

SCIENCE AND TECHNOLOGY NEWS

THE BEST JOBS IN MICROBIOLOGY

# NewScientist

May 20-26, 2006



## Time travel

At last, an idea we can test



## Shrinking iguanas

When the going gets tough, the tough get smaller

**VIRTUAL VICE**  
MURDER AND  
EXTORTION IN  
CYBERSPACE

US\$4.95 CAN\$5.95 £2.70 No2552





## UK

Lacon House, 84 Theobald's Road,  
London, WC1X 8NS  
Tel +44 (0) 20 7611 1200  
Fax +44 (0) 20 7611 1250

## USA

600 Technology Square, Cambridge,  
MA 02139  
Tel 617 386 2190 Fax 617 397 2805

201 Mission Street, 26th Floor,  
San Francisco, CA 94105  
Tel 415 908 3348 Fax 415 704 3125

## Australia

Tower 2, 475 Victoria Avenue, Chatswood,  
NSW 2057  
Tel +61 2 9422 2999 Fax +61 2 9422 2877

**Publishing Director** Dominic Feltham  
**Personal Assistant** Lindsey Bezzina

## Marketing

**US** Lauren Hoops-Schnieg, Alissa Menovich  
Diane Schmidt  
Tel +1 617 386 2192/2194/2195  
**UK** Tracey Syrett, Louise Thwendale,  
Georgina Rushworth, Luise Mulholland,  
Paola Van Den Brande, Sophie Ashworth  
Tel +44 (0) 20 7611 1299  
Fax +44 (0) 20 7611 1290  
marketing@newscientist.com

## Director of Sales David Wilson

**Sales Team** Sarah Etherington, Paul Fowler,  
Mary Keenan, Michael Shabaka  
Tel 617 386 2190 Fax 617 397 2805

## Display Advertising Jamie Labate,

Jennifer Holmes, Camilla Bailey,  
Amea Williams, Lara Schonberger  
**Online Marketing Executive** Alex Bagdad  
Tel +44 (0) 20 7611 1291  
Fax +44 (0) 20 7611 1290

**Advertisement production** Rob Brack  
Tel +44 (0) 20 8652 4449  
Fax +44 (0) 20 8652 4422

## Subscriptions

Tel 888 822 3242  
email subscribe@newscientist.com

## Enquiries

Tel +44 (0) 20 7611 1201  
Fax +44 (0) 20 7611 1280  
enquiries@newscientist.com

## Permissions

Tel +44 (0) 7611 1230

## Newsstand

Tel 201 634 7400

## Syndication

Tribune Media Services International  
Tel 213 337 7987  
email latsihelp@latsi.com

An annual subscription in the USA is  
\$140 including delivery.

An annual subscription in Canada is  
CAN\$215 including delivery. Distributed by  
Deutsche Post Global Mail Limited, 301  
Veterans Boulevard, Rutherford, NJ 07070.

Newsstand distributed by Curtis Circulation  
Company, 730 River Road, New Milford,  
NJ 07646-3048  
Tel 201 634 7400 Fax 201 634 7499

© 2006 Reed Business Information Ltd,  
England.

New Scientist ISSN No. 0262 4079 is  
published weekly with the exception of  
the last week in December by Reed  
Business Information Ltd, England.  
Reed Business Information, c/o Schnell  
Publishing Co. Inc., 360 Park Avenue  
South, 12th Floor, New York, NY 10010.  
Periodicals postage paid at New York, NY  
and additional mailing offices.

Postmaster: Send address changes to New  
Scientist, 6277 Sea Harbor Drive, Orlando,  
Florida 32887-4800.

Registered at the Post Office as a  
newspaper and printed in USA  
Colour origination by J Jays Ltd (Southend,  
UK), and printed by Fry Communications  
Inc, Mechanicsburg, PA 17055



COVER IMAGE: MATTHEW HUGHES/SON

Carbon trading runs into trouble p 8

## ON THE COVER

Time travel, page 34

Shrinking iguanas, page 48

Virtual vice, page 38



TRANSJANTHINEN PICTURES

Shrink me p 48

## NEWS

## EDITORIAL

What can humans' long dalliance  
with chimps teach us about biodiversity  
and the nature of species? **5**

## UPFRONT

British troops in Iraq cope with the stress;  
"cloning king" on fraud charges; south  
Asia's monsoon moving away from land;  
sun-worshipping Incas chose world's  
sunniest spot; can genes predict cancer  
risk? race for the hydrogen X prize **6**

## THIS WEEK

Is Europe's flagship scheme to  
curb carbon emissions in crisis? **8**  
Chronic fatigue gets physical **10**  
Dwarf galaxies triggered own demise **12**  
Our ancestors interbred with chimps **14**  
Real-life *Truman Show* studies language **17**  
Evolution rewind **18**  
Himalayan forests quietly vanish **20**

