Workshop on Quantum Technologies (WQT)

# Important Dates

| | |
|---|---|
| **Paper Submission Deadline** | 27th October 2024 (AoE) |
| **Notification of Acceptance** | 3rd December 2024 |
| **Camera-ready Submission** | 10th December 2024 |
| **Workshop Date** | 10th January 2025 |

**Workshop Overview:**

The 20th century, often referred to as the information age, witnessed the first quantum revolution with the invention of transistors, superconducting levitation, atomic clocks, and superfluidity. There is a broad consensus that we are now at the cusp of a second quantum revolution, and that the 21st century will be even more disruptive with the development of new quantum technologies. By exploiting quantum resources such as superposition and entanglement, we can radically transform technologies from communication to computing. For instance, in the communication domain, quantum physics can offer the ultimate (information-theoretic) security; while for certain problems in computing, quantum computers can potentially offer speed-ups that are unattainable by their classical counterparts. Besides them, quantum sensing is another mature quantum technology that can offer sensors with sensitivities approaching the ultimate (Heisenberg) limit and highly miniaturized footprints, imperceptible by their traditional counterparts. The very fragility of quantum states, which is a hindrance to their scalability in communication and computing, makes them invaluable sensors. The technological readiness levels of these offerings are improving so rapidly that some of them have already become commercially viable.

With 2025 set to be the International Year of Quantum Technologies celebrating the 100 years since the initial development of quantum mechanics, and after a highly successful launch of QCom(P), the first international workshop on Quantum Communication and Computing at COMSNETS 2024, we are now ready to make it bigger, better and more general. Hence, going forward, we have expanded the scope and now present the **Workshop on Quantum Technologies (WQT)**, which will be co-located with COMSNETS 2025 and will encompass all 3 major drivers of quantum technology as of today: sensing, communications and computing. The aim of this workshop is to bring together quantum researchers, scientists, engineers, entrepreneurs, developers, students, practitioners, educators, and programmers, from both academia and industry, working in this field. In this context, the workshop also intends to include the topic of understanding what it takes to bring more of the technology from an academic setting to real-world applications based on the industry requirements and technology development roadmap.

**Call for papers:**

Prospective participants are invited to submit their research contributions in the form of articles, surveys, tutorials, work-in-progress reports, extended abstracts, etc. that range from breakthrough ideas to real-world applications. This workshop would enable participants to present and discuss their accepted submissions via contributed talks and poster presentations. WQT features both experimental and theoretical presentations. This workshop also comprises keynote addresses and invited talks on areas deemed topical and of special interest to the attendees. Finally, the workshop, along with a dedicated industry session, aims to serve as a forum to exchange ideas, present new results, connect and foster collaborations. The topics of interest include, but are not limited to:

**Quantum Computing:**
§ Qubit modalities - both theoretical and experimental results
§ Hardware, platforms and architectures for quantum and hybrid computing
§ Quantum error correction and fault-tolerant quantum computing
§ Software stacks, tools and programming languages for quantum-enhanced computing
§ Error mitigation, error suppression and error management techniques
§ Quantum algorithms for NISQ and beyond
§ Hybrid gate-annealer-classical computing
§ Quantum machine learning and artificial intelligence
§ Quantum-enhanced optimization
§ Quantum simulations and quantum chemistry
§ Quantum-enhanced solutions for different applications and domains
§ Benchmarking in the areas of quantum computing
§ Quantum-inspired computing architecture
§ Quantum-inspired classical algorithms

**Quantum Sensing:**
§ Quantum magnetometry
§ Quantum electrometry
§ Quantum gravimetry
§ Quantum inertial sensing (gyroscopy)
§ Atomic clocks
§ Quantum(-insipred) imaging
§ Hybrid & intelligent quantum sensing
§ Quantum-enhanced metrology
§ Signal processing & AI for quantum sensing

**Quantum Communication:**
§ Networked & distributed quantum computing and sensing
§ Quantum for Blockchain and IoT
§ Quantum communication and networks
§ Quantum cryptography and post-quantum cryptography

**Foundational topics of quantum technologies:**
§ Quantum complexity theory
§ Quantum information theory
§ Quantum estimation and detection

