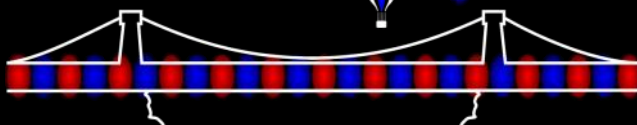


ISS:IQP



International Summer School in
Integrated Quantum Photonics

19-26 July 2023



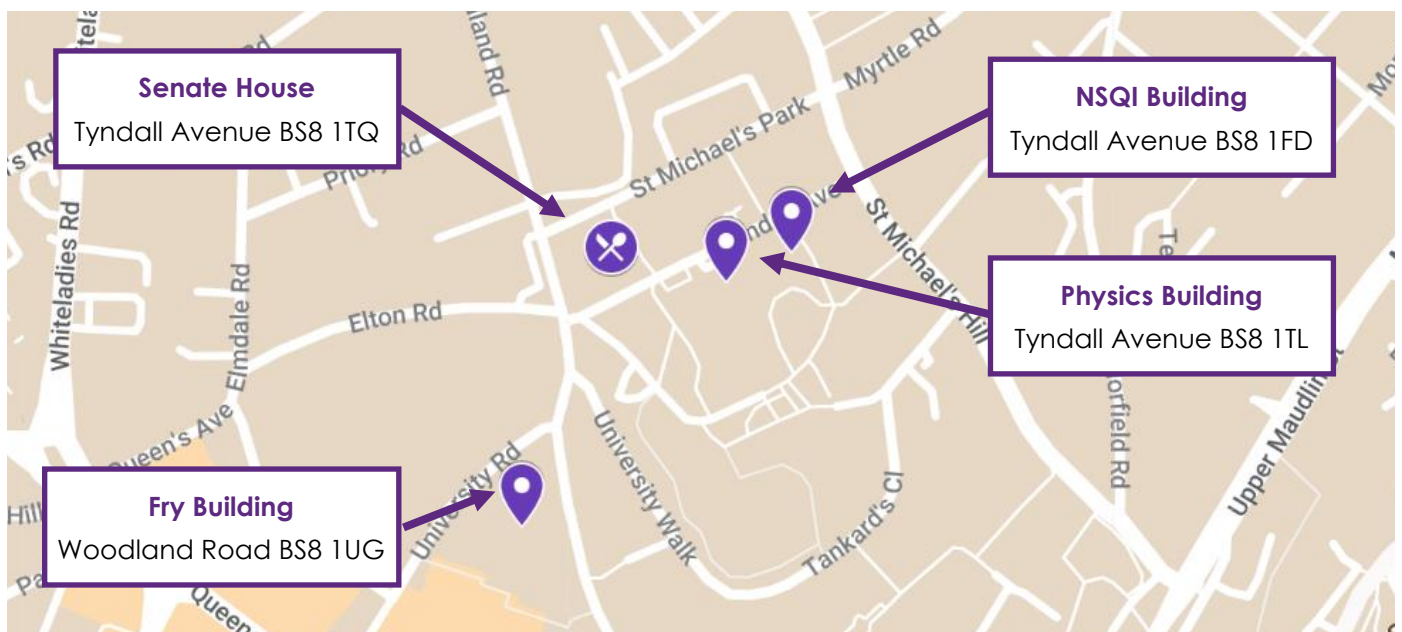
QETI
Labs/

 University of
BRISTOL

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VENUES



WELCOME TO ISS:IQP

Welcome all to the International Summer School in Integrated Quantum Photonics (ISS:IQP)

Quantum Technologies have had an undeniable impact on research around the world, and they are quickly permeating into the private sector. The promise of impact for a wide range of applications in computing, communications and metrology has been further emphasised by national and international research programmes. However, there is not yet consensus on the ideal technological platform for the deployment of quantum systems nor for the implementation of discrete quantum components. Integrated photonics is an often-overlooked quantum platform; it benefits dramatically in that it is a rather mature technology and has already been implemented in a wide variety of classical applications. The phase-stability and scalability of the platform enables the efficient realisation of quantum optics principles and ideas. Quantum photonics combines, therefore, the advanced field of photonics with the booming quantum technologies sector, enabling multiple applications across the full quantum spectrum.

For more than a decade, the research groups at the University of Bristol have pioneered the development of integrated quantum photonics. This research effort in Quantum Science and Technologies has been further endorsed by the University of Bristol through the establishment of the Quantum Information Institute. The current research community at Bristol exceeds 100 researchers across the Schools of Physics, Electrical and Electronic Engineering, and Mathematics. A critical mass of researchers has enabled the University of Bristol to train generations of PhD students, an effort formally consolidated with the establishment of the Quantum Engineering Centre for Doctoral Training (QE-CDT) and an MSc programme in Optoelectronics and Quantum Technologies. Moreover, Bristol hosts the Quantum Technology Enterprise Centre and the Quantum Technologies Innovation Centre, offering a broad range of career perspective for Quantum Engineers.