## IN BRIEF

Missing link for flowering plants;  
how Prozac works in the brain; pint-  
sized extrasolar planets revealed;  
super antibiotic kills superbugs;  
monkey talk has hidden meaning;  
pigeons count on a logarithmic scale;  
caterpillars scent trouble;  
captain's logs tell magnetic tale **22**

## 18 YEARS AGO

Herbicide resistance is genetically  
engineered into sugar beet **14**

## TECHNOLOGY

Using flocking birds to sort your files;  
magnetic ring shoots satellites into  
orbit; gecko-like robot climbs walls **29**

## DESKTOP DUEL

The battle is on to control how we  
use our computers: will Microsoft or  
Google come out on top? **30**

How the body's defences can aid  
computers in distress **32**

## FEATURES

## COVER STORY

**HEAD 'EM OFF AT THE PAST**  
Why take the scenic route when  
short-cuts through time are merely  
a dimension away? **34**

## JUST A GAME?

With crime in the virtual world bleeding  
into the real one, we need to decide  
where to draw the line between  
innocent games and law-breaking **38**

## REDESIGNING LIFE

For bio-hackers, creatures are a  
collection of parts for building  
living machines **43**

## THE INCREDIBLE SHRINKING IGUANA

Meet the reptile that changes its  
size according to the weather **48**

## REGULARS

## COMMENT AND ANALYSIS

Wild birds almost certainly play a  
part in spreading the H5N1 virus, and  
ornithologists will have to learn to live  
with that, says Debora MacKenzie **24**

## LETTERS

Love's many stories; grid power; actions,  
not words on climate; modifying  
Newton; carbon and sewage **26**

## TALKING POINT

What's it like sawing into people's  
heads? Are live brains really like goo?  
And who gets to choose the music in  
the operating room? Neurosurgeon  
Katrina Firlik tells all **50**

## SECOND SIGHT

Striking images of supercomputers may  
sometimes suggest god-like powers,  
but Justin Mullins is sceptical **52**

## REVIEW

Why biographers find it so hard to grasp  
the scientist in Benjamin Franklin **53**

## HISTORIES

Nosing around a steamship's engine  
room inspired a retail revolution **54**

## THE WORD

They can live for a century – but only  
in caves. Meet the troglodytes **56**

## BOOKENDS

Fighting intelligent design;  
code-breaking Colossus **56**

## ENGIMA

**56**

## FEEDBACK

**72**

## THE LAST WORD

**73**

## JOBS

**58**

**"Bio-hackers dream of a future in  
which biological devices are as  
ubiquitous as today's electronics"**

For some, genomes are just a construction kit, page 43



# Confessions of a brain surgeon

What really goes on inside an operating room? If you suspect that neurosurgeons listen to their MP3 players and secretly enjoy sawing open skulls, you are right. Neurosurgeon **Katrina Firlik** set out to write the brain-surgery equivalent of Anthony Bourdain's infamous restaurant trade exposé *Kitchen Confidential*, and has managed to provide a candid behind-the-scenes peek into the OR and the body's most fascinating organ, which she describes as "soft like tofu". **Amanda Gefter** talks to the woman who delves deep into grey matter

### What are the biggest misconceptions about neurosurgery?

People think of neurosurgery as something highly intellectual. They use phrases like "it doesn't take a brain surgeon". Of course, you have to be smart and make quick decisions, but, in part, a neurosurgeon is a kind of mechanic. We cut heads open, we use drills. On a daily basis we are thinking about practical things like, how do I get this nail out of this guy's head? You have to love the brain and also love working with your hands.

### Why do you like the brain?

It is still so mysterious. And it makes us who we are. There is nothing else I would want to specialise in. The kidney, liver and lungs can be replaced. You can get somebody else's and still be the same person. I also love the aesthetics of the brain, the architecture. As a whole, you might think it looks like a blob, but when you dissect it, it is unbelievably intricate. The pattern of the blood vessels at the base of the brain is so weird, like a strange creature.

### What is the most fun part of your job?

To be in the operating room and to expose the brain. It is something we get used to but it is still fun. The camaraderie in the OR is great. It is not as serious as you might think. There is a lot of joking around, music playing and people are talking about what they are doing for Thanksgiving. You might think that is dangerous, but it is not. We are like mechanics working on a car. We know what we are doing, it is a routine.

