

Source: The Times  
Issue Date: Saturday April 30, 2005  
Byline: Hannah Betts  
Page: Times Magazine 36  
Word Count: 2234  
Edition: TTM  
Picture Caption: PHOTOGRAPHS MARK HARRISON

## **Einstein's babies**

You don't need to be a rocket scientist to make a career out of physics these days. Fifty years after the death of Albert Einstein, we meet the men and women who are making a big bang in everything from film-making to international finance - and there's not a nerd in sight

A drizzly Friday morning at the Institute of Physics, and one would be hard-pressed to spend it with a more dazzling array of characters. A glaciologist gets talking to a creator of Harry Potter's Hippogriff, an MC raps with a rocket scientist, and a James Bond-type compares notes with an explosives expert. Proof, if proof were needed, that the stereotype of the "physics geek" is not merely tired, but exhausted.

For this is Einstein Year - the 50th anniversary of his death and centenary of his annus mirabilis - and the Institute has gathered a diverse array of talents to pay tribute to this shambling, self-effacing genius. The achievements of 1905 were as baroque an exhibition of intellect as have been achieved in any discipline: not one, but five investigations into topics that have become the very foundations of the field - including special relativity, Brownian motion and photoelectric effect. He was awarded a Nobel prize for the latter, but any one might have yielded such a prize, and continue to do so for those who elaborate upon his ideas.

And yet Einstein himself claimed not to be a major intellect. At birth doctors declared him brain-damaged. Slow to speak, but perfectly coherent when he did so, the great theorist was a school dropout who made no great impression while he was there. As science communicator Laura Grant jokes, "He gives hope to us all."

The celebrations of his legacy have cast light upon the capacity of physics to furnish its enthusiasts with the broadest and most empowering of educations. Arts students may vaunt their Renaissance man and woman credentials, yet most tend to opt for one of a limited range of careers.

Meanwhile, as the numbers of those with an understanding of physics dwindle, so the opportunities in new and compelling fields increase, ready for these rare and exotic creatures to take advantage of. The "geeks" will inherit the Earth, not least because they are the ones who best understand it.

"Physics sets you up with a grounding for anything," argues Helen Czerski, a Cambridge research student specialising in high-speed impacts. "You look at things and ask questions. And the more you know, the more questions there are. It's

wonderful being able to understand things." This is the consensus among the Einstein enthusiasts. Physics is the ultimate adventure.

Financial strategist Jessica James met her husband at an Oxford physics interview when, as a long-haired fellow student, he asked her a question to which she had no answer. "I love physics," she beams. "It's an incredibly romantic thing to do. There's a story about a famous physicist who looked up at the stars and his girlfriend said, 'How the stars shine,' and he replied, 'Yes, and I know why.' You feel as if you're struggling with the foundations of the universe."

For more information visit [www.einsteinyear.org](http://www.einsteinyear.org)

#### JESSICA JAMES, 36, STRATEGIST DEVELOPING MODELS FOR EXCHANGE RATE MOVEMENTS

A D.Phil in theoretical atomic and nuclear physics took James into interest-rate modelling. More recently, her work has focused on the construction of mathematical models for exchange-rate movements. "I look at past movements of exchange and other economic rates to pick out patterns that are predictable. That's quite a tall order, as every bit of news will impact upon currencies in different ways. We try to find a signal in the noise. But you have to be very careful not to mistake coincidence for prediction.

"If you're cautious then you can extract information, which is marvellous because no one's done this before. I feel like a kid in a candy shop."

#### BEN WALLACE, 18, THE UK'S TOP STUNT BMX RIDER, CO-CREATED AND PERFORMED THE EINSTEIN FLIP

Wallace is a competitor in extreme sports events around the world. For the Einstein flip, he launched himself off a 6ft ramp and spun backwards through 360 degrees while folding his bike underneath him. The stunt, modelled by Helen Czerski (below), involved an upside-down Wallace travelling at 15mph with his head 12ft off the ground. "I didn't do physics at school. They'd just give you a book and make you copy it down. But I told Helen exactly what I'd be doing and she explained it to me on the computer. You could see how it works and figure out how to do it. I was totally amazed at how real it was."

