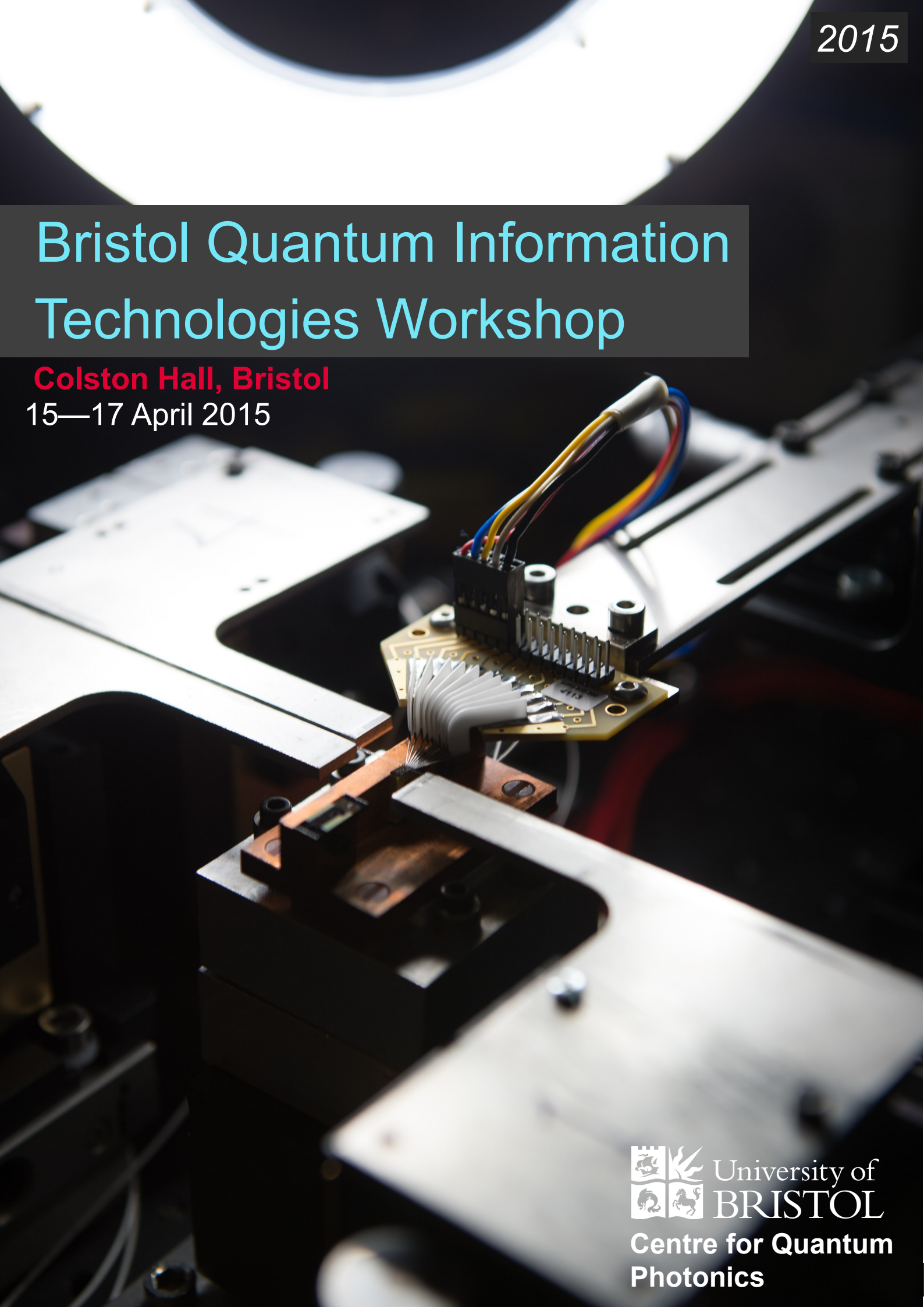
2015

Bristol Quantum Information Technologies Workshop

Colston Hall, Bristol

15—17 April 2015



University of BRISTOL

Centre for Quantum Photonics

WELCOME

Dear Colleagues and Friends,

On behalf of the Programme Committee, I would like to welcome you to Bristol and the 2015 Quantum Information Technologies Workshop. Innovation is a cornerstone of BQIT:15 with an exciting programme of presentations and panel discussions on quantum technologies, including an industry perspective session on Wednesday morning, the launch of Quantum Engineering Technologies QET|⟩ Labs on Wednesday evening, and an Innovation session on Friday morning. We have a full agenda during the next three days, so please take a few minutes to read through the information in this programme. It includes our itinerary and other important information about our evening events.

