



Viva

Celebrating the many achievements made by electronics engineers could be key to making electronics seem a more attractive career path to students. By **Elaine Essery**.

The dearth of engineering graduates – and electronics graduates in particular – is not a new phenomenon. However, as numbers continue to decline, the impact on the electronics industry is becoming more acute. Inadequate teaching in schools, a poor image among young people and failure of government to intervene are contributory factors. Leading campaigners are sending out a rallying call for more ‘joined up’ action from government, companies, individuals – the entire electronics community – to tackle the root causes.

Statistics paint an alarming picture. Latest UCAS figures show a marked year on year drop in the number of applications for electronic and electrical degree courses since 2002. Applications received this year are a worrying 17.7% down on those in 2005. These figures stack up with a decline in students taking relevant A level subjects: in 2004, there were only 28,000 entries for physics





electronics!

Chris Wilson — Ambassador

and 8000 for computer science. Maths entries fell by 16.5% between 1996 and 2003.

If lack of quantity is an issue, lack of quality is even more critical. ARM fishes from a small pond of leading electronics universities in search of top quality graduates. "We have major difficulties getting people from this country, because not enough people of the right quality are being educated in the UK and we anticipate the situation getting worse," says Bill Parsons, ARM's executive vice president, human resources. Compounding the problem is the competition for the best graduates which electronics companies faces from merchant banks, the Civil Service, management consultancies and other employers. To fill the deficit, ARM sources engineers from countries as diverse as Vietnam, Russia, India and China.

The Electronics Innovation and Growth Team's report states the productive life of an electronics designer is around ten years. How, then, is the profession going to ensure its survival? Young Engineers chief executive, Stuart Ellins (above), believes the solution rests with today's engineers: "The question every engineer should ask themselves is: 'where is my replacement coming from?' and the answer is: your replacement is out there, but they need convincing. Engineers are the only people who are going to do it." He adds: "The seed corn is there



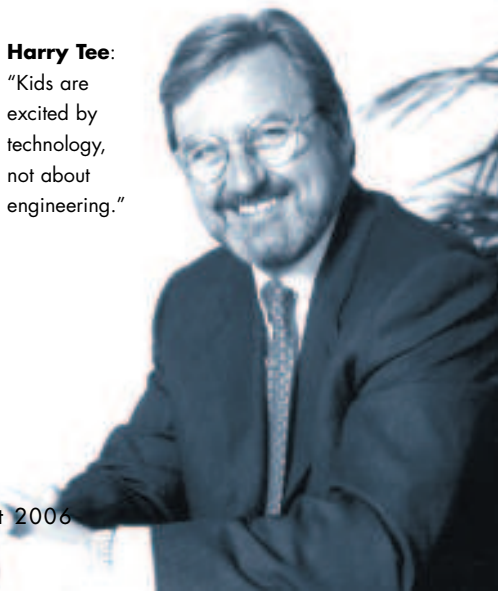
but it needs nurturing. It takes one to one contact, mentoring, enthusiasm and passion." And that's where Science and Engineering Ambassadors (SEAs) come in (see the two SEA profiles).

In addition to a number of national challenges, including the Young Engineer for Britain competition, Young Engineers supports a growing network of 1200 after school clubs with teacher resources and other services. More important than providing materials are the people who will help teachers get the most out of them. Many SEAs are engaging with schools through Young Engineers clubs and other activities, providing technical expertise and inspiration, but more are needed. Ellins says: "Getting people into schools to convince students that engineering is a really exciting, rewarding and challenging career is key. Young people will be inspired by a role model who can go along and say 'this is why I did engineering, this is why I'm passionate about it, these are the kind of things I'm doing'."

We need to look further back at the education system to find the root cause of poor graduate output. According to Ollie Althorpe, chair of the Electronics in Schools initiative, the problem lies in the lack of teachers who truly understand electronics. Already at Key Stages 3 and 4, lack of support in schools and lack of motivation is stifling

Harry Tee:

"Kids are excited by technology, not about engineering."



Chris Wilson lectures in the department of cybernetics at Bradford University, runs the university's volunteering centre and still owns the electronics business he set up whilst at school.



His early involvement in schools electronics projects came when, as a design technology A level student, he was co-ordinator for a team whose robots featured on TV's *Robot Wars*. He went on to help other schools with their robotics projects, building his skills at the same time.

As he was finishing his A levels, he undertook formal training through his local SETPOINT and was asked to deliver pieces of work under close guidance. Wilson explains: "The training is a combination of how to get across your knowledge and experience in an exciting way to kids and understanding the school system, the national curriculum and what teachers focus on."

