Quantum Autumn School 2025

Date:
Nov 3-7, 2025

location: RISE KTH at "Innoversum" room

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