#### HELEN CZERSKI, 25, EXPLOSIVES EXPERT WHO MODELLED THE EINSTEIN FLIP BMX STUNT

Czerski's PhD is an investigation into the physics of high-speed impacts on explosives. Her research has practical applications for rocket boosters and the positioning of satellites in space.

"Explosives, shockwaves, general destruction - that's me. It sounds obvious that when you hit an explosive with a hammer then it goes bang. But it's not always obvious exactly what's going on to make that happen. So I look at the details with high-speed photography, following things to a millionth of a second."

CAMERON MCMILLAN, 27, PERFORMER IN A BALLETTIC TRIBUTE TO EINSTEIN

McMillan will appear in the Rambert Dance Company's Constant Speed, commissioned by the Institute of Physics, at Sadler's Wells next month.

"The ballet is about molecules and how they interact. One idea that we've worked with is the concept that when pollen lands on water it doesn't stop moving. So a lot of the dance that's being created is very random.

"The physicality of what dancers do has become so refined that there is more of a scientific element than in the past. This applies to our spatial awareness, kinaesthetics, and the level to which we are aware of how we move in space. It's about the dynamics within movement."

HELEN NESBITT, 25, FILM COMPOSITOR CREATING EFFECTS FOR THE HARRY POTTER MOVIES

Nesbitt studied physics and astronomy at Durham University, after which she was snapped up by Framestore-CFC, the company that became famous for its effects in Walking with Dinosaurs.

"Framestore-CFC was responsible for the Hippogriff, the half-horse, half-eagle that Harry flies. I work in 2D at the end of the line, so you take the 3D that's been created by our animators and work it into what's already been shot. At other times it will be sky replacements, nipple removal, or painting spots off celebrities.

"I am a firm believer that people who do physics are also very creative.

This myth about, 'Are you an artist or a scientist?' is rubbish."

SILKE PETZOLD, 35, PATENT ATTORNEY

Dr Petzold conducted research into the field of high-energy physics at the German Laboratory for Particle Physics. She joined Jenkins, the world leaders in intellectual property, in 1999.

"Physics isn't a prerequisite for being a patent agent. But it makes a suitable background because one is endeavouring to get one's head around a broad range of

things: IT, optics, medical applications. Einstein worked as a patent agent; it gave him time to work on his real interests. But I am not working on any similar theories!"

#### GRAHAM DILLON, 31, STRATEGIST COMBATING TERRORIST FINANCING

Doctoral work in nuclear physics led Dillon to be recruited by the Atomic Weapons Establishment. It became clear that the same complex modelling techniques used in his defence work could be applied to developing anti-money-laundering strategies. These tactics came to the fore in the aftermath of September 11 as a means of counteracting terrorist funding.

Dillon heads KPMG's Financial Crime Technology Advisory Service.

"The systems that financial institutions are deploying use state-of-the-art analytics to profile customers and identify suspicious transactions.

Against the billions of transactions that occur daily, techniques such as neural networks, genetic algorithms, profiling and link analysis are used - techniques that physicists have used for years.

"I didn't expect a love of the subject to lead to this. I was very happy with blue-sky physics research, led a typical academic life, and certainly wouldn't have anticipated that I would be combating terrorism. I thought I'd still be wearing tweed and corduroy."

#### MARK DICKINSON, 33, ASTROPHYSICIST SPECIALISING IN SATELLITE COMMUNICATION

A PhD in very-high-energy astrophysics propelled Dickinson into a career with Inmarsat, a pioneer in satellite communications. He is part of a team responsible for Inmarsat 4, some of the largest and most complex satellites ever created.