The idea for this International Summer School in Integrated Quantum Photonics (ISS:IQP) was conceived about a year ago, prompted by multiple converging factors: Bristol's critical mass of research expertise and teaching resources, our network of quantum photonics experts, the unambiguous support from UK's Engineering and Physical Sciences Research Council, the substantial demand in academia and the private sector postgraduates with skills in integrated photonics and quantum technologies, and UK's drive to foster new international collaborations. Our team has worked passionately for the past 10 months to assemble a world-class training programme, specifically designed to provide a coherent learning profile. We have brought together national and international speakers, representing both academic institutions and the private sector with expertise ranging from the fundamentals of integrated optics to the applications of the platform for quantum science and technologies. We want ISS:IQP attendees to learn new skills, appreciate the similarities and differences with other approaches, and ultimately, we want everyone to have a fantastic experience and celebrate the potential of scientific research through collaboration and innovation.

The ISS:IQP team and I are looking forward to hosting everyone at Bristol!

[Jorge Barreto, Director of the Quantum Engineering CDT, University of Bristol](#)

Supported by:



**Engineering and
Physical Sciences
Research Council**

DAY ONE AGENDA

WEDNESDAY

JULY 19

TIME	EVENT	LOCATION	LENGTH
09.00	Registration and coffee	Fry building entrance	45 min
09.45	Jorge Barreto (University of Bristol) <i>Welcome</i>	2.41 Fry building	15 min
10.00	Martin Cryan (University of Bristol) <i>Guided mode optics</i>	2.41 Fry building	60 min
11.00	Coffee break		15 min
11.15	John Rarity (University of Bristol) <i>Linear and non-linear photonics</i>	2.41 Fry building	90 min
12.45	Lunch	Senate house	60 min
13.45	Jon Pugh (University of Bristol) <i>Integrated photonics building blocks</i>	2.41 Fry building	60 min
14.45	Zoe Davidson (BT) <i>III-Vs and lasers</i>	2.41 Fry building	60 min
15.45	Coffee break		15 min
16.00	Callum Littlejohns (Cornerstone) <i>Fab and MPWs</i>	2.41 Fry building	60 min
17.00	Close		

DAY TWO AGENDA

THURSDAY

JULY 20

TIME	EVENT	LOCATION	LENGTH
09.00	Jake Biele (Light Trace Photonics) <i>Photonic device simulation (pt 1)</i>	LG.21 Fry building	90 min
10.30	Coffee break		15 min
10.45	Jake Biele (Light Trace Photonics) <i>Photonic device simulation (pt 2)</i>	LG.21 Fry building	75 min
12.00	Lunch	Senate house	60 min
13.00	Shayan Mookherjea (University of California San Diego) <i>Generation of states of light</i>	2.41 Fry building	90 min
14.30	Jorge Barreto (University of Bristol) <i>Detection of DV quantum states of light</i>	2.41 Fry building	60 min
15.30	Coffee break		15 min
15.45	Giacomo Ferranti (University of Bristol) <i>Detection of CV quantum states of light</i>	2.41 Fry building	60 min
16.45	Close		

DAY THREE AGENDA

FRIDAY

JULY 21

TIME	EVENT	LOCATION	LENGTH
09.00	James Lee (Wave Photonics) <i>Photonic mask design (pt 1)</i>	LG.21 Fry building	90 min
10.30	Coffee break		15 min
10.45	James Lee (Wave Photonics) <i>Photonic mask design (pt 2)</i>	LG.21 Fry building	75 min
12.00	Lunch	Senate house	60 min
13.00	Industry Panel chaired by Kimberley Brook (University of Bristol) <i>Zoe Davidson (BT)</i> <i>Jake Biele (Light Trace Photonics)</i> <i>James Lee (Wave Photonics)</i> <i>Araceli Venegas-Gomez (QURECA)</i>	2.41 Fry building	90 min
14.30	Kimberley Brook (University of Bristol) <i>Entrepreneurships</i>	2.41 Fry building	30 min
15.00	Coffee break		15 min
15.15	Poster session 1	Lower Ground Floor, Fry building	90 min
16.45	Close		

DAY FOUR AGENDA

SATURDAY

JULY 22

TIME	EVENT	LOCATION	LENGTH
09.00	Labs (see page 20 for details) <i>Chip 1 - Group 1</i> <i>Chip 2 - Group 2</i> <i>Chip 3 - Group 11</i> <i>HOM Disp - Group 12</i>	NSQI G.09 CDT lab, Physics NSQI 2.04 CDT lab, Physics	210 min
12.30	Lunch	NSQI foyer	60 min
13.30	Labs (see page 20 for details) <i>Chip 1 - Group 2</i> <i>Chip 2 - Group 1</i> <i>Chip 3 - Group 12</i> <i>HOM Disp - Group 11</i>	NSQI G.09 CDT lab, Physics NSQI 2.04 CDT lab, Physics	210 min
17.00	Close		



7-9pm: Laser tag

Laser Fusion,
Silver Street,
Broadmead,
Bristol BS1 2AG

DAY FIVE AGENDA

SUNDAY

JULY 23

TIME	EVENT	LOCATION	LENGTH
09.00	Labs (see page 20 for details) <i>Chip 1 - Group 3</i> <i>Chip 2 - Group 7</i> <i>Chip 3 - Group 4</i> <i>HOM Disp - Group 8</i>	NSQI G.09 CDT lab, Physics NSQI 2.04 CDT lab, Physics	210 min
12.30	Lunch	NSQI foyer	60 min
13.30	Labs (see page 20 for details) <i>Chip 1 - Group 4</i> <i>Chip 2 - Group 8</i> <i>Chip 3 - Group 3</i> <i>HOM Disp - Group 7</i>	NSQI G.09 CDT lab, Physics NSQI 2.04 CDT lab, Physics	210 min
17.00	Close		

