

Elektra European Electronics Industry Awards 2007

Student Engineer of the Year - Dr Carol Marsh OBE

39 archived evidence files	20+ outlets and institutions	2007-08 sustained coverage
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Purpose of this report

This report provides website evidence of the impact of my 2007 Elektra Student Engineer of the Year Award. It combines a concise account of the impact with copies of the original coverage. Where the same press release appeared in several publications, one copy is reproduced and every additional publication is listed so the breadth of coverage is retained without unnecessary duplication.

The award and its technical basis

I became the first winner of the Student Engineer of the Year category at the Elektra European Electronics Industry Awards on 12 December 2007. The award recognised my EngD contribution to Algotronix' DesignTag technology. DesignTag used a small, low-power digital tag and a thermal communications channel to help identify intellectual property within electronic devices.

The contemporary coverage records that I designed and demonstrated several variants of DesignTag and researched cryptography and a true random-number generator used to enhance Algotronix security IP. The judges highlighted achievement in both academic and commercial environments.

Impact

Technical recognition

The award gave independent industry recognition to research addressing IP misuse and counterfeit integrated circuits.

Research and academic impact

EPSRC, iSLI and university publications used the award as evidence of the value of industry-sponsored Engineering Doctorate research.

Commercial visibility

Trade and sponsor coverage connected the research to a developing product and explained its application beyond academia.

Policy engagement

The recognition led to an invitation to the House of Commons in 2008 to discuss engineering skills and how to attract young people into engineering.

Role-model impact

Women-in-engineering and STEM publications used the story to show the value of returning to education and to encourage more women into engineering.

How duplicate coverage is handled

A substantial group of publications reproduced or closely adapted the same core announcement. The fullest preserved version is reproduced once under “Core award announcement and technical background”. The report then lists all other known publications carrying that material. Distinctive profiles, institutional reports, official records and follow-on articles are reproduced separately because they add different evidence.

Verified working links

[Carol Marsh - Awards & Recognition](#)

[University of Glasgow - EngD thesis record](#)

[Scottish Engineering Hall of Fame - Carol Marsh](#)

[IACR Cryptology ePrint - Thermocommunications](#)

Evidence guide

1. Official Elektra winners coverage

Confirms the 2007 awards ceremony and names Carol Marsh as Student Engineer of the Year. **Also published/saved as:** Elektra 2007 - Winners 2007 (official category listing).

2. Official winners list

Official category record naming Carol Marsh, iSLI, as winner.

3. Judges' comments and winner panel

Records the judges' assessment, winner photograph and sponsor attribution.

4. Core award announcement and technical background

The fullest preserved version of the original release, explaining the award, EngD route, DesignTag contribution and wider engineering activity. **Also published/saved as:** Components in Electronics; Electronic Specifier; ElectronicsTalk; EMSNow; Engineer Online; University of Glasgow Engineering Graduate School; Talent Scotland; Women in Technology; UKRC News; SSF4F - Scottish Student of the Year Wins Award.

5. Scotland's iSLI student engineer comes top

Regional technology coverage adding career background and the European context of the award.

6. The dancing, cryptic mind of Carol Marsh

An original follow-on profile focused on Carol, DesignTag and the security problem addressed by the research.

7. The IP Protector

A substantial IET technical feature explaining DesignTag, the research journey and the wider significance of the work. **Also published/saved as:** IET - The IP Protector (single-page saved PDF); IET - The IP Protector (Word copy).

8. Award sponsor coverage

Coverage by Rapid, sponsor of the category, including the award result and DesignTag summary. **Also published/saved as:** Rapid Weblog - Elektra 07 Winners.

9. Algotronix - Behind the News

The industry sponsor's record linking the Elektra result with DesignTag development and demonstrations.

10. Women's Engineering Society coverage

Records the award for a women-in-engineering audience and its role-model significance.

11. Scottish Schools for a Future newsletter

Shows the award reaching an education and Scottish STEM audience.

12. EPSRC Connect 60

National research-council coverage presenting the award as an outcome of the Engineering Doctorate route.

13. EPSRC Annual Review 2007/08

Formal annual-report evidence that the achievement was selected as an EPSRC research-training success story. **Also published/saved as:** EPSRC Article (saved PDF and JPEG copies).

14. University of Glasgow CTA Review Report

External review evidence citing the pan-European award as a programme achievement.

15. University of Strathclyde UPDATE

University publication recording the award immediately after the December 2007 ceremony.

16. iSLI Annual Review 2008

Programme-level record connecting the award to Carol's research and the Institute's outcomes. **Also published/saved as:** iSLI MSc News 01/08; iSLI 2008 - 10th Anniversary.

17. House of Commons engineering-skills discussion

Evidence of impact beyond publicity: the award led to participation in a House of Commons discussion about engineering skills and attracting young people. **Also published/saved as:** Global SMT & Packaging - Event Held at the House of Commons.

Reproduced evidence

The following pages are copies from the supplied archive. Historical web addresses visible in the copies may no longer work; the saved pages are retained as the evidence record.

Evidence 1

Official Elektra winners coverage

Why it is included

Confirms the 2007 awards ceremony and names Carol Marsh as Student Engineer of the Year.

Also published or preserved as

- Elektra 2007 - Winners 2007 (official category listing)

The reproduced pages follow.

ElectronicWeekly.com

Monday 21 January 2008

News

[XML](#) [Latest News](#) | [Newsletter](#)

Elektra European Electronics Industry Awards 2007 - The Winners

by **Richard Wilson**

Friday 14 December 2007

[View video coverage of the 2007 Elektra Awards here.](#)

Sir Robin Saxby, chairman emeritus at [ARM](#), has been recognised for his major contribution to the UK's semiconductor design industry at the 2007 Elektra European Electronics Industry Awards.

The [Elektra Awards](#) were presented at a gala dinner in London's West End last night, with representatives from the electronics industry recognising the achievements of individuals and companies.



Presenting the *Lifetime Achievement Award* to [Saxby](#), who was the first CEO of ARM, Elektra host Sir Trevor McDonald said: "Sir Robin Saxby embodies the combination of entrepreneurial and technical skills which has helped to give the UK a truly world class reputation in high quality semiconductor design."

There were joint winners of the *Company of the Year Award* with component distributor [Anglia Components](#) joining wireless IP firm [PicoChip Designs](#) on the winner's rostrum. This was one of three Awards for the Bath-based wireless semiconductor developer.

Bristol-based [XMOS Semiconductor](#) was named as *Start-up of the Year* while Barcelona-based Fractus won the R&D Award for its fractal antenna-in-package technology.

[Xilinx](#) headed the product categories by winning the *Semiconductor of the Year* award with its 65nm Virtex-5 LX FPGA.

The worthy winner of the *Student Engineer of the Year Award* was Carol Marsh who is an EngD Research Engineer at the [ISLI](#) (Institute for System Level Integration), sponsored by Algotronix.

The full list of Elektra Award winners is as follows:

Embedded System Product of the Year

XMOS Semiconductor

Semiconductor Product of the Year

Sponsored by Azzurri Technology

Xilinx - 65nm Virtex-5 LX FPGA

Student Engineer of the Year

Sponsored by Rapid Electronics

Carol Marsh, Algotronix sponsored, iSLI EngD Research Engineer

Readers' Choice Product Innovation of the Year

Sponsored by International Rectifier

Electronics Weekly readers voted the Nintendo Wii games console as the Product Innovation of the Year.

A full [gallery of pics](#) from the event will follow, and a webcast of the awards should be appearing online on Friday.

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Evidence 2

Official winners list

Why it is included

Official category record naming Carol Marsh, iSLI, as winner.

The reproduced pages follow.

Sponsored by



Winner - Ericsson Power Modules

Website Innovation Award

Sponsored by



Winner - Vicor

Start-up of the Year

Sponsored by



VARITRONIX

Winner - XMOS Semiconductor

Semiconductor Product of the Year

Sponsored by



Winner - Xilinx for the Virtex-5L.X - F.P.G.A

Product Innovation of the Year - Readers' Choice

Sponsored by



Winner - Nintendo Wii games console

Student Engineer of the Year

Sponsored by



www.rapidonline.com

Winner - Carol Marsh, iSLI

Company of the Year

Sponsored by



Winners - Anglia and picoChip

Lifetime Achievement Award

Sponsored by



Winner - Sir Robin Saxby

Sponsors:



anglia



intellect

OMRON



SONY



Evidence 3

Judges' comments and winner panel

Why it is included

Records the judges' assessment, winner photograph and sponsor attribution.

The reproduced pages follow.

Student Engineer Elektra 07

of the Year

European Electronics Industry Awards

Carol Marsh

Algotronix sponsored,
iSLI EngD Research Engineer



Carol Marsh received her award from Paul Baker, director of Rapid Electronics.

Carol Marsh has been an active member of EPSRC's EngD (engineering doctorate) scheme since 2005. Studying at iSLI in Livingston and sponsored by Algotronix, she is currently in her second year of research.

Marsh's EngD research primarily relates to the electronic tagging of ICs, IP cores and FPGA designs to detect fraudulent activity and provide reliable product and version identification.

Her detailed research has been aimed at developing her sponsor's DesignTag product, a low power IP core which functions as an 'active' tag for a larger design. Her circuits will be used in the commercial product.

Over the last two years Marsh has also undertaken extensive background reading in cryptography and security technologies for IP protection and has published papers in three prestigious international conferences.

Before joining the EngD scheme, Marsh worked for Marconi Avionics, BAE Systems and most recently ECS Technology when she completed a part time MSc with iSLI.

JUDGE'S COMMENT

"The winner impressed us all by the level of her achievements in both academic and commercial environments. She has every right to be proud of her achievement."

