

# COMPUTING AT SCHOOL

EDUCATE · ENGAGE · ENCOURAGE

## 3RD CONFERENCE FOR TEACHERS 2011

UNIVERSITY OF BIRMINGHAM 24 JUNE 2011



Microsoft  
**Research**

**Google**<sup>™</sup>

**CPHC**  
The Council of Professors  
and Heads of Computing



UNIVERSITY OF  
**BIRMINGHAM**

## Achim Jung University of Birmingham



It gives me great pleasure to welcome back the Computing at School annual conference to the University of Birmingham. The concerns that led to the CAS initiative, that is, the downgrading of an intellectually exciting and economically important discipline to mere IT training, affect Higher Education just as much as they do schools and colleges.

From the beginning it has been a remarkable feature of CAS to attempt to resolve these issues through a wide coalition of stakeholders, from school teachers and university lecturers to exam boards, professional bodies and industry. Our contribution to this concerted effort in organising the first two conferences was rewarded with inspirational talks and workshops, and real excitement among the participants.

I wish this year's event the same success and hope that it, too, will prove worthwhile to all participants and beneficial to the aims of CAS.

## Simon Peyton Jones Computing at School



Welcome to the Computing at School Teachers Conference 2011! From its initial beginning as a group of individuals with a common concern to convey the excitement of computing to our young people, CAS has now grown into a vibrant organisation with hundreds of members, and real national impact.

As school teachers, you are the sharp end of the CAS endeavour. It is on your enthusiasm, expertise, and sheer hard work that the

entire enterprise depends. I hope that this conference will give you lots of new ideas, new friendships, and new energy to inspire your thinking and teaching.

As well as the incredible buzz of CAS teachers sharing information and ideas about teaching computing at school, the last twelve months has seen a great deal of activity at the policy level. Notably:

- We have developed model curriculum for computing as a school subject; it is the subject of a plenary session at the conference.
- The Royal Society investigation of Computing in Schools has got under way. Bill Mitchell, Simon Humphreys, John Woollard, and I are all members of the panel. The report is due late in 2011.
- The Commons Select Committee on Education ran an enquiry into the English Baccalaureate; we made a submission.
- The Department for Education started a Review of the National Curriculum; we have made a submission and are trying to engage constructively with the DfE in any way we can.

It's an exciting time. But in the end, it all comes down to what you do in the classroom. Please keep innovating in what you teach, pooling your insights, collaborating to solve problems, and sharing your enthusiasm.

**Individually we are powerless. Together we can change the world.**

*Special thanks to Achim Jung, Sarah Collins and the University of Birmingham for their kind support and providing this excellent venue and to Lyndsay Hope, Karen Manning and Claire Davenport for their help with the conference programme and exhibition.*

# Future of computing

The Computing at School Working Group (CAS) is a grass roots organisation, whose energy, creativity, and leadership comes from its members. CAS is a collaborative partner with the BCS through the BCS Academy of Computing, and has formal support from other industry partners. Membership is open to everyone, and is very broad, including teachers, parents, governors, exam boards, industry, professional societies, and universities.

## The challenge

Computing in recent decades has transformed the way we communicate, work and play. It has also inspired new ways of thinking which have had influence in fields as diverse as biology, mathematics and philosophy. Yet most people are unaware how broad and exciting the field of computing is. Its full potential can only be realised by working with concepts, theories and challenges with creativity and ingenuity.

## Our mission

CAS aims to support and promote this vision of computing in UK schools, by providing opportunities and resources to help all educators and learners to better understand, use and develop computing in a variety of activities and fields.

## Events

In addition to the annual teacher conference, CAS also hosts a series of events throughout the year. Details of these activities appear on the website.

- Regional hubs – where teachers and lecturers can share their ideas for developing the teaching of computing in their schools, their classrooms and their community.
- Sixth form conferences – a series of one-day conferences aimed at sixth form students (and interested Year 11s) that are highly informative, engaging and enjoyable, with links to topics from the A Level curriculum.
- CPD courses – a number of training days and other courses to support your career development needs.

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

Or email: [info@computingatschool.org.uk](mailto:info@computingatschool.org.uk)