DAY SIX AGENDA

MONDAY

JULY 24

TIME	EVENT	LOCATION	LENGTH
09.00	Labs (see page 20 for details) <i>Chip 1 - Group 5</i> <i>Chip 2 - Group 9</i> <i>Chip 3 - Group 10</i> <i>HOM Disp - Group 6</i>	NSQI G.09 CDT lab, Physics NSQI 2.04 CDT lab, Physics	210 min
12.30	Lunch	Senate house	60 min
13.30	Labs (see page 20 for details) <i>Chip 1 - Group 6</i> <i>Chip 2 - Group 10</i> <i>Chip 3 - Group 9</i> <i>HOM Disp - Group 5</i>	NSQI G.09 CDT lab, Physics NSQI 2.04 CDT lab, Physics	210 min
17.00	Close		



7-9pm: Bristol Harbour boat tour

Watershed Pontoon
(outside BSB Sports Bar),
Canon's Rd,
Bristol BS1 5TX

DAY SEVEN AGENDA

TUESDAY

JULY 25

TIME	EVENT	LOCATION	LENGTH
09.30	Ruth Oulton (University of Bristol) <i>Quantum dots and photonics</i>	LG.02 Fry building	60 min
10.30	Coffee break		15 min
10.45	Alex Clark (University of Bristol) <i>Molecules and colour-centres in photonics</i>	LG.02 Fry building	60 min
11.45	Chen-Lung Hung (Purdue University) <i>Neutral atoms and photonics</i>	LG.02 Fry building	60 min
12.45	Lunch	Senate house	60 min
13.45	Poster session 2	Lower Ground Floor, Fry building	75 min
15.00	Coffee break		15 min
15.15	Matthias Keller (University of Sussex) <i>Trapped ions and photonics</i>	LG.02 Fry building	60 min
16.15	Krishna Balram (University of Bristol) <i>Microwave to optical transducers: photonic interfaces to superconducting qubit</i>	LG.02 Fry building	60 min
17.15	Close		

DAY EIGHT AGENDA

WEDNESDAY

JULY 26

TIME	EVENT	LOCATION	LENGTH
09.15	Jake Kennard (KETS) <i>Quantum communications</i>	LG.02 Fry building	75 min
10.30	Coffee break		15 min
10.45	Naomi Solomons (Duality Quantum Photonics) <i>Quantum simulations</i>	LG.02 Fry building	75 min
12.00	Lunch	Senate house	60 min
13.00	Mihai Vidrighin (PsiQuantum) <i>Quantum computing</i>	LG.02 Fry building	75 min
14.15	Alasdair Price (Siloton) <i>How Integrated Quantum Photonic Design Techniques Can Unlock Next-Generation Sensing for Healthcare</i>	LG.02 Fry building	75 min
15.30	Coffee break		15 min
15.45	Industry panel chaired by Pouya Dianat (Optica) Jake Kennard (KETS) Jonathan Matthews (Duality Quantum Photonics) Mihai Vidrighin (PsiQuantum) Alasdair Price (Siloton)	LG.02 Fry building	60 min
16.45	Jorge Barreto (University of Bristol) <i>Closing and poster award</i>	LG.02 Fry building	15 min
17.00	Close		



Jorge Barreto

University of Bristol

Jorge Barreto is the Director of the Quantum Engineering Centre for Doctoral Training (QE-CDT) and Senior Lecturer at the University of Bristol with expertise in quantum optics, integrated photonics, and semiconductor fabrication technologies.

He obtained his Licenciatura (2003) and PhD (2009) in Physics from the Universitat Autònoma de Barcelona where he developed light-sources using silicon quantum dots. Before joining the University of Bristol he held a SCiRA Fellowship at the University of Birmingham studying ultra-fast light-matter interactions and surface-science techniques. His current research interests lay on the practical realisation of complex photonic devices for quantum information processing applications, targeting three key components: photon sources, modulators and single photon detectors. He has supervised nearly 30 postgraduate students and has contributed to the development of multiple postgraduate units for the QE-CDT.



Martin Cryan

University of Bristol

Professor Martin Cryan has worked in the fields of electromagnetic modelling, device and circuit fabrication for 37 years. He is joint head of the Photonics & Quantum research group in Electrical and Electronic Engineering where he is also Deputy Head of Department and teaches electromagnetics to both Undergraduate and Masters students. He is Co-I on EPSRC project : GLIMMER which is developing RF-acoustic devices on GaN. He was PI on EPSRC grant on GaN Photonic Crystal fluorescence sensors and PI on a £800K EPSRC grant on Integrated Tunable Flat Lenses. He is a co-founder of recent Bristol spin-out www.FluoretiQ.com, which is developing low-cost biosensors for bacteria detection, which came through the Quantum Entrepreneurship programme at Bristol (QTEC).