SPONSOR
Rapid

www.rapidonline.com

Core award announcement and technical background

Why it is included

The fullest preserved version of the original release, explaining the award, EngD route, DesignTag contribution and wider engineering activity.

Also published or preserved as

- Components in Electronics
- Electronic Specifier
- ElectronicsTalk
- EMSNow
- Engineer Online
- University of Glasgow Engineering Graduate School
- Talent Scotland
- Women in Technology
- UKRC News
- SSF4F - Scottish Student of the Year Wins Award

The reproduced pages follow.



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Press Release

iSLI Research Engineer Wins 'Student Engineer of the Year' Award

Carol Marsh, a student from the highly acclaimed Institute for Systems Level Integration (iSLI) based in Livingston, has won the Elektra Award for Student Engineer of the Year, beating off competition from both undergraduate and postgraduate students attending academic institutions all over Europe. Now in its fifth year, the Elektra Awards are the most prestigious product technology and business awards in Europe. They recognise the achievements of individuals and firms across the Electronics industry.

Carol is studying for an Engineering Doctorate (EngD) in System Level Integration at iSLI and is currently in her third year of research. The EngD programme is the flagship doctoral qualification of the government-funded Engineering and Physical Sciences Research Council (EPSRC). It is a four-year programme, placing emphasis on research within an industrial context. Students, known as Research Engineers, combine a research project, based with a UK sponsoring company, with accredited technical and business training. The EngD is the ideal opportunity for both employers and students to engage in a mutually beneficial relationship. Tony Harker, CEO of iSLI commented that

"The Engineering Doctorate course provides an excellent opportunity for people already in industry who want to further their education in the field, whilst also providing their sponsors with key access to cutting edge research at attractive costs..."

Carol is sponsored by Algotronix Ltd, a U.K. based supplier of technical due diligence on semiconductor companies and a vendor of silicon IP. With the aid of iSLI and Dr Tom Kean, managing director of Algotronix, Carol has produced research primarily relating to the electronic tagging of integrated circuits, IP cores and FPGA designs. Her designs focus on the detection of fraudulent activity and provide reliable product and version identification. She has been developing Algotronix' DesignTag™ product, a very small, low power IP core which functions as an 'active' tag for a larger design. The DesignTag™ communicates through the chip package with an external 'reader' using small changes in chip temperature as a signaling mechanism.



HART MARKETING
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Carol has produced circuit designs for several variants of the DesignTag™ which were demonstrated very successfully at the 2007 Design Automation Conference (DAC) in San Diego and at the Cryptographic Hardware and Embedded Systems (CHES) Conference in Vienna. The circuits will be used in Algotronix' commercial products. In addition, Carol has extensively researched cryptography and used this knowledge to enhance Algotronix' Security IP Cores.

Tony Harker revealed that "the importance of Carol's research cannot be underestimated". Currently accepted methods of inking IC packages can be easily abused. More deeply embedded identification such as chip metalization requires destructive testing to confirm identity. Furthermore, FPGA designers or IP core vendors cannot mark the package of the chip nor can they easily customize the metal layers of their product. The circuits she has designed are particularly challenging because they must perform what is essentially an analogue communications function using only digital logic. A security tag is only useful if its resource requirements are minimal compared with the design it protects placing difficult research and design constraints on the tag circuit designer.

Before joining the EngD scheme, Carol worked for Marconi Instruments, BAE Systems and most recently ECS Technology. During her time with ECS Carol completed her part time MSc with iSLI. She then returned to full-time education after 20 years of full time employment. Regarding her achievement, Carol remarked,

I hope that in winning this award it will encourage other people and especially women that it's never too late to return to education.

Carol is instrumental in encouraging women to enter the field of engineering in Scotland. An active member of the Women's Engineering Society (WES) council, which she joined in September 2007, she introduces higher education institutes to the society and promotes WES to Scottish Engineering companies. In addition, she promotes Science and Engineering to young people in Scotland in her role as a Science and Engineering Ambassador (SEA). The aim of the SEA program is to encourage more young people to understand the opportunities that a science, engineering or technology-based career can offer them.

Carol also found time during her career and studies to bring up two children and keep an active social and personal life. Her work has demonstrated that there is a significant role for trained engineers to play in leading edge commercial research. More importantly she is a role model for others considering EngD as an alternative option to further tertiary level education and research.

Ends



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Editors' notes:

Founded in 1998, iSLI (the Institute for System Level Integration) provides postgraduate education, professional training and research in system level integration incorporating cross over technologies such as hardware, embedded software, MNT/MEMS.

A collaboration of the computing science, informatics and electronic engineering departments of the universities of Edinburgh, Glasgow, Heriot-Watt and Strathclyde, and Scottish Enterprise, the Institute is the first centre of excellence in system level integration to be established worldwide. Its aim is to support the development of electronics systems design worldwide and to encourage the exploration of new technologies through research.

iSLI's operations are underpinned by funding from Scottish Enterprise, UK Central Research and HE funding agencies, and substantial sponsorship funding, including "expert in-kind support" from companies in the microelectronics industry.

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Fax: +44 (0)1506 469 301

Web: www.sli-institute.ac.uk

General enquiries: sl-i@sl-i-institute.ac.uk

Algotronix

http://www.algotronix.com/index_flash.html

Women in Engineering

<http://www.wes.org.uk/>

SEA Program

<http://www.setpointscotlandseas.org.uk/about.htm>



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F1 in Schools

<http://www.f1inschools.co.uk/about.asp>

Lab in a Lorry

<http://www.labinalorry.org.uk/>

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Evidence 5

Scotland's iSLI student engineer comes top

Why it is included

Regional technology coverage adding career background and the European context of the award.

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Friday 14th December 2007

Scotland's iSLI student engineer comes top



Carol Marsh wins Student Engineer of the Year

In the Elektra European Electronics Industry Awards 2007 Student Engineer of the Year is Carol Marsh, Algotronix sponsored and iSLI EngD Research Engineer.

14 December, 2007

Carol Marsh's EngD programme is funded by EPSRC and the FPGA High-Performance Computing Alliance (FHPCA), an alliance of high-tech organisations working to develop new computer solutions using FPGAs.

As part of the project, a new type of 'supercomputer' will be built. The project could revolutionise the development of applications to help with processing requirements in areas such as defence, medical imaging and mobile telecoms.

Marsh's contribution to FHPCA, with her sponsoring company Algotronix, is research into novel technologies for the protection of design information sold as 'IP cores' for FPGA chips.

With over 20 years' design experience under her belt, Carol enrolled on EngD in autumn 2005, via a route that was very different to many other students. She has demonstrated that with the right skills, experience and motivation, EngD is viable for many engineers, and is not the sole reserve of 'traditionally-qualified' younger graduates.

After completing an HND at Napier University in the early 1980s, Marsh began her career with Marconi Instruments, Donibristle Industrial Estate. Following the completion a company sponsored MSc in Digital Techniques at Heriot-Watt University, and a career break to start a family, Marsh returned to work full-time and was promoted to increasingly senior technical positions.

In 1991, she started working as an FPGA engineer. Carol said "FPGA technology was very new at the time, and it was great to work in such a groundbreaking area. I found the work exciting and challenging; it sparked an interest and I knew it was an area I'd enjoy working in".

Carol remained with the company, now Selex, as an FPGA engineer 'troubleshooting' on various projects until 2000, when she was headhunted by ECS Technology, South Queensferry to specialise in FPGA design. She also enrolled on ISLI's MSc, gaining the postgraduate diploma with distinction-level grades while continuing to work full-time.

While investigating a project to complete the MSc, Carol heard about FHPCA, and the possibility of doing an EngD. Marsh said "It made sense to do the EngD – it was industry-based and I had so much experience to offer. I had considered a part-time PhD once I'd finished the MSc, but this opportunity was really exciting, it just seemed like an ideal solution".

"Initially, I didn't think I could apply; because I don't have an undergraduate degree, but then I discovered that EngD values industry experience as well as formal qualifications. I talked it through with my tutors, and they convinced me to apply".

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www.Flexible-Learning.co.uk

Evidence 6

The dancing, cryptic mind of Carol Marsh

Why it is included

An original follow-on profile focused on Carol, DesignTag and the security problem addressed by the research.

The reproduced pages follow.

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Wednesday 27th August 2008

The dancing, cryptic mind of Carol Marsh



Carol Marsh in work mode

[ASIC vs Processor Designs](#)

Discuss benefits and tradeoffs with experts at Intel's Embedded Forum
intel.com/go/embeddedfc

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[C to FPGA Compiler Tools](#)

Generate FPGA hardware from C for embedded and HPC applications
www.ImpulseAccelerated.com

[Encryption White Paper](#)

Discover how to use an encryption appliance with most applications.
www.safenet-inc.com/dat

If you visit the website of Carol Marsh, it's easy to see what her current focus in on: investigating cryptographic technologies for enforcing IP licenses in IP cores and investigating technologies for detecting products which incorporate unlicensed IP cores. Her newest page is on cryptography book reviews, providing two 'must reads' for budding cryptographers and four 'next reads' as well.

Back in 2005, the iSLI advertised an Engineering Doctorate position working with the FPGA Super Computer Group at Edinburgh University. Marsh applied for this and was accepted by Dr Tom Kean of Algotronix. Dr Kean designed the CAL device that was implemented into the Xilinx FPGA and Marsh wrote about this in her first MSc dissertation.

She is now in her final year of the EngD, enjoying it immensely, and considers it a great privilege to be working with Dr Kean. Marsh says that the advances in IP protection approach are due to him. "He is brilliant on the subject. It was his idea to use the undesirable 'side channels' in which a considerable amount of research had already been devoted to hiding them."