BQIT:15 is the ideal opportunity to meet colleagues, establish new connections and collaborations and explore new directions in this important and rapidly developing field. We are pleased to have such distinguished international scientists, researchers and industry leaders joining us to take part in this year's workshop. Throughout the presentations and panel sessions, which have been carefully selected by the programme committee, we will explore the latest scientific advances, research developments and technical innovations in quantum technologies.

I would like to thank each of you for attending BQIT:15 and contributing your expertise. Together, we can build truly transformative quantum technologies, which will alter our lives, society and economy.

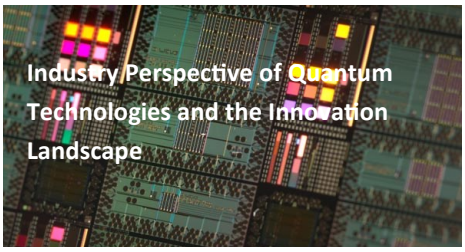
We sincerely hope you enjoy your time with us in Bristol and hope to see you back for BQIT:16 on the 8-10 April next year.

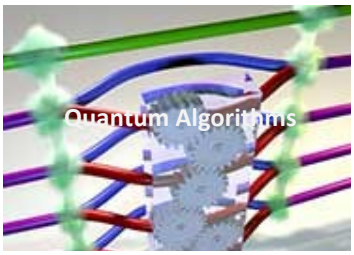
Best Wishes

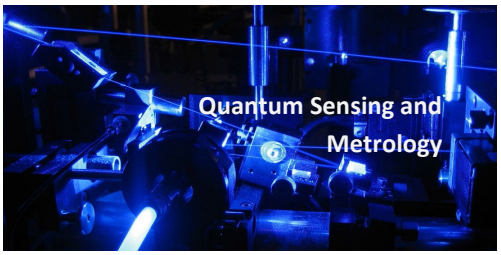
Jeremy O'Brien

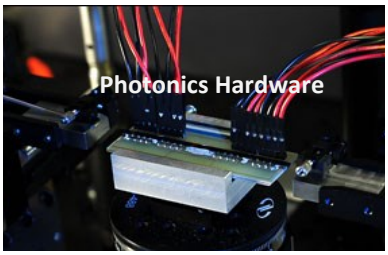
On Behalf of the Programme Committee