John Rarity

University of Bristol

Prof. John G. Rarity, FRS is Professor of Optical Communication Systems, in Electrical Engineering and a member of QET Labs at the University of Bristol. He is a founding father of quantum technologies, publishing the pioneering papers in solid-state single-photon detection, quantum interferometry, quantum measurements and quantum key distribution in fibre and in free space. He developed the first photonic crystal fibre pair photon sources in 2005 and subsequently built up multi-qubit entanglement experiments based on this technology. He has over 200 publications on quantum optics and nanophotonics (Google scholar h-index 67, >17000 citations). He was awarded the IoP Thomas Young Medal in 1994, the Descartes prize in 2004, a Wolfson research merit fellowship 2006 and in 2015 he was elected Fellow of the Royal Society.



Jon Pugh

University of Bristol

Dr Jon Pugh is a Lecturer in the Quantum Engineering Centre for Doctoral Training, and Deputy Programme Director for Electrical and Electronic Engineering, and Computer Science and Electronics at the University of Bristol. Jon completed his PhD in the University of Bristol where he worked on the modelling of nanoscale light confinement, and rapid prototyping using focused ion beam technologies. Following a brief 18-Month secondment to industry (BAE Systems), he spent nearly 10-years as a postdoctoral researcher working on projects spanning nano-engineering of III-nitride semiconductors to microfluidic assay design. In November 2019, Jon joined the QE-CDT as a lecturer where amongst his achievements leading the design and implementation of a unit that trains users the design principles, simulation and fabrication methods, and characterisation of photonics integrated circuits (PICs). He is Co-Investigator on grants totalling nearly £3M including a recently funded Innovate UK PIC Industry Bootcamp that will run in Summer 2024, designed to transform physicists or engineers into skilled experts who can develop PIC technologies for real-life applications.



Zoe Davidson

BT

Dr Zoe Davidson is a Senior Research Specialist for the Optical Networks and Quantum Research team at BT in the Network Strategy and Research department. Zoe's research focus is on Photonic Integrated Circuits for use in both classical and quantum networks. Zoe is from NZ where she completed her undergraduate degree in Optoelectronics at the University of Auckland, during which time she published research on the non-invasive investigation of fruit using free space optics. She then worked at Vodafone NZ as a design engineer in Optical Networks before moving to Bristol to complete her PhD in Photonics (with a focus on semiconductor compounds for energy efficient emission in the O- and C-bands), which she successfully defended in November 2022.



Callum Littlejohns

Cornerstone

Dr Callum Littlejohns is the coordinator of the CORNERSTONE silicon photonics foundry service and is responsible for the day-to-day leadership of the CORNERSTONE team, having previously completed his PhD within the Silicon Photonics Group in 2015. He has a track record of excellence, having received multiple awards throughout his academic life, including being recognised in the 2023 Electro-Optics Photonics100 list of people driving the global photonics industry forwards and being awarded the Information Overload category winner at the 2015 EPSRC ICT Pioneers Awards. Callum has published a book chapter, over 50 papers in peer-reviewed journals, and over 140 international conference papers. He has served as co-chair at the Silicon Photonics conference at SPIE Photonex since 2017.



Jake Biele

Light Trace Photonics

Dr Jake Biele is CEO & co-founder of Light Trace Photonics, a company developing PIC-based educational tools to help students learn integrated photonics. Jake did his PhD at the University of Bristol where he developed integrated photonic resources for quantum-enhanced gas sensing in the mid-infrared. He then joined Bristol startup, Siloton, where he helped develop chip-based optical coherence tomography as a portable tool for 3D eye scanning. In 2022, Jake launched Light Trace Photonics with co-founder Dr Dominic Sulway where he now works developing products for education. Jake is also one of Innovate UK's Young Innovators and holds a seat on the Future Photonics Leaders committee, a group elected to help amplify the voices of the next generation in the UK's photonics industry.



Shayan Mookherjea

University of California San Diego

Shayan Mookherjea received the BS degree with honors from Caltech, the SM degree from MIT, and the PhD from Caltech in Electrical Engineering with a minor in Physics. He is a Professor of Electrical and Computer Engineering at the University of California, San Diego (UCSD). He leads the Integrated Photonics Group at UCSD (<https://integratedphotonics.ucsd.edu/>)



Giacomo Ferranti

University of Bristol

Giacomo Ferranti obtained a Ph.D. in Physics at University of Bristol in 2019, under the supervision of Prof. Jonathan Matthews, and he kept working as a postdoc in the same research group until 2022. He is currently employed as a lecturer within the Quantum Engineering Centre for Doctoral Training (Bristol, UK). His research work focuses on developing a scalable on-chip infrastructure for non-gaussian continuous-variables quantum optics.



James Lee

Wave Photonics

Dr James Lee is the CEO and co-founder of Wave Photonics, a Cambridge-based startup developing a platform to unleash the transformative potential of integrated photonics. Based on a core computational design technology, this platform will enable designers to take products from idea to volume using pre-designed, adaptable components and integrations with packagers and other service providers. Removing long development times and reducing high barriers to entry allows designers to remain focused on their core differentiating technology from the start.

