



UT AUSTIN PORTUGAL 2019 ANNUAL CONFERENCE

Masterclass I

Quantum computing: Principles, algorithms and applications

September 20, 13.30 – 17.30 (includes coffee break)

Venue: IB-S, Vislab Room, 2nd floor

Arguably, quantum computing is coming of age. With the race for quantum rising between major IT players and the public availability of the first prototype, proof-of-concept machines, the area is in the verge of a real shift. For the first time the viability of quantum computing may be demonstrated in a number of real problems extremely difficult to handle, if possible at all, classically, and its utility discussed across industries. In a sense, Feynman's dream of letting Nature, suitably engineered, compute for us through its own natural quantum behaviour, seems to be closer, even if the project of a universal quantum computer has still a long way to go. In this context, the masterclass aims at introducing the principles of quantum computing and its engineering. Following a tutorial on quantum algorithms, particular emphasis will be placed on applications to simulation of complex systems and cryptography. A hands-on session with IBM's Quantum Experience will complete the program.

Speakers include:

Scientific coordinator of the session:

[Luís Soares Barbosa](#), Full Professor, University of Minho, Portugal

1. [Joaquín Fernandez-Rossier](#), Leader of the Group of Theory of Quantum Nanostructures INL (International Iberian Nanotechnology Laboratory), Portugal
2. [Paulo Mateus](#), Full Professor, IST, Portugal
3. [Mikhail Vasilevskiy](#), Full Professor, University of Minho, Portugal
4. [Luís Paulo Santos](#), Assistant Professor, University of Minho, Portugal
5. [Afonso Rodrigues](#) and [Ana Neri](#), Ph.D. Students, QuantaLab & University of Minho, Portugal (Hands-on session)

Target Audience: Researchers in Computer Science, Physics and Mathematics, as well as Engineers of different backgrounds, preferably, but not necessarily, with some previous contact with Quantum Computing.

Requirements: For the hands-on session, a laptop with Wi-Fi connection (instructions of software installation will be forwarded to participants)

Registration is free but limited to the number of seats available. Acceptance of participants will be made on a first-come, first-served basis.