10th Workshop in Primary and Secondary Computing Education

WiPSCE '15

The Great Hall

King's Building

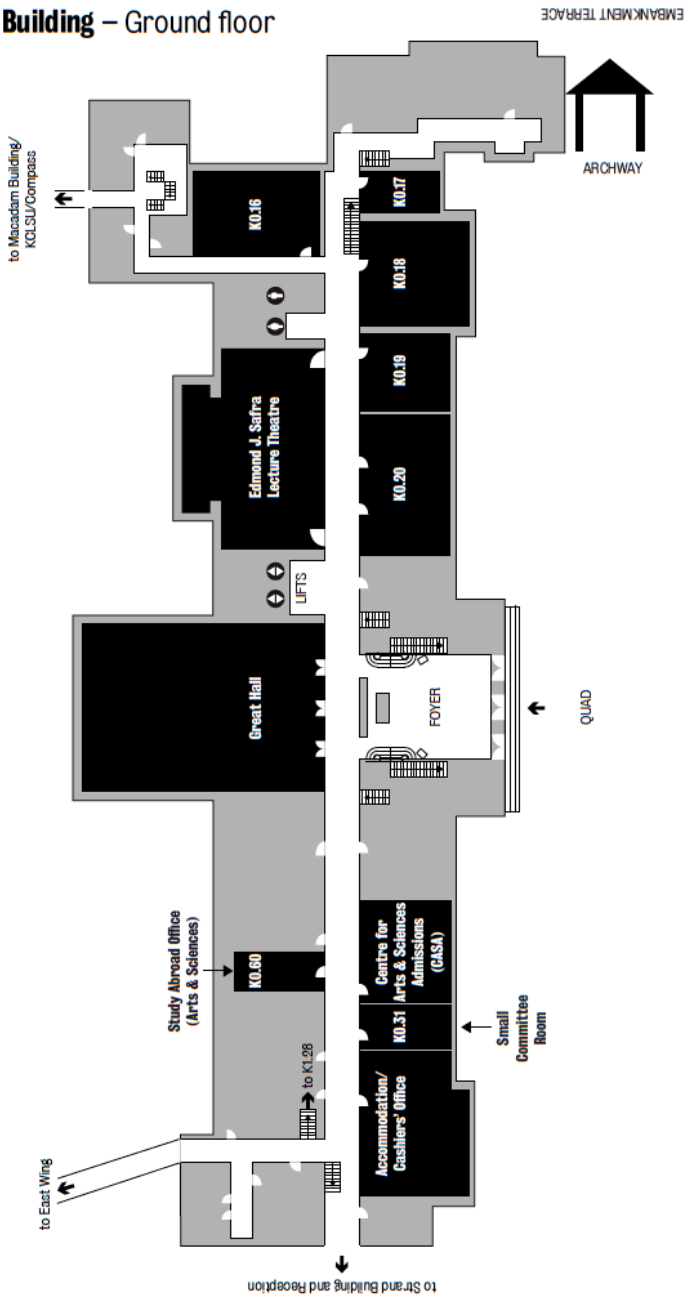
Strand Campus

King's College London

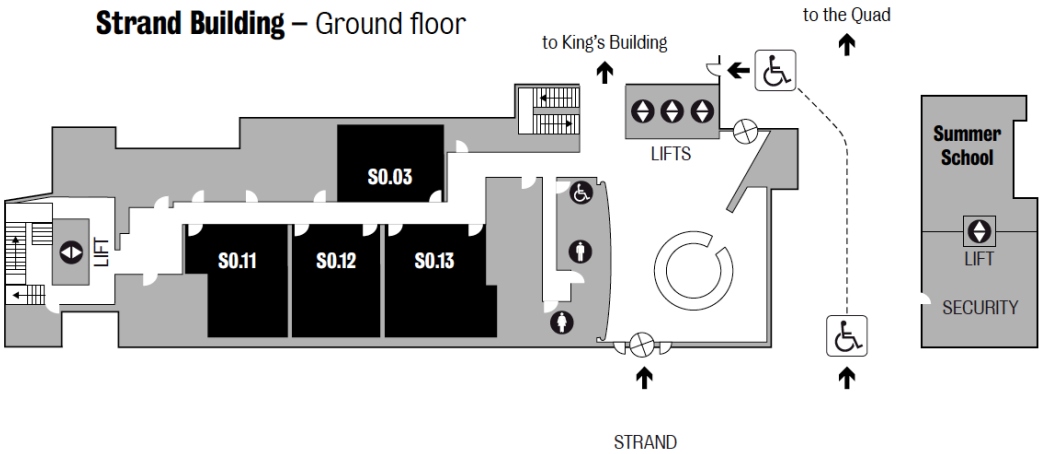
In-Cooperation

The Strand Campus – floor plans

King's Building – Ground floor



Strand Building – Ground floor



10th Workshop in Primary and Secondary Computing Education

WiPSCE '15

9th -11th November, 2015

London, UK

King's College London

Department of Education and Professional Studies

Monday, November 9

12:00 – 13:30	*Registration / Coffee (The Great Hall, King's Building)*
13:30 – 14:00	Conference Opening Session Judith Gal-Ezer
14:00 – 15:00	Keynote Session 1 Chair: Judith Gal-Ezer *Early Education – What Does Computing Have to Do with it, and in What Ways?* Michal Armoni
15:00 – 15:30	*Coffee break (30 mins)*
15:30 – 16:30	Paper Session 1 Chair: Michael Caspersen *Design and First Results of a Psychometric Test for Measuring Basic Programming Abilities* (Full Paper) Andreas Mühling, Alexander Ruf, Peter Hubwieser *What do I have to know and to do? Development of a Theory-based, Normative Competence Description for the Profession of Computer Specialists* (Practical Report) Simone Opel, Torsten Brinda
16:30 – 16:45	*Coffee break (15 mins)*
16:45 – 17:45	Paper Session 2 Chair: Barbara Ericson *Using – Analysing – Creating – Embedding: A Framework for Scaffolded Problem-based Discovery Learning in Informatics' Education* (WiP) Lutz Hellmig, Tino Hempel *Master Teachers in computing: the first two years* (WiP) Neil Smith, Yasemin Allsop, Helen Caldwell, David Hill, Yota Dimitriadi, Andrew Paul Csizmadia *"Now they just start working, and organize themselves" – First Results of Introducing Agile Practices in Lessons* (WiP) Petra Kastl, Ralf Romeike
