated studies by Schön, who was based at Bell Laboratories in Murray Hill, New Jersey, on molecular field-effect transistors. The papers that they revisited featured examples of 7 of the 16 different types of data falsification or fabrication of which Schön was found guilty last October<sup>1</sup>.

Field-effect transistors — electronic devices that can switch and amplify currents — are the workhorses of silicon circuits. Schön claimed to have observed transistor-like behaviour in a layer of an organic compound, just one molecule thick, sandwiched between two metal electrodes. This suggested that the size of transistors, and thus of integrated circuits, could be hugely reduced.

Teams of physicists at the Delft University of Technology in the Netherlands and IBM’s Thomas J. Watson Research Center in Yorktown Heights, New York, have now investi-

gated devices based on Schön’s design<sup>2,3</sup>. Both groups followed the methods in his papers: the electrodes were made from thin layers of gold, between which rod-like organic molecules capped with gold-binding chemical groups provided a conducting pathway.

Neither group obtained the results recorded by Schön. Jeong-O. Lee and colleagues at Delft, for example, say that their devices were unreliable from the outset. Of more than 1,000 prepared, many were short-circuited — the current simply flowed between the two electrodes, heedless of the intervening layer of molecules. Only in 5–16% of devices did the current seem to flow through the molecular layer. Even then, the devices quickly degraded.

Coming from two of the world’s most experienced molecular-electronics labs, the results imply that the approach is fundamentally flawed. But the new studies have highlighted requirements for making similar molecular transistors, such as better methods for purifying the components. “There is no scientific reason to lose faith in the tremendous promise of the field,” insists Cherie Kagan, a member of the IBM group. ■

1. Brumfiel, G. *Nature* **419**, 419–421 (2002).
2. Lee, J.-O. *et al.* *Nano Lett.* **3**, 113–117 (2003).
3. Kagan, C. R. *et al.* *Nano Lett.* **3**, 119–124 (2003).

## NASA seeks inspiration from microscopic views of life

**Jonathan Knight, San Francisco**

The space-shuttle programme may be on hold, but NASA researchers are still dreaming of the future. Ten days after the Columbia broke apart on re-entry, scientists gathered at the University of California, Los Angeles (UCLA), to discuss the development of futuristic spacecraft modelled on living cells.

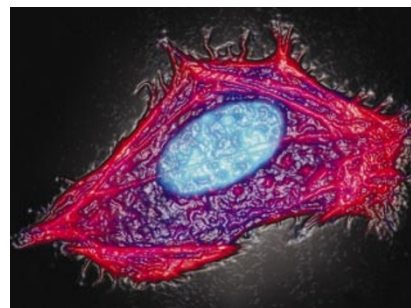
The day-long event, held on 10 February, inaugurated the Institute for Cell Mimetic Space Exploration, which is funded mainly by a ten-year, US\$30-million grant from NASA. The agency hopes that the institute’s 15 principal investigators, housed at UCLA and several other southwestern universities, will come up with biology-inspired devices that could facilitate space travel 30 years from now.

It’s an open-ended goal, admits Harry Partridge, an administrator at the NASA Ames Research Center in Moffett Field, California. “Instead of asking what do we need and how do we get there, this asks what is possible and what we can do with what we come up with,” he says.

Most of the research groups are exploring basic cellular processes that might later be scaled up. Biomedical engineer Carlo Montemagno’s group at UCLA, for example, is developing microscopic sacks of biological reagents — which the group calls ‘biobugs’ — that propel themselves, amoeba-like, across a substrate. The sacks will include growing filaments of actin, which normally make up the skeletons of living cells. According to Montemagno’s theory, the biobags will move at several micrometres per minute by extending an actin filament and pulling themselves along it.

Montemagno says that the goal is to endow the biobugs with the ability to sniff out and move towards specific substances, in much the same way that nerve tips grow towards chemical signals in the body. Biobugs could be dispatched en masse to search a spaceship for chemical or biological contamination, Montemagno suggests.

Other groups are copying different systems from the book of life, such as networks that gather sunlight, transmit



Cellular example: NASA researchers hope that cell biology will inform future space travel.

information through chemical signals and repair structural damage.

The inaugural event was planned before the Columbia disaster, and NASA administrators decided to hold it as scheduled. “In the spirit of exploration, things must go on,” says the director of the institute Chih-Ming Ho, an aerospace engineer at UCLA. ■

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