

Pre-Conference Workshops

Monday, 26.08.2019, Room G 55

Time	ID	PRE-CONFERENCE WORKSHOPS
09:00	WS 1	<p style="text-align: center;">Machine Learning for Experimental Quantum Physics</p> <p style="text-align: center;"><i>Lecturer: Titus Neupert</i></p> <p>This one-day workshop introduces the principles of neural-network-based machine-learning applications in condensed matter, quantum mesoscopic physics, and quantum optics. In two lectures, the theoretical background of supervised learning with deep neural networks will be discussed, including convolutional networks, various regularization schemes, and an overview on existing applications. In a tutorial session elementary examples are demonstrated step-by-step and the participants will learn how to set up a simple neural network calculation using the Keras environment in Tensor Flow. The topics are geared towards experimental data analysis. The goal of the workshop is to enable participants to use elementary machine-learning techniques in their research. No previous knowledge is required, except for elementary command of python in the hands-on programming session at the end of the workshop. To participate in the hands-on session, a laptop with internet connection is needed.</p>
11:00		Coffee Break
11:30	WS 2	<p style="text-align: center;">Programming a Quantum Computer with Examples in Quantum Machine Learning</p> <p style="text-align: center;"><i>Lecturers / Tutors: Stefan Woerner, Almudena Carrera Vazquez, Christa Zoufal</i></p> <p>In this workshop we first provide a general introduction followed by a hands-on experience on how to program quantum computers with Qiskit. We show how to implement quantum circuits in Python, how to simulate them using classical computers, and how to run them on real quantum hardware via the IBM Q Experience. Based on this fundament, a quantum machine learning algorithm for classification is introduced and it is shown how to train and test it for any given dataset. To participate in this workshop basic knowledge of how to program in Python is required and a laptop with an internet connection. Ideally, you have already installed Qiskit and Qiskit Aqua (pip install qiskit / pip install qiskit_aqua).</p> <p>References: http://qiskit.org, http://learnqiskit.org/, https://nbviewer.jupyter.org/github/Qiskit/qiskit-tutorial/blob/master/index.ipynb</p>
12:30		Lunch
14:00	WS 1	<p style="text-align: center;">Machine Learning for Experimental Quantum Physics Hands-On Workshop Part 1</p> <p style="text-align: center;"><i>Tutors: Mark Fischer, Frank Schindler, Eliska Greplova, Kenny Choo</i></p>
15:15		Coffee Break
15:45	WS 1	<p style="text-align: center;">Machine Learning for Experimental Quantum Physics Hands-On Workshop Part 2</p> <p style="text-align: center;"><i>Tutors: Mark Fischer, Frank Schindler, Eliska Greplova, Kenny Choo</i></p>
17:15		END

Time	ID	PRE-CONFERENCE WORKSHOPS
14:00	WS 2	<p>Programming a Quantum Computer with Examples in Quantum Machine Learning Hands-On Workshop Part 1</p> <p><i>Lecturers / Tutors: Stefan Woerner, Almudena Carrera Vazquez, Christa Zoufal</i></p>
15:15		Coffee Break
15:45	WS 2	<p>Programming a Quantum Computer with Examples in Quantum Machine Learning Hands-On Workshop Part 2</p> <p><i>Lecturers / Tutors: Stefan Woerner, Almudena Carrera Vazquez, Christa Zoufal</i></p>
17:15		END