**Chair**
Fabio Sciarrino, University of Rome La Sapienza

**Scientific Committee**
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Roberto Osellame, IFN-CNR
Christine Silberhorn, University of Paderborn
Ian Walmsley, University of Oxford
Philip Walther, University of Vienna

**Local Organizing Committee**
Giuliana Pensa, University of Rome La Sapienza

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# International Conference on Integrated Quantum Photonics

***Final Conference of PICQUE and QUCHIP projects***

## Rome, 26-29 September 2017

# SCIENTIFIC PROGRAMME

## Tuesday 26 September

09.00 *Welcome address*

**Invited Tutorial**
Boson sampling I
*Scott Aaronson, Massachusetts Institute of Technology (USA)*

10.00 **Invited Speaker**
Quantum-information processing with quantum dot photon-emitter interfaces
*Peter Lodahl, Niels Bohr Institute, University of Copenhagen (Denmark)*

10.30 *Coffee break*

11.00 **Invited Speakers**
Silicon-based materials for optical quantum technologies
*Alberto Politi, University of Southampton (UK)*

Quantum optics and information science in multi-dimensional photonics networks
*Christine Silberhorn, University of Paderborn (Germany)*

12.00 **Oral contributions**
On-chip, tunable all-electrical single photon sources
*David Ellis, Toshiba Research Europe Ltd (UK)*

Integration of single-photon sources and detectors on GaAs platform
*Giulia Digeronimo, Eindhoven University of Technology (The Netherlands)*

12.30 *Lunch break*

14.00 **Invited Speakers**
Photonic quantum computing exploiting the superposition of gates and other features
*Philip Walther, University of Vienna (Austria)*

A frequency-multiplexed source of heralded single photons
*Steven Kolthammer, Imperial College London (UK)*

15.00 **Oral contributions**
On-chip quantum interference of micro-ring resonator heralded sources in Si-photonics
*Imad Faruque, University of Bristol (UK)*

Telecom single photon sources for multi-qubit experiments
*Chiara Greganti, University of Vienna (Austria)*

Active demultiplexing of single photons from a solid state source
*Mirko Lobino, Griffith University (Australia)*

Photostable molecules on chip: integrated single photon sources for quantum Technologies
*Pietro Ernesto Lombardi, LENS-Università di Firenze (Italy)*

An efficient plug-and-play single photon source, and limits on spectral purity and heralding efficiency for photon pairs
*Evan Meyer-Scott, University of Paderborn (Germany)*

Electro-mechanical control of an on-chip beam splitter with an embedded single photon source
*Zofia Bishop, University of Sheffield (UK)*

16.30 *Coffee break*

17.00 **Poster session 1**

| | Wednesday 27 September |
|---|---|
| 09.00 | **Invited Tutorial**<br>Boson sampling II<br>*Scott Aaronson, Massachusetts Institute of Technology (USA)* |
| 10.00 | **Invited Speaker**<br>Engineering parametric down-conversion in multimode nonlinear waveguides<br>*Konrad Banaszek, University of Warsaw (Poland)* |
| 10.30 | *Coffee break* |
| 11.00 | **Invited Speakers**<br>Optical nonlinearity at the single-photon level: towards deterministic photon-photon gates<br>*Loïc Lanco, University Paris Diderot – CNRS (France)*<br>Generation of entangled quantum states with on-chip optical frequency combs<br>*Roberto Morandotti, INRS-EMT (Canada)* |
| 12.00 | **Oral contributions**<br>Boson sampling with Gaussian measurements<br>*Levon Chakhmakhchyan, Université libre de Bruxelles (Belgium)*<br>Gaussian Boson Sampling<br>*Craig Hamilton, Czech Technical University (Czech Republic)* |
| 12.30 | *Lunch break* |
| 14.00 | **Invited Speakers**<br>Advanced photon sources<br>*Alan L. Migdall, National Institute of Standards and Technology (USA)*<br>Distinguishability and many-particle interference<br>*Stefanie Barz, University of Stuttgart (Germany)* |
| 15.00 | **Oral contributions**<br>Quantum metrology enhanced by entanglement from boson sampling<br>*Daniel Nagaj, Slovak Academy of Sciences (Slovak Republic)*<br>Driven quantum dynamics<br>*Linda Sansoni, University of Paderborn (Germany)*<br>Single-photon quantum contextuality on a chip<br>*Ioannis Pitsios, Institute of Photonics and Nanotechnology-CNR (Italy)*<br>Multiphoton interference in time with a fiber-integrated interferometer<br>*Joelle Boutari, University of Oxford (UK)* |
| 16.00 | *Coffee break* |