James undertook his PhD in Toshiba's Quantum Information Group at Cambridge University where he developed photon sources for quantum computing, followed by a time modelling equity derivatives at an investment bank. He also holds master's degrees in Photonic Systems Development from Cambridge University and Physics from Oxford University. In 2019 James received a QTEC Enterprise Fellowship to assist with developing the commercial foundations to Wave Photonics' platform for integrated photonics, and the company was formally incorporated in 2021.



Kimberley Brook

University of Bristol

Kimberley has been supporting the creation and development of high growth deep technology businesses since 2016 where she first started training entrepreneurs through the Quantum Technology Enterprise Centre. She is now the Director of SETsquared Bristol, an inclusive incubator which enables entrepreneurs to realise their ambition for their technology businesses.

Outside of incubation support, her and her team continue to support students, researchers and the wider public on their journey to commercialisation of new disruptive technologies through bespoke training initiatives which seek to inspire future entrepreneurs, facilitate the ideation process and support new venture creation.



Araceli Venegas-Gomez

QURECA

Dr. Araceli Venegas-Gomez spent several years working for Airbus in Germany and France as an aerospace engineer, before falling in love with quantum mechanics. She then decided to follow her passion for physics, and moved to Scotland to pursue a PhD in quantum simulation at the University of Strathclyde. Following discussions with the different quantum stakeholders she had over the last years, Araceli identified the need to bridge the gap between businesses and academia, as well as to raise the quantum awareness to the general public. Continuing her work on outreach advocating quantum technologies, she was named the "quantum ambassador", after winning the Optical Society Milton and Rosalind Chang Pivoting fellowship in 2019. Araceli founded her own company called QURECA (Quantum Resources and Careers) to create a link between the different stakeholders in the quantum community through a common language, and to generate global opportunities with quantum technologies. QURECA provides a range of professional services, business development, and the solution to the quantum workforce skills bottleneck: the first online platform for quantum training and resourcing, to support individuals and businesses to be part of the quantum revolution.



Ruth Oulton

University of Bristol

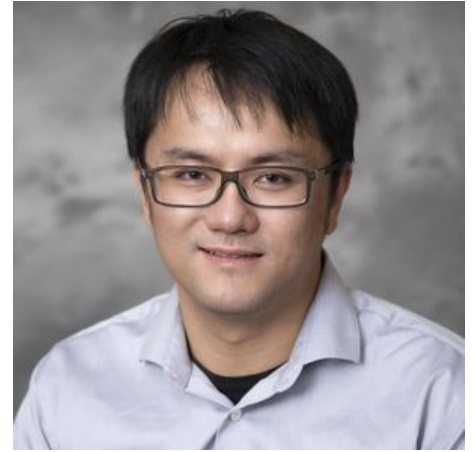
Prof. Ruth Oulton is a Professor of Quantum Photonics at the University of Bristol and is currently Research Director for the School of Physics in Bristol University. She is currently developing semiconductor quantum mechanical devices that will form the first reliable quantum sources of light such as single photons sources and single photon switches. These are key components in the up-and-coming quantum technologies, for use in secure communications and in novel quantum simulation techniques that solve classically intractable calculations. Prof. Oulton has a wide interest in light-matter interactions, and her other work includes investigations of how optical interference effects in plants improve photosynthesis, and how plastic molecules called j-aggregates can have the optical properties of metals. Prof. Oulton studied at the University of Manchester (UMIST), and undertook her PhD in Sheffield on the optics of semiconductor quantum dots. She was formerly an EPSRC Career Acceleration Fellow and a Quantum Technologies Fellow, and held an Alexander von Humboldt fellowship in TU Dortmund, Germany. In a recent European network, COST Action 1403 "Nanoscale Quantum Optics", she was the gender balance advisor and implemented interventions to start the conversation about gender inequality in the quantum technologies sector.



Alex Clark

University of Bristol

Dr Alex S. Clark studied a MSci in Physics and a PhD in Quantum Photonics at the University of Bristol, during which he developed photonic crystal fibers to generate photons in a variety of quantum states, demonstrated a quantum controlled-NOT gate in optical fiber and created multi-qubit cluster states using fiber devices. In 2011 he joined the Centre for Ultrahigh-bandwidth Devices for Optical Systems (CUDOS) group at the University of Sydney and was Project Leader of the Quantum Integrated Photonics Project. Whilst there he won a Discovery Early Career Researcher Award, a three-year fellowship to work on integrated quantum frequency conversion. In 2015 he won a Marie Skłodowska Curie Research Fellowship to work in the Centre for Cold Matter at Imperial College London, leading a group of researchers working on the use of organic dye molecules to build photon sources and other quantum-enhanced technology. In 2017 he was awarded a prestigious Royal Society University Research Fellowship to pioneer a new field of Molecular Quantum Photonics. In 2021 he was appointed as a Senior Lecturer in Quantum Communication Technology in the Quantum Engineering Technology Labs at the University of Bristol, based in the Department of Electrical and Electronic Engineering. His research interests cover solid state single photon sources, nanophotonics, quantum integrated photonics, quantum memories, and quantum imaging and sensing systems. He is Chair of the IOP Quantum Optics, Quantum Information, and Quantum Control (QQQ) Group and Chair of the IOP Photon Conference.