"Side channels show power spikes, electromagnetic activity and temperature differences. It was decided that the side channel temperature would be a good way to go." So the cryptography we have developed deliberately uses 'side channels'."

The DesignTag is an active circuit present in a finished chip, not merely an optical identification code on special mask layers, or a watermark in the design source code. The Tag system is made up of a small 'tag' circuit built into the IP core or chip which needs protection; a sensor for collecting activity data from the tagged chip, software which processes that collected data; and a web-based database of tag codes and design information.

For the owners of the IP Core or a complete chip design, it has been difficult and expensive to prove their IP is being used illegally in a product. In the case of silicon chips, the only practical method of detecting an IP Core, has been to obtain a sample of the product under suspicion, send it to a specialist laboratory for analysis and a 'tear down' or reverse engineering. But detecting the presence of an IP Core in designs implemented on 'anti-fuse' FPGAs or designs for a SRAM FPGA, in which the bitstream is already protected by cryptography, is virtually impossible.

Now the small security DesignTag circuit is added to IP cores (or to complete designs). A reader 'wand' detects and receives information from the 'security tag' to provide a method of proving illegal use of an IP core. This is both non-invasive, quick and does not affect the system functionality. The technique can detect the IP Tag even if it is implemented on an FPGA where the bitstream is encrypted. And as well as protecting against design piracy, the tag combats the increasing problem of low-cost 'equivalent' chips, falsely marked as coming from reputable manufacturers.

"Most customers are good about IP," says Marsh, "and quite often breaches of IP are not deliberate. DesignTag is also helpful for design houses to pick up on accidental breaches of IP use. We've got one version of the new Tag out now for over a month," says Marsh "and we've demonstrated it at several conferences to many people."

"Basically the 'active tag' generates heat in a circuit and an outside monitor detects the tag. We are also working on a passive tag, a heat circuit outside the chip and providing detection within the basic design. It's not at production level, but currently a prototype."

Asked how she personally found maths teaching at school, Marsh says she was lucky in having an excellent teacher.

"I was terrible at exams when I was younger. In third year, my maths teacher wanted us to sit our O grade, but we weren't allowed to so we started the Higher syllabus in fourth year and went back and sat the O grade at the end of fourth year. I only got a B in the O grade, but the teacher knew that I had no problems with Higher Maths. By the time I left school I had a good grounding in maths and loved it so much I went on to do physics and again I had an excellent teacher.

"When my oldest son went to school, his teacher was my physics teacher and he remembered me. I had thought of becoming a teacher, but I was in a statistics class and had watched a teacher who simply couldn't control the classes, and thought 'that would be me.'

It turned her to computing engineering, programming and learning to fix things. "I was really lucky," she reflects. "Computing as a subject was quite new 25 years ago" She has now done her own web site with text editor, and gone back to school to learn HTML language.

"I started working with FPGAs in the early 1990s when FPGA replaced PLDs in systems, but while the actual devices keep changing so do the applications and the tools for these have not kept up with them. IP security is one of the critical elements for FPGA progress."

How did she get into dancing? "I did aerobics for 12 years, and never though about teaching. But I did take the exam, and when one of the teachers left, I was given the classes. That's really how I became a fitness instructor and it was great for building self confidence. Later on I qualified as a Dance instructor."

"I'm running two classes just now, but do not have time for more," she says, though she admits to thinking about taking up lecturing, finding an appeal in an advisory role and enjoying being with and helping people. "I don't want to be just an engineer sitting at a desk and working on problems."



Judging by her record, small chance of that.

Webs: <http://www.carolmarsh.co.uk/index.html>
<http://www.sli-institute.ac.uk/>
http://www.algotronix.com/index_flash.html

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The IP Protector

Why it is included

A substantial IET technical feature explaining DesignTag, the research journey and the wider significance of the work.

Also published or preserved as

- IET - The IP Protector (single-page saved PDF)
- IET - The IP Protector (Word copy)

The reproduced pages follow.

[Home](#) > [Students and apprentices](#) > [Magazine](#)

Breaking the sound barrier

More red-hot engineering research news, including voice-activated robots, beach balls and a spicy food detector.

Breaking the sound barrier

Bradford electrical engineering student Zhiguo Lu has really worked on getting machines and humans to work together - solving problems to get his voice-controlled robot to understand him.



Zhiguo, from Heilongjiang in China, said: "Programming the voice recognition software was not straightforward, it can be especially difficult for me as it sometimes doesn't understand my English pronunciation. I'm hoping this project could have practical applications – perhaps for controlling wheelchairs or appliances in the home for physically disabled people."

Zhiguo, 22, has just completed his final year in Bradford's School of Engineering, Design and Technology. He has developed a control program to direct the robot, using speech recognition and Bluetooth. His tutor, Dr Darwin Liang, is a lecturer in electrical engineering at Bradford and a specialist in power electronics and robotics control. He said: "Students all over the world are fascinated by the intelligence of robots using modern technology. Zhiguo's work is a continuation of my current research in intelligent robotics, where robots can assist patients with certain disabilities."

Hot stuff

By Mark Hunter

Roohollah Torabi is not the first doctorate student to regard himself as an expert on curry. But perhaps he has more reason than most.

As part of Professor Richard Compton's research team in the Physical and Theoretical Chemistry laboratory at Oxford University, Torabi has helped develop a method of using carbon nanotubes to judge the heat of chilli sauces. The technology, which measures the levels of capsaicinoids (or active components) in samples of chilli sauce, may soon be available commercially as a cheap, disposable sensor for the food industry.

Current methods of measuring the strength of chilli are either highly subjective (the industry standard Scoville method uses five trained tasters) or expensive (using high performance liquid chromatography).

"Our work basically involved designing a cheap and simple sensor using carbon nanotubes," says Torabi.

"This sensor was tested for a variety of sauces with different pungency levels, including one of the hottest sauces in the world – 'Mad Dog's Revenge' – which is rated at 1,000,000 Scoville units, just 16 times less pungent than the pure capsaicin."

The sensor uses a technique known as adsorptive stripping voltammetry (ASV) in which the capsaicinoids are adsorbed onto multi-walled carbon nanotube (MWCNT) electrodes and then oxidised by an electrochemical reaction. This causes a current change that can be measured and translated into Scoville units.

"ASV is one of the most powerful electrochemistry techniques which can be used for detection and determination of analytical targets," says Torabi. "In the case of this chilli sensor, the adsorption happened with the aid of carbon nanotubes which are able to increase the surface area and also adsorption efficiency of the sensor significantly."

The research team have already published their findings in the Royal Society of Chemistry journal *The Analyst* and have applied for a patent to allow the technique to be commercialised.

In the meantime, Torabi is nearing the completion of his doctorate on "Electroanalysis using different forms of

carbon based materials" - with the occasional night off for a meal out with friends.

"I've always liked hot foods, specially the Indian ones, but I became more interested when I started doing this project," he says. "The main point of this sensor is to judge the heat level without using your tongue, so I didn't have to taste the chilli sauces we tested. However, we did try several different sauces just for fun and to see how bearable they are."

Rubber ducks, sand heaps and beach balls

By Jo Carlowe

Ah, beach volleyball. All you need is a net, a bit of sand, and a few skimpy costumes, surely?

Wrong! When they held the European beach volleyball championships in Blackpool last month they had to make a new beach. Although the resort's sand was good enough, organisers couldn't use the beach itself, because the tide would wash the games out.

So contractors had to extract more than 3,000 tonnes of sand from the sea and build six courts on the town's iconic Promenade.

"We had a two week window in which to remove the sand," explained Simon Barker, project manager for contractors Birse Coastal.

The works were planned around early morning low tides. The sand was removed using loading shovels and 25-tonne articulated dump trucks, which took out 3,500 tonnes of sand over four days. The sand was then tipped and levelled using a 13-tonne rubber duck (a rubber-tyred excavator), while the tides and the holiday crowds meant work on the beach was limited to six-hour windows.

"You have to remember that the courts are located in middle of one of the country's busiest tourist beaches," said Mr Barker.

Under the rules of the Federation Internationale de Volleyball, the sand on the courts must be at least 400mm deep to enable players to dive and jump without injuring themselves. For this reason each single court required at least 200 tones of sand, with a JCB used to level it out.

At the end of the championships, the courts were demolished. Under European legislation the sand cannot be returned to the beach, so instead the 3000-plus tonnes of displaced sand will be used as infill for Blackpool's promenade redevelopment work.

As well as the courts, a 2,000-seater stadium was constructed and high bandwidth Internet facilities relayed via Blackpool Tower. Dave Spokes, managing director of Beach Volleyball UK Limited, said this needed for the international live Internet betting taking place during the championships, which took place between September 11 and 14.

Blackpool now wants to host the World Beach Volleyball competition and beach cricket, rugby and football events.

Further information:

<http://www.beach-volleyball.co.uk/index.htm>

The IP protector

By Mark Hunter

From mobile phones to medical imaging equipment, most electronic devices use Field Programmable Gate Arrays (FPGAs) to speed up microchip performance. The intellectual property within these programmable semiconductors is highly valuable but notoriously difficult to protect.

This, however, may be about to change, thanks to the work of an EngD student from Scotland.

Carol Marsh, now in the final year of her EngD in System Level Integration at the Institute for Systems Level Integration (iSLI) in Livingston, has already received last year's Elektra Student Engineer of the Year award for her work. The Elektras are the Oscars of the European electronics industry and the Student Engineer category recognises both technical knowledge and practical application of electrical engineering skills.

Now Marsh is hoping that the results of her endeavours could revolutionise IP protection within the FPGA core industry.

