

QICS Spring School

on Foundational Structures in Quantum Computation and Information

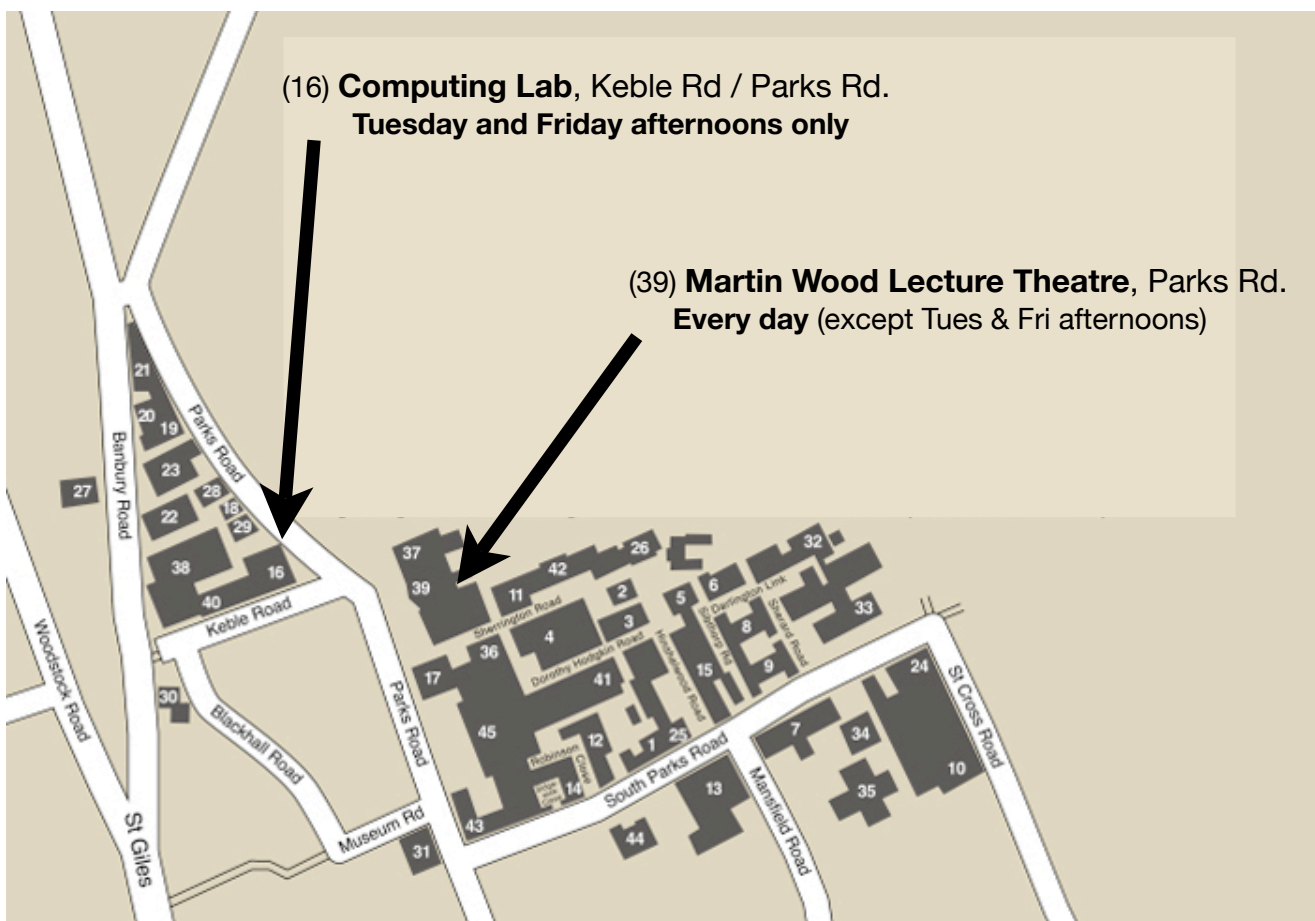
This event marks the end of the EU FP6 STREP QICS on Foundational Structures in Quantum Computation and Information. It consists on extended tutorials on the main research strands within QICS, namely:

- Structures and methods for measurement-based quantum computation
- Categorical semantics, logics, diagrammatic methods
- Classical-quantum interaction and information flow
- Quantum automata, machines, calculi

Lectures will be given both by senior members of the network as well as by former and current QICS researchers.

Times and Venues

The school will take place Monday to Friday, May 24-28, 2010, and will run from **9.00am until 6.00pm** each day. Lectures will usually take place in the **Martin Wood Lecture Theatre** (Physics Department) on Parks Road, with the **exception** being on the afternoons of Tuesday 25th and Friday 28th, when the lectures will be in the **Computing Laboratory Lecture Theatre B**.



Programme

Sunday 23 May : 19:00 : Welcome drinks at the ROYAL OAK (see map)

Monday 24 May

09.00-09.30 registration and coffee

09.30-11.00 **Akimasa Miyake** (Perimeter Institute)
Introduction to measurement-based quantum computing, with connections to condensed matter physics.

11.00-11.30 break

11.30-13.00 **Bob Coecke, Chris Heunen, & Jamie Vicary** (Oxford)
Introduction to monoidal categories and graphical calculus 1.

13.00-14.30 Lunch

14.30-16.00 **Richard Jozsa** (Cambridge)
Classical simulation of quantum circuits.

16.00-16.30 break

16.30-18.00 **Peter Selinger** (Dalhousie)
Higher types in quantum computing.

