Summer School on

Quantum Languages Design and Implementation

Verona (Italy) - 23-27 September 2019

Quantum Computing Languages landscape, by Patricia Segado

Quantum computing is the design of hardware and software that replaces Boolean logic by quantum laws. Quantum devices are still under development as are quantum languages, whose incremental evolution follows the progress in the construction of the hardware on which they are supposed to be implemented.
Starting with D-Wave Systems, the first quantum computing company founded in 1999, a number of companies, such as IBM, Google, Microsoft, Rigetti, Zapata and Xanadu are striving to build scalable, fault-tolerant quantum computers and design software architectures for programming quantum algorithms on them.
The common endeavour is to demonstrate quantum systems' capabilities that are beyond today's classical systems.

This school is aimed at giving the students an as thorough as possible view of the state-of-the-art research on Quantum Programming Languages at the different levels of programming: from assembly languages to higher level and universal languages that can run on all quantum devices.
Both theoretical and implementation aspects will be addressed; in particular, we will offer laboratory sessions in which the students will be able to experience quantum programming and implement quantum algorithms using Qiskit library (https://qiskit.org).

The school programme consists of six hours per day for six days, from Monday to Saturday. Below is a schedule of the lectures. More details are available here.

	Mon	Tue	Wed	Thu	Fri	Sat
9:30-11:00	Quantum Computing and Algorithms	**QDRIVE**	**QDRIVE**	Microsoft Q# (Andrès)	Quipper (Benoit)	Programming D-Wave (Alejandro)
Coffee						
11:30-13:00	Quantum Computing and Algorithms	**QDRIVE**	**QDRIVE**	Microsoft Q# (Andrès)	Quipper (Benoit)	Programming D-Wave (Alejandro)
Lunch						
14:30-16:00	Quantum Programming (Tomas)	**QDRIVE**	**QDRIVE**	Microsoft Q# (Andrès)	Quipper (Benoit)	Student Workshop
Coffee						
16:30-17:30	Quantum Programming (Tomas)	**QDRIVE**	**QDRIVE**	Microsoft Q# (Andrès)	Quipper (Benoit)	Student Workshop

SPEAKERS

- Tomáš Babej (ProteinQure Inc. and QOSF)
- Fabrizio Illuminati (Università di Salerno, Italy)
- Andrès Paz (Microsoft Quantum)
- Alejandro Perdomo Ortiz (Zapata - Toronto Canada)
- Benoit Valiron (LRI - France)
- Abuzer Yakaryilmaz and Maksims Dimitrijievs - QDrive (University of Latvia)