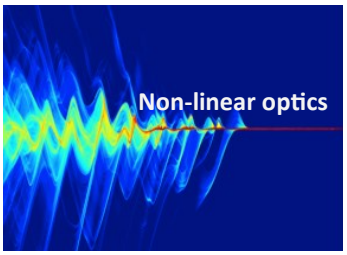
Topics for Discussion

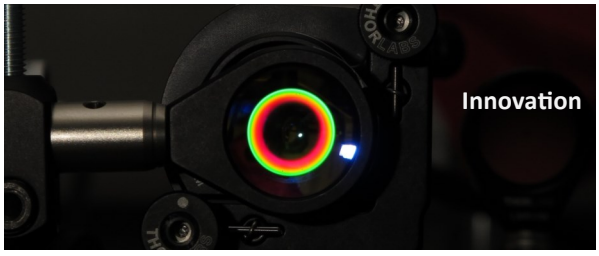


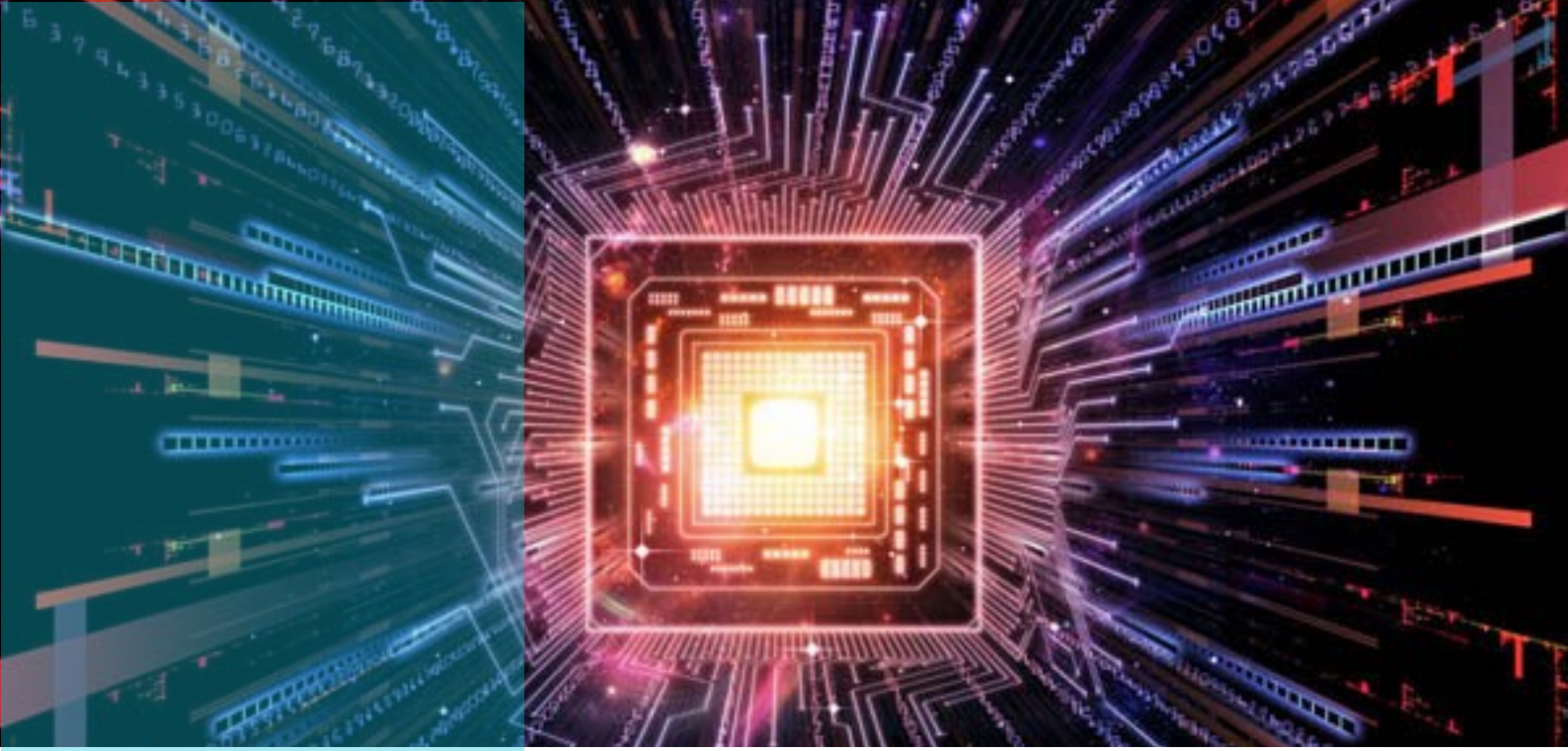












Day One

Wednesday 15th April 2015

Time	Event
09:00	Arrivals and Registration
Industry Perspective	
10:00	Welcome by Jeremy O'Brien
10:05	John Martinis *(UCSB- Google)* ***Building a quantum computer: Bit flip error correction in superconducting qubits***
10:45	**Panel Members** • Krysta Svore (*Microsoft Research*) *(chair)* • Antti Niskanen (*Nokia-TECH)* • Alistair Sinclair *(NPL)* • Gregoire Ribordy *(ID-Quantique)*
11:20	*Short Break*
Quantum Algorithms	
11:40	Krysta Svore *(Microsoft Research)* ***Compiling Quantum Circuits into Device-level Instructions***
12:20	Elham Kashefi *(University of Edinburgh)* ***Computing on Encrypted Data***
12:40	**Panel Members:** • Ashley Montanaro *(University of Bristol)* (chair) • Enrique Solano ((*University of the Basque Country)* • Daniel Shepherd *(GCHQ/Univeristy of Bristol)* • Rajagopal Nagarajan *(University of Middlesex)* • Toby Cubitt *(University of Cambridge)*
13:15	*Lunch / Poster Sessions*