Chen-Lung Hung

Purdue University

Dr. Hung received his PhD degree in Physics at the University of Chicago, where he performed one of the first in situ studies of quantum critical dynamics and quantum phase transitions in atomic Bose-Einstein condensates loaded in optical lattices. Prior to joining Purdue as a faculty member in 2015, he held a postdoctoral fellowship at California Institute of Technology, where he has co-designed and developed one of the first photonic crystal atom-photon interface. Hung is currently an associate professor at Purdue Physics. One of his research directions focuses on interfacing ultracold atoms with integrated photonic circuits for applications in quantum optics, and for studying novel many-body dynamics with photon-mediated long-range interactions between trapped atoms. He is a recipient of the Air Force young investigator award and the NSF CAREER award.



Matthias Keller

University of Sussex

Prof Matthias Keller is a Professor of Experimental Physics in the Department of Physics and Astronomy at the University of Sussex. He received his PhD in 2004 for his work with Prof. H. Walther at the Max Planck Institute for Quantum Optics (Garching, Germany) on cavity QED with trapped ions. His work has been awarded in 2005 with the Otto-Hahn medal from the Max-Planck society. In 2005 he joined the University of Sussex as a Leopoldina Fellow. After the end of his fellowship in 2007 he became a Lecturer in Atomic Molecular and Optical Physics at the University of Sussex and is now a Professor of Experimental Physics.

His seminal work on cavity-QED with trapped ions include the first coupling of a single ion to an optical cavity, the deterministic generation of shaped single photons and the first demonstration of strong ion-cavity coupling.



Krishna Balram

University of Bristol

Krishna C. Balram is currently an Associate Professor in Electrical & Electronic Engineering at the University of Bristol. He received his PhD at Stanford University working with David A.B. Miller and was a postdoctoral fellow at the National Institute of Standards & Technology with Kartik Srinivasan. His research interests are primarily in the design, fabrication and characterization of nanoscale opto-electro-mechanical devices for applications in classical and quantum information processing. His work is currently supported by an ERC starting grant award.



Jake Kennard

KETS

Jake is Co-Founder and Technical Sales Director at KETS Quantum Security. KETS are a company that's passionate about solving real world security problems using the unique advantages of quantum technologies. Their unique chip-based solutions, based on technology developed over a decade at the University of Bristol, provide ultra-low size, weight and power without compromising performance. KETS are currently engaging with a number of blue chip organisations across a range of sectors including telecommunications, governments, defence and finance to help them secure their systems and data with quantum-safe crypto solutions.



Naomi Solomons

Duality Quantum Photonics

Naomi is a year 4 student in the University of Bristol CDT in Quantum Engineering, with a PhD project focussed on applications of Gaussian boson sampling, alongside part time work with Duality Quantum Photonics. From September to December 2021 Naomi carried out an internship with Riverlane Research Ltd. In her first year at Bristol she carried out projects in the communications group, focused on authentication in QKD networks, and about quantum algorithms for lattice cryptography. Naomi completed her Masters in Natural Sciences at Durham University, with her final year project in flavour physics, and was a summer school student at DESY, Hamburg, working on the FCC (Future Circular Collider) project as part of the ATLAS group.



Jonathan Matthews

Duality Quantum Photonics

Jonathan Matthews is Principle Photonics Engineer at Duality Quantum Photonics and is Professor of Quantum Photonics & Co-Director the QET Labs research centre at the University of Bristol. He has 15 years of integrated quantum photonics experience that includes seminal research works that established the field. His contributions have been recognized by regular invited talks at international conferences, award of three academic fellowships (Leverhulme Trust, EPSRC, ERC) and a 2021 Philip Leverhulme Prize for Physics. He co-founded Raycal Ltd. that commercialised photon sources with photonics multinational Thorlabs, Inc.



Mihai Vidrighin

PsiQuantum

Mihai Vidrighin joined PsiQuantum in 2017. He is a director of R&D, leading the development of integrated photon pair sources for the company's photonic quantum computer. He has developed complete and accurate models for photon pair generation in waveguide devices. Previously, he received his PhD in experimental quantum optics from Imperial College London's Qontrolled Quantum Dynamics Doctoral Training Center.



Alasdair Price

Siloton

Dr Alasdair Price is the CEO and Co-Founder of Siloton, a Bristol-based start-up developing personal eye scanners for the 1 in 4 of us who will be diagnosed with macular disease once we are over the age of 60. Macular disease affects the area of the eye responsible for your central vision and, if left untreated, leads to blindness. Alasdair holds an MPhys in Physics from the University of Sussex, where he worked on ion-trap quantum computing, and a PhD in Quantum Engineering from the University of Bristol. During his PhD, he built the first link in the UK Quantum Network, invented the BB84-AES family of quantum key distribution (QKD) protocols, and developed a chip-based QKD receiver unit that was installed in a hangar and on an airfield laser range. This was a central part of the work for which he was named an EPSRC Connected Nation Pioneers finalist, "recognising exceptional research contributions towards the development of a Connected Nation". He has designed 12 photonic chips, 8 of which were for commercial application, including for KETS Quantum Security. Alasdair received a QTEC Enterprise Fellowship in 2019 to assist with the development of Siloton, which was formally incorporated in April 2020. Since then, he has led Siloton from idea through to first revenue, using photonic chips to ensure everyone can access clinical-grade eye imaging wherever and whenever they need it.