Tuesday 25 May

09.30-11.00 **Maarten van den Nest** (Max Planck Institute)
Introduction to graph states and their applications.

11.00-11.30 break

11.30-13.00 **Bob Coecke, Chris Heunen, & Jamie Vicary** (Oxford)
Introduction to monoidal categories and graphical calculus 2.

13.00-14.30 Lunch

14.30-16.00 **Prakash Panagaden** (McGill)
Modular tensor categories and topological quantum computing.

16.00-16.30 break

16.30-18.00 **Samson Abramsky** (Oxford)
Coalgebraic methods in quantum computing.

This session in the Computing Lab

Wednesday 26 May

09.30-10.15 **Simon Perdrix** (Grenoble)
Flow and depth in measurement-based quantum computing 1.

10.15-10.45 break

10.45-12.15 **Ross Duncan** (Oxford)
Complementarity, quantum algebra, and applications to measurement-based quantum computing.

12.15-13.00 **Simon Perdrix** (Grenoble)
Flow and depth in measurement-based quantum computing 2.

13.00-14.30 Lunch

14.30-15.15 **Simon Perdrix** (Grenoble)
Classical-quantum graphical calculus.

15.15-16.00 **Andreas Winter** (Bristol)
The fidelity alternative and quantum measurement simulation.

16.15-16.45 break

16.45-18.00 **Pablo Arrighi** (Grenoble) & **Reinhard Werner** (Hannover)
Quantum cellular automata 1.

Thursday 27 May

- 09.30-10.30 **Joe Fitzsimons** (Oxford)
Blind quantum computing.
- 10.30-11.00 **Lucas Dixon** (Edinburgh),
Ross Duncan & Aleks Kissinger (Oxford)
Quantomatic demo.
- 11.00-11.30 break
- 11.30-12.15 **Mehrnoosh Sadrzadeh** (Oxford)
Vector spaces and meaning.
- 12.15-13.00 **Peter Hines** (York)
Is coherence important in quantum computing?
- 13.00-14.30 Lunch
- 14.30-15.15 **Ottfried Gühne** (Innsbruck)
Quantum contextuality.
- 15.15-16.30 **Howard Barnum** (Perimeter Institute) & **Jonathan Barrett** (Bristol)
Generalized probabilistic theories 1.
- 16.30-17.00 break
- 17.00-18.00 **Pablo Arrighi** (Grenoble) & **Reinhard Werner** (Hannover)
Quantum cellular automata 2.

Friday 28 May

- 09.30-11.00 **Dan Browne** (UCL)
Measurement-based quantum computing, measurement-based classical computing, and non-locality.
- 11.00-11.30 break
- 11.30-12.15 **Bill Edwards** (Oxford)
Phase groups and non-locality.
- 12.15-13.00 **Bob Coecke & Aleks Kissinger** (Oxford)
Compositional multipartite entanglement.
- 13.00-14.30 Lunch
- 14.30-15.30 **Sandu Popescu** (Bristol)
TBA
- 15.30-16.00 break
- 16.00-17.15 **Howard Barnum** (Perimeter Institute) & **Jonathan Barrett** (Bristol)
Generalized probabilistic theories 2.
- 17.15-18.00 **Pablo Arrighi** (Grenoble) & **Reinhard Werner** (Hannover)
Quantum cellular automata 3.

This session in the Computing Lab


Timetable

Breaks, Talks

Mon 24 May – Fri 28 May 2010 (London)

Monday 24/5 Tuesday 25/5 Wednesday 26/5 Thursday 27/5 Friday 28/5

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|-------|--|--|----------------------------------|----------------------------------|----------------------------------|
| 09:00 | Registration + Coffee | | | | |
| 10:00 | Miyake 09:30 - 11:00 | Van den Nest 09:30 - 11:00 | Perdrix 09:30 - 10:15 | Fitzsimons 09:30 - 10:30 | Browne 09:30 - 11:00 |
| 11:00 | Break 11:00 - 11:30 | Break 11:00 - 11:30 | Break 10:15 - 10:45 | Quantomatic 10:30 - 11:00 | Break 11:00 - 11:30 |
| 12:00 | Coecke, Heunen, Vicary 11:30 - 13:00 | Coecke, Heunen, Vicary 11:30 - 13:00 | Duncan 10:45 - 12:15 | Sadrzadeh 11:30 - 12:15 | Edwards 11:30 - 12:15 |
| 13:00 | Lunch 13:00 - 14:30 | Lunch 13:00 - 14:30 | Lunch 13:00 - 14:30 | Lunch 13:00 - 14:30 | Lunch 13:00 - 14:30 |
| 14:00 | | | | | |
| 15:00 | Jozsa 14:30 - 16:00 | Panangaden 14:30 - 16:00 | Perdrix 14:30 - 15:15 | Guehne 14:30 - 15:15 | Popescu 14:30 - 15:30 |
| 16:00 | Break 16:00 - 16:30 | Break 16:00 - 16:30 | Winter 15:15 - 16:15 | Barrett, Barnum 15:15 - 16:30 | Break 15:30 - 16:00 |
| 17:00 | Selinger 16:30 - 18:00 | Abramsky 16:30 - 18:00 | Break 16:15 - 16:45 | Break 16:30 - 17:00 | Barrett, Barnum 16:00 - 17:15 |
| 18:00 | | | Arrighi, Werner 16:45 - 18:00 | Arrighi, Werner 17:00 - 18:00 | Arrighi, Werner 17:15 - 18:00 |
| 19:00 | | | | | |



 These sessions in the Computing Lab

Local Information