# PROGRAMME SCHEDULE (subject to change until the last moment)

TIME	ROOM	FORMAT*	TITLE	SPEAKER(S)
8:45	Registration	Atrium		
9:15	Plenary	G31	Welcome	Steve Furber
9:30	Keynote	G31	Creativity is for Everybody	Karen Brennan
10:20	Plenary	G31	Computing in the Classroom	Simon Peyton Jones
10:40	Break	Atrium		
<b>11:00 Workshops and Seminars</b>				
	LG33	S02	Brains and Computers	Steve Furber
	LG34	W04	Getting started with Scratch	Karen Brennan
	LG56	W06	Digital Schoolhouse	Mark Dorling
	LG52	W11	Alan Turing Centennial: The Legacy of a Computer Scientist	Huma Shah, Faron Moller
	LG53	F04	Computing – a new curriculum?	Cynthia Selby, Stephen Hunt
	UG05	W12	Activating Pupils: CS Inside and CS Unplugged	Quintin Cutts
	LG32	F02	GCSE Forum	Darren Travi
<b>11:50 Workshops and Seminars</b>				
	LG33	S01	Teaching Programming	Quintin Cutts
	UG05	W02	Programming with Greenfoot and Kinect	Neil Brown, Michael Kölling
	LG34	W05	Using Scratch Sensor Boards	Margaret Low
	LG56	W09	Apps For Good	Debbie Forster
	UG06	W13	cs4fn	Peter McOwan
	LG53	W10	Careers in Computing	Andrew Tuson
	UG04	T01	Teacher Trainees	John Woollard
	LG32	F03	CPD Forum	Simon Humphreys
12:40	Lunch	Atrium		
	Library		Exhibition	
	Atrium		Poster Display	
<b>13:40 Workshops and Seminars</b>				
	LG33	S03	Modelling with Constructivist Computing	Steve Russ, Meurig Beynon
	LG34	W04	Getting started with Scratch	Karen Brennan
	LG53	F04	Computing – a new curriculum?	Cynthia Selby, Stephen Hunt
	UG06	W07	High Engagement KODUing – for beginners, by beginners	Tim Meek, Russ Payne
	LG52	W15	Google ApplInventor	Dale Jones
	UG05	W12	Activating Pupils: CS Inside and CS Unplugged	Quintin Cutts
	LG56	W09	Apps For Good	Debbie Forster
	UG06	W14	'IT's boring and I'm not a geek'	Reena Pau
<b>14:30 Workshops and Seminars</b>				
	LG33	S04	Algorithms + Data Structures = Programs	Richard Millwood
	LG56	W03	How to Hack the Web	Anna Debenham
	LG34	W05	Using Scratch Sensor Boards	Margaret Low
	LG52	W08	YOUSRC	Paul Clarke
	UG05	W02	Programming with Greenfoot and Kinect	Neil Brown, Michael Kölling
	UG06	W13	cs4fn	Peter McOwan
	LG53	W15	Google ApplInventor	Dale Jones
	LG32	F01	A Level Forum	Sue Sentance
15:20	Break	Atrium		
15:45	Plenary	G31	Logic and Computing Science	Tony Hoare
16:30	Plenary	G31	From Real-Life to the Classroom	Doug Aberdeen
17:15		G31	Closing Remarks	Simon Peyton Jones
17:30		G31	Close	

\*S = seminar, W = workshop, F = forum, T = teacher trainees

## CREATIVITY IS FOR EVERYBODY

Room G31 at 9:30

Complex problems require creative solutions – but how do people learn to think and act creatively? In this presentation, I will share the work that we are doing in the Lifelong Kindergarten research group at the MIT Media Lab to design technologies and environments that enable everybody (particularly young people) to develop as creative thinkers.

I will focus on our experiences of designing Scratch (<http://scratch.mit.edu>), a programming environment that makes it easy for young people to create and share their own interactive stories, games, simulations, and art.

**Karen Brennan**  
PhD candidate at the MIT Media Lab and a member of the Scratch Team

Karen's research is primarily concerned with the ways in which learning communities support computational creators. More concretely, her work focuses on Scratch and the Scratch educator community, studying how participation in the Scratch online community and how professional development for educators can support young people as creators of computational media.



## FROM REAL-LIFE TO THE CLASSROOM

Room G31 at 16:30

Much of the ICT world is geared towards doing things faster, cheaper and at unimaginable scales. But occasionally a technology comes along that dramatically changes the world and the way we think about it. Examples include encryption, Google search, and Hawk-Eye sports technology.

This talk will demonstrate, by example, how these technologies, and the stories behind them, can be used to educate and motivate secondary students.

**Doug Aberdeen**  
Staff Engineer, Google Zurich

Doug works for Google Zürich as a Software Engineer, working on Gmail's spam and abuse detection algorithms and, more recently, the Gmail Priority Inbox. Before that he was a Computer Science post-doc with a sideline in K12 outreach.



Doug has presented and demonstrated some of the greatest accomplishments in computing to hundreds of high-school students around Australia. In 2006 he was presented with a Young Tall Poppy award for achievements in Science and Science Outreach in Australia and still takes every opportunity to motivate students to study computing.

## LOGIC AND COMPUTING SCIENCE

Room G31 at 15:45

Many of the fundamental ideas of Computer Science have been invented, explored and discussed by leading philosophers and logicians, long before computers were invented (by logicians, of course).

This session starts with the ancient Greek philosopher Aristotle, father of logic, biology, and many other branches of science. He defined the validity of logical reasoning in the same way that we now define the execution of a program by computer – in terms only of the grammatical form of the individual steps, and independent of the subject matter. That is what makes both computers and logic into general-purpose tools.

The early Greek mathematician Euclid applied logical reasoning to the practice of geometry (land measurement). He invented the world's first programming language, similar to graphical languages of the present day, and he used it to prove the correctness of many useful programs. Later contributors include St. Thomas Aquinas, William of Ockham, Leibnitz, George Boole, and of course Alan Turing.

Here, some of their ideas will be explained along with their relevance to computing of the present day.

