10th International BSC Severo Ochoa Doctoral Symposium 2023

Objectives

Registrations to present at the 10th International BSC Severo Ochoa Doctoral Symposium 2023 are closed

Download here the agenda

The aim of the BSC Doctoral Symposium is to provide a forum in which PhD students and PostDoc researchers can present the results of their research work. To reach these goals, PhD students and PostDoc researchers will share their experience and findings through talks, poster sessions and discussions.

Authors are invited to submit manuscripts regarding original research and recent developments, as well as position and strategic papers in the remit of the Symposium. All accepted abstracts will be given either a presentation or a poster slot.

The tutorials of the Symposium focus on career development with lectures on research and functioning skills: presentation, academic writing, IPR issues etc.

IMPORTANT DATES

Abstract submission opening: February 6th, 2023

Asbtract submission deadline: ~~March 17th, 2023~~ **EXTENDED! March 27th, 2023 10am**

Notification of acceptance: April 5th, 2023

To submit presentations and posters (only for selected presenters): May 2nd, 2023 via email/to the office (follow email instructions)

Attendee registration deadline (only for non-presenters): May 3rd, 2023

How to Submit

1. For the Extended abstract, please use the BSC-IDS format (2 or less pages, approx. 800 words including references, diagrams and illustrations). Link to Extended abstract template in MS Word and LaTex is in the **submit link.** Please **create a