| | |
|---|---|
| 16.30 | **Oral contributions**<br>A general quantum photonic model for cavity-emitter systems evanescently coupled to a waveguide<br>*Frédéric Peyskens, Massachusetts Institute of Technology (USA)*<br>Reconfigurable femtosecond laser written integrated photonic devices for quantum Information<br>*Syed Adil Rab, Sapienza Università di Roma (Italy)*<br>Quantum storage of heralded single photons in a laser written waveguide<br>*Alessandro Seri, Institut de Ciències Fotòniques-ICFO (Spain)*<br>Silicon quantum photonics in the short-wave infrared<br>*Joshua Silverstone, University of Bristol (UK)*<br>Scaling up entanglement in integrated silicon quantum photonics<br>*Jeremy Adcock, University of Bristol (UK)*<br>Frequency-entangled qudits in AlGaAs waveguides<br>*Giorgio Maltese, Université Paris Diderot, Sorbonne Paris Cité (France)* |
| 19.30 | ***Social dinner*** |

| | Thursday 28 September |
|---|---|
| 09.00 | **Invited Tutorial**<br>Verification of quantum technology<br>*Elham Kashefi, University of Edinburgh (UK), CNRS–Univ. Pierre et Marie Curie (France)* |
| 10.00 | **Invited Speaker**<br>Large-scale photonic integrated circuits for quantum information processing and machine learning<br>*Dirk Englund, Massachusetts Institute of Technology (USA)* |
| 10.30 | *Coffee break* |
| 11.00 | **Invited Speakers**<br>AlGaAs photonic devices for quantum information<br>*Sara Ducci, Université Paris 7-CNRS (France)*<br>Femtosecond laser writing for integrated quantum photonics<br>*Roberto Osellame, Institute of Photonics and Nanotechnology-CNR (Italy)* |
| 12.00 | **Oral contributions**<br>On chip analysis of path-polarization hyperentangled cluster photon states<br>*Mario Arnolfo Ciampini, Sapienza Università di Roma (Italy)*<br>All-optical generation of tensor-network states<br>*Ish Dhand, University of Ulm (Germany)* |
| 12.30 | *Lunch break* |
| 14.00 | **Invited Speakers**<br>Continuous-variable quantum cryptography on silicon<br>*Eleni Diamanti, CNRS – Université Pierre et Marie Curie (France)*<br>Quantum enhancement of accuracy and precision in optical interferometry for optical property measurements<br>*Sébastien Tanzilli, INPHYNI, CNRS, University Côte d'Azur (France)* |
| 15.00 | **Oral contributions**<br>Hybrid quantum circuits<br>*Ali Elshaari, KTH Royal Institute of Technology in Stockholm (Sweden)*<br>Engineering of orbital angular momentum supermodes in coupled optical waveguides<br>*Jordi Mompart, Universitat Autonoma de Barcelona (Spain)*<br>Bound states and entanglement generation in waveguide QED<br>*Francesco Pepe, INFN-CNR (Italy)*<br>On-chip conversion of quantum entanglement between different degrees of freedom<br>*Xifeng Ren, University of Science and Technology of China (China)*<br>Noise features dictating the ultimate precision of frequency estimation<br>*Andrea Smirne, University of Ulm (Germany)*<br>Optical phase measurements with single-photons and two-photon phase sensitivity<br>*Panagiotis Vergyris, Universite Cote d'Azur, CNRS (France)* |
| 16.30 | *Coffee break* |
| 17.00 | **Poster session 2** |

| | Friday 29 September |
|---|---|
| 09.00 | **Invited Speakers**<br>Single and multi photon counting using an array of SNSPDs<br>*Alessandro Gaggero, Institute of Photonics and Nanotechnology-CNR (Italy)*<br>Efficient tomographic techniques that are relevant to LOQC<br>*David Gross, University of Cologne (Germany)*<br>Shaping the photon: Tailoring spontaneous emission in advanced single-photon sources<br>*Andrea Fiore, Eindhoven University of Technology (The Netherlands)* |
| 10.30 | *Coffee break* |
| 11.00 | **Invited Speakers**<br>Single-copy entanglement detection<br>*Borivoje Dakic, University of Vienna (Austria)*<br>Experimental Quantum Hamiltonian Learning<br>*Nathan Wiebe, Microsoft Research (USA)* |
| 12.00 | **Oral contributions**<br>An integrated pulse-position resolving detector based on spatially multiplexed superconducting nanowires<br>*Francesco Mattioli, Institute of Photonics and Nanotechnology-CNR (Italy)*<br>Photon-number-resolving detector free of systematic errors for strongly nonclassical light characterization and single emitter counting<br>*Miroslav Jezek, Palacky University Olomouc (Czech Republic)* |
| 12.30 | *Lunch break* |
| 14.00 | **Invited Speakers**<br>A universal device for quantum communications<br>*Andrew Shields, Toshiba Research Europe Ltd (UK)*<br>Scaling quantum photonic technologies<br>*Mark Thompson, University of Bristol (UK)* |
| 15.00 | **Oral contributions**<br>Endurance of quantum coherence in Born-Markov open quantum systems<br>*Diego Guzman Silva, University of Rostock (Germany)*<br>Quantum key distribution using space division multiplexing<br>*Davide Bacco, Technical University of Denmark (Denmark)* |
| 15.30 | *Coffee break* |
| 16.00 | **Special Session on Quantum Innovation** |

