NTNU

iDesignRES

Workshop: Quantum Computing Applications in Optimization

When: Thursday, March 20th, 2025

Where: NTNU Gløshaugen, Trondheim

Time: 10.30am - 5.00pm

Scope: Quantum Computing (QC) could lead to major breakthroughs in solving and handling hard *optimization problems*. Sharing advances in quantum computing allows researchers across disciplines to work together, develop best practices, and understand opportunities.

Aim: Sharing the latest QC applications and methodological approaches through scientific presentations and engaging discussions. Foster collaboration between researchers and industry stakeholders.

We welcome participants to present their research.

Keywords: *Optimization, Algorithms, Energy, Finance, Logistics.*

Please register: here

Questions & contact: quinton.f.alexander@ntnu.no

SINTEF

Quantum Delta NL

RystadEnergy

NTNU

Workshop: Quantum Computing Applications in Optimization

Date and time: Thursday, March 20th 2025, from 10:30 to 16:15.

Location: Salemhuset, Prinsens gate 22B, Trondheim

Quantum Computing (QC) could lead to major breakthroughs in solving and handling hard optimization problems. This workshop aims to share research developments and methodological approaches through scientific presentations and engaging discussions. The workshop covers a range of topics to:

- Gain insights into the latest advancements in QC applications for optimization.
- Connect researchers to discuss limitations, challenges and opportunities in QC
- Explore collaborative opportunities in quantum computing and beyond

The agenda is structured into three main segments. The workshop will commence with introductions and an exploration of quantum computing's potential applications and challenges within the energy sector. After lunch, the program will transition to a series of presentations focusing on gate-based quantum computing and algorithm development. The final session will address quantum and quantum-inspired annealing for optimization purposes. The event will conclude with a discussion of open collaboration opportunities. Participants are invited to attend a sponsored dinner at Frida, scheduled for 18:45.

The Workshop is a collaborative effort between various research projects and institutions:

iDesignRES

Gemini Center on Quantum Computing

Fraunhofer ITWM

SINTEF

Quantum Delta NL

RystadEnergy

Organization committee: Pedro Crespo del Granado, Finley Quinton, David Ribes Marzá, Tatiana González Grandón, Mostafa Barani

Program

10:30 – 11:00	**Arrival, Networking and Refreshments**
11:00 – 11:30	- **Welcome,** *Pedro Crespo del Granado (NTNU)* - **Introduction to Quantum Computing,** *Finley Quinton (NTNU)* - **The Gemini Center on Quantum Technologies,** *Franz Fuchs (SINTEF Digital)*
11:30 – 12:30	- **Frontiers and Future Scientific Developments,** *Tatiana Gonzalez Grandón (NTNU)* - **Computational Challenges in the Energy Data Industry,** *Alexandre Ramos Peon (Rystad Energy)* - **EnerQuant project,** *Pascal Halffmann (Fraunhofer)*
12:30 – 13:15	**Lunch Break**
13:15 – 14:30	- **Efficient circuits for subspace control operators and application to MaxKcut formulation,** *Ruben Pariente Bassa (SINTEF Digital & UiO)* - **Quantum algorithms and Post-Quantum Cryptography,** *Erik Hieta-aho, (VTT - Technical Research Center of Finland)* - **Light talks or short pitches:** ▪ Improving QAOA, Torbjørn Smedshaug (NTNU) ▪ Quantum Computing in Energy Systems (Knut Gjerden, SINTEF) ▪ Hybrid quantum in Benders decomposition (Truls Flatberg, SINTEF Industry)
14:30-14:45	**Short break and coffee entanglement**
14:45-16:00	- **IBM ,** Lars Nordbryhn (IBM) - **Community detection via simulated bifurcation,** *Konrad Tywoniuk (UiB)* - **Light talks or short pitches:** ▪ Simulated Quantum Annealing (Sindre Nesheim, UiB) ▪ Quantum Annealing for QUBOs (Henrik Idsal, NTNU) ▪ Stochastic Unit Commitment Problem (David Ribes, NTNU)
16:00 – 16:15	**Quantum guide to commercial acceleration: energy sector,** *Pavel Kalinin, Quantum Delta NL.*
16:15 – 17:00	Open collaborations.
18.45 –	Superposition Dinner at Frida (Fjordgata 15, 7010 Trondheim)