17:45 – 18:00	*Welcome from the Head of Department, Department of Education and Professional Studies, King's College London* Professor Sharon Gerwitz
18:00 – 19:30	*Conference drinks reception (Chapters Restaurant)*

Tuesday, November 10

09:00 – 10:00	Keynote Session 2 Chair: Sue Sentance *The dream of a lifetime: shaping how our children learn computing* Simon Peyton-Jones
10:00 – 10:30	*Coffee break (30 mins)*
10:30 – 12:00	Paper Session 3 Chair: Ralf Romeike *Frame-based editing: easing the transition from blocks to text-based programming* (Full Paper) Michael Kölling, Neil Brown, Amjad Altadmri *A Pilot Computer Science and Programming Course for Primary School Students* (Full Paper) Caitlin Duncan, Tim Bell *Constructionist Gaming Beyond the Screen: Middle School Students' Crafting and Computing of Touchpads, Board Games, and Controllers* (Practical Report) Yasmin Kafai, Veena Vasudevan
12:00 – 13:15	*Lunch (Chapters Restaurant)*
13:15 – 14:45	Paper Session 4 Chair: Yasmin Kafai *Computer Science for Key Stage One* (Practical Report) Benjamin Wohl, Barry Porter, Sarah Clinch *A Comparative Evaluation of a Microworlds-based Learning Approach for Developing Literacy and Computational Thinking in Cross-curricular Contexts* (WiP) Craig Jenkins *Exploring Students' Computational Thinking Skills in Modeling and Simulation Projects: a Pilot Study* (WiP) Natasa Grgurina, Erik Barendsen, Bert Zwaneveld, Klaas van Veen, Cor Suhre *Introducing Computer Programming to Children through Robotic and Wearable Devices* (WiP) Alexandros Merkouris, Konstantinos Chorianopoulos
14:45 – 15:15	*Coffee break (30 mins)*