### What kind of music do you listen to in the OR?

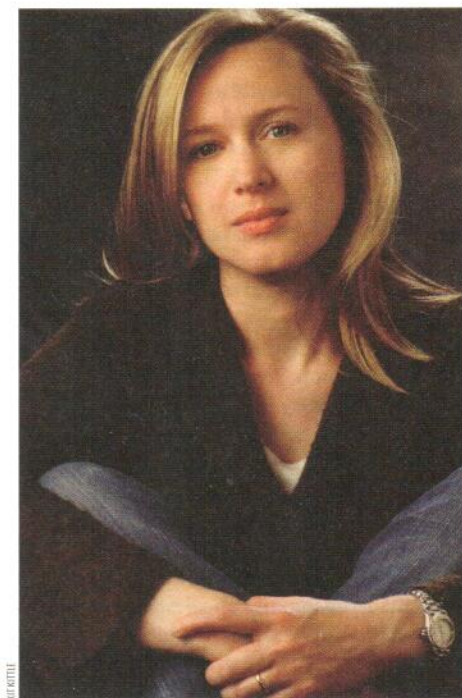
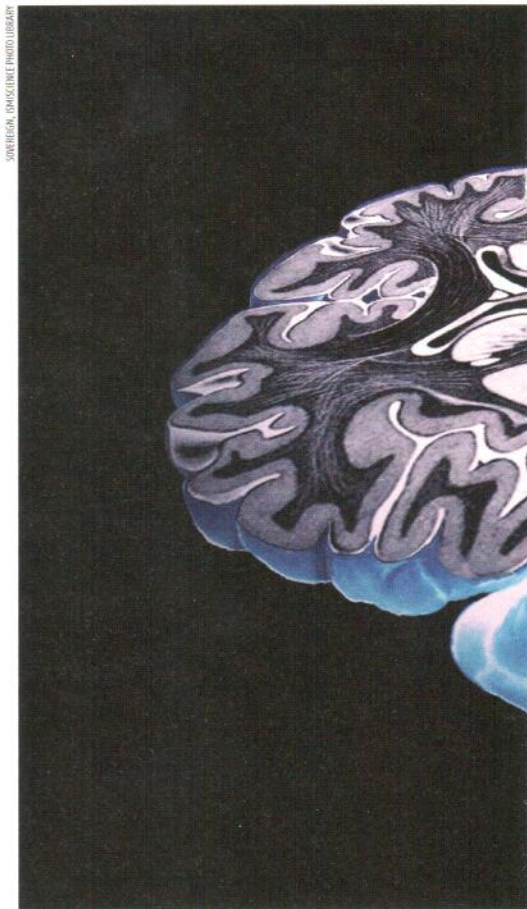
Usually the surgeon gets to choose. That is an unwritten rule. But I like to give other people the choice so I will listen to anything other than heavy metal or music that is disturbing. When I choose, I like to listen to jazz because it is soothing. Usually we have the anaesthesiologist bring in his iPod and we put it on random play.

### Have the boys given you any trouble for being a woman?

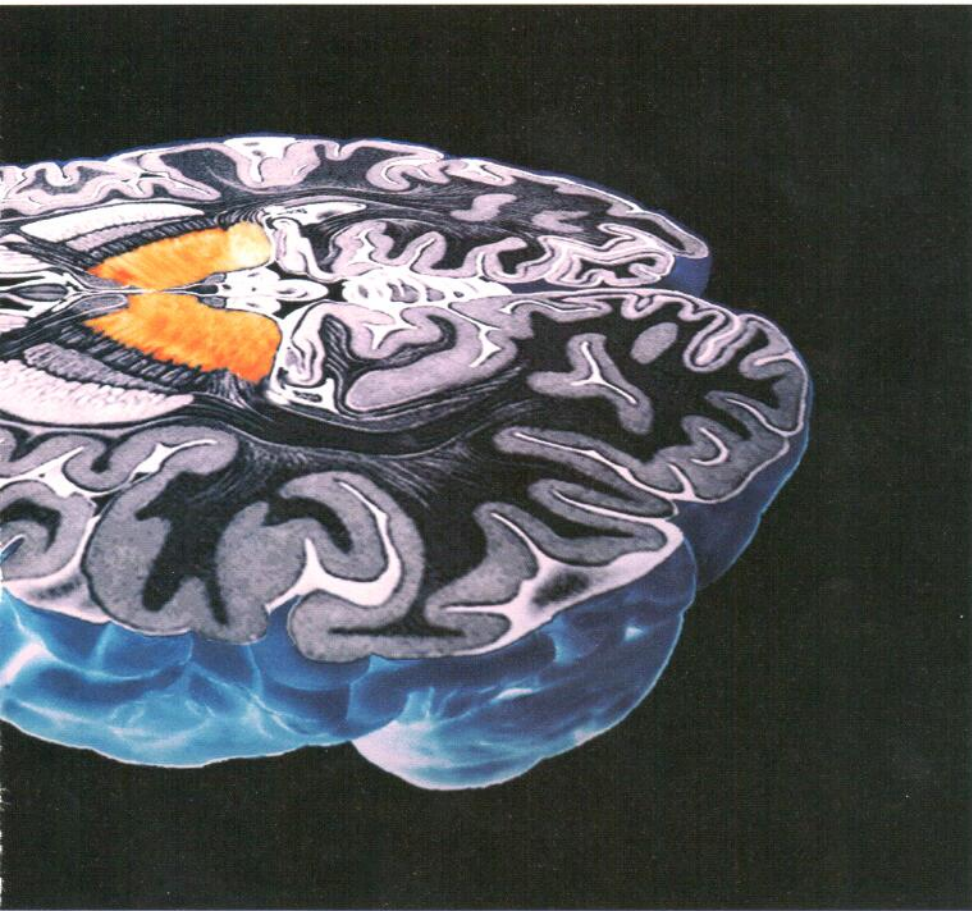
People expect this would be a really big deal, and there were small instances when I was the butt of a few light-hearted jokes, but I was lucky to work with a bunch of guys who were pretty progressive. A senior neurosurgeon asked me at an interview, how do you know you will be able to handle the big drills? It turns out that I breezed through even easier than some of the guys did.