"We've only just gone live with the product and we've had a lot of interest, mainly from chip designers who are obviously worried about fraudulent chips coming out of places like China," she says.

The traditional way to combat fraudulent use of the IP within an FPGA is to "ink" the integrated circuit package, but these methods are not difficult to circumvent.

Moreover, marking FPGA chip packages credits the vendor but not the creator of the IP. Marking a complex system on a chip (SoC) credits only the company that markets the final product. As a result, anyone else involved in the design will struggle to gain recognition for their work.

Identification can be more deeply embedded using techniques such as chip metallisation. But these require the product to be destroyed before the chip can be identified, hardly the most cost-effective solution.

The system Marsh has been working on offers a far more economical and device-friendly method of IP protection.

Marketed in June this year by Algotronix, the DesignTag is a very small, low power IP core which functions as an active tag for a larger design. It communicates through the chip package with an external reader using small changes in chip temperature as a signalling mechanism. The result is a machine-readable e-tag that can be implanted within the active circuitry of a microchip.

"It can measure very minute changes in temperature which are specific to each chip," says Marsh. "So it's like reading a fingerprint."

The launch of DesignTag is the culmination of an incredible four years for Marsh in which she returned to full-time education after a gap of 20 years, beat off worldwide competition to win the Elektra award and is now hoping to continue her career at the cutting edge of digital design.

Somehow she has also found time to be a mother to two children, qualify as a yoga instructor, teach ceroc dance classes and take an active role on the Women's Engineering Society council. She is also helping to introduce more young people to science and engineering through the 'Lab in a Lorry' programme.

"I never thought I'd get a chance to go back into education," says Marsh. "I'd originally studied electronic engineering but it was all about power engineering which did nothing for me. But while I was working for Marconi I moved into digital engineering and as soon as I saw the digital stuff I knew that was what I wanted to do."

Her chance came in 2005 when the iSLI advertised an EngD position working with the FPGA Super Computer Group at Edinburgh University. Marsh applied and was accepted by Dr Tom Kean, managing director of Algotronix.

"It's worked out really well because I can mostly work at home, which helps when you've got kids. I get the best of both worlds," she says. "Obviously winning the award last year was amazing, although it has made me work even harder because I feel that I've got to show that I'm worthy of it."

For the future Marsh intends to remain within the FPGA field and will take up a position with Algotronix when she finishes her EngD.

"I just love the digital work, so that's what I want to keep doing. Dr Kean has been very good and taken me to a lot of conferences. So I've met a lot of people and made some very good contacts. And obviously winning the award has helped raise my profile."

Evidence 8

Award sponsor coverage

Why it is included

Coverage by Rapid, sponsor of the category, including the award result and DesignTag summary.

Also published or preserved as

- Rapid Weblog - Elektra 07 Winners

The reproduced pages follow.

Company Information

- ▶ [About Rapid](#)
- ▶ [Careers](#)
- ▶ [Quality Policy](#)
- ▶ [Purchase Conditions](#)
- ▶ [How to find Rapid](#)
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- Suffolk school wins First Lego League National Final
- Rapid shortlisted for Supplier of the Year 2008
- More choice than ever in the new Rapid catalogue
- BeGreen - penning a new chapter in recycling
- Elektra 07 Student Engineer of the Year
- EISS course - 6th February 2008
- Rapid start 2008 at ASE and BETT shows
- Wide range of consumer electronics now available at Rapid
- Charity providing brighter future
- Never be stuck for a solution with Siroflex
- Surelight products a glowing concern for Rapid
- Evaluate the Wii's Motion Sensor
- Introducing Semiteach IGBT
- Young Scot zooms away with engineering award
- Rapid provide on-tap supplies for leading water-saving systems
- Keeping guitar heroes happy!
- Rapid and Fastron - racing ahead!
- High performance TruOpto Power LEDs - at low prices!
- One Man and his 'Bot
- Leicester Amateur Radio Show
- The 39th Annual Radio Rally
- Rapidonline.com wins AFDEC Marketing Award
- Jaguar Cars Maths in Motion Challenge for Schools 2007/2008
- Rapid sponsors Young Engineer of the Year Award at Elektra '07
- Derbyshire and Yorkshire race to victory in National Final of Toyota Technology Challenge 2006-07
- Camden Electronics and Rapid sign franchise agreement
- New Trade Counter Opened at Rapid Ltd
- During April we are launching some interesting new solid state lighting products at Rapid
- Rapid wins Supplier of the Year: Over £3million turnover award

Suffolk school wins First Lego League National Final

A team of budding engineers from a Suffolk primary school hope to represent the UK at the FIRST LEGO League World Festival, after winning the National Final in Birmingham.

Trimley St Martin Primary School, near Ipswich, beat off the challenge of 23 secondary and primary schools from all over the UK and Ireland, and more than 400 schools who originally entered the prestigious research and robotics competition. Rapid are proud to be a sponsor of FIRST LEGO League UK, which promotes team building, problem solving, creativity and analytical thinking among children aged 9-16.

The nine members of the 'TSM Roboteam' were highly praised for their winning entry. The team had to prepare a presentation on the theme of energy conservation, alongside designing, building and programming an advanced autonomous LEGO Mindstorms robot capable of undertaking a series of complex tabletop missions.

TSM Roboteam's achievement was the fruit of many hours work at the school's Young Engineers Club. Derek Edwards, the club's leader, was delighted with the team's success. 'Throughout this period the team has spent three after-school sessions a week gaining an understanding of where our energy comes from, why we need to be careful how we use it and methods of alternative energy.'

As part of their project, the team conducted an energy survey, and several of their recommendations about energy conservation were implemented by the school, leading to significant energy savings and benefits for the local environment.

Trimley have now qualified for the FIRST LEGO League World Festival, which is to be held in Atlanta in April. In order to fund the trip to the US, the school needs to raise around £10,000. If you would like to make a donation, big or small, you can find out more details at the Trimley St Martin Primary School website. Any amount would help and be gratefully received.

[Click here to visit the school website, or e-mail the team leaders here.](#)

Release date: 27 February 2008

Rapid shortlisted for Supplier of the Year 2008

Rapid have been shortlisted for the category of "Supplier of the Year: Over £3million annual turnover", at the Education Resources Awards 2008. Rapid won the award in 2007.

Kate Rushworth of Rapid said: 'We are delighted to have been shortlisted again. Rapid have made every effort to build on our success over the last twelve months, in terms of the range of our educational products and the quality of our service to schools, colleges and universities. We are especially proud of our sponsorship activity, which includes the Toyota Technology Challenge and First Lego League.'

'The competition is even stronger this year but we are pleased to have been recognised by the industry once again.' The other shortlisted companies are 2Simple Software, British Thornton - Furniture Specialist, Scholastic, TAG Learning, The Consortium and Uniservity.

Now in their 11th year, The Education Resources Awards highlight the quality and diversity of educational products and resources, excellent educational establishments and the most dedicated members of the teaching profession and supplies industry, all working together to encourage the very best in education.

The ERA Awards take place on the 29th February at the National Motorbike Museum in Birmingham.

Release date: 07 February 2008

More choice than ever in the new Rapid catalogue

The 2008 Rapid catalogue is now available - the biggest and best edition yet!

As one of the UK's leading suppliers of electronic components and electrical products, Rapid are widely respected for the quality and detail of our sales publications. This year is no exception. In fact, because of the growth and success of the company over the last 12 months, the 2008 edition of Rapid's main catalogue offers more choice than ever before.

Featuring our complete range of 50,000 products - 10,000 more than last year - this is your definitive guide to buying from



Rapid.

The catalogue features full product descriptions, specifications and pricing, colour coded sections for easy browsing, detailed delivery and service information, and indices for searching for products by alphabet, Rapid order code and manufacturer's order code.

Also available as a download from the Rapid website, this is the most essential of all Rapid's publications – indispensable for new and established customers alike.

Release date: 01 February 2008

BeGreen – penning a new chapter in recycling



The writing's on the wall for environmentally unfriendly pens and pencils – and Rapid are delighted to be making the point with a complete new range of recycled pens, markers and accessories from Pilot.

The BeGreen range is a huge innovation in the world of writing instruments. Following the ISO 14021 international environmental standard, every product is made from at least 65% recycled material, usually more and for some lines as much as 98%. Helping the environment doesn't have to cost the Earth either – BeGreen products are no more expensive than their unrecycled equivalent.

As one of the leading pen brands in the world, Pilot is committed to reducing raw material consumption. BeGreen pens are manufactured to the same high specification as standard Pilot products, integrating the latest industry technology with high quality recycled plastics.

Rapid offer 44 lines in the BeGreen range – including ballpoint, rollerball and perma-ball pens, refillable pencils, CD and DVD markers, spotlights, erasers and correction tape. Most products are offered in packs of 10, with pens available in a choice of blue, black or red ink. There is sure to be something for you that ticks the boxes of performance, style, comfort – and conservation.

To see the full BeGreen range at Rapid, visit the Office and IT section.

Release date: 09 January 2008

Elektra 07 Student Engineer of the Year



Carol Marsh has grand designs on a brilliant career after winning the Student Engineer of the Year award, sponsored by Rapid, at Elektra 07.

Carol, an EngD Research Engineer at the ISLI, received her award at a recent gala dinner at The Hilton, Park Lane, London, where the electronics industry gathered to celebrate the technical and commercial achievements of individuals and companies throughout Europe.

It was Carol's work on the DesignTag, a machine-readable chip identification system, which made an outstanding impression on the judges.