15:15 – 15:45	Poster Session Chair: Jan Vahrenhold *Using Interface Design to Develop Computational Thinking Skills* Ana Calderon and Tom Crick *Informatics teachers: Subjective competence assessments before and after an in-service training* Claudia Hildebrandt and Ira Diethelm *Dr. Scratch: a webtool to automatically evaluate Scratch projects* Jesús Moreno-León and Gregorio Robles *Physical Computing in STEM Education* Sandra Schulz and Niels Pinkwart *Challenges of a computer science classroom: Teachers' perspectives* Aman Yadav, Sarah Gretter and Susanne Hambrusch *Do you want to be a Data Profiler? Teaching about the Cellular Network, Big (Location) Data, and Privacy* Carsten Schulte and Benjamin Piétza
15:45 – 16:45	Paper Session 5 Chair: Michael Kölling *Searching for Barriers to Learning Iteration and Runtime in Computer Science* (WiP) Philipp Shah, Dino Capovilla, Peter Hubwieser *PILeT: an Interactive Learning Tool To Teach Python* (WiP) Bedour Alshaigy, Samia Kamal, Faye Mitchell, Clare Martin and Arantza Aldea *Report of the ITICSE Working Group in K-12 Education* (Special Session) Peter Hubwieser
16:45 – 19:00	*Free Time*
19:00 – 22:00	*Conference Dinner (The Great Hall)* Professor Adrian Johnstone of Royal Holloway, University of London will give us an informative talk about the life of Babbage and the Babbage engines. We will also have live musical entertainment from Crimson Keys, a London-based vocal/piano duo

Wednesday, November 11

09:00 – 10:40	Paper Session 6 Chair: Maria Knobelsdorf *Relationships: computational thinking, pedagogy of programming, and Bloom's Taxonomy* (Full Paper) Cynthia Selby *Bringing the Innovations in Data Management to CS Education: an Educational Reconstruction Approach* (WiP) Andreas *Grillenberger, Ralf Romeike* *Bebras Contest for the Blind Pupils* (WiP) Ľudmila Jašková, Natália Kováčová *Launching Swiss Computer Science Education Week* (Practical Report) Nora Escherle, Dorit Assaf, Ashok Basawapatna, Carmine Maiello, Alexander Repenning
10:40 – 11:10	*Coffee break (30 mins)*
11:10 – 12:40	Paper Session 7 Chair: Carsten Schulte *Students' Attitudes and Motivation During Robotics Activities* (Full Paper) Fatima Kaloti-Hallak, Michal Armoni, Mordechai Ben-Ari *Usability and Usage of Interactive Features in an Online Ebook for CS Teachers* (Full Paper) Barbara Ericson, Steven Moore, Briana Morrison, Mark Guzdial *Technocamps: Advancing Computer Science Education in Wales* (Practical Report) Tom Crick, Faron Moller
12:40 – 13:00	Conference Closing Session and Information about WiPSCE 2016 Jan Vahrenhold
14:30 – 17:00	*[Optional] Excursion to Science Museum (places limited)*

Our Keynote speakers

Michal Armoni

Early Education – What does computing have to do with it, and in what ways?

Michal Armoni is a senior scientist at the Department of Science Teaching, Weizmann Institute of Science, since 2009. She received her PhD from the School of Education in Tel-Aviv University, and her B.A. and M.Sc. in computer science from the Technion, Israel Institute of Technology. She is engaged in computer science education for more than 20 years. She has a rich experience in teaching computer science (for undergraduate and graduate students, for prospective and in-service high-school teachers and for high-school students), and in curricular development for all levels. Michal has co-authored several textbooks for high schools and for junior high schools.

Abstract

The issue of early computing education is very complex. It has connections with many other – close and less close – domains. In this talk I intend to touch some of these connections, to some extent. Obviously, such a light treatment, of **some** of the connections, and only to **a certain** extent cannot lead us to well-formed conclusions regarding early teaching of computing. Specifically, by the end of this talk we probably will not be able to agree on the proper age to start computing education, or on the corresponding didactic philosophy. But, there is a good chance that by the end of this talk you will become familiar with the set of the relevant connections and the domains they connect.

Historically, computing education started in universities and colleges. Then came high-school computing education. In some countries this happened earlier than in others, while it is still waiting to happen in other countries. The next stage was middle school, and even below, to primary school, down to ages as young as 5. Not surprisingly, a common strategy, used in many (mainly earlier) cases, was to rely on a pedagogic approach and a curriculum of a certain level and adapt it to a lower-age level. Adaptation is for example using a simpler language, more suited to younger students, to

teach the same set of knowledge units. Another example is deleting from the programs complete units, usually the most advanced ones.