Wilson became an SEA, delivering sessions in City Learning Centres and primary schools, helping with Headstart, SET days and summer schools. "Doing SEA work in schools made me realise there's a lot of theory taught but not enough hands on application. It spurred me on to see gaps where kids weren't enthused about these sorts of areas." He now uses his role in the university's volunteering centre to recruit new SEAs.

"Being an SEA gives you a great sense of achievement. It's fantastic being able to work with other like minded professionals and bounce ideas and synthesise those when working with teachers and kids," Wilson enthuses. "Whatever skills, knowledge and time you have – from an hour a week to an occasional day – you can get involved and put something back into society."





Daksha Patel — Ambassador



Daksha Patel is hardware development manager at Gent by Honeywell and has been an SEA for six years. Her activities have ranged from supporting primary schools, through acting as a role model at WISE events, and participating in engineering days in secondary schools.

Describing her work with Year 5 and 6 children, supporting a K'nex Challenge project, Patel says: "It's about having fun, treating them like engineers for the day and giving them the feeling that this is

what they could be doing as a career. To see the kids feel they've achieved something at the end of the project – they've thought about it, done the drawings themselves, made it themselves – and be able to bring that out is very rewarding." Another primary school project was to build a fairground ride where Patel helped children – and teachers – understand how to use motors and the principles behind them.

Gent actively supports Patel's SEA activities. It has hosted WISE events, where girls tour the site to see different aspects of engineering, and role model Patel has supervised hands on sessions. "It's great being able to change young people's perception of engineering and get them excited about the possibilities," she says. "They discover it's a clean environment and are in awe of some of the processes – they didn't realise what could be done." Patel will soon participate in an 'Electronics for the Terrified' event for teachers being held at Gent.

Recognising the personal development opportunities that SEA activities provide for young engineers, Patel involves members of her team. "They enjoy interacting with people and it builds their confidence. Everyone should get a chance to do it if they want to."



Ollie Althorpe: "The government and the education system has not appreciated the massive link between electronics and every facet of a child's existence."

the number of children who could potentially make the transition to university, he says. He is quick to point out that it is not the fault of the teachers. "The government and the education system has not appreciated the massive link between electronics and every facet of a child's existence," Althorpe says. "Unfortunately, we are not supporting the education system to enable them to create a greater cohort of children who will then populate the excellent university places we have. Teachers are not being empowered to do a job that if they were empowered to do, they would do well and everyone would benefit."

Electronics in Schools supports teachers through in service training to enable them to be more confident in their teaching. The initiative receives just £150,000 government funding, whilst £2million has recently been 'ringfenced' to reinvigorate the teaching of geography. Althorpe suggests a small proportion of the massive funding allocated to ICT be channelled into training and supporting teachers to apply electronics across the whole school curriculum. "If you maintain that engagement, you will have a greater number of children opting for electronics," he says.

Electronics Leadership Council chair Harry Tee insists that defined government intervention

is needed to change things. He is working up the political chain of command to convince government of the importance of electronics to the UK economy. His next target is curriculum influencer Lord Adonis. "It's not good enough for the DfES to sit back," Tee says. "We have to get real money, real intervention and real initiatives that are going to make a difference." Convincing those with political clout cannot be done in isolation. It needs the whole electronics community to engage in a coordinated way. Part of Tee's role is to draw all the strands together. "Too many people are running around trying to do good work without correlating it very well. Joined up thinking and joined up action is required," he says.

Corporate commitments

With the demise of GEC, Marconi, Lucas Industries and other electronics giants, the role of promoting the industry has fallen to smaller companies with fewer resources. ARM has taken on the challenge of championing the cause at local and national level. The company's commitment is impressive: it sends its engineers into schools and invites schools in, provides financial and practical support for Young Engineers, sponsors several specialist schools and participates in teacher conferences. Parsons is anxious for more companies to come on board. "Whatever we do has to be done in concert with other companies," he stresses. "We put in as much effort as we have time and resources to spare but we're a pebble in a big pond – we make a few ripples, but what we do is a fraction of what some of the bigger companies used to do."

Tee agrees that other employers should do more to attract young people into the industry and help undergraduates complete their degrees. Offering work experience and summer vacation placements, working with teachers and holding open days for schools are all things companies can do, he suggests. "If more companies did that, I think we'd have a higher proportion of young people deciding this was an interesting career path for them." He also wants to drop the 'engineering' label that carries the grease monkey image and replace it with technology. "Kids are excited by technology, not about engineering. We need to get them excited about how their MP3 player works, how their Playstation functions, what makes their mobile phone do what it does to get them engaged with the technology side, which is where we want them to build their careers."

The Science and Engineering Ambassadors (SEA) initiative is part of SETNET, the network for science, engineering and technology, and organised locally by SETPOINTS. For information visit www.setnet.org.uk 