The judging panel included industry experts and their citation included the following comments: 'Carol is currently in her second year of research and is producing excellent results for both her academic and commercial tutors. Her EngD research primarily relates to the electronic tagging of integrated circuits, IP cores and FPGA designs to detect fraudulent activity and provide reliable product and version identification.'

'She was responsible for the circuit designs for several variants of the DesignTag, which were demonstrated very successfully by her sponsor, Algotronix, at the 2007 Design Automation Conference in San Diego.'

Carol is studying for an Engineering Doctorate at iSLI in Livingston, Scotland. iSLI – the Institute for System Level Integration – is a centre of excellence for postgraduate education within the design and research engineering sector. Carol was presented with her award by the broadcaster Sir Trevor McDonald, with Rapid's Managing Director, Paul Baker, also in attendance.

Visit the Rapid Blog for more from Elektra 07, including video coverage of the event.

Release date: 03 January 2008

EISS course - 6th February 2008

The EISS course is designed help teachers delivering KS4 Electronics courses and Systems and Control.

The course will be taught by Gerry Heather of Setpoint who will be joined by Jim Neale from New Wave Concepts, and the focus will be the new PIC version of Circuit Wizard.

Places are available on a first come first served basis and the cost of the course will be £50.

The venue will be Samuel Whitbread Engineering College in Clifton nr. Shefford - SG17 5QS. Enquiries and bookings to Hayley Bayley - bayleyh@blebp.co.uk or 01525 408082.

Release date: 14 December 2007

Rapid start 2008 at ASE and BETT shows

Rapid will be exhibiting at two major educational shows early in the New Year.

Our first port of call is the ASE Annual Conference at the University of Liverpool from 3-5 January 2008. The Association for Science Education is the UK's largest subject association. ASE promotes excellence in science teaching and learning, and the ASE Conference gives teachers, lecturers and advisers a forum to share knowledge and resources about their subject.

The conference gives Rapid the chance to meet new and established customers, as well as hand out goodie bags and product catalogues. Come and visit us at stand no. C30 and C31.

Then on 9-12 January we head down to London's Olympia for BETT, the world's largest educational technology event and the UK's biggest education show. Last year's BETT attracted over 29,000 visitors and 600 exhibitors, and 2008 promises to be bigger and better than ever. This is where the educational community gather to see the latest technology, practical solutions and new ways to put ICT at the heart of education.

Rapid will be on stand P10, where schools, colleges and universities can learn more about our extensive range of electronics-based educational resources, such as science equipment, optoelectronics components, robotics projects and power supplies.

Click on the following links - ASE and BETT - for more details about the shows and how to order free tickets.

Release date: 07 December 2007

Wide range of consumer electronics now available at Rapid

Rapid customers can now choose from an exciting range of consumer electronics and home entertainment products – and not just because Christmas is coming!

The IT and Electrical & Power sections are now home to some of the world's most popular electrical brands – Apple, Sony, Philips, Toshiba, Fuji, Canon, Epson – featuring new products such as widescreen televisions, MP3 players, digital cameras, multimedia receivers, laptops and computer

Evidence 9

Algotronix - Behind the News

Why it is included

The industry sponsor's record linking the Elektra result with DesignTag development and demonstrations.

The reproduced pages follow.

"The man who reads
nothing at all is better
educated than the man
who reads nothing but
newspapers"

Thomas Jefferson



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Contact: email info@algotronix.com telephone +44 131 556 9242

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News

News

February 2008. Elonics Ltd. Raises \$4M

Algotronix provided technical due diligence to [Braveheart Ventures](#).

Press Coverage:

EETimes: [Elonics Raises £2M in first VC Round](#)

January 2008. Powervation Ltd. Raises \$10M

Algotronix provided technical due diligence to [Scottish Equity Partners](#).

Press Coverage:

EETimes: [Intel Helps Irish Startup Raise \\$10M](#)

December 2007. Algotronix EngD Student wins Elektra Award

Carol Marsh an Algotronix sponsored EngD student working on future developments of the DesignTag technology won the best student category at the European Electronics Industry Awards ceremony in London.

[Compute Scotland story](#)

November 2007. Gigle Semiconductor Raises \$20 Second Round

Algotronix provided technical due diligence to Scottish Equity Partners.

Press Coverage:

Light Reading: [Gigle Takes Home \\$20M](#)

June 2007. Algotronix demonstrates DesignTag at 44th DAC in San Deigo

At its booth at DAC Algotronix demonstrated its DesignTag system successfully detecting five tags within a operating FPGA chip on a Xilinx evaluation board. Each tag was included

within a major IP block within a complex design taken from a Xilinx application note which included a PicoBlaze processor, VGA driver, audio driver and user interface circuits. This demonstrates the feasibility of using DesignTag to quickly determine whether a particular IP core is present within an SoC chip.

[Press Release](#) on Design Reuse website.

[2006 News](#)

[2005 News](#)

[2003-2004 News](#)

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Evidence 10

Women's Engineering Society coverage

Why it is included

Records the award for a women-in-engineering audience and its role-model significance.

The reproduced pages follow.

THE Woman Engineer

Volume 17, Number 19 – Spring 2008

www.wes.org.uk

■ Young Woman Engineer of the Year p6 ■ Karen Burt Award winner p8 ■ Launch of new WES website p3



■ *Sasha Gallagher describes how mentoring helped her rethink her career, see p12*

President's message



The newly elected WES Council met in London on 19

January. WES does not have a permanent meeting place, and recently we have met in different venues ranging from the British Computer Society in Covent Garden (very posh) to the meeting room of Polish Culture Association in Hammersmith.

2008 will be a very busy year for both Council members and all WES volunteers. Standard activities, such as representing WES on the Boards, committees and courts of different national and international organisations, will be supplemented by the initial implementation of the WES' business plan for 2007-2012. That's not bad for an organisation approaching ninety years of age.

In the last issue, I mentioned the forthcoming activities described in the business plan but as spring is just around the corner, I would like to focus on one particular action.

The Bluebell Wood symbolises spring and new beginnings. The vision of thousands of bluebells inspire the launch of WES' new mission for the future. Bluebells and grass co-exist in harmony achieving impact and strength in partnership, as we intend to do in

Continues on page 3

Success for Carol

■ *Below – Carol after receiving her award from Sir Trevor MacDonald; on her right are Paul Baker Director of Rapid Electronics (sponsor of the category) and Richard Wilson, Editor of Electronics Weekly.*

WES Council member Carol Marsh, has won the Elektra Award for Student

Engineer of the Year, beating competition from both undergraduate and postgraduate students across Europe. The Elektra Awards recognise the achievements of individuals and firms across the electronics industry.

"I am very proud to have won this award. It is a great achievement, for the iSLI, my sponsoring company Algotronix and myself. It is fantastic that the Engineering Doctorate qualification has been recognised. I'm especially proud because I am a female who has returned to education after 20 years in industry. I hope that in winning this award it will encourage other engineers to return to education and further their engineering careers," Carol said.

Carol is studying for an Engineering Doctorate (EngD) in system level integration at the Institute for Systems Level Integration (iSLI) based in Livingston. She returned to full-time education after working with Marconi Instruments, BAE Systems and most recently ECS Technology.

Commenting on her decision to undertake the EngD, Carol said: "I was working full-time in a small company, which was struggling during the downturn of the telecommunications market and so we had to go part-time.

"I decided to use the spare time to start an MSc in system level integration. I was really surprised at how easy it was to return to education and how much I enjoyed the MSc.

"The iSLI advertised an engineering doctorate position with the FPGA High Performance Computing Alliance. The candidate was to be sponsored by Dr Tom Kean from Algotronix. I knew about Dr Kean from my previous MSc and since FPGA was my field of expertise, I applied for the position.

"I was attracted to the EngD,



because the research work is done with a company rather than in a university and also because it was a full-time position funded for 40 months, which gave the security my current job was not providing."

Carol has been developing Algotronix' DesignTagTM product, a very small, low power IP core which functions as an 'active' tag for a larger design. This tag enables fraudulent activity to be detected and provides reliable product and version identification. This is ground-breaking research as previous methods of tagging integrated circuits had either been open to abuse or required destructive testing for identification.

Carol has produced circuit designs for several variants of the DesignTagTM which were demonstrated very successfully at the 2007

Design Automation Conference (DAC) in San Diego and at the Cryptographic Hardware and Embedded Systems (CHES) Conference in Vienna. The circuits will be used in Algotronix' commercial products. In addition, Carol has extensively researched cryptography and used this knowledge to enhance Algotronix' Security IP Cores. The circuits she has designed are particularly challenging because they must perform what is essentially an analogue communications function using only digital logic.

Carol is married to Graham and has two sons Ross (16) and Stuart (11). In addition to her WES activities, Carol promotes science and engineering to young people in Scotland in her role as a Science and Engineering Ambassador (SEA).

WES hosts meeting of senior women engineers

One of the proposals in the new WES Business Plan is to hold seminars for technical leaders. The first seminar takes place on 19 March and Dame Ann Dowling will be in the chair.

The speaker will be Deborah

Grubbe from BP. The aim is to have thirty senior women engineers as the audience.

A webinar based on the proceedings will be ready for promotion within a month of it taking place.

Evidence 11

Scottish Schools for a Future newsletter

Why it is included

Shows the award reaching an education and Scottish STEM audience.

The reproduced pages follow.

What is the Student Support Forum for Females About?



Some startling statistics:

- Only 1 in every 3 SET (Science, Engineering and Technology) graduates in 2002 were women
- Between 1991-2001: a higher percentage of men were employed in SET occupations than women
- In 2002: 6% of all female SET graduates were in Engineering and Technology occupations

However, although these statistics paint a rather negative picture, they are always changing, for the better; for example, according to an analysis conducted in 2006 by Experian, a leading information services company, the number of female directors in the UK automotive industry has increased. Furthermore, according to the DTI, Employment of female SET graduates in SET occupations has increased from approximately 49,500 to 81,000 over the period 1992-2002: representing a 64% increase in the number of women compared to a 21% increase in their male counterparts.

