# Quantum Autumn School 2025

Date:
Nov 3-7, 2025

organisers: ENCCS, NCC Denmark, NCC Lithuania

| | | Monday 3rd | Tuesday 4th | Wednesday 5th | Thursday 6th | Friday 7th |
|---|---|---|---|---|---|---|
| slot 1 | 9:00-10:00 | arrival and coffee 8:30-9:20<br><br>**Welcome! QAS2025 Introduction**<br>Apostolos Vasileiadis, Karim Elgammal (ENCCS/RISE, SE)<br><br>**MIMER AI Factory**<br>Thor Wikfeldt (MIMER/RISE, SE) | coffee/sandwich 8:30-9:00<br><br>**Introduction to variational quantum algorithms: VQE, QAOA and beyond (QPE, ..., SQD)**<br>Juan de Gracia Triviño (ENCCS/RISE, SE) | coffee/sandwich 8:30-9:00<br><br>**Variational Algorithms; Designing use cases for near term quantum algorithms**<br>Panagiotis Barkoutsos (IonQ) | coffee/sandwich 8:30-9:00<br><br>**Scaling up ion trap quantum computers and quantum technologies; the case of IonQ**<br>Panagiotis Barkoutsos (IonQ) | coffee/sandwich 8:30-9:00<br><br>**Quantum Neural Networks**<br>Stefano Markidis (KTH, SE) |
| slot 2 | 10:00-11:00 | **The European hybrid HPC+AI+QC ecosystem**<br>10:00-10:40<br>Mikael Johansson (CSC, FI)<br><br>coffee break 10:40-11:00 | **interactive tutorial:** experiments with quantum gates, circuits and algorithms (qrisp simulation)<br>10:00-10:40<br>Juan de Gracia Triviño (ENCCS/RISE, SE)<br><br>coffee break 10:40-11:00 | **Controlling a quantum computer using pulses**<br>10:00-10:40<br>Stefan Seegerer (IQM)<br><br>coffee break 10:40-11:00 | **Atomistic simulations on quantum accelerated supercomputing**<br>10:00-10:40<br>Karim Elgammal, Marc Maußner (ENCCS/RISE, SE) (infoteam, DE)<br><br>coffee break 10:40-11:00 | **hands-on QNNs using pennylane/classification (tutorial)**<br>10:00-10:40<br>Stefano Markidis (KTH, SE))<br><br>coffee break 10:40-11:00 |
| slot 3 | 11:00-12:00 | **Software stack for NISQ devices**<br>Miroslav Dobsicek | **Opportunities for extending quantum computing through subspace, embedding and classical molecular dynamics techniques**<br>Thomas M. Bickley (UCL, UK) | **LUMI-Q/VLQ presentation**<br>Miroslav Dobsicek | **Accelerated Quantum Supercomputing using NVIDIA CUDA-Q**<br>Esperanza Cuenca-Gómez (NVIDIA) | **Quantum Reservoir computing**<br>Ruben Pariente Bassa (SINTEF, NO) |
| | 12:00-13:00 | Lunch | Lunch | Lunch | Lunch | Lunch |
| slot 4 | 13:00-14:00 | **Quantum gates, circuits and algorithms**<br>Juan de Gracia Triviño (ENCCS/RISE, SE) | **Getting started with algorithm development on actual quantum hardware using IQM Resonance**<br>Stefan Seegerer (IQM) | **How to use quantum computers for biomolecular free energies**<br>Matthias Christandl (København U, DK) | **Quantum error-correction (QEC)**<br>Mats Granath (Göteborg University) | closing<br><br>The end |
| slot 5 | 14:00-15:00 | **Introduction to Quantum Algorithms**<br>Giulia Ferrini (MC2, Chalmers, WACQT, SE) | **Developing quantum algorithms with qrisp, the next generation of quantum algorithm development**<br>Stefan Seegerer (IQM) | **Pre-panel discussion**<br>Göran Wendin (RISE, SE)<br><br>coffee break | **Quantum kernel estimation with application to disability insurance**<br>Björn Löfdahl (SEB) | |
| | 15:00-15:30 | coffee break | coffee break | **Towards 2045: Do we still only talk about Quantum superiority?**<br>Panel discussion Göran Wendin (RISE, SE) | coffee break | |
| slot 6 | 15:30-16:30 | **Quantum Information Theory introduction, building quantum algorithm, QFT, ...**<br>Stefano Markidis (KTH, SE) | **QAOA - theory**<br>Ruben Pariente Bassa (SINTEF, NO) | PechaKucha presentations<br><br>(in-person only) | **interactive tutorial:** Quantum error-correction (QEC) hands-on<br>Moritz Lange (Göteborg University) | |
| slot 7 | 16:30-17:30 | **From qubits 2000 to Nobel Prize 2025**<br>Göran Wendin (RISE, SE) | | | **interactive tutorial:** Quantum kernel estimation with application to disability insurance<br>Björn Löfdahl (SEB) | |
| | 18:00-20:00 | Reception, mingling | | Buffé dinner | | |