## Profile

Katrina Firlik was the first woman admitted to the neurosurgery residency programme at the University of Pittsburgh Medical Center in Pennsylvania, the largest and one of the most prestigious neurosurgery programmes in the US. She is now a private practitioner in Greenwich, Connecticut, and a clinical assistant professor at Yale University School of Medicine. Her book *Another Day in the Frontal Lobe: A brain surgeon exposes life on the inside* is published in the US by Random House, \$24.95, ISBN 1400063205, and in the UK (titled *Brain Matters*) by Weidenfeld & Nicolson, £16.99, ISBN 0297848070







Depending on where an injury occurs, the brain can be a remarkably resilient organ

adults, who often mull over things, thinking “woe is me, I was in a car accident”. Partly because of their attitude and partly because their brain is young, they can damage a large portion of the brain and make a full recovery. On the other hand, if someone has a tiny injury in the brain stem, that can put them in a locked-in state where they can only communicate by blinking. In that way the brain is exquisitely sensitive. The Achilles’ heel of the brain is that it matters where the injury is. Damage to the frontal lobe might not make a huge difference but a tiny brain-stem injury can be devastating.

**What do you see for the future of brain surgery?**

Implanted electrical stimulators. A device for stroke survivors is under development that has been effective in early studies. A small electrical implant revs up the area that is trying to recover. It is still experimental, but I think in the future we are going to be implanting devices for depression and language disorders. It is going to be a whole new field, helped along

**“Enhancing cognition will be a wide-open field for neurosurgeons”**

by functional MRI work, that shows which parts of the brain control which functions to help us target where to place implants. That will be an alternative to drugs.

**What about dementia?**

Enhancing cognition will be a wide-open field that neurosurgeons will participate in. Memory is a big one. Baby boomers are starting to worry about Alzheimer’s. People do brain teasers and things to try to pump up their brain functioning, but if there’s a way to enhance memory or language skills electrically or by some other means, even though it sounds very invasive – and it certainly is – people will be more amenable to it than you might think.

**After seeing so many head injuries, do you have any advice?**

This is common advice, but I can’t stress it enough: wear a seat belt. People who get ejected from a vehicle are a total wreck, missing half their scalp because they were thrown through the front windshield. There is no excuse. ●

**What about patients?**

That is a more interesting question. I think I get questions that the guys don’t get. For instance, I can spend 45 minutes with a new patient going into detail about the operation and at the end you wouldn’t believe how many people say, “So, who is actually doing the surgery?” They expect me to be an intermediary or something. It is usually the older people. I don’t think it is sexism per se. It is a generational thing.

**What was your most bizarre case?**

A guy came in with a long-neglected tumour on his scalp. It should have been very easy for a dermatologist to fix in an office, but he had a psychiatric disorder and he just ignored it, and was destitute so didn’t have any medical care. Over a period of years, the tumour had eroded through his entire scalp and skull, and he ended up with his frontal lobe exposed to the air and spinal fluid dripping down his face. By the time he came to us, a huge portion of brain was exposed and there were maggots in the wound. That was an extreme case.

**What is the most rewarding part of the job?**

Seeing someone improve. Something that is starting to come out of the woodwork is the ability to recognise a condition called NPH (normal pressure hydrocephalus, or excess fluid in the brain). It is one of the only treatable, reversible forms of dementia. I have had patients who are in a wheelchair, barely able to speak because of what had been assumed to be Alzheimer’s. Then someone thought, maybe it isn’t Alzheimer’s, maybe it is NPH. Then you put a shunt in to drain the fluid, and there is a miraculous transformation. Within five months they are back home, getting a driver’s licence again and reading *The New York Times*. To be the one who puts the device in, to see them transform and to see their family’s reactions, it is really amazing.

**Do you think of the brain as a resilient or a fragile organ?**

Both. I’m amazed by how, for example, kids bounce back from what seems like a devastating head injury. They have so much resilience and so much drive compared with