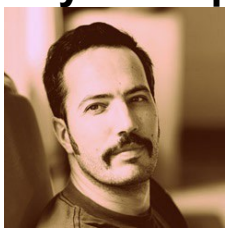
**Submission guidelines:**

- Submissions must be no greater than **6 pages** in length including all figures, tables, and references and must be a PDF file. A minimum number of 3 pages are required.
- Submissions must be original work that has not been previously published or under review at another conference or journal. Submissions are expected to articulate a non-technical, clear and insightful description of the main idea and results, their impact, and their importance.
- Reviews will be **double-blind**: authors name and affiliation should not be included in the submission.
- Submissions must follow the formatting guidelines as given on IEEE Website https://www.ieee.org/conferences/publishing/templates.html. Those that do not meet the size and formatting requirements will not be reviewed.
- All workshop papers (full papers - both regular and invited) will appear in conference proceedings and be submitted to IEEE Xplore as well as other abstracting and Indexing (A&I) databases.
- All papers must be submitted as an Adobe Portable Document Format (PDF) document and uploaded through the WQT Workshop submission site on (link https://comsnets25wqt.hotcrp.com/).

Papers can be submitted through HOTCRP : **<https://comsnets25wqt.hotcrp.com/>.**

For any queries, please contact us at comsnets.wqt@gmail.com

# Keynote Speakers



Antoine (Jack) Jacquier
Imperial College London

Visit Homepage
Visit Google Scholar Page

Antoine (Jack) Jacquier is a Professor of Mathematics at Imperial College London. He holds a Masters Degree from ESSEC Business School and a PhD in Mathematics from Imperial College London. His research broadly focuses on the developments and applications of mathematical theories to quantitative finance, ranging from stochastic analysis to numerical analysis and quantum computing. Prof. Jacquier also serves as a scientific consultant and advisor for various finance and technology companies.

Prabha Mandayam
Indian Institute of Technology Madras

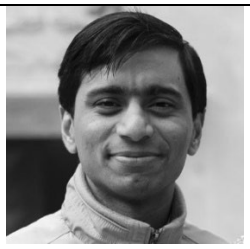
Visit Homepage
Visit Google Scholar Page

Prabha Mandayam is an associate professor in the department of Physics at the India Institute of Technology, Madras. She obtained her PhD in Physics from the Institute for Quantum Information and Matter at Caltech and has subsequently been a Post-doctoral Fellow at the Institute of Mathematical Sciences, Chennai and an Inspire faculty fellow at the Chennai Mathematical Institute. Her research interests are in the area of quantum computing and quantum information theory. In particular her group focusses on noise-adapted quantum error correction, security and implementation of quantum key distribution protocols, and, using quantum information as a tool to explore fundamental questions in theoretical physics.

Alexander Huck
Technical University of Denmark / DiaSense
Visit Homepage
Visit Google Scholar Page

Alexander Huck is Associate Professor at the Department of Physics, Technical University of Denmark (DTU). He obtained a MSc degree in Physics from the Friedrich-Alexander University of Erlangen-Nuremberg and holds a PhD degree from DTU. Alexander is conducting research in experimental physics focusing with his team on the investigation of optical and spin properties of colour centres and their applications in nano-scale optics, quantum sensing and information processing. In the context of quantum and magnetic sensing with diamond colour centers, Huck actively collaborates with other researchers in biology, neurophysiology and medical sciences, where he aims at translating fundamental sciences to applications and the development of new diagnostic tools with the aim to contribute to the detailed understanding of biological processes. In 2024, Alexander has co-founded DiaSense, aiming at the development of a quantum diamond magnetic microscope for advancing neuroscience, enhancing semiconductor technology, and transforming materials and surface analysis.

## Workshop Co-Chairs

| | | | | |
|---|---|---|---|---|
|  |  |  |  |  |
| M Girish Chandra<br><br>TCS Research<br>India | Sourav Chatterjee<br><br>TCS Research<br>India | Nitin Jain<br><br>University of Denmark<br>Denmark | Rajiv Krishnakumar<br><br>QuantumBasel<br>Switzerland | Kaushik Seshadreesan<br><br>University of Pittsburgh<br>USA |

**Sponsored by**

QUANTUM AI GLOBAL

QuantumBasel
Center of Competence
for Quantum Computing and AI

qruise