As most, if not all of you, already know this is not a very effective strategy. Many pedagogic methodologies that help and support learning of undergraduate students do not work (and sometimes even disturb or hinder) when it comes to learning processes of high-school students. Of course, the same holds when going down from the high-school level to the middle-school level. This is even more explicit when going down from the middle-school level to the lower levels of primary school.

Obviously, this is due to students' age. Younger students probably understand the same material slower than older students. They need more help, more guidance and support. So, if we take our adapted program, but allocate more teaching hours, and perhaps even more teaching staff, will that improve students' learning? No, it will not, as probably anyone would guess.

A third-grade student is not merely younger than himself or herself in 10^{th} grade. Cognitive-wise, one can quite safely say that these are different children. During school years a child undergoes a huge cognitive development. As this process of cognitive development moves forward, the child abandons certain thinking patterns and strategies, and acquires others instead. Such a clearly different set of thinking patterns and tools calls for a different pedagogical planning. Instead of adapting a well-tested and reliable program for older students, one must start all over again, from scratch, wearing different pedagogical glasses.

So, educational curricular theories that are applicable to school ages are relevant. Pedagogical knowledge regarding other schools subjects is also relevant. After all, this curricular challenge is not unique to computing. For example, this is also the case for mathematics and science. Computing has something in common with both. Can we use the knowledge acquired by the corresponding educational communities, and if so – what parts of it? This requires deep insights into the essence of these subjects – mathematics and physics as the borrowed subjects, and computing as the borrowing one. Such an insight is essential in order to determine which pieces of borrowed pedagogical knowledge are relevant to computing.

A deep insight into the nature of computing is highly important in other contexts as well, for example, for handling the following important questions. Is a certain proposed program teaches computing, or only some subset of it that is too narrow to be called computing? What is the smallest core that still yields a program for teaching computing?

This is just a taste of issues and domains I intend to look at. The younger the intended age for computing education, the more challenging is the task of computing educators. This is true even for the preliminary sub-task of determining feasibility, that is, whether learning computing is possible at a certain age.

Simon Peyton Jones

The dream of a lifetime: shaping how our children learn computing

Simon Peyton Jones is a principal researcher at Microsoft Research in Cambridge, where he studies the design and implementation of functional programming languages, especially Haskell. He is also deeply involved in the introduction of computer science into the school curriculum in England, and he serves as chair of the Computing at School working group.