**Tony Hoare**  
Principal Researcher at Microsoft Research, Cambridge

Tony Hoare studied Latin and Greek at school, and philosophy as well at Oxford University. He is the inventor of the Quicksort method of sorting. He became a computer programmer in 1960, working for a small British computer manufacturer. In 1968, he moved to academic life as a professor at the Queen's University, Belfast, and concentrated his research on the application of logic to computer programming. On retirement from University in 1999, he continued his research in Cambridge at Microsoft Research Ltd.



## SPEAKERS

### COMPUTING IN THE CLASSROOM

Room G31 at 10:20

If we want Computing at School, we should say what “computing” actually is. A group of us has been beavering away doing just that, and in this session I’ll give a brief summary of the curriculum we’ve produced.

The next step is to develop classroom resources to help deliver such a curriculum, and that’s where you come in!

**Simon Peyton Jones**  
Principal Researcher,  
Microsoft’s Research Lab, Cambridge

Simon is also Chair of the Computing at School Working Group, and is passionately committed to improving computing education in UK schools.



(S) – SEMINAR  
(W) – WORKSHOP  
(F) – FORUM  
(T) – FOR TEACHER TRAINEES

### BRAINS AND COMPUTERS (S)

Room LG33 at 11:00

Computers and brains are both information processing systems, but they work on very different principles. Computers have progressed very rapidly since the Manchester “Baby” ran the world’s first program in June 1948, but there are limits to how long this rapid progress can continue as we approach physical limits.

Perhaps there are things we could learn from the brain that might enable us to improve the capabilities of computers, if only we knew how brains actually work?

**Steve Furber**  
ICL Professor of Computer Engineering at the  
University of Manchester

In the 1980s Steve helped design the BBC Micro and the first ARM microprocessors (descendants of which are in most mobile phones, iPads, etc today). He is currently leading research into massively-parallel computers for brain modelling. He Chairs the Advisory Group to the Royal Society study into computing in schools which is due to report later this year.



## WORKSHOPS AND SEMINARS

### GETTING STARTED WITH SCRATCH (W)

Room LG34 at 11:00 and 13:40

With Scratch (<http://scratch.mit.edu>), students can program their own interactive stories, games, animations, and simulations – and share their creations online.

The Scratch website has become a vibrant online community, with student sharing, discussing, and remixing projects. In the process, students learn to think creatively, reason systematically, and work collaboratively, while also learning important mathematical and computational concepts.

In this workshop, we’ll work through a set of introductory hands-on activities, and discuss strategies for integrating Scratch into classroom practice. Please bring a laptop with the latest version of Scratch installed (available free at [http://info.scratch.mit.edu/Scratch\\_1.4\\_Download](http://info.scratch.mit.edu/Scratch_1.4_Download)).

**Karen Brennan**  
PhD candidate at the MIT  
Media Lab and a member  
of the Scratch Team



*More information about Karen is on page 6.*

### DIGITAL SCHOOLHOUSE (W)

Room LG56 at 11:00

#### Transitional Challenges

“What and how do I teach my Year 7s?”

This workshop provides an opportunity to answer your questions and give practical advice on creative and integrated lesson planning, kinaesthetic learning activities, and use of technology to enhance pedagogy.

Secondary teachers will also gain a valuable insight into primary ICT (Computing) curriculum to help your department overcome the (Key Stage 2/3) transitional challenges. Mark will also share some of the secrets behind the successful Digital Schoolhouse model operating at Langley Grammar School.

**Mark Dorling**  
Specialist School Link Teacher,  
Langley Grammar School,  
Langley, Berkshire



Mark is a primary-trained teacher with secondary teaching and industry experience. He has taught in both all-ability and selective schools. Mark joined Langley Grammar School in 2008 to establish and lead a cross phase (Key Stage 2/3) transition project called the Digital Schoolhouse which has worked with over 50 primary schools.

Mark regularly coordinates a cluster group of primary and SEN schools, is a guest lecturer on the postgraduate programme (primary) at Brunel University and delivers in-house training sessions on his areas of interest and expertise.

### YOUSRC (W)

Room LG52 at 14:30

#### First steps in coding – learning to write apps for the web and Android

YOUSRC (“you source” [www.yousrc.com](http://www.yousrc.com)) is a free web-based online environment where students can learn how to code.

Using a simple programming language YOUSRC is a simple first step into programming real code, and a bridge for students from visual coding environments like Scratch towards more complex languages such as C or Java. YOUSRC apps run on a web browser and, unchanged, on Android mobile devices.

YOUSRC is child-safe and family-friendly. Teachers are given “teacher privileges” on the site so they can register their own students and monitor the apps they write and the sound or image assets they use in their apps. Plenty of examples and tutorials on the site help students get started. Apps can also be embedded in your school’s website to showcase work to the outside world.

At the workshop Paul will demonstrate how easy it is to get started writing apps with YOUSRC, and will outline a YOUSRC programming competition running to the end of October 2011 with two prizes each worth £500 to the winning schools.

**Paul Clarke**  
CAS member, YOUSRC



Paul started writing code before he was ten years old. Pursuing a technical and then managerial career through Phillips, Cap Gemini, and Hewlett Packard, Paul now runs his own IT consultancy.

