Near-Term Quantum Algorithms
Quantum AlgoLab
Summer School 2024

Orford, Québec, Canada
June 2nd – 14th 2024

INSTITUT QUANTIQUE UDS

QUANTUM ALGOLAB

Purpose of the event

Institut quantique's Quantum AlgoLab is organizing and hosting its first Summer School from June 2nd to 14th, 2024. The two-week event will be held at Jouvence, a resort on the shores of Lake Stukely and adjacent to Mont Orford provincial park in Quebec.

The event will focus on teaching quantum and hybrid algorithms targeting NISQ hardware. By the end of the school, students will be familiar with the design principles of noise-resistant algorithms. They will also be able to adapt and apply those principles to their respective domain. The summer school curriculum will be officially recognized by Université de Sherbrooke as a graduate course.

The AlgoLab is funded by Québec's Ministry of Economy, Innovation, and Energy (MEIE). In 2020, the AlgoLab established the first IBM Quantum Hub in Canada and has since organized 120+ scientific events with more than 5000 participants to facilitate the adoption of quantum algorithms in academia, government, and industry.

Our goal is to bring researchers from different backgrounds together to discuss the latest advances in near-term quantum algorithms, which are currently at the heart of quantum computing.

All participants, in particular students and postdocs, are encouraged to submit abstracts for scientific talks and posters. Morning sessions will comprise of lectures and afternoon sessions will be dedicated to hands-on programming of quantum algorithms.

We look forward to welcoming you in June!

Summer School 2024 Schedule

	Monday June 2	Tuesday June 3	Wednesday June 4	Thursday June 5	Friday June 6
AM	**Sophia Economou** Variational quantum algorithms	**Pooya Ronagh** Neural quantum states and their applications	**Christa Zoufal** Variational quantum simulation	**Thomas Iadecola** Variational principle for quantum simulation in and out of equilibrium	**Zlatko Minev** Introduction to noise in quantum computers and Quantum simulation of many-body systems
PM	**AlgoLab** Practical work Level up	**AlgoLab** Practical work Algorithms	**AlgoLab** Practical work Simulation 1 **Evening Poster Session**	**Zohreh Davoudi** Quantum algorithms for simulating nature's fundamental interactions	**AlgoLab** Practical work Simulation 2

	Monday June 10	Tuesday June 11	Wednesday June 12	Thursday June 13	Friday June 14
AM	**AlgoLab** Practical work Error correction	**Micheline Soley** Connection between tensor network methods and quantum computing algorithms	**Andrew Green** Translating tensor network algorithms to quantum computers	**Stefanie Czischek** Introductory lectures on simulating quantum many-body systems with language models	**Exam**
PM	**Nicolas Quesada** Classically simulating quantum continuous variable systems	**Sponsored Session** Practical work	**Sponsored Session** Practical work **Evening Poster Session**	**AlgoLab** Practical work QML	**End**

Confirmed speakers

Stefanie Czischek
Assistant Professor
University of Ottawa

Zohreh Davoudi
Associate Professor
University of Maryland

Sophia Economou
Professor
Virginia Tech

Andrew Green
Chair of Condensed
Matter Physics, UCL

Thomas Iadecola
Assistant Professor
Iowa State University
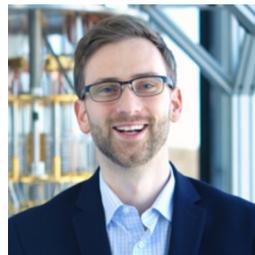
Zlatko Minev
Global Team Technical
Lead, IBM Quantum

Nicolas Quesada
Assistant Professor
Polytechnique Montréal

Pooya Ronagh
Assistant Professor
University of Waterloo

Micheline Soley
Assistant Professor
Wisconsin Quantum
Institute and CQE

Christa Zoufal
Quantum Applications
Researcher IBM Zurich

Committee Members

Planning & Scientific
Stefanos Kourtis
AlgoLab Scientific Director
Institut quantique

Planning
David Sénéchal
Professor
Université de sherbrooke
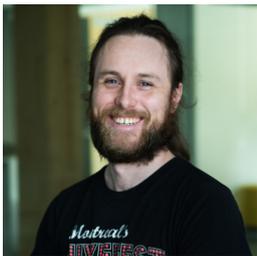
Planning & Scientific
Alexandre Foley
Quantum Computing
Developer
Institut quantique

Scientific
Anne Broadbent
Professor
University of Ottawa

Planning & Scientific
Ghislain Lefebvre
Chief Partnerships Officer
Institut quantique
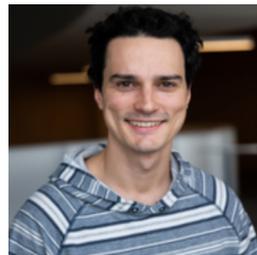
Scientific
Baptiste Royer
Associate Professor
Université de Sherbrooke

Planning
Étienne Lefrançois
Training coordinator
Institut quantique

Student participation

Students have the opportunity to be the focal point of the event during this summer school program. Students will present their work in two official poster sessions, but throughout the entire summer school, posters will be on display to promote in-depth conversations. At this event, students are encouraged to ask questions and have plenty of opportunity to network with speakers and one another during free time and hands-on sessions. A few places will be available for speakers' students and postdocs. International students must either obtain a visa or present their admission letter upon entry. All students can register for this School as a 3 credit PhD level course with Université de Sherbrooke (45 hours of lecture, equivalent to a one-semester course). There will be a discount on living expenses for those who register for credits.

Room and Board (Price in CAD for 12 days)

Single occupancy with taxes: $1800
Double occupancy with taxes : $1400
Multiple occupancy with taxes : $1000

***There is a $200 discount for those who register for the 3 credits PhD course**

Application process

To be considered for the 2024 Quantum AlgoLab Summer School, kindly fill out **all sections of the application form**.

The application deadline is 15 March 2024.
If you have any additional questions, you can write to : **ecole.iq@usherbrooke.ca**

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