Pouya Dianat

Optica

Pouya Dianat, PhD is a Technical Director at Optica's Corporate Engagement Department, focusing on Photonic Integrated Circuits and Quantum applications. Pouya has worked in the Photonics industry for more than 10 years, focusing on business development for advanced photonic technologies, from concept to market launch. His previous experience includes commercializing and industrializing high-performance photodetectors for applications such as 3D sensing and imaging, specifically for automotive LiDAR, defense, and datacom markets and developing relationships with partners, and key stakeholders across photonic industry ecosystems. He earned his PhD in Electrical Engineering from Drexel University in 2015, where he conducted research on opto-plasmonic quantum capacitors, and since then has closely followed the commercial developments in quantum technologies, with the advent of practical quantum computers.

LAB GROUPS

#	GROUP CONCEPT	GROUP MEMBERS
1	Basics	Madhava Krishna Prasad, Oliver Powell, Adam Brzosko, Sayan Gangopadhyay
2	Basics backwards	Maeve Wentland, Atmadev Rai, Angela Stephens, Suruchi Bala
3	Basics - quantum	Alan Yahya, Wenhan Zhang, Guanwei Huang, Phillip Kirwin
4	Basics - quantum backwards	Qing Wang, Shashaank Khanna, Davey Armstrong, Daniel Hutama
5	Fibre contrast (scaling up)	Mark long, Charli Hamilton, Sourav Das, Chih-Yu Lee
6	Fibre contrast (improvement)	Kate Fenwick, Ibtisam Hammad Abbasi, Shradhanjali Sahu, Gemma Quinn
7	Auto-scaling	Javier Martínez, Joshua Castro, Samuel Blair, Horatio Wong
8	Zoom-in	Trevor Steiner, John Adeniran, Pratihtha Agnihotri, Gisell Lorena Osorio
9	Automated chip	Eleanor Nichols, Lillian Thiel, Michael Ajana, Yousef Alharbi
10	Automated chip v2	Sarah McCarthy, Jack deGooyer, Luca Maggio, Matteo Pennacchietti
11	Q phenomena	Fangling Wu, Adnan Adnan, Will Smith, Petros Laccotripes
12	Q phenomena v2	Ali Pour Mohammad Qoli Vafa, Shangxuan Yu, Nicholas Smith, Chao Wen

LAB DESCRIPTIONS

TITLE	DESCRIPTION
Chip 1	Manual i/o for photonic chips and spectral analysis of simple structures
Chip 2	Single photon sources
Chip 3	Quantum random walk
HOM Disp	HOM dip change with dispersion for different sources

POSTERS

1. Sam Blair

University of York, UK
Tuneable Phase and Amplitude Modulation Using a 2D Indium Tin Oxide Architecture

2. Will Smith

Univeristy of Bath, UK
Reducing noise in photonic crystal fibre sources of high purity heralded single photons

3. Fangling Wu

Lancaster University, UK
Unclonable anti-counterfeiting application of green emissive carbon quantum dots derived from spent oolong tea leaves

4. Charli Hamilton

University of Strathclyde, UK
Integrated Generation of Continuous-Variable Photonic Cluster States via Four-Wave Mixing

5. Nicholas Smith

Virginia Polytechnic Institute and State University, USA
Magnetization Precession in Co/Pd Multilayers at Low Laser Fluence Regime

6. Pratishtha Agnihotri

University of Utah, USA
Abstractions for modeling manufacturing variations in silicon photonics circuits

7. Atmadev Rai

University of Portsmouth, UK
Ultimate quantum sensitivity in the estimation of multiple parameters in a linear optical interferometer with squeezed light

8. Luca Maggio

University of Portsmouth, UK
Multi-parameter quantum estimation of the polarization of multiple photons

9. Shradhanjali Sahu

University of Leeds, UK
Finite key analysis for Continuous Variable Quantum Key Distribution in Multiple-Input Multiple-Output Settings

10. Adnan Adnan

University of Strathclyde, UK
Development of a Hybrid Lithium Niobate Photonic Platform

11. Chih-Yu Lee

University of Maryland, USA
Combinatorial Investigation of Ge-Sb-Te Phase-Change Memory Materials for Neuro-Inspired Applications

12. Matteo Pennacchietti

University of Waterloo, Canada
Oscillating photonic Bell state from a semiconductor quantum dot for quantum key distribution

13. Sourav Das

University of Warwick, UK
Optimal quantum spectroscopy of a two-level system with single photon pulses

14. Kate Fenwick

University of Ottawa, Canada
Photonic quantum walk with ultrafast time-bin encoding

15. Sarah McCarthy

University of Strathclyde, UK
Entangled photon sources for satellite QKD

16. Sayan Gangopadhyay

University of Waterloo, Canada
Purcell Enhanced Nanowire Quantum Dot Sources of Single and Entangled Photons

17. Eleanor Nichols

University of Cambridge, UK
Towards quantum-confined spin-qubits in monolayer, semiconducting WSe₂

18. Angela Stephen

University of Bristol, UK
Enhancing zero-phonon line emission in optically active implanted defects through Photonic Crystal Cavities

19. Oliver Powell

University of Cambridge, UK
Spin and optical physics of 2eV single defects in hBN

20. Madhava Krishna Prasad

Newcastle University, UK
Charge transfer and quantum emitters in 2D heterostructures

21. Trevor Steiner

University of California, Santa Barbara, USA
Integrated Quantum Photonics using AlGaAsOI

NOTES

NOTES

CODE OF CONDUCT

ISS:IQP is an EPSRC funded International Summer School in Integrated Quantum Photonics. We value the engagement of each attendee and work to ensure all participants have an enjoyable and fulfilling experience. Accordingly, all attendees are expected to show respect and courtesy to other attendees throughout the summer school and at all related events. All attendees, speakers, and volunteers at ISS:IQP are required to agree with the following code of conduct. Organisers will enforce this code throughout the summer school. We expect cooperation from all participants to help ensure a safe environment for everybody. Thank you for helping make this a welcoming, friendly event for all.

