

INVITED LECTURERS

Paolo Cremonesi

Polytechnic University of Milan, Italy

Zoe Holmes

EPFL - Lausanne, Switzerland

Aroosa Ijaz

University of Waterloo - Toronto, Canada

Luca Innocenti

University of Palermo, Italy

Guglielmo Mazzola

University of Zurich, Switzerland

Minh Ha Quang

RIKEN Center for Advanced Intelligence Project,
Tokyo, Japan

Thanasilp Supanut

Centre for Quantum Technologies, National University
of Singapore

*Please note that the list is not definitive, more lecturers
will be announced soon.*

*Updates will be posted on CISM website and on
<http://eqai.eu/>*

LOCAL COMMITTEE

Alex Falcon - Post-doc Researcher, University of Udine

Beatrice Portelli - PhD Student, University of Udine

Riccardo Romanello - PhD Student, University of Udine

Simone Scabro - Graduate Research Fellow, University of Udine

ADMISSION AND ACCOMMODATION

The course is offered in a hybrid format giving the possibility to attend the course also by remote (on Microsoft Teams platform).

On-site places are limited and assigned on first come first served basis.

The registration fees are:

- On-site participation, 450.00 Euro + VAT*

This fee includes a complimentary bag, five fixed menu buffet lunches, coffee breaks, downloadable lecture notes.

Deadline for on-site application is **April 29, 2023**.

- Online participation, 300.00 Euro + VAT*

This fee includes downloadable lecture notes.

Deadline for online application is **May 15, 2023**.

Course application is available at

<https://www.cism.it/en/activities/courses/J2302/>

A message of confirmation will be sent to accepted participants.

Upon request a limited number of on-site participants can be accommodated at CISM Guest House at the price of 35 Euro per person/night (mail to: foresteria@cism.it).

** where applicable (bank charges are not included)
Italian VAT is 22%.*

CANCELLATION POLICY

Applicants may cancel their registration and receive a full refund by notifying CISM Secretariat in writing (by email) no later than:

- April 29, 2023 for on-site participants (no refund after the deadline);

- May 15, 2023 for online participants (no refund after the deadline).

Cancellation requests received before these deadlines will be charged a 50.00 Euro handling fee. Incorrect payments are subject to Euro 50,00 handling fee.

For further information please contact:

CISM (*seat of the School*)

Palazzo del Torso - Piazza Garibaldi 18 - 33100 Udine (Italy)

tel. +39 0432 248511 (6 lines)

e-mail: cism@cism.it | www.cism.it

Information available also at <http://eqai.eu/>

ACADEMIC YEAR
2023

University of Udine
International Centre for Mechanical Sciences



Centro Internazionale
di Scienze Meccaniche
International Centre
for Mechanical Sciences



UNIVERSITÀ
DEGLI STUDI
DI UDINE
hic sunt futura

EQAI 2023

2nd European Summer School on Quantum AI

QUANTUM MACHINE AND DEEP LEARNING

FIRST ANNOUNCEMENT AND CALL FOR POSTERS

CISM-UniUD Joint Advanced School
coordinated by

Giuseppe Serra
University of Udine, Italy

Alessandra di Piero
University of Verona, Italy

Carla Piazza
University of Udine, Italy

Francesco Petruccione
University of KwaZulu-Natal, Republic of South Africa

Udine May 29 - June 1 2023

EQAI 2023 - QUANTUM MACHINE AND DEEP LEARNING

MOTIVATION

Quantum computing is a rapidly evolving field with the potential to transform many areas of science and technology. Quantum Machine Learning, which is the application of quantum computing to ML tasks, is an emerging field that has already shown promising results in some applications and a promising future for Artificial Intelligence at large. These technologies could allow incredible advancements in various fields, tackling various issues such as complex physical simulations and optimization problems. This summer school aims to help students and researchers to learn about the latest developments in this field and provide a platform to discuss new ideas and applications.