Continued on next page

Day One cont.…

Time	Event
Quantum Sensing and Metrology	
14:30	Pieter Kok (University of Sheffield) ***Quantum imaging and metrology***
14:50	Jonathan Matthews (University of Bristol) ***Quantum enhanced tomography of unitary processes***
15:10	**Panel members:** • Jonathan P Dowling (*Louisiana State University*) (chair) • Hugo Cable (*University of Bristol*) • Animesh Datta, (*University of Warwick*) • Christopher Chunilall (*NPL*)
15:45	*Coffee Break*
UK Quantum Hubs Network	
16:15	**Panel Members:** • David Delpy *(DSAC) (chair)* • Sir Peter Knight *(The Kavli Royal Society International Centre-Imperial College) (co-chair)* • Miles Padgett *(University of Glasgow) (Quantum Imaging Hub)* • Douglas Paul (*University of Glasgow) (Quantum Sensors Hub)* • Simon Benjamin *(University of Oxford) (Quantum Information Technologies Hub)* • Tim Spiller *(University of York) (Quantum Communications Hub)*
17:15	**Taxi pick up outside Colston Hall to SS Great Britain**

Sponsors

We are grateful to a number of organisations that have provided funding for our event. The additional funding provided by these organisations helped fund our programmes and evening activities; enabling us to make BQIT:15 our best yet. Thank you to:

Centre for Doctoral Training Quantum Engineering EPSRC	EPSRC Centre for Doctoral Training in Quantum Engineering
IDQ FROM VISION TO TECHNOLOGY	ID Quantique
NQIT	UK National Networked Quantum Information Technologies Hub
UK National Quantum Technology Hub in Sensors and Metrology	UK National Quantum Technology Hub in Sensors and Metrology
ICE Innovative Cryogenic Engineering	ICE Oxford

Welcome Dinner

Promenade Deck, SS Great Britain

Our welcome dinner takes place in the first class dining saloon on the promenade deck on the SS Great Britain.

The SS Great Britain was designed by Isambard Kingdom Brunel and built in 1843 at the Great Western Dockyard in Bristol.

She was built to serve the growing transatlantic passenger trade between England and the United States.

The ship was unique at the time in terms of its construction and size.

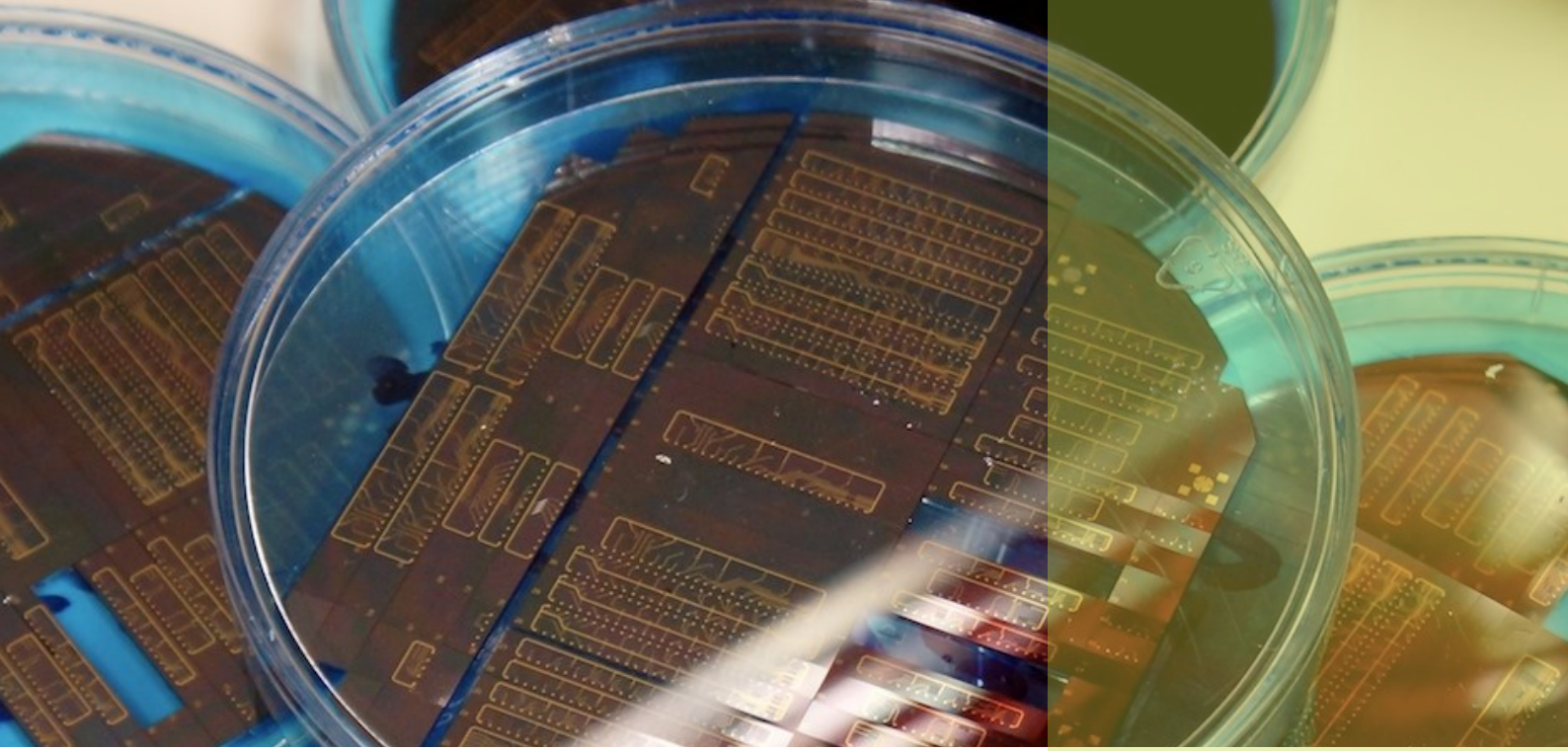
She was the first propeller driven, ocean going, iron wrought ship in the world.

