Abstractions

CONTRIBUTING AUTHOR
Shri Kulkarni, professor of astronomy at the California Institute of Technology, has an abundant publication record thanks, in part, to his attitude towards graduate students and postdocs. Since 1982, he has chalked up some 200 articles and reviews. Hard work is part of it but, more importantly, Kulkarni gives graduate students a greater role in the process than many senior scientists give their protégés.

Kulkarni is also a proponent of learning different observational techniques. In the paper on page 845, his group uses four different methods to observe short, intense γ-ray bursts that result from the merger of neutron stars or black holes.

Why so many observational techniques for this paper?
A lot of people stick to one kind of instrument or another. Having a whole bunch of toolkits gives you more opportunities.

Why did you learn them all?
I have an attention deficit syndrome. Every three to five years I feel it's time to move on. It's not a value judgment or anything. It's just me.

What sort of scientific advantages does switching techniques and research goals provide?
Part of my strategy is to get ahead in new fields. I have so many weaknesses. But one thing I have reasonable luck in is identifying new opportunities a couple of years or a couple of months before others — and being there.

Why not just pursue obvious targets?
I don't do 'me too' stuff. You really have to know something special in an existing field.

How have you been able to pick up new sub-disciplines and tools?
I have a lot of bright young people in my group and they really keep me alive this way.

What role do graduate students and postdocs play in your research and publication?
I tell them: "You're the one who will trigger the great telescope. You're the one who will write the submission letter, deal with referees..." I have almost all graduate students in their second year submit a paper. But it's not like the students are thrown in the water and then are asked to thrash around.

How has this approach contributed to your publication record and overall output?
The top-ranking students, they talk among themselves. If they hear they can be first author of a big paper in a high-profile journal, they will consider joining my lab. I get lots of ambitious, self-driven students. ■

MAKING THE PAPER

Kazushige Touhara

In search of the chemicals that guide mating in mice.

Kazushige Touhara and some of his mice.

A trail of tears has led a team of Japanese researchers to an unusual aspect of courtship in mice, details of which are published on page 898 of this issue.

The group, led by Kazushige Touhara at the University of Tokyo, had been investigating the chemical signals used by mice to recognize a potential mate. The team's first port of call was a selection of chemicals that had previously been flagged up as potential mouse pheromones. But when they began studying these compounds, the researchers discovered that they didn't really fit the bill. The compounds did not seem to be recognized by the organ in the nose associated with pheromone detection in behaving mice. There was only one conclusion. "There must be other pheromones," Touhara thought.

And so the hunt began. The first place the scientists looked was in mouse urine, but they found no suitable candidates there. Then Hiroko Kimoto, one of Touhara's graduate students, examined a little-known gland below the ear and got a promising response. Turning to a book on mouse anatomy, she realized that this gland was a type of tear gland.

"It took time to identify the secreting organ, because nobody expected the pheromone to be released from the eyes," Touhara says. "Apparently, no one has looked at this gland closely before."

The researchers investigated further and were surprised to find that the active substance secreted by the gland was non-volatile. This is unusual for pheromones, as they are usually volatile compounds that are detected by the nose. If the new compound was the elusive mouse pheromone, mice would have to detect it by touch.

To confirm the team's suspicions, Kimoto set about purifying the peptide, now named ESP1. This was an involved process, and meant extracting the peptide from some 80 mice. The team then tested each fraction on mice to see whether it caused gene expression associated with pheromone recognition. This stage took about a week per mouse and required scores of mice to get a statistically significant result.

But even with positive data from this work, the researchers couldn't be certain that ESP1 was a pheromone — the gene-expression work could not prove that the peptide generated an electrical signal in the pheromone-detecting tissue in the mouse nose. "The electrophysiology that we show in the paper was an important experiment to prove that the isolated pheromone was real," Touhara says. Koji Sato did these experiments, and Sachiko Haga found that ESP1 is indeed recognized by a suspected pheromone receptor.

Although the team is confident it has now found its pheromone, Touhara says that there is a lot of work ahead. He wants to look at the evolution and function of the ESP gene family, and pick apart its neurological mechanisms. Ultimately, he would like to find out more about ESP1's receptor and how the peptide binds to it, and reveal where the signal is integrated in the brain and what effects it has on behaviour. ■

QUANTIFIED **BRAZIL**

A numerical perspective on *Nature* authors.
Founded in the late eighteenth century, Brazil's National Museum is the oldest scientific institution in Latin America. Now run by the Federal University of Rio de Janeiro, it houses more than 20 million specimens from around the world. Working at the museum, says Alexander Kellner, means a combination of curatorial and teaching work.

Like most museums in Brazil, Kellner says that the National gives its staff free rein to follow their research interests. For Kellner, this is the evolution of pterosaurs (flying reptiles), and on page 875 he and his team present their latest findings from China, where they discovered two new pterosaurs. The fossils show that some 120 million years ago, flying reptile groups were more diverse than expected. They also offer fresh insights into the competition between pterosaurs and birds.

2 papers in *Nature* this week have contributing authors who are working in Brazil.

54 submissions made to *Nature* so far this year have come from Brazil (total submissions to date = 10,451).

6 Brazilian institutions have had papers published in *Nature* this year.

23,011 visits to www.nature.com were made, on average, each week from people based in Brazil during September 2005.