

get A–C grades, at Greenhead it is 80%. If any department underperforms there are tough questions to answer. Within departments students can, to a certain extent, choose their teachers. Students are allowed to swop groups if they feel that they would do better with another teacher (with a class size limit of 20).

Compared with most state-funded schools and colleges the staff are well paid and have a relatively light teaching load. Staff teach academic classes for 18 hours per week, with an extra two-hour teaching slot in which they contribute to enrichment activities. Pastoral care and counselling is done by specialist staff. However, staff are on-call in the science resources area at other times, similar to the US ‘office-hours’ system. Students are encouraged to spend time with their teachers out of class so that they can keep up.

The undoubted success of Greenhead College is that it has high expectations of everybody. The senior management are committed to allowing highly competent, professional teachers to flourish. The teachers work hard to present students with clear, achievable targets whilst working towards ambitious goals. And the students, as a result, work hard and achieve A-level scores that, for many of us, are the stuff of dreams.

Kerry Parker



Huddersfield, UK:

- Served by Kirklees Education Authority: population of Kirklees area 400 000
- 4 colleges and 11 school sixth-forms offer post-16 pre-university teaching to 27 000 students
- One university with 17 000 students
- South Asian children make up 17% of the school population

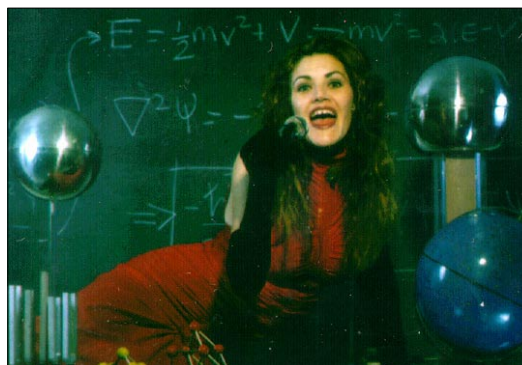
PERSONALITY

A closer look at the people involved in physics education

Physics, sex and politics

Kerry Parker talks to Lynda Williams, the Physics Chanteuse

High school ‘failure’ Williams grew up in California and like many of her friends she messed about at school, involved with too many other teenage preoccupations to be bother with studies or classes. She began to study when she got to Community College and eventually got a BS in Physics and Maths. (She went back and told her Math teacher about her success: she knew he would remember telling her that she would never get anywhere in Math.) From university graduation she took five years ‘off’ and worked as a video performance artist, working in interactive installations, gradually moving into performance with science themes. She went back to university to do an MS with the intention of moving into TV, but she went into teaching and developed her act as ‘The Physics Chanteuse’: a sexually provocative, politically barbed entertainment which made her a popular after-dinner entertainer amongst US physicists.



The Physics Chanteuse in action.

Reinventing herself again, Linda moved to New York and started to study for a PhD in the summer of 2001, but the events of September 11 have changed her think-

PEOPLE

Featuring relationships, personalities, interactions, environments and reputations involved in physics and education

ing. She gave up the PhD, and is now much more reflective, hoping to write and teach back in California. 'I'm still running from the towers... I want to see nature before it is all destroyed', she told me as we sat in a bar during the AAPT winter meeting in Philadelphia, where Lynda had been explaining how to create Powerpoint Karaoke Physics.

What do you hate about physics?

Hate is such a negative word, one we need to hear less of in this world, so I prefer not to use it. What I dislike in physics is our lack of social responsibility or moral conscience. We produce weapons of mass destruction and nuclear power that endangers and pollutes the world. We build billion dollar labs to do esoteric research projects such as searching for the Higgs field, when there are much more important problems to apply our brain power to now, such as developing sustainable energy sources or dealing with nuclear waste. We have a real Frankenstein complex—scientific discovery at any cost. But progress at any cost is too expensive. We are technologically sophisticated but socially retarded and we need to bring that into balance.

Physicists suffer from a ridiculous sense of superiority and entitlement—the 'rocket scientist' complex. The cancellation of the Superconducting Super Collider was a mega-shock to the community. For the first time since the Manhattan Project, physicists were told No. So now they are running scared to the 'outreach' specialists to educate the public about their research but it really is more of a publicity campaign than an educational effort. They want the people to support their research without question. NASA doesn't include criticism or debate in its educational materials. There is no environmental impact lesson plan about the risk of launching plutonium-powered probes from Earth or discussion of whether the search for life on Mars is really relevant or a priority. I think physics is out of sync with the real world. We need to educate people so they are politically empowered, not ideologically cloned 'anything-goes' science sheep.

What is your biggest disappointment in physics?

My biggest disappointment is that physics is so disconnected from Nature. We say we study nature but it has become so specialized that we can't see the living being through its atoms, and that has dangerous consequences. We perpetuate the illusion that science is objective and without social influence, and that is simply absurd! We have disdain for social sciences and liberal arts, which is really stupid because it is all just different ways of looking at and for truth. We have lost touch with our origins as Natural Philosophers and have



We need to evolve out of our addiction to power and explosions and weapons. Physicists—just say NO to Star Wars!

become narrow-minded logical technicians working for the profit of powers who are often doing great harm to nature. It is really shameful.

I am also very disappointed in some of our research choices. For example, we are spending incredible amounts of human and economic resources trying to achieve sustainable fusion when there is all the fusion energy we could ever need coming from the Sun! There is wind and wave power! We are obsessed with our own selfish intellectual pursuits. This is why it is critical that we have a scientifically literate voting population: so everyone can participate in making decisions about the direction science takes and keep scientists in check.

We are at a very, very dangerous crossroads in the world. The US wants to build a so-called Missile Defense system, and guess who is going to build it? Physicists! A Star Wars system in space is the wrong direction for the world. Unfortunately we are a lot better at building bombs than building peace. We need to evolve out of our addiction to power and explosions and weapons. Physicists—just say NO to Star Wars!

What turns you on about physics?

I'm a natural philosopher and I studied physics because I wanted to understand how the universe came into existence. I also think physics is the most powerful tool humans have for understanding the laws of nature and the cosmos. It is amazing to me that we can study the origin and evolution of the universe. Science fact is so much more bizarre than science fiction. I love it! It makes my brain go yum-yum. And I also like the thrill of problem solving—the beauty and elegance of deriving Maxwell's equations. The best thing about physics is the training—it really teaches you to think and reason. It gets your brain into shape for the rest of your life. That is what I tell my students, study physics and you'll be smarter the rest of your life! Physics is the ultimate mental gymnastics.

More information

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