Are you a female student in the Faculty of Engineering, Computing and Creative Industries? Are you interested in:

- Meeting other female students
- Finding out about career opportunities
- Getting tips on interviews and work placements
- Taking forward your professional development

Join the SSF4F – send an email with your name and matriculation number to ssf4f@napier.ac.uk

Carol Marsh - Winner of the European Electronics Industry Award 2007



Carol Marsh, a graduate of Napier University was announced as the winner of the Student of the Year in the European Electronic Industry Award 2007. She was judged the most outstanding student in electronics and software in a Europe wide competition open to both undergraduate and post-graduate students.

At the fifth Elektra Awards in December 2007, Carol was awarded The Student Engineering of the Year. The event was held in the Hilton Park Lane Hotel with over 600 guests and other most influential companies in the industry. More details can be found at www.sli-institute.ac.uk

EPSRC Connect 60

Why it is included

National research-council coverage presenting the award as an outcome of the Engineering Doctorate route.

The reproduced pages follow.

EngD student wins European prize

Electronics industry recognition

AN EngD student from the Institute for Systems Level Integration (ISLI) in Livingston, West Lothian, was named 'Student Engineer of the Year' at December's Elektra European Electronics Industry Awards. Carol Marsh was presented with the prize at a gala dinner in London, having triumphed over competition from undergraduate and postgraduate students on courses across Europe.

The EngD is EPSRC's flagship doctoral qualification. It places a significant emphasis on research within an industrial context. Students, known as Research Engineers, combine a research project within a UK sponsoring company with accredited technical and business training.

Carol is currently in her third year of research sponsored by Algotronix Ltd, a UK based supplier of technical diligence on semiconductor companies. Tony Harker, Director and Chief Executive of ISLI said that "Carol's work... has demonstrated that there is a significant role for trained engineers in leading edge commercial research. Most importantly she is a role model for others considering EngD as an alternative option to further tertiary level education and research."

Having recently returned to full time education after 20 years of employment and as an active member of the Women's Engineering Society (WES), Carol said: "I hope that in winning this award it will encourage other people and especially women that it's never too late to return to education."

Contact: Helen Bailey, helen.bailey@epsrc.ac.uk

Further information: www.sli-institute.ac.uk



(Left to right):
Sir Trevor
McDonald, winner
Carol Marsh, Paul
Baker (Director of
Rapid Electronics)
and Richard Wilson
(Editor of
Electronics Weekly).

Final report changes

Narrative not required from April

ALONG with the other Research Councils, EPSRC is developing a new final reporting process. This process will be more efficient and effective in capturing both the short- and longer-term outcomes from the grants we fund. While it is being developed, we are modifying our current final report process in preparation for the change. As a result, from 1 April 2008 onwards we will not require a narrative report when final reports are submitted.

Grant holders will still be required to complete a final report form to provide information on the outcomes of a grant. They will also be required to submit a short statement explaining any significant differences between the planned and actual expenditure on the grant. Neither of these will be sent out for peer review though. We hope these changes will reduce the reporting burden for researchers, enabling them to spend a greater portion of their time and effort carrying out research.

Motivation for this change comes from the recent RCUK Peer Review Efficiency Project, which found that more than 80% of the full economic cost of the final reporting process went into the preparation of the report by the investigators and host organisation. Between them, the Research Councils are expected to make £30m of peer review efficiency gains over the Comprehensive Spending Review period (2008-2011) and the changes being planned for final reporting will make the single largest contribution to this target.

Some final reports are currently in the middle of their assessment. Unless otherwise communicated, these will be peer reviewed and graded to provide the feedback the investigators and research organisations were expecting when they submitted them. Despite not requiring the final report narrative, we are still keen to hear of successes and the impact of our grant funding. The information provided on the report form is evidence essential in analysing the performance of the engineering and physical sciences research community.

Contact: Douglas Niven, douglas.niven@epsrc.ac.uk

Calls

Science and Innovation Awards 2008

Closing date: 22 April 2008

We are inviting outline proposals from Higher Education Institutions (HEIs) for the fifth round of Science and Innovation Awards.

Science and Innovation Awards aim to build new activity in areas of national strategic importance, with a particular focus on supporting new research leaders. The Awards are high value, longer-term grants supporting staff in a research group, requiring a commitment from the host HEIs to continue support after the end of the grant.

This fifth call will have a different approach to previous Science and Innovation Awards. Proposals are being sought in emerging research areas where strategic investment at this time, has significant potential for added value in terms of the UK's future research capacity and international impact.

The number of outline proposals that each organisation can submit is limited to three so please contact your university's research support office if you are interested in applying.

EPSRC is partnered in this call by the Higher Education Funding Council for England, Scottish Funding Council, Department for Employment and Learning, and the Higher Education Funding Council for Wales.

Contact: Philippa Hemmings, philippa.hemmings@epsrc.ac.uk
Samantha Madden, samantha.madden@epsrc.ac.uk

Partnerships for Public Engagement

12th Call for Proposals

Closing date: 8 May 2008

The scheme is designed to enable active researchers to engage with the public, including young people. It aims to communicate the excitement of fundamental and applied research in science and engineering. Awards are aimed at active researchers, in partnership with their research teams and outside specialists or partner organisations that can provide communication expertise.

The objectives of the scheme are to:

- stimulate the public's interest in contemporary research, including work funded by us
- inspire future generations of researchers in engineering and the physical sciences
- encourage public debate about the role of research in society and establish a dialogue between researchers and the public
- build and sustain a community of researchers active in public engagement, including through partnerships, with the necessary expertise.

We are particularly interested in projects that not only increase the public's awareness of science and engineering, but also include some level of dialogue between members of the public and scientists or engineers, where this is appropriate.

Contact: Katherine Miller, katherine.miller@epsrc.ac.uk
Gill Stephens, gill.stephens@epsrc.ac.uk

EPSRC Annual Review 2007/08

Why it is included

Formal annual-report evidence that the achievement was selected as an EPSRC research-training success story.

Also published or preserved as

- EPSRC Article (saved PDF and JPEG copies)

The reproduced pages follow.

A real winner



Even before completing her EngD – EPSRC's flagship doctoral qualification – Carol Marsh, has proved herself to be a real winner. Now a final year student studying for an EngD at the Institute for System Level Integration (ISLI) in Livingston, Scotland and sponsored by Algotronix, Carol won the 2007 Elektra Award for Student Engineer of the Year, in the face of stiff competition from engineering students from all over Europe.

Carol already had an enviable track record. With a Higher National Diploma in Electrical and Electronic Engineering from Napier University, Carol undertook an MSc in Digital Techniques from Heriot Watt University, raised a family and worked as an electronics engineer for 20 years before returning to

full time education.

"I'm enjoying the EngD immensely," she says. "I hope that in winning this award it will encourage other engineers, and especially women, to return to education and further their engineering careers."

Right to left;
Sir Trevor McDonald, winner Carol Marsh, Paul Baker (Director of Rapid Electronics) and Richard Wilson (Editor of Electronics Weekly).

ECONOMIC IMPACT CONTINUED

£45m

£45 million over three years to support activities in partnership with the Technology Strategy Board.

maximise the benefits of research innovations.

For EPSRC, knowledge transfer is an integral feature of all that we support. For example the stimulus for knowledge transfer arises from our portfolio of collaborative research projects which involve over 2000 partnerships with research user organisations from the industrial, business and service sectors. The Economic Impact Study, initiated by RCUK, has shown that this is bearing fruit in some impressive improvements in market impact in the UK and abroad. One example from its analyses of a range of case studies showed that basic polymer research supported by EPSRC had led to direct and indirect impacts amounting to around £200 million in the field of display applications.

The pathway to boosting economic impact is complex. But EPSRC is confident that it can play a distinctive role in helping to raise the appetite of business for research and high-level skills by acting as a catalyst for business-academic interaction. Key ambitions for realising this include:

- Enhanced routes for business/university collaboration for example through increasing levels of collaboration in research and training.
- Responsive postgraduate skills for business and the economy, in particular by promoting collaborative training and ensuring such training is more demand-led.
- Strengthening partnerships to improve knowledge transfer, for example through the development of strategic partnerships with research intensive companies.

By building further the richness and scale of engagement with business, EPSRC will seek to ensure that many more companies and organisations find it natural to interact with the science base. The EPSRC portfolio has many of the tools for such interactions, and universities deploy them well and imaginatively in general. We are making the opportunities for collaboration more visible to UK businesses, and sharing an informed picture of the 'demand side' with the university sector from our engagement with several industrial sectors.

Accelerating wealth creation

The aim of accelerating the commercialisation of research in the UK has been greatly enhanced by the creation of the Technology Strategy Board in 2007. EPSRC has already established a substantial partnership with the Board in co-funding cutting edge technologies with exciting potential for take up by businesses. We plan to allocate funding of at least £45 million over three years to support activities in partnership with the Board. During the year, EPSRC's contribution to the UK Technology Programme was £12 million providing support for themes ranging from lightweight materials and structures to sensors and imaging, and biosciences and healthcare to low carbon energy and oil and gas technologies. Funding of £3.5 million from EPSRC was also agreed for projects proposed in the areas of materials for energy, high value manufacturing and cell therapy.

EPSRC funding mechanisms have been 'joined up' to co-fund major projects with the

Evidence 14

University of Glasgow CTA Review Report

Why it is included

External review evidence citing the pan-European award as a programme achievement.