Paul has had a varied career where he has designed hardware and software, written and published games, delivered a number of high-profile IT projects and programmes, and run multi-million pound IT services businesses. YOUSRC is Paul’s way of giving something back to the next generation – hoping to make the current generation of app consumers into app creators!

### ACTIVATING PUPILS: CS INSIDE AND CS UNPLUGGED (W)

Room UG05 at 11:00 and 13:40

CS Inside and CS Unplugged are two international projects that aim to bring computing science alive without the need to use programming to do so. They use a range of active and often kinaesthetic learning techniques to open pupils’ eyes to the computing that is all around them. The format is a range of roughly lesson-length workshops that can be led by school teachers, university teachers and students, and science communicators.

In this workshop, I’ll talk about the context and design of the workshops briefly and then we’ll work through a few of them to really see how they work. The aim is that you could walk into your classroom the next day and present them with (almost!) no further preparation!

**Quintin Cutts**  
Senior Lecturer in Computing Science at the University of Glasgow



As a lecturer, Quintin has striven to increase the engagement of students with the subject at hand.

He has taken part in both multi-institutional and multi-disciplinary teaching and learning research projects, investigating the learning of computer science in a range of contexts. He has been involved in public understanding of Computer Science for a number of years, having held the major EPSRC public engagement project, CS Inside.

### COMPUTING – A NEW CURRICULUM? (F)

Room LG53 at 11:00 and 13:40

Have you ever had one of those lessons where the pupils’ mouths dropped open in amazement? Have you ever left a classroom, walking on pillows of soft white clouds, with a smile on your face because of the light bulbs shining above the pupils’ heads?

We’re hoping to find teachers who have had these experiences and are willing to share them. We’d also like to hear from those teachers who are eager to start teaching Computing concepts in their own classrooms.

This forum is intended to provide the groundwork for moving the CAS Computing Curriculum for Schools from paper into the classroom. In order to prepare for this, we need the help and contributions of many

people with different skills, aptitudes, and resources.

So, come and share your thoughts, approaches, resources, and expertise.

For more information, to join our group, to contribute resources, or just to share ideas with a chat, contact Cynthia ([c.selby@soton.ac.uk](mailto:c.selby@soton.ac.uk)) or Stephen ([s.p.hunt@herts.ac.uk](mailto:s.p.hunt@herts.ac.uk)).

#### Speaker(s):

Stephen Hunt, School of Computer Science, University of Hertfordshire.  
Cynthia Selby, Teacher, Bay House School and Sixth Form College; Doctoral student (Education), University of Southampton

### GCSE FORUM (F)

Room LG32 at 11:00

This is a forum session for any teachers currently teaching, or planning to teach, the GCSE Computing offered by OCR.

Darren, Peter and Mark have been teaching this course this year and have developed a number of resources that they will share including using BYOB, VBA. They will also discuss different aspects of the course, for example programming assessments using 'Little Man Computer' and Javascript.

There will be plenty of opportunity to ask questions, it is a forum after all, and to

discuss with colleagues different approaches and resources that have been used to deliver this new course.

*Come and find out more!*

#### Speaker(s):

Darren Travi (Royal Grammar School, High Wycombe), Peter Marshman (Park House School, Newbury), Mark Clarkson (Egglescliffe School, Teesside)

### TEACHING PROGRAMMING: TOO MUCH DOING, NOT ENOUGH UNDERSTANDING (S)

Room LG33 at 11:50

Most programming courses use a student's demonstrated ability to create working programs as an assertion that the student understands those programs and the underpinning computational concepts. Most teachers, when pushed, will admit that this is not a reliable assertion. Yet doing still regularly trumps understanding.

Quintin will present a radically revised course design that places understanding, not doing, at the heart of the instructional design. He will report on feedback from around 1,000 novice programming students who have taken the course and report significant attitudinal changes regarding their role as a learner.

With a strong nod to Pappert, Quintin will close by speculating on how a course of this style should underpin all computing courses and be a general requirement for all students. He also invites teachers to explore with him the possibility of piloting this course in their own school.

**Quintin Cutts**  
Senior Lecturer in Computing Science at the University of Glasgow

*More information about Quintin is on page 11.*

### PROGRAMMING WITH GREENFOOT AND KINECT (W)

Room UG04 at 11:50 and 14:30

The Kinect is a motion and body tracking sensor developed by Microsoft for the Xbox games console – but it can also be connected to a PC using a standard USB connection. Greenfoot is an easy-to-use educational Java development environment aimed at school level.

This workshop shows how to combine Greenfoot and the Kinect to create fascinating, motivating games/activities that are controlled by the human body quickly and easily. A demo of what is possible is here: [www.greenfoot.org/doc/kinect/](http://www.greenfoot.org/doc/kinect/) This new mode of interaction with the computer has the potential to engage students who

are uninterested in traditional keyboard-based games. The link to Greenfoot provides an easy way for students to interact with an impressive device at the forefront of technology.