At the time many sceptics believed that a metal ship on such a scale would not be able to float.

However, they were proved wrong and the SS Great Britain made her maiden voyage to New York in 1845, taking just 14 days to complete the journey.

The ship was renowned for its opulent interiors with artwork, gold leaf decorations and mod cons which were unrivalled by other ships of her day.

Today Brunel's ship is seen as a hugely important Victorian engineering achievement which was a forerunner of modern ships.



Day Two

Thrusday16th April 2015

Time	Event
09:00	Tea and Coffee
Photonics Hardware	
09:15	Michal Lipson, *(Cornell University)*
09:55	Joshua Nunn *(University of Oxford)* ***Quantum memories for scalable photonics***
10:15	Fabio Sciarrino *(Sapienza University of Rome)* ***Boson sampling with integrated photonics***
10:35	Panel Members: • Mark Thompson *(University of Bristol)* (chair) • John Rarity *(University of Bristol)* • Ray Beausoleil *(HP Labs)*
11:05	*Short Break*
Solid State	
11:15	Peter Lodahl *(University of Copenhagen)* **Quantum-information processing in a one-dimensional photonic reservoir**
11:35	Val Zwiller *(Delft University)*
11:55	Ronald Hanson (*Delft University)* ***Quantum networks and computing in Delft: status and prospects***
12:15	*Lunch / Poster Sessions*
Solid State (cont)	
13:30	David Reilly *(University of Sydney)*
14:00	Panel Members: • David Reilly *(University of Sydney)* (chair) • Ruth Oulton (*University of Bristol)* • Alberto Politi *(University of Southampton)*

Day Two cont....

14:35	*Coffee Break*
Quantum Optics and Communication	
14:55	Alex Clark *(Imperial College London)* (***Nonlinear quantum photonic circuits***
15:25	Alexander Gaeta *(Cornell University)*
15:55	Sebastien Tanzilli (CNRS) ***Wavelength division multiplexing for quantum key distribution***
Quantum Optics and Communications	
16:15	**Panel members:** • Tim Spiller *(University of York)* (chair) • Alex Clark *(Imperial College London)* (co-chair) • Gerald Buller *(Heriot Watt University)* • Simon Benjamin *(University of Oxford)* • Federico Levi *(Associate Editor, Nature Communications)* • Gaby Slavcheva *(University of Bath)*
18:00	**Dinner and Drinks at Bordeaux Quay**