THE SHORT VERSION

The ISS:IQP team is dedicated to providing a harassment-free experience for everyone, regardless of gender, gender identity and expression, age, sexual orientation, disability, physical appearance, body size, race, ethnicity, religion (or lack thereof), or technology choices. We do not tolerate harassment of participants in any form. Sexual language and imagery is not appropriate for any summer school venue or platform, including talks, panels, social activities, Twitter and other online media. Summer school participants violating these rules may be sanctioned or expelled from ISS:IQP at the discretion of the workshop organisers.

THE LONGER VERSION

Harassment includes, but is not limited to:

- Verbal comments that reinforce social structures of domination related to gender, gender identity and expression, sexual orientation, disability, physical appearance, body size, race, age, religion, or technology choices.
- Sexual images in public spaces.
- Deliberate intimidation, stalking, or following.
- Harassing photography or recording.
- Sustained disruption of talks or other events.
- Unwelcome sexual attention.
- Advocating for, or encouraging, any of the above behaviour.

Participants asked to stop any harassing behaviour are expected to comply immediately. If a participant engages in harassing behaviour, the summer school organisers may take any action they deem appropriate, including warning the offender or expulsion from ISS:IQP.

WHO TO CONTACT

If someone makes you or anyone else feel unsafe or unwelcome, please contact our team as soon as possible through our email quantum-engineering@bristol.ac.uk.

Harassment and other code of conduct violations reduce the value of our event for everyone. We want you to be happy at our event. People like you make our event a better place.

The ISS:IQP team will be happy to help participants contact local law enforcement or otherwise assist those experiencing harassment to feel safe for the duration of the summer school.

We expect participants to follow these rules at all summer school venues, online platforms and related social events.

ATTENDEE PROCEDURE FOR INCIDENT HANDLING

1. The ISS:IQP team will be prepared to handle the incident. All our staff are informed of the code of conduct policy and guide for handling harassment at the workshop.
2. Report the harassment incident to an ISS:IQP team member through email at quantum-engineering@bristol.ac.uk (this inbox will be frequently checked for the duration of the event). All reports are confidential. When taking a personal report, our staff will ensure this is confidential. They may involve other event staff to ensure your report is managed properly. During the reporting process, we'll ask you to tell us about what happened. This can be upsetting, but we'll handle it as respectfully as possible. You won't be asked to confront anyone and we won't tell anyone who you are.
3. We will only involve law enforcement or security at a victim's request. If you do feel your safety is in jeopardy please do not hesitate to contact local law enforcement by dialling 999. If you do not have a phone please ask a member of the ISS:IQP team who can call on your behalf.

ATTRIBUTION

This Code of Conduct was adapted from confcodeofconduct.com and [Geek Feminism Wiki](https://www.geekfeminism.com/wiki/).

THE ISS:IQP TEAM WOULD LIKE TO THANK

Our speakers and panellists for sharing their work and opinions on an expansive range of topics.

Our sponsors for helping to make the ISS:IQP a success.

The ISS:IQP organising team, advisors and helpers for their innovative ideas and diligent work. Thank you for your support and enthusiasm during the whole process.

And finally, all of our ISS:IQP attendees for participating. Thank you for joining us, and we look forward to welcoming you back to Bristol soon!

ORGANISING TEAM



Jorge Barreto
*Director of the
Quantum
Engineering CDT*



Lin Burden
*Quantum
Engineering CDT
Student
Administrator*



Giacomo Ferranti
*Quantum
Engineering CDT
Lecturer*



Robert Hicks
*Quantum
Engineering CDT
Industry
Engagement
Manager*



Sorrel Johnson
*Quantum
Engineering CDT
Manager*



Siddarth Joshi
*Lecturer in
Optical
Communications*



Jon Pugh
*Quantum
Engineering CDT
Lecturer*



Carrie Weidner
*Quantum
Engineering CDT
Lecturer*

ADDITIONAL SUPPORT



Eesa Ali
Quantum
Engineering CDT
student



James Blatcher
QET Labs PhD
student



Holly Caskie
QET Labs Senior
Research
Administrator



Nathan Moses
QET Labs PhD
student



Samantha Pugh
QET Labs Executive
Assistant



Marija Radulovic
Quantum
Engineering CDT
student



Jaya Sagar
Quantum
Engineering CDT
student



Zulekha Samiullah
Quantum
Engineering CDT
student



Belinda Sharpe
QET Labs Centre
Manager



Molly Thomas
QET Labs PhD
student

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