Through programming with Greenfoot and Kinect, students can learn general programming principles in an engaging context. The material and examples are appropriate for use in KS4 and up.

**See also:**

<http://www.greenfoot.org/>  
<http://greenroom.greenfoot.org/>

**Michael Kölling**  
Professor at the School of Computing, University of Kent, in Canterbury



Michael holds a PhD in computer science from Sydney University, and has worked in Australia, Denmark and the UK. Michael's research interests are in the areas of object-oriented systems, programming languages, software tools, computing education and HCI.

He has published numerous papers on object-orientation and computing education topics and is the author of two Java textbooks. Michael is the lead developer of BlueJ and Greenfoot, two educational programming environments.

**Neil Brown**  
Research Assistant at the School of Computing, University of Kent



Neil recently completed his PhD in computer science at the University of Kent. He has worked in several different areas of research, including concurrency, machine learning, functional programming and computing education. Neil currently works on the BlueJ and Greenfoot educational programming environments, and was responsible for developing the interface between Greenfoot and the Microsoft Kinect.

### USING SCRATCH SENSOR BOARDS (W)

Room LG34 at 11:50 and 14:30

This workshop gives a practical introduction to using scratch sensor boards (Picoboard) via a tutorial that could be used in a classroom session. The sensor board allows Scratch projects to sense and respond to events in the real world. This form of interaction is common in much of the high-tech equipment used by children, but with the sensor board they have an opportunity to understand some aspects of these how these devices work and create their own interactions.

The workshop looks at the creative possibilities opened up by use of the built in sensors on the scratchboard (light, sound, a button press, and a slider), and also considers some of the other sensors can be added in, to enhance the learning possibilities. Development of this workshop has been generously funded by the National HE STEM Programme (Engineering) as part of the Encouraging Young Engineers Project.

To participate in this workshop you will need a computer with these two items installed:

**Scratch, download:** <http://scratch.mit.edu>

**ScratchBoard driver, download USB version:** <http://www.picocricket.com/picoboardsetupUSB.html>

**Margaret Low**  
Senior Teaching Fellow in WMG  
(Warwick Manufacturing Group),  
University of Warwick



Margaret has over 25 years experience in teaching software development and the design, development and implementation of engineering applications.

As a STEM Ambassador she setup the Technology Volunteers, where students run scratch workshops in local schools, amongst other activities ([go.warwick.ac.uk/techvolunteers](http://go.warwick.ac.uk/techvolunteers)).

### APPS FOR GOOD (W)

Room LG56 at 11:50 and 13:40

#### New cutting-edge course bringing innovation and entrepreneurship to the classroom.

Find out how your school can get involved and learn more about this real-life education programme that combines mobile technology, business skills, civic engagement, and problem solving.

'Apps for Good' is a programme backed by Dell YouthConnect and The Nominet Trust where young people learn to identify problems in their everyday lives and, with guidance from technology industry professionals, create imaginative mobile apps that solve them. The course piloted in London last year and now CDI Europe, the charity behind Apps for Good, is expanding the scheme to schools across England.

'Apps for Good' teaches young people about the world by expecting them to transform it. During 70 contact hours, students work in teams to uncover the issues they want to tackle and solve before designing a way of fixing it with a mobile app. The students learn about the different functionalities of smartphones and use the devices as tools to explore the world of mobile applications themselves in a personal learning journey – documenting their community-based research and learning through videos, photos and immediate notes on their phones.

More information about the course can be found on the website: [www.appsforgood.org](http://www.appsforgood.org) or by contacting Debbie Forster at [debbie.forster@cdieurope.eu](mailto:debbie.forster@cdieurope.eu)

**Debbie Forster**  
Head of Partnering at the education charity, CDI Europe



Debbie is currently leading on the UK school launch of their newest programme, Apps for Good, an innovative course which teaches young people to create apps that change their world. Debbie also chairs e-skills UK's "Girls in IT" Employers group, a campaign which brings together IT professionals to inspire young women about a career in technology.

Debbie has 20 years of educational experience, working in a range of single sex, co-educational, selective and comprehensive schools in the UK and the US, most recently serving for six years as head teacher of a mixed comprehensive school in Berkshire.

While at e-skills UK (the sector skills group for IT and business) Debbie advised on education policy and strategy, served as the organisation's education spokesperson/liaison at government, partner and stakeholder events. She oversaw all e-skills education programmes, including Computer Clubs for Girls, BigAmbition (website for 14-19 year olds), Make IT Happy (competition run in partnership with Parliamentary IT Committee) and Vital (teachers' CPD programme in partnership with Open University).



## CS4FN (W)

Room UG06 at 11:50 and 14:30

### Exploring the Computer Science for Fun project.

This workshop will introduce you to the free classroom resources of the Computer Science for Fun (cs4fn) project which you will be able to use in your teaching ([www.cs4fn.org](http://www.cs4fn.org)). From 'intelligent' bits of paper to amazing magical tricks – we have created fun interactive classroom activities to help you teach the fundamentals of computing.

There will also be samples of our free schools magazine and books available (which can also be downloaded at [www.cs4fn.org](http://www.cs4fn.org)). So come along and explore with us the magic of computer science.