# Poster session 1 – Tuesday 26 September

**P1_01** Experimental benchmark of Boson Sampling with pattern recognition techniques
**Iris Agresti**, *Sapienza Università di Roma (Italy)*

**P1_02** Deterministic positioning of quantum emitters in photonic devices
**Luke J. Bissell**, *Air Force Research Laboratory (USA)*

**P1_03** Experimental violation of local causality in a quantum network.
**Gonzalo Carvacho**, *Sapienza Università di Roma (Italy)*

**P1_04** Experimental signature of Quantum Darwinism in photonic cluster
**Mario Arnolfo Ciampini**, *Sapienza Università di Roma (Italy)*

**P1_05** Development of an integrated photon pair source at telecom wavelength fully realized by femtosecond laser micromachining
**Giacomo Corrielli**, *IFN-CNR (Italy)*

**P1_06** Laser written integrated programmable multiport interferometer
**Ivan Dyakonov**, *Lomonosov Moscow State University (Russian Federation)*

**P1_07** An On-chip Homodyne Detector for Measuring Quantum States
**Giacomo Ferranti**, *University of Bristol (UK)*

**P1_08** Observation of majorization principle for quantum algorithms via 3-D integrated photonic circuits
**Taira Giordani**, *Sapienza Università di Roma (Italy)*

**P1_09** Pure down-conversion photons through sub-coherence length domain engineering
**Francesco Graffitti**, *Heriot-Watt University (UK)*

**P1_10** Quantum state engineering using the one dimensional discrete time quantum walk
**Luca Innocenti**, *Queen's University Belfast (UK)*

**P1_11** Quantum non-Gaussianity of multi-photon light
**Lukáš Lachman**, *Palacký University (Czech Republic)*

**P1_12** Programmable quantum state engineering in multimode fibers
**Saroch Leedumrongwatthanakun**, *École Normale Supérieure (ENS) (France)*

**P1_13** Perfect probabilistic storing and retrieving of unitary channels
**Michal Sedlák**, *Slovak Academy of Sciences (Slovakia)*

**P1_14** On-chip monolithic integration of heralded single photons sources and beam splitters
**Jonathan Belhassen**, *Université Paris-Diderot (France)*

# Poster session 2 – Thursday 28 September

**P2_01** Direct characterisation of a nonlinear photonic circuit's wave function with laser light
**Francesco Lenzini**, *Griffith University (Australia)*

**P2_02** Experimental implementation of three- and four-qubit linear-optical quantum logic circuits
**Michal Micuda**, *Palacký University (Czech Republic)*

**P2_03** Probing the measurement process in Discrete-Time Quantum Walks via recurrence
**Thomas Nitsche**, *Universität Paderborn (Germany)*

**P2_04** Integrated DBT molecules on chip as single photon emitters
**Anna Ovvyan**, *University of Münster (Germany)*

**P2_05** Experimental quantum Hamiltonian learning: integrated quantum photonics to learn quantum spin dynamics and models
**Stefano Paesani**, *University of Bristol (UK)*

**P2_06** Transmission of photonic path entanglement through multi-core optical fibers
**Hee Su Park**, *Korea Research Institute of Standards and Science (South Korea)*

**P2_07** Entanglement of photons in their dual wave-particle nature
**Emanuele Polino**, *Sapienza Università di Roma (Italy)*

**P2_08** Joint Spectral Density measurement of energy correlations of photon pairs in an integrated micro-ring resonator
**Micol Previde Massara**, *University of Pavia (Italy)*

**P2_09** Spatial mode filtering using adiabatic passage and supersymmetric waveguides
**Gerard Queraltó Isach**, *Universitat Autònoma de Barcelona (Spain)*

**P2_10** Generalized Hadamard transformations for validation of multi-particle interference
**Niko Viggianiello**, *Sapienza Università di Roma (Italy)*

**P2_11** Error modelling in complex in silicon quantum photonics devices
**Caterina Vigliar**, *University of Bristol (UK)*

**P2_12** Polarization encoded quantum computation on a chip
**Jonas Zeuner**, *University of Vienna (Austria)*

**P2_13** Integration of photonic crystal devices
**Chii-Chang Chen**, *National Central University (Taiwan)*

**P2_14** Single organic molecule coupling to a hybrid plasmonic waveguide
**Samuele Grandi**, *Imperial College London (UK)*

# Information

**Contributed Talks**

Please keep your talk within 12 minutes, leaving 3 minutes for questions and discussion.

**Poster sessions**

The two poster sessions will be held on the 2nd floor of the Department of Physics. Check your poster number and the corresponding session.

**Session 1 on Tuesday 26 at 17.00** and **Session 2 on Thursday 28 at 17.00.**
Presenters are invited to stand by their poster(s) during the poster session.

*Set up and removal times:* Posters must be hung on the same day of the session before 14.00 and removed at the end of the session (the panels will be removed at the end of each session).

**Abstract book**

The abstracts of the conference will be available online at:
http://www.picque.eu/iqpconf2017-abstract-book/

# Venue

**Conference Venue**
University of Rome La Sapienza
Piazzale Aldo Moro 5
00185 Rome, Italy

**Scientific sessions**
Department of Orthopaedics
(1st building on your right as you enter the main entrance of the Campus, which is in Piazzale Aldo Moro)
Ground Floor, Aula A
University of Rome La Sapienza
Piazzale Aldo Moro 5
00185 Rome, Italy

**Poster sessions**
Department of Physics, 2nd floor
University of Rome La Sapienza
Piazzale Aldo Moro 5
00185 Rome, Italy

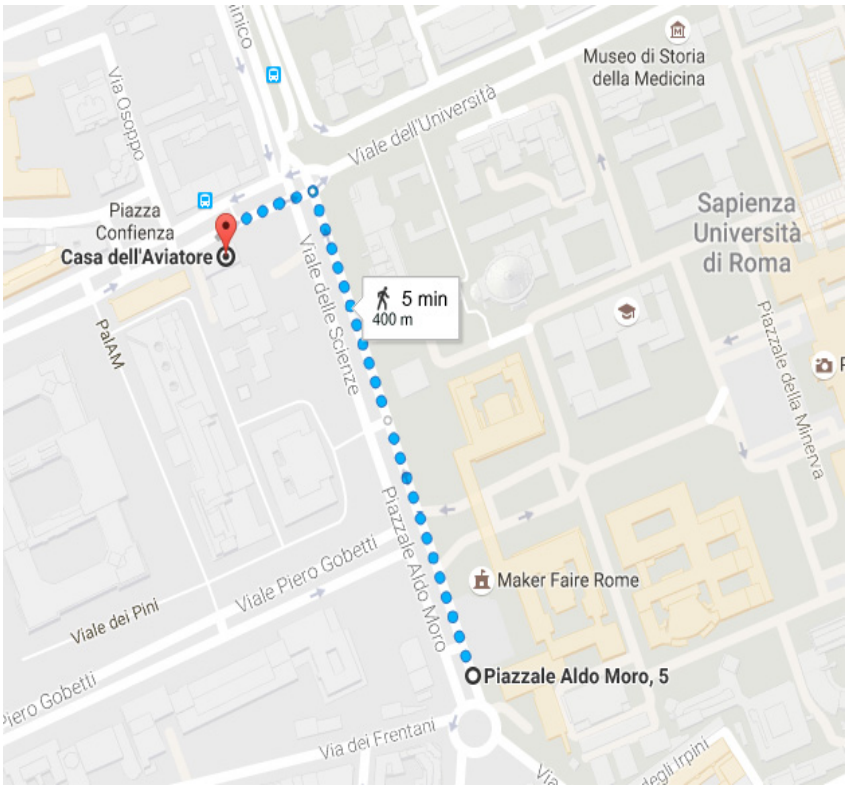
**Wi-Fi**
Access to free Wi-Fi Internet connection is available in and outside the building of the Department of Physics, where poster sessions, lunches and coffee breaks are held, but not in the meeting room.
To login use the username and password you received by email. Should you have difficulties in connecting to the Wi-Fi onsite, please try changing your browser and/or lowering your computer's security settings.

# Social dinner

The social dinner will take place on **Wednesday 27 September** at 19:30 at **Casa dell'Aviatore** (Viale dell'Università 20). The social dinner is included in the registration fee. Please bring your conference badge.

**Dress code: formal (jacket recommended, no shorts)**

**Casa dell'Aviatore** is within walking distance of the meeting venue.



# Funding & support

PICQUE Project (Photonic Integrated Compound Quantum Encoding)

QUCHIP Project (Quantum Simulation on a Photonic Chip)

The Department of Physics of the University of Rome La Sapienza

3D-QUEST (3D – Quantum Integrated Optical Simulation) Project

**Conference website:** www.picque.eu/iqpconf2017/

**PICQUE project website:** www.picque.eu

**QUCHIP project website:** www.quchip.eu