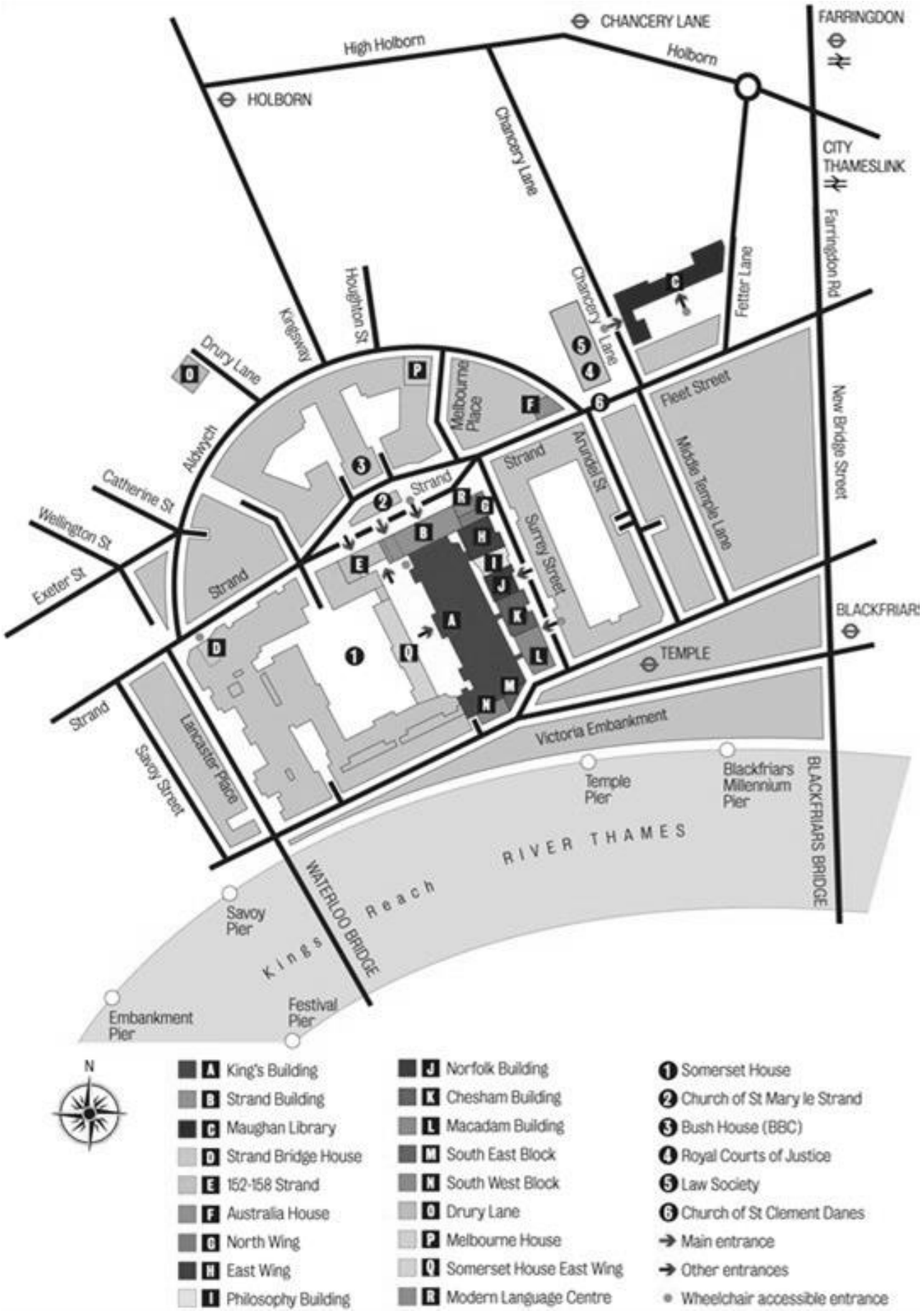
Abstract

In England from September 2014, every child will learn computer science, including programming, from primary school onwards. In effect, computer science has become an entirely new foundational subject discipline at school, alongside maths and natural science.

This earthquake gives us a huge opportunity and multiple equally-huge challenge. The opportunity is to shape how computer science becomes a vibrant reality in every classroom, in England certainly but then the world. But who will train the teachers? Who will find out whether discovery-based learning works better than more scaffolded approaches, or vice versa? What the right balance between plugged and unplugged activities is? How to convey the essence of computational thinking without it becoming buried in the myriad details of modern computer systems? How to assess the things we want students to learn, rather than assessing the things that are easy to measure? How can we exploit the symbiosis between maths and computing?

In my talk I'll sketch the UK context, and the events that led to our astonishing 100% policy success. I'll say a bit more about the challenges we face, and in particular I'll elaborate on our desperate need for help from researchers in computing education. The WiPCSE community is perfectly placed to lead the charge, and now is the time to do so. I intend this talk the opening of a dialogue, not a retrospective on past glories.

The Strand Campus – site map



Useful information

Travel to the conference

The Strand Campus is conveniently located in central London, with a range of public transport services within easy reach.

Tube

Closest stations: **Temple** (District and Circle lines): 2 minute walk; **Charing Cross** (Bakerloo and Northern lines): 10 minute walk

Train

Closest stations: **Charing Cross**: 9 minute walk; **Waterloo**: 12 minute walk; **Waterloo East**: 10 minute walk; **Blackfriars:** 12 minute walk

Bus

Buses stopping outside the university: **1, 4, 26, 59, 68, 76, X68, 168, 171, 172, 176** (24 hour), **188, 243** (24 hour), **341** (24 hour), **521, RV1**.

On arrival

Please make your way to the Great Hall in the King's Building at our Strand Campus. You can access the King's Building either through the Strand Building or via the main entrance in the quad. Floor plans and maps are found on the inside covers of this programme.

Internet access

Delegates will receive a unique Wi-Fi code upon registration that will be valid for the duration of the conference

Catering

The conference includes lunch and dinner on Tuesday. On Monday and Wednesday you will need to purchase meals. There is a café in King's one floor above The Great Hall called the Chapters Restaurant which serves light meals and snacks. In addition, there are many cafés and restaurants in the local area, including several at **Somerset House**, which is located next to the King's Building on The Strand. Other quick eateries include: **Pret A Manger** (2 minute walk); **Café Nero** (2 minute walk); and **Zizzi** (6 minute walk).