**Peter McOwan**  
Professor of Computer Science,  
School of Electronic Engineering  
and Computer Science, Queen  
Mary, University of London



Peter's research interests are in artificial intelligence, usability and robotics. He co-created Computer Science for fun cs4fn, a national outreach project to enthuse schools about computer science research. He was elected a National Teaching Fellow by the Higher Education Academy in 2008 and is an amateur magician!

## CAREERS IN COMPUTING (W)

Room LG53 at 11:50

The provision of high-quality careers advice regarding IT professional careers is sadly lacking. Furthermore the picture regarding the skills needs of the IT industry can seem to the outsider rather confusing and contradictory.

This session aims to give you exposure to the evidence base and the wider issues within IT careers so you can advise and support your students' professional aspirations, plus critically evaluate and contribute to the IT skills debate.

A set of slides for CAS members with links to resources is available on the CAS Google Groups area.

**Andrew Tuson**  
Undergraduate Admissions  
Tutor and Senior Lecturer  
in Computing at City  
University London



Andrew has been involved in student recruitment for over ten years. His interest in skills and employability in the IT profession has led to his membership of BCS's former Careers Working Group, as well as acting as a major contributor to the influential 2007 Developing the Future report (and quoted in the DTI's i2010 report). His concerns regarding the IT skills chain is at all levels; most recently he launched the Master of Information Leadership the UK's first executive masters for aspiring CIOs.

## TEACHER TRAINEES (T)

Room UG04 at 11:50

The discussion will be stimulated by four experienced teacher trainers with an interest in computing. From their particular perspective, they will describe the changing context of ICT and computing in schools. We hope that you will establish a group which can unite trainee ICT teachers across the country with the same interest/passion for enabling pupils to experience the rigour, understanding, achievement and satisfaction when working with algorithm, code and instructions whether it is programming a turtle, moving a sprite, designing an interface, building a circuit or querying a database. The endeavour is to promote computing by taking it into your placement schools.

### Important links are:

- Greenfoot** – <http://www.greenfoot.org>
- Scratch** – <http://scratch.mit.edu>
- GCSE Computing** – [http://www.ocr.org.uk/qualifications/type/gcse\\_2010/ict\\_tec/computing](http://www.ocr.org.uk/qualifications/type/gcse_2010/ict_tec/computing)
- Logo** – <http://www.softronix.com/logo.html>
- Computer Programming in Key Stage 3** – <http://computingatschool.org.uk/index.php?p=cpinks3>
- Computing** – a curriculum for schools – <http://computingatschool.org.uk/data/uploads/ComputingCurric.pdf>
- Royal Society Call for Evidence** – <http://computingatschool.org.uk>

## CPD FORUM (F)

Room LG32 at 11:50

"Training, training, training! Continuing Professional Development", that buzz phrase with senior management. We cannot move for exciting opportunities for CPD in computing! Or can we? What opportunities are there? What should, or could, CAS provide? What do you need? CAS has a small group looking into this and we need your help.

Come along and find out what we would like to provide and have your say on those opportunities that you would like to see provided."

**Simon Humphreys**  
Coordinator Computing At School



Simon taught music for many years before a hearing impairment forced a change in direction and he went back to university. Having graduated with a first-class degree he started to teach A Level Computing at Hills Road Sixth Form College in Cambridge where he became concerned that many students were being put off computing as a subject and with the disconnect between the different key stages in school and university.

Simon has been employed by CAS to co-ordinate their activities, a role that has been formalised through the generous support of BCS, The Chartered Institute for IT.

### MODELLING WITH CONSTRUCTIVIST COMPUTING (S)

Room LG33 at 13:40

We commonly liken programming to carrying out an everyday procedure, such as 'making a cup of tea'. First, we boil water, then... etc. But have you ever tried to make a cup of tea in someone else's kitchen? Where is the kettle? Is this a teapot? How do I plug this in? We need to relate a standard procedure to our personal tea-making experiences and to our perception of an unfamiliar context.

"Constructivist computing" is about model-building that makes a world

of shared sense out of our personal experiences. This workshop will briefly introduce principles and tools that illustrate how thinking about computing from a constructivist perspective leads to a broader conceptual framework for the discipline that does fuller justice to its applications than 'computational thinking' alone.

**This represents work in our Empirical Modelling research project:**  
[www.dcs.warwick.ac.uk/modelling](http://www.dcs.warwick.ac.uk/modelling)

**Meurig Beynon**  
Emeritus Reader in Computer Science at the University of Warwick, UK



Dr Beynon took early retirement in October 2010 in order to focus on his research and teaching in Empirical Modelling, an area which he established and developed in collaboration with colleague Dr Steve Russ and some twenty research students over the last 25 years.

Over his career, he has published over 100 refereed research papers detailing his research contributions to mathematics (with particular reference to the discovery of the Baker-Beynon duality), to theoretical computer science (including the introduction of a notion of computational equivalence, and its application to the characterisation of boolean functions

computable by planar monotone circuits) and to Empirical Modelling, a body of principles and tools that offers an alternative conceptual framework for computing with applications to human-computer interaction, computer graphics and CAD, software development, decision-support, educational technology and humanities computing.