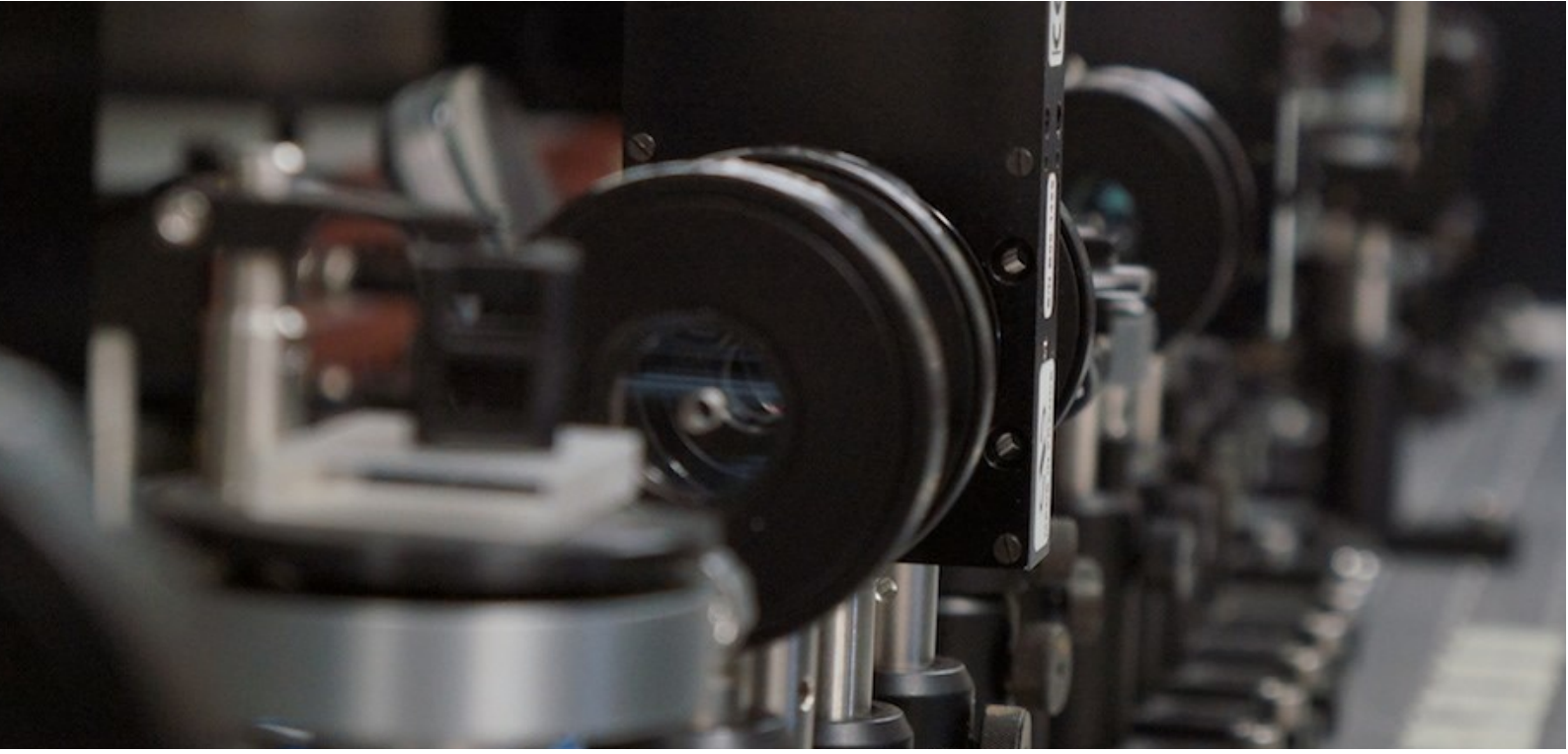
Day 2 : Dinner and Drinks Reception

Bordeaux Quay, Harbourside

Bordeaux Quay is situated on the beautiful Bristol Floating Harbour around the old dockland area of Bristol. Overlooking the River Avon the harbour is linked to Queen Square by Pero's Bridge famous for it's iconic horn-shaped counterweights.

The harbourside is a truly vibrant and unique part of Bristol, It has existed since the 13th century but was developed into its current form in the early 19th century by installing lock gates on a tidal stretch of the River Avon in the centre of the city. It is often called the **Floating Harbour** as the water level remains constant and it is not affected by the state of the tide on the river.