It is crucial to study ways to develop efficient and effective Quantum ML algorithms to take advantage of these new technologies, which have the potential to revolutionize the way we approach problems and make significant progress in areas such as drug discovery and material science, and optimization. Quantum ML is an interdisciplinary field that requires expertise from multiple areas, including physics, mathematics, information theory, and computer science. By bringing together experts in these fields and quantum enthusiasts from both academia and industry, the summer school aims to foster collaboration and cross-disciplinary thinking.

There are also a lot of open challenges in quantum ML. While small-scale quantum ML is possible, scaling it to larger datasets is extremely challenging due to limited physical memory and the noisiness of current quantum computers. Therefore, it is of utmost importance to spread knowledge about this topic and involve new researchers who can contribute to its progress.

LECTURES

All lectures will be given in English. Lecture notes can be downloaded from the CISM web site. Instructions will be sent to accepted participants.

OBJECTIVE

Following the success of the first edition, this summer school aims to provide an objective and clear overview, as well as an in-depth analysis, of the state-of-the-art research in Quantum Machine Learning and Deep Learning.

The courses will be delivered by world renowned experts in the field, from both academia and industry, and will cover both theoretical and practical aspects of real problems.

The school aims to provide a stimulating opportunity for young researchers, Ph.D. students, and quantum enthusiasts coming from both industry and academia. The participants will benefit from direct interaction and discussions with experts in this field. Participants will also have the possibility to present the results of their research and to interact with their scientific peers in a friendly and constructive environment.

A BRIEF CONTEXT

Over the last century, the introduction of computers has drastically transformed the world of science, technology, and society. The first computer, developed around the 20th century, was incapable of performing computations on its own. However, today, compact devices can solve complex problems instantaneously and accurately, given the appropriate inputs and instructions. While computers and their components have been continually optimized for performance, speed, and size, we are now approaching the point where the only way to enhance their computational power is to work at atomic levels. Although this presents both tremendous potential and substantial challenges, quantum computing offers a solution. This new kind of computing, which is based on quantum mechanics, utilizes subatomic particles, such as atoms, electrons, and photons, as bits, exploiting their probabilistic nature. Quantum computers can solve any problem that classical computers can and vice versa, but they can do so with reasonably lower time complexities, leading to what is known as "Quantum Supremacy." Since in classical machine learning, the model performance is related to the size of the training dataset and the allotted training time, quantum machine learning enables us to train models on larger datasets while overcoming current time constraints. While QML is still a nascent field, there have already been some promising examples where it has shown significant potential, e.g., for image classification and part-of-speech tagging.

CALL FOR POSTERS

EQAI aims to be a stimulating space for PhD students, researchers, and industry professionals with an interest in QML applications. The Poster Session is an excellent opportunity for students and researchers to present their results and ideas on Quantum Machine Learning and related topics. This is an occasion to interact with scientific peers in a constructive environment, and for industry and academia to share ideas on future developments and practical applications of the research.

All participants in the EQAI summer school may submit a poster to present their research activity. Posters on Quantum-related topics are preferred, but other AI/ML topics are welcome to encourage building bridges between different disciplines.

We will reserve a suitable space for the on-site students to show their posters at the summer school's location (CISM).

Poster Guidelines

The poster should be written in English and sent to info@cism.it and info.eqai@gmail.com by **May 15** in a printable A1 format (.pdf or .jpg 300dpi), preferably horizontal.

Specifications:

- Title: Unicode character set
- Author List: in the format "Surname1 N1., Surname2 N2, ..."
- Abstract: each poster should contain an abstract, max 500 characters
- Size: 594 mm tall x 841 mm wide (A1 format)

For the on-site participants:

To take part in the poster session, you will need a physical copy of the poster. CISM can arrange the poster printing in Udine if the poster will be sent to info@cism.it by **May 10**. Please note that all posters sent after the deadline cannot be taken into consideration for printing.

The printing price here in Udine is 12 EUR: payment can be made at CISM via VISA or MC Credit card or ATM card (NO CASH).