**Steve Russ**  
Computer Science,  
University of Warwick



Steve taught mathematics in schools for ten years before joining Computer Science at Warwick. His interests lie in Empirical Modelling, history and philosophy of science and computing education.

### HIGH ENGAGEMENT KODUING – FOR BEGINNERS, BY BEGINNERS (W)

Room UG06 at 13:40

**at CAS creative game making with KS2/KS3 teachers**  
*No specialist coding knowledge required – perfect for KS2, KS3, transition, reluctant learners*

Kodu Game Lab will captivate and motivate the most reluctant KS2 and lower KS3 students, and engage them in the world of 3D game making for the Xbox Live and PC platforms.

**Attend this workshop and receive:**

- a brief introduction to Kodu and its educational potential
- innovative tried and tested ideas for the use of Kodu in your classroom
- a **free USB memory stick** containing the Kodu software, video tutorials and educational resources needed to get you started

**Tim Meek**  
Primary teacher with responsibility for transition



Tim spent 8-9 years as a primary teacher (ICT coordinator) before taking time out to travel. After a period working in digital educational publishing, Tim is returning to the Primary classroom this September.

**Russ Payne**  
Primary teacher with responsibility for transition



Russ taught in primary schools in Gloucestershire for 11 years teaching, with the last four as a deputy head.

### GOOGLE APPINVENTOR (W)

Room LG52 at 13:40 and 14:30

**Starting in the classroom with Google Appinventor**

The workshop offers a hands-on introduction to Appinventor and how it might be used in the classroom. Delegates bringing their own laptops will find it useful to have installed Appinventor before the event:  
<http://appinventor.googlelabs.com/about/>

**Dale Jones**  
Consultant, ExcitingICT



Dale worked as Head of ICT and eLearning Leader in schools, and was School Improvement Consultant for Shropshire LA. He is passionate about developing effective learning opportunities with digital technologies.

### 'IT'S BORING AND I AM NOT A GEEK' (W)

Room UG06 at 13:40

#### Engaging Female students in ICT Lessons.

This session will be an interactive one with tips and techniques on how to engage female students into ICT. We will be discussing how girls learn differently, how they feel in ICT lessons and what we can do to get them to love it! Feel free to bring along your own ideas and experiences.

*Can't wait to meet you!*

#### Reena Pau



Reena is a researcher at the University of Southampton in the School of Education who is looking at and interested in how to increase the numbers of students deciding to study STEM subjects, in particular computing and ICT. Reena also organises public engagement activities to help increase the profile of computing to young girls.

For more information email: [reenapau@gmail.com](mailto:reenapau@gmail.com)

### ALGORITHMS + DATA STRUCTURES = PROGRAMS (S)

Room LG33 at 14:30

In mathematics and science education there has been a strong focus, especially in the 1970s and 80s to establish the conceptual development in learners as they study key topics. It has been found that young people are creative in developing their own diverse concepts and that these are often limited in their accuracy and in their ability to generalise to a wider selection of cases. A good working knowledge of the range of these misconceptions is arguably an important basis for good teaching.

This session address the questions of conceptual development and progression in computing and asks what research progress has been made in this area and is it well known? In particular, what misconceptions do learners have of algorithms AND of data structures?

#### Richard Millwood Director, Core Education UK



Richard is a founder and director of Core Education UK, a not-for-profit team devoted to innovation in learning and technology, across all phases and sectors in education. He combines this with a post as Reader in Distributed Learning in the Institute for Educational Cybernetics, University of Bolton where he is engaged in developing new frameworks for work-focussed, action-inquiry learning at undergraduate and postgraduate levels.

[www.core-ed.org.uk](http://www.core-ed.org.uk)  
[idibl.bolton.ac.uk](http://idibl.bolton.ac.uk)  
[blog.richardmillwood.net](http://blog.richardmillwood.net)

### HOW TO HACK THE WEB (W)

Room LG56 at 14:30

This generation of students are often referred to as "digital natives", but how do we encourage them to graduate from being consumers to creators?

This workshop will show you how to get students excited about developing for the web in a way that lets students collaborate with each other, just like real web developers.

**Introduction:** What is hacking? What is the open web?

**Inspecting the web:** How to look under the bonnet of a website and live-edit the contents of any web page.

**Hacking the web:** How to re-mix the web, build your own websites and collaborate with others.

All workshop demos, slides and links will be uploaded here: <http://lanyrd.com/2011/computing-at-school/sdzh/>

#### Anna Debenham



Anna is a web developer based in Brighton. She works with Mozilla as Hackasaurus Event and Curriculum Manager on a project which develops free and open-source web tools for kids, and runs hack-jams around the world. She also runs a community called Scrunchup for young designers and developers.

### A LEVEL FORUM (F)

Room LG32 at 14:30

The A-Level forum will be of interest to you if you are a current or prospective A-Level Computing teacher.

This year focuses particularly on the issues of resources and support for the A2 coursework and any ensuing CPD requirements.