The reproduced pages follow.

The majority of students who have graduated or anticipate graduating this year (63%) are working within the UK commercial sector, however other destinations include, UK defence sector (17%), Academia (7%), EU Industry (10%) with only 3% still writing up.

Other outputs include the following:

1. **Pan-European Award:** Student engineer of the year awarded to one of the Centre's current research engineers – Carol Marsh (EngD 2005-09)
2. **Publications:** academic papers published over the CTA period have included seven which have received or been short-listed for a best paper award at electronics conferences internationally.

Industrial involvement and collaboration: The funding provided by the CTA has enhanced the Centre's overall engagement with industry and has therefore facilitated and supported complementary project partnerships and further collaboration with 27 of the 42 companies the Centre has worked with since 1999. Furthermore, 50% of the Centre's project partners have been SMEs. This particularly fulfils the University's aim to meet the needs of this key sector and addresses a key objective of our CTA from the outset.

During the course of their studies, EngD REs have frequently developed products and working practices that benefit the companies which co-sponsor their research, something which SMEs particularly value. Many REs ultimately go on to employment with their sponsor. One student who produced circuit designs used by their sponsor company and these demonstrated internationally at the 2007 Design Automation Conference (DAC), San Diego and 2007 Cryptographic Hardware and Embedded Systems (CHES) Conference, Vienna.

Feedback from industrial sponsors indicates that the EngD is increasingly an integral part of their research portfolio, providing a cost effective way of addressing mid-term objectives that can easily be translated into business exploitation. Industrial sponsors are particularly supportive of the business modules provided within the programme. They also appreciate the closer relationships that have built up with the academic community, both in terms of research and technology transfer, and in the way in which they have been able to provide direct input to the University's transferable skills and employability strategies. Examples of feedback from industrial sponsors include:

"We have sponsored 3 EngD REs over the last 5 years. We have found the programme to be extremely valuable, as it allows us the opportunity to guide and direct some forward-looking research in areas that are commercially relevant to us. The support infrastructure provided by the ISLI and partner universities has also been an important factor, and key to the success of each project. We certainly hope to be able to continue our involvement with EngD in the years to come."

Dr David H Crawford, Manager, EPSON Scotland Design Centre, Livingston (large company)

"The EngD program run by ISLI is the best I have encountered that provides research students to industry. The initial grounding in the lecture-based approach of the first year combined with a business element goes along way in creating a rounded engineer – and ensures they bring value with their research. Our first RE published 13 journal and conference papers during the course of their work. We have a second RE in their third year, who is also very successful. This is not just down to Nallatech, but reflects the calibre of student ISLI attracts and is a further important aspect that ISLI brings to the table. In summary, EngD is the right mix for industry to engage with academia to carry out research and certainly a program I recommend whenever I can."

Dr Malachy Devlin, SVP and Chief Technology Officer, Nallatech Limited (medium sized company)

Future plans: The Centre plans to continue to support provision of the EngD in collaboration with its founding HE partners and industry. It plans to seek funding through the call for Doctoral Training Centres in 2008 as part of its continued public sector support. Given the level of support from industry for this route, the Centre plans to raise its minimum annual intake of students from 8 to 10.

The development of relationships with multi-nationals will continue. ARM Ltd has committed to new studentships in October 2008. New strategic partnerships within other UK companies will also be developed, expanding marketing and promotion in electronic clusters in South West England and Cambridge. The EngD Centre looks forward to working with the growing number of EngD Centres throughout the UK and to develop strategic relationships and partnerships that ensure all Centres can work to their maximum capacity.

MSc System Level Integration

Introduction: This MSc has been supported via the CTA in recognition of its direct relevance to the UK economy through the provision of training to address key skills shortages e.g. in analogue design. Furthermore, it forms the core taught element of the EngD. Available in full-time, part-time and distance learning formats the degree supports the key EPSRC interests in electronic design, computing science,

Evidence 15

University of Strathclyde UPDATE

Why it is included

University publication recording the award immediately after the December 2007 ceremony.

The reproduced pages follow.

2007 October Congregations - Graduation Ceremony and Reception

Wednesday 31st October 2007 was a day of celebration in EEE following the Faculty of Engineering's Graduation Ceremony.

Held in the University's Barony Hall, the Ceremony saw five PhDs, forty-seven MSc and five BEng students from the Department awarded their degrees. Afterwards, to mark their success, EEE hosted a reception to celebrate with the graduates', their families and friends, many of whom had travelled from overseas to attend. The reception was the culmination of a demanding but rewarding study period for all the students and EEE wishes each of them, every success in their chosen careers.



EEE Graduates

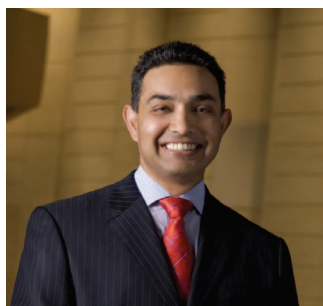
New Visiting Professor in ICSP

The Institute of Communications and Signal Processing is pleased to announce the appointment of **Dr Sanjay Jha** as Visiting Professor. Dr Jha is, Chief Operating Officer of QUALCOMM and President of QUALCOMM CDMA Technologies (QCT). QCT, the Chipset and Software Division of QUALCOMM Incorporated.

Dr Jha has led and overseen the development of five generations of modem and cell chip sets, both digital baseband and RF (radio frequency) and system software.



Qualcomm is a leader in developing and delivering innovative wireless communications products and services based on CDMA digital technology.



Dr Jha holds a PhD in Electronic and Electrical Engineering from the University of Strathclyde. He received his Bachelor of Science degree in Engineering from the University of Liverpool.

<http://www.qualcomm.com>



EngD Student wins Award

Carol March, has won the "Student Engineer of the Year Award", sponsored by Rapid Electronics, at the **Elektra European Electronics Industry Awards 2007** ceremony held in London on 12 December 2007. Now in their fifth year, the Elektra Awards are the most prestigious product technology and business awards in Europe, and recognise the achievements of individuals and firms across the European Electronics industry.



l-r: Sir Trevor McDonald, Carol Marsh, Paul Baker, Director of Rapid Electronics, and Richard Wilson, Editor of Electronics Weekly

Carol, who is currently working within the Institute for Communications and Signal Processing with Professor John Soraghan, is an EngD research engineer at the Institute for System Level Integration, and is sponsored by Algotronix.

iSLI Annual Review 2008

Why it is included

Programme-level record connecting the award to Carol's research and the Institute's outcomes.

Also published or preserved as

- iSLI MSc News 01/08
- iSLI 2008 - 10th Anniversary

The reproduced pages follow.



Throughout 2007/08, the EngD Centre has continued its mission to facilitate research in complex electronic systems design. With a presence in key clusters across the UK and a clear policy of engagement with industry, the Centre has continued to support challenging research in real-world applications - from improving core technologies to next generation product development. I hope you will enjoy reading about the Centre's achievements, and welcome your comments about the programme.

Sian Williams
EngD Centre Manager

In September 2007 RE Carol Marsh won the Elektra Award for Student Engineer of the Year, beating off competition from both undergraduate and postgraduate students attending academic institutions all over Europe. Now in its fifth year, the Elektra Awards are the most prestigious product technology and business awards in Europe. They recognise the achievements of individuals and firms throughout the Electronics industry. Carol is studying for an Engineering Doctorate (EngD) in System Level Integration and is currently in her fourth year of research.

PROJECTS - APPLICATION DRIVEN RESEARCH & TRANSITIONAL CHANGE

Throughout 2007 the projects offered on the EngD program have seen a significant change. The projects now cover a wide range of application areas which has broadened the scope of research that the EngD now supports.

The EngD has embraced the use of emerging technologies including mixed-mode hardware/software and mechanical design techniques and has developed a major focus of supporting applications-driven research – in addition to its continuing support for core electronics in the design market.

TRAINING CHANGES TO THE ENGD PROGRAMME

To continue to ensure that the EngD programme remains fresh, marketable, and appealing to both EngD students and sponsoring companies, the EngD Centre has introduced



some training changes to the programme.

The taught elements of the programme have been expanded to support new multi-disciplinary research challenges and have been tailored to industry. REs can now, with prior approval, access the EngD programme using credits via MSc modules from our partner universities, or via external learning at other UK universities. The iSLI EngD Centre is working with Heriot-Watt University business school to adapt MBA modules to introduce technology-based case studies to reflect complementary industry/commercial sensitivities of our industry partners.



NEWS HIGHLIGHT |

iSLI Research Engineer Waqar Nabi won "Best paper in category" at the International Conference on Computer, Control and Communication held in November 2007 in Karachi, Pakistan

STRATEGIC PROGRAMME INITIATIVE INVOLVEMENT

(FHPCA) FPGA High Performance Computing Alliance is developing high-performance computing solutions using Field Programmable Gate Arrays (FPGAs) to deliver new levels of performance into the technical computing market. Up to six fully-funded EngD places are offered by FHPCA to companies of any size involved or interested in FPGA research, subject to certain qualifying conditions. Funding is provided by EPSRC and Scottish Enterprise.

Projects in place through the FPGA alliance include Codeplay, Blue Flow and Algotronix with potential projects being set up with Selex and Xilinx. Negotiations are currently in place for a final project.

EPSRC REVIEW (JAN-MARCH 2007)

The aim of the EPSRC review was to assess the balance and quality of training, and delivery of EngD programmes against EPSRC set scheme objectives.

The following areas were highlighted in the review as major strengths for the iSLI EngD Centre included: the high level of SME involvement, engagements of companies and universities, students joining the programme with more than 10 years of industry experience, and the proactive development and marketing of the centre.