"Inmarsat 4 launched in March. There will be two, possibly three satellites, each of which will have a lifetime of 15 years. We write the software to control the satellite. Information from this control system is analysed to check for anomalies such as temperature variations. The satellite also has to be kept in a particular region of sky.

"What physics offers is a different way of looking at problems. Then again, I can't spell!"

#### VADER, 22, RAPPER, DJ AND TEACHER WHO TURNED $e=mc^2$ INTO A LOVE SONG

John Vader's Einstein-inspired love song has been championed by the Institute of Physics, who came across the hip-hop number on the composer's website: [www.vadercrewkiller.com](http://www.vadercrewkiller.com).

"A few months back I saw a postcard of an old man. I didn't really know who he was, but it had his famous saying, that when a man sits with a woman an hour becomes a minute. And I thought, 'That's what's happening in my life.'

"So I made a track about Einstein. Writing this song has totally changed me. Before I was writing about street crime. Now I'm writing about more true stuff. Everyone does physics every day."

#### JACK LIEBECK, 24, VIOLINIST PERFORMING AT THE EINSTEIN BIRTHDAY CELEBRATIONS

Liebeck was a child prodigy whose career continues to generate excitement. His debut disc was released last year to critical acclaim.

"Einstein was an incredibly keen fiddler. Music played an important part in his life, as it tends to in a lot of physicists' lives. The subject demands a way of coming up with reasons why things happen and putting everything in its place - and music is very ordered in that way. You see dots on a page and decipher how they're assembled. Once you've learnt that code, you put it together and it works. If you get a child to play an instrument their maths will always improve."

#### HAMISH PRITCHARD, 30, GLACIOLOGIST

A passion for mountains led Dr Pritchard, a geographer, into a career as a glaciologist.

"The most northerly part of Antarctica is covered in small glaciers churning down towards the sea. It's the fastest-warming area in the world: 2.5 degrees centigrade in the past 50 years. We think that water from melting snow is seeping down and lubricating the glaciers, a bit like putting a scoop of ice-cream on to hot pudding. This could speed up sea-level rise.

"The physics of what I do involves satellites 800km above us. They whiz around at 15,000mph bursting out pulses of radar."

#### SIMON WHITTAKER, 28, PROGRAMMER OF PLAYSTATION GAMES

"It would be horrendous to describe what it is I actually do. People come up with algorithms, ways of doing things, and I'll sort of make them go faster. If you think

about something like Batman's cape, it's completely free where it can move in the game world. But to achieve that you've got to do the physics.

"I am an object of jealousy among teenage boys. I've heard rumblings about my becoming some kind of poster boy for classroom physics."

#### LAURA GRANT, 23, SCIENCE COMMUNICATOR TAKING EINSTEIN'S THEORIES INTO SCHOOLS

In addition to writing up her thesis on science communication, Grant runs getSET (get Science, Engineering and Technology), an outreach programme for the University of Liverpool. She will also be presenting the Institute of Physics's schools lecture series in 2005.

"Physics is a very strong brand - if you say physics to someone everyone will have a reaction. But it's just made so dry at school. I give demonstrations where we might do things with particle physics, say, or liquid nitrogen - making ice-cream with it is always a crowd pleaser.

"The main lecture I'm doing for the Institute of Physics is about sustainability. It's a fully interactive talk using an electronic voting system. This will be used partly to collect opinions and partly so the students can choose their own lecture out of six topics. We'll certainly be kept on our toes."

#### MIKKEL KRAGH, 39, PHYSICIST DESIGNING INTELLIGENT BUILDINGS

Dr Kragh is one of the world's foremost building-facade specialists.

"Buildings are responsible for a vast proportion of the energy we consume.

Back in history, architecture and construction were based on deep knowledge of climate, materials and the way you put things together. Then came a long period where you just air-conditioned to control the environment. We can no longer do that because of global warming. In a way we are rediscovering the physics in architecture."