The purpose of the session is two-fold:

- to provide an opportunity to share good practice with other A-Level Computing teachers
- to identify concrete ways in which CAS can support A-Level Computing teachers, particularly those who are new to teaching it.

The intention is that the session will not be a grumbling session about any inadequacies of any particular specification!

#### Sue Sentance

Sue Sentance is now a Senior Lecturer at Anglia Ruskin University; until very recently she had taught A-Level Computing for many years. She is also an A-Level Computing examiner.

## WORKSHOPS AND SEMINARS

### ALAN TURING CENTENNIAL: THE LEGACY OF A COMPUTER SCIENTIST (W)

Room LG52 at 11:00

In his speech to Parliament during his recent visit to the UK, President Barack Obama reflected on the creative talents of the UK and US with the following line: "From Newton and Darwin to Edison and Einstein; from Alan Turing to Steve Jobs, we have led the world in our commitment to science and cutting-edge research, the discovery of new medicines and technologies."

The name with the least global recognition in this list is Alan Turing. 2012 is the centenary of the birth of Alan Turing, mathematician, code-breaker and early computer scientist. Alongside Einstein, Alan Turing is considered, by Time Magazine, as one of the 100 most important thinkers of the last century.

The centenary celebrations will see events throughout the year celebrating Turing and Computer Science. This presentation raises awareness of Alan Turing and his legacy, in particular his place in defining computers, computing, and artificial intelligence.

Huma will provide a practical demonstration asking attendees to determine between artificial and human dialogue taken from real Turing tests.

An ideal lesson activity for all ages and a chance to explore how Turing's ideas pervade our modern digital society both benefiting it (human transactions using computers), and making us wary (predators using cyberspace).

#### Huma Shah Lead scientist Turing100



Huma has a PhD in 'Deception-detection and machine intelligence in practical Turing tests'. She ran Turing tests at the University of Reading in 2008 and co-organised the 16th Loebner Prize for Artificial Intelligence at UCL in 2006. She is a member of the Turing centenary advisory committee (TCAC)/Alan Turing Year 2012 and Coordinator of Turing100.

#### Faron Moller Professor of Theoretical Computer Science at Swansea University



Faron's research interests are in the study of infinite-state systems, formalisms for real-time systems, and automated and semi-automated proof systems. He is the Director of the Swansea Railway Verification Group which carries out research into the safety and reliability of railway systems.

He is also Director of Technocamps ([www.technocamps.com](http://www.technocamps.com)), a 3-year, £6 million schools outreach project led by IT Wales in the Computer Science Department at Swansea University in partnership with the Computer Science Departments in Aberystwyth, Bangor and Glamorgan Universities.

## EXHIBITORS

### BCS, The Chartered Institute for IT

Our learning solution is used in schools throughout the UK and covers digital media, office based software, including the popular ECDL qualification and a growing suite of over 80 units covering a wide range of ICT skills.

The support we offer Schools includes:

- e-learning materials
- lesson plans
- registration and certification
- testing and assessment tools

[www.bcs.org/schools](http://www.bcs.org/schools)



### Microsoft .NET

Gadgeteer is a toolkit for building small electronic devices. Gadgeteer combines the advantages of object-oriented programming, solderless assembly of electronics with a kit of peripherals, and support for quick physical form factor construction using computer-aided design.

<http://netmf.com/gadgeteer>



### Greenfoot

Greenfoot is a free, open source development environment that lets students develop exciting games and simulations in Java quickly and easily. It works as a great motivator to get young learners interested in programming, while teaching fundamental programming concepts as they go. Greenfoot was developed at the University of Kent and is available from:

[www.greenfoot.org](http://www.greenfoot.org)



# EXHIBITORS

## Youngcoder platform

The Youngcoder platform is an innovative teaching solution for teaching programming in C++ and Java. It can be used as a first step to actual code writing!

### Main features:

- tutorials
- programming problems
- online Judge
- platform based online

### Main benefits:

- no installation
- quick lesson preparation
- possibility to organize a test or a contest

[www.youngcoder.eu](http://www.youngcoder.eu)  
[info@youngcoder.eu](mailto:info@youngcoder.eu)



## The National Museum of Computing

The National Museum of Computing is dedicated to showing the development of computing in its broadest sense from the pioneering war time efforts that resulted in Colossus, to the products and systems we use today.

The museum is part of the whole Bletchley Park experience and schools and colleges are welcome to visit us.

[www.tnmoc.org](http://www.tnmoc.org)



## Moviestorm

Moviestorm is a software application that lets anyone make animated movies on a home computer. It's fast, fun, easy and free to try!

- Massive library of characters, props and animations
- No animation or artist skills required
- Everything is fully customizable
- Import and export flexibility

[www.moviestorm.co.uk](http://www.moviestorm.co.uk)



## National Stem Centre

The National STEM Centre houses the UK's largest accessible physical library of resource materials to support the teaching and learning of science, design & technology, engineering and mathematics – and increasingly computing.

In collaboration with CAS we are also building an eLibrary collection and online community group for teachers of computing and ICT. We look forward to discussing plans for this with you.

[www.nationalstemcentre.org.uk](http://www.nationalstemcentre.org.uk)