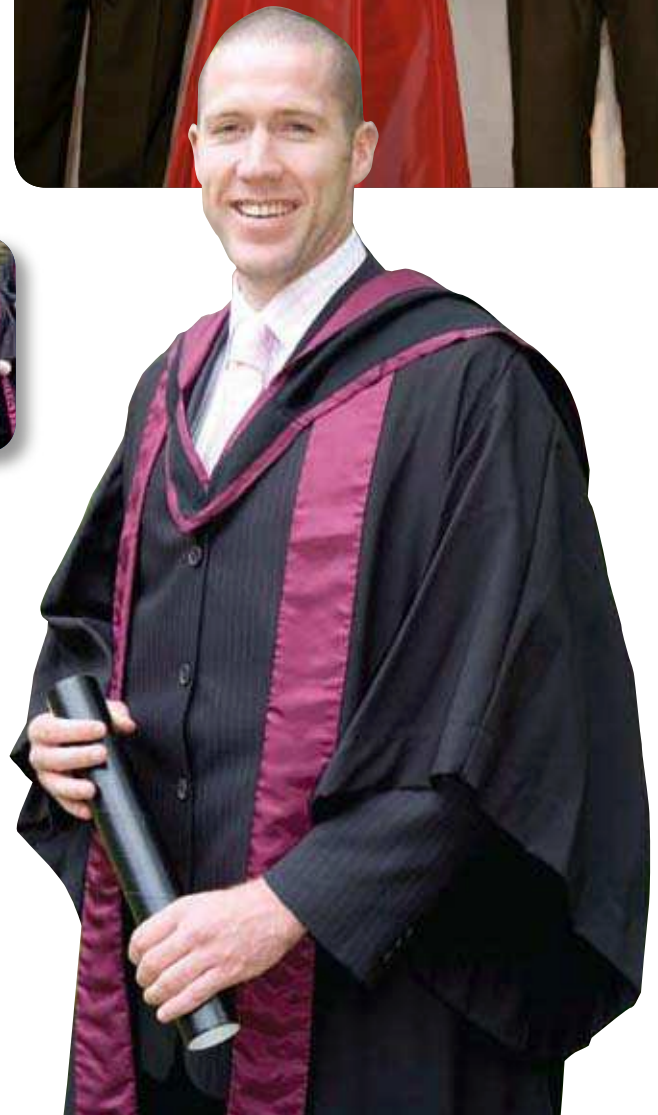
NEWS HIGHLIGHT |

The single biggest group of graduating EngD students to Date
July 2007 – 7 Research Engineers



“ The experience of my EngD was second to none. During my taught credits in my first year at the Institute I had access to the latest tools and software which gave me a solid base then to move into my company research. Having finished the EngD for the ISLI in 2005 I am still with my sponsoring company. I am also still at the cutting edge of technology as we work to carve out a market in Reconfigurable High Performance Computing.”

Daniel Denning, Nallatech



Selected EngD research engineer and staff published papers for 2007

Nabi, SW; Wells, CC; Vanderbauwhede, W

"Towards a Reconfigurable SoC for Wireless MACs in Consumer Handheld Devices"

First International Conference on Computer, Control and Communication, pp. 182-191, 12-13 November 2007, Karachi, Pakistan

Renshaw, D; Stewart, G; Riley, M

"A novel motion estimation power reduction technique"

17th International Conference on Field Programmable Logic and Applications (FPL 2007), 27-29 August 2007, Amsterdam, Netherlands

Wirthlin, M; Poznanovic, D; Sundararajan; Coppola, A; Pellerin, D; Najjar, W; Bruce, R; Babst, M; Pritchard, O; Palazzari, P; Kuzmanov, G

"An elementary transcendental function core library for reconfigurable computing"

Reconfigurable Systems Summer Institute (RSSI 2007), 17-20 July 2007, Illinois USA

Wirthlin, M; Poznanovic, D; Sundararajan; Coppola, A; Pellerin, D; Najjar, W; Bruce, R; Babst, M; Pritchard, O; Palazzari, P; Kuzmanov, G

"OpenFPGA CoreLib core library interoperability effort"

Reconfigurable Systems Summer Institute (RSSI 2007), 17-20 July 2007, Illinois USA

Anas, M; Cumming, DRS

"Fast internal combustion engine knock processing algorithm using an automotive PowerPC system-on-a-chip"

IEEE Transactions on Vehicular Technology [accepted for publication in 2007]

Bruce R; Devlin M; Marshall S; Ruet C

"Minimum Entropy Restoration Using FPGAs and High-Level Techniques"

EUSIPCO 2007, Full Paper & Oral Presentation, September 3-7 2007, Poznań, Poland

Chamberlain R; Genest G; Bruce R

"Programming an FPGA-based Super Computer Using a C-to-VHDL Compiler: DIME-C"

AHS2007 Special Session on High-Performance Reconfigurable Computing, August 5th-8th 2007, Edinburgh, UK

Nabi SW; Wells, CC; Vanderbauwhede, W

"A Dynamically Reconfigurable System-on-Chip for Implementing Wireless MACs"

IEEE 3rd Conference on PhD Research in Microelectronics and Electronics, July 2-5, 2007, Bordeaux, France

Morgan, P; Taylor, R

"ASIP Instruction Encoding for Energy and Area Reduction"

44th Design Automation Conference, June 4-8th 2007, San Diego, California

Marsh, C; McLaren, D

"A System for Detecting the Presence of Misused IP within ICs", Poster

44th Design Automation Conference, June 4th 2007, San Diego, California

Marsh, C; McLaren, D

"Introducing DesignTag and Thermal Side Channels", Slide Presentation

44th Design Automation Conference, June 4th 2007, San Diego, California

R. Hassan; A. Harris; N. Topham; A. Efthymiou

"Synthetic Trace-Driven Simulation of Cache Memory"

IEEE International Symposium on Embedded Computing (SEC 2007), 21-23 May, Niagara Falls, Canada

Bruce, Robin

"Developing Applications for Nallatech HPC Platforms"

Xilinx Virtex Platform Newsletter, April 2007

Nazish Aslam, Mark Milward, Ioannis Nousias, Tughrul Arslan, Ahmet Erdogan

"Code Compressor and Decompressor for Ultra Large Instruction Width Coarse-Grain Reconfigurable Systems"

IEEE Symposium on Field-Programmable Custom Computing Machines April 23 - April 25, 2007
Napa Valley, California

Aslam, N; Arslan, T; Erdogan, A

"Algorithmic level design space exploration tool for creation of highly optimized synthesizable circuits"

IEEE International Conference in Acoustics, Speech, and Signal Processing (ICASSP 2007), 15-20 April 2007, Honolulu, Hawaii, USA

Bruce R; Devlin M; Marshall S; Ruet C

"Restoration of Star-Field Images Using High-Level Languages and Core Libraries"

Manchester Reconfigurable Supercomputing Conference (MRSC), 28th/29th March 2007, 28th/29th March 2007

Aslam, N; Milward, M; Nousias, I; Arslan, T; Erdogan, A

"Code compression and decompression for instruction cell based reconfigurable systems"

IEEE Computer Society 14th Reconfigurable Architectures Workshop (RAW 2007), 27-28 March 2007, Long Beach, CA, USA

R. Hassan; A. Harris; N. Topham; A. Efthymiou

"A Hybrid Markov Model for Accurate Memory Reference Generation"

IAENG International MultiConference of Engineers and Computer Scientists (IMECS 2007), 21-23 March, Hong Kong

S. Alexander, E. Pfann, R. Stewart

"An improved algorithm for assessing the overall quantisation error in FPGA based CORDIC systems computing a vector magnitude."

Microprocessors and Microsystems, Volume 31, Issue 2, Pages 87-93. 5 March, 2007

Ahmed, I.; Arslan, T.

VLSI Design of Multi Standard Turbo Decoder for 3G and Beyond

The 12th Asia and South Pacific Design Automation Conference" (ASP-DAC2007)
Japan: Jan 23-26, 2007

Marsh, C; Kean, T

"A Security Tagging Scheme for ASIC Designs and Intellectual Property Cores"

Design & Reuse, 29 Jan 2007

House of Commons engineering-skills discussion

Why it is included

Evidence of impact beyond publicity: the award led to participation in a House of Commons discussion about engineering skills and attracting young people.

Also published or preserved as

- Global SMT & Packaging - Event Held at the House of Commons

The reproduced pages follow.

electronicswweekly.com

Friday 5 September 2008

Business

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Business

MPs discuss engineering skills with award-winning student

by **Richard Wilson**

Wednesday 30 July 2008

Carol Marsh, a student from the Institute for System Level Integration (iSLI) who won the **Elektra Award** for Student Engineer of the Year in 2007 was invited to the House of Commons to join a discussion on the future of engineering in this country.

At the event earlier this month, MPs, engineering students and representatives from the Engineering and Physical Sciences Research Council (EPSRC) debated about the future of engineering and the need for highly skilled engineering students.

"This event focused on the importance of engineers to the UK economy, and ways to promote engineering to young people," said Carol Marsh, who is studying for an Engineering Doctorate (EngD) in System Level Integration at the **iSLI**.

As part of this, the government-backed 'Engineering the Future' initiative aims to introduce technology into mainstream science lessons for pupils attending primary and secondary schools.

At the heart of the matter is the problem companies still experience recruiting engineers with the necessary key skills. The MPs heard how companies are now working with universities to shape future engineering courses to ensure that students graduate with skills-sets that are relevant to industry.

Marsh is currently in her fourth year of her research, which is sponsored by Algotronix.

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