Bristol Harbour hosts the Bristol Harbour Festival in July of each year, attended by tall ships and hundreds of ships and boats of all kinds. About 200,000 visitors view the boats, and watch live music, street performances and other entertainments.



Day Three

Friday 17th April 2015

Time	Event
09:00	Tea and Coffee
Quantum Simulation and Cold Atoms	
09:30	Enrique Solano *(University of the Basque Country)* **Digital-analogue quantum simulators**
09:50	Stefan Kuhr *(University of Strathclyde)* **Quantum simulation with ultra-cold gases in optical lattices**
10:20	**Panel members:** • Enrique Solano *(University of the Basque Country)* (chair) • Iulia Georgescu (Senior Editor, Nature Physics) • Barry Garraway (University of Sussex) • Axel Kuhn (Oxford University)
11:00	*Short Break*
The Innovation Landscape	
11:20	Ray Beausoleil, (*HP Labs)* ***Integrated Photonic Quantum Technologies for Classical IT***
11:55	**Panel members:** • Sir John O'Reilly (chair) • Tim Leeder (University of Bristol) • John M Martinis *(UCSB- Google)* • Leonie Mueck (*Associate Editor, Nature*)
12:40	*Close*
12:45	**Lunch**

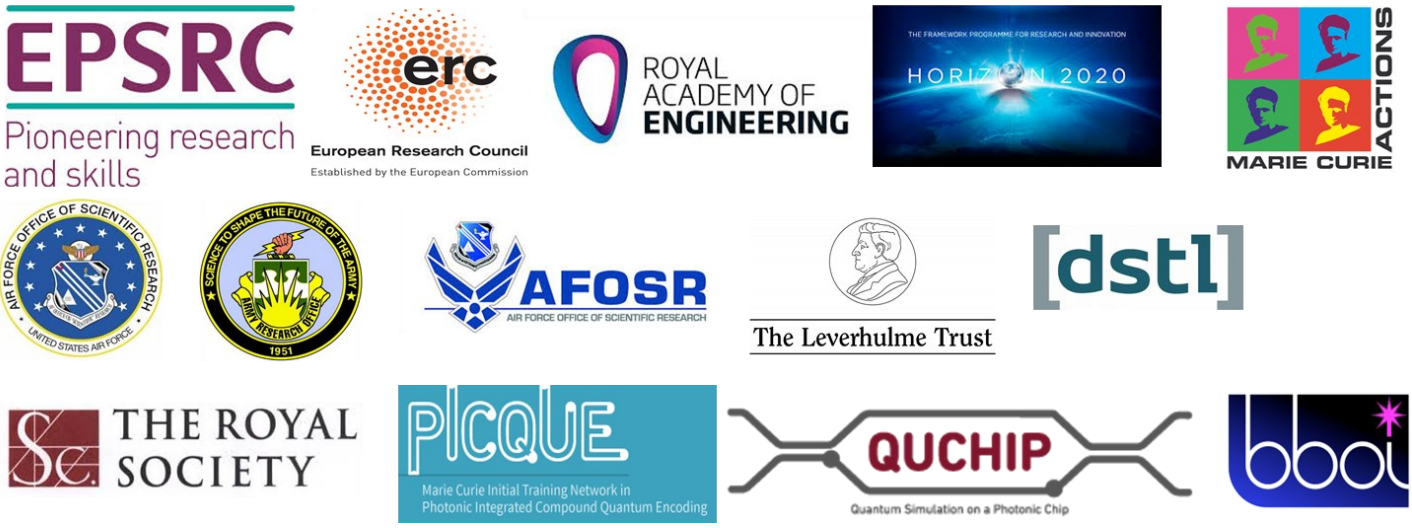
Please remember to add BQIT:16 into your calendar: Wednesday 8th—10th April 2016.

Notes:

Notes:

Thank you to our funders and supporters

University of BRISTOL



Contact Us

For general enquiries or to receive our monthly newsletter, please email **cqp-enquiries@bristol.ac.uk** or call **0117 928 8737.**

Contact details for team members can be found on our website at **bristol.ac.uk/physics/research/quantum/people**

If you have any feedback about our workshop please contact us at **bqit-2015@bristol.ac.uk**

We look forward to welcoming you back to Bristol next year.

Centre for Quantum Photonics
HH Wills Physics Laboratory,
Tyndall Avenue,
Bristol,
BS8 1TL

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