Photons

PIERRE-EMMANUEL EMERIAU

QUANDELA

FROM TODAY'S PHOTONIC QUANTUM COMPUTERS TO LARGE-SCALE SPIN OPTICAL PLATFORMS

Pierre-Emmanuel Emeriau is the quantum algorithms and applications lead at Quandela, where he drives the development of algorithms and applications for photonic quantum computers. His work focuses on bridging theory and hardware by designing resource-efficient quantum algorithms tailored to near-term photonic platforms.

Cold atoms (including annealing)

DAVIDE DREON

planqc

BUILDING QUANTUM COMPUTERS, ATOM BY ATOM

Davide Dreon is Head of Product Development at planqc, working on building and developing neutral atom quantum computers. An experimental physicist by training, he completed his PhD at the Laboratoire Kastler Brossel on highly magnetic quantum gases, and later conducted research at ETH Zurich on Bose-Einstein condensates coupled to optical cavity modes. Before joining planqc, he was Research Fellow and Head of R&D setups at Pasqal.

Rydberg atoms

CLÉMENCE BRIOSNE-FREJAVILLE

Pasqal

INDUSTRIALIZING RYDBERG-ATOM QUANTUM COMPUTING: PASQAL'S ROADMAP AND EARLY USE CASES

I'm Clémence Briosne-Frejaville, manager of PASQAL's System Performance team. As PASQAL grew, we built a team focused on QPU system performance and functional validation for neutral-atom quantum computers leveraging Rydberg interactions. Since joining PASQAL in June 2021, my team has worked across hardware characterization, calibration and measurement methods, and experimental bench infrastructure, bridging atomic physics and systems engineering to deliver measurable, reliable system-level performance with scalability and robustness in mind. I received my PhD in ultracold atoms in 2020 at Laboratoire Charles Fabry under the supervision of Marc Cheneau.

At the Quantum Technologies Deep Dive, I will share PASQAL's technology and industrial strategy for Rydberg-atom quantum computing, highlighting our hardware roadmap and early end-user use cases already run on our quantum processors.

Trapped ions

VIKTOR KRUTIANSKII

universität innsbruck

TRAPPED-ION QUBITS: PERSPECTIVES AND CHALLENGES

I received my PhD in physics in 2016 from Lomonosov Moscow State University, where I worked on nonlinear optics of nanostructures. Then I moved to Innsbruck and started working on trapped-ion-based quantum networks in the newly established group of Ben Lanyon. We work on connecting small quantum processors, represented by registers of trapped ions, into a scalable network. Leveraging benefits of trapped ions as a quantum computing platform, we such milestones in the field as the demonstrations of long-distance ion-photon entanglement, remote entanglement of trapped ions and a trapped-ion-based quantum repeater. Now I am leading two independent research projects which include building of a new trapped-ion experiment. At the same time, I continue working in Ben Lanyon's group within the broader "quantum networking" collaboration in Innsbruck which, in its turn, is a part of the pan-European "Quantum Internet Alliance" collaboration.

Superconducting Transmons

ATTILA GERESDI

IQM

QUANTUM COMPUTATION WITH A LATTICE OF SUPERCONDUCTING QUANTUM BITS: THE CURRENT STATE OF PLAY AND FUTURE ROADMAP

Attila Geresdi is the leader of the team responsible for developing and characterizing fundamental gate operations at IQM, a work that spans from fundamental physics through quantum engineering to software development supporting IQM's quantum computer product line. He received his PhD at the Budapest University of Technology in Hungary on experimental quantum transport, and subsequently moved to Delft, The Netherlands as a postdoctoral researcher and later senior scientist at QuTech investigating Majorana bound states. Thereafter, as an assistant and then associate professor at the Chalmers University of Technology in Sweden, he led a research group investigating hybrid superconductor-semiconductor quantum bits before moving to Munich, Germany to join IQM in 2023. He has authored more than 30 scientific publications with over 3500 citations in total.

Superconducting Transmons

MIKKO MÖTTÖNEN

Aalto University

THE FUTURE OF SCALABLE SUPERCONDUCTING QUANTUM COMPUTERS

Mikko Möttönen is a Professor of Quantum Technology and an Academy Professor at Aalto University and VTT, renowned for his pioneering work in superconducting quantum-electric circuits and ultrasensitive bolometers, culminating to the development of an autonomous quantum processing unit (AQPU). With more than 160 scientific articles and over 10,000 citations—including four notable publications in Nature and Science. His research bridges both experimental innovation and deep theoretical insight. A recipient of five ERC grants, Mikko earned his doctorate in 2005 from the Helsinki University of Technology at the Department of Applied Physics. His groundbreaking work has not only advanced quantum physics but has also enabled the commercialization of quantum-computing devices, exemplified by the spinout of IQM Quantum Computers, a quantum unicorn, from his research group. As one of the four co-founders of both IQM Quantum Computers and QMill Oy, his entrepreneurial spirit is matched by a series of prestigious recognitions—including the Nokia Recognition Award, Väisälä Science Prize, Innovation Professor Award, and an Honorary Doctorate from Lappeenranta University of Technology—and a membership in the Finnish Academy of Science and Letters as well as the Finnish Academy of Technology.

Majorana Qubits

CÉCILE YU

Microsoft

SCALABLE QUANTUM COMPUTING WITH MAJORANA-BASED TOPOLOGICAL QUBITS

I'm a Senior Measurement Engineer at Microsoft Quantum in Delft, where I work on the development and characterisation of Majorana devices. I did my PhD at CEA Grenoble on spin–photon coupling in silicon quantum dots, and then a postdoc at QuTech working on large germanium spin qubit arrays. My current work focuses on making Majorana devices robust, long-lived and advancing their control and readout capabilities.

Carbon nanotube spin qubits

MATTHIEU DELBECK

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MICROSECOND-LIVED QUANTUM STATES IN A CARBON-BASED CIRCUIT IN CQED

Matthieu Delbeck graduated from ESPCI and is now an associate professor at Sorbonne University. He earned his PhD at École Normale Supérieure on carbon nanotubes and worked as a postdoc at the RIKEN center (Tokyo) in one of the pioneering teams of silicon spin qubits. He is an expert in spin qubits, holding the record for fidelity. His foundational research on carbon nanotube quantum devices is at the heart of C12's technology. He is also passionate about classical electronics, a key skill for the development of this technology.

Carbon nanotube spin qubits

PIERRE DESJARDINS

C12

CARBON NANOTUBE SPIN QUBITS: ADVANTAGES, MILESTONES AND THE ROAD TO FAULT-TOLERANT QUANTUM COMPUTING

Pierre Desjardins is the co-founder and CEO of C12, a Paris-based quantum computing startup building the world's only carbon nanotube spin qubit processor. He holds a Master of Science in Quantum Physics from École Polytechnique and Columbia University. After his research role at MIT's Quantum Photonics Lab, Pierre transitioned to Roland Berger. At this global strategy consulting firm, he led over 40 projects, advising companies and investment funds on strategic and operational growth. Since co-founding C12, Pierre has driven the company's mission to develop scalable, high-performance quantum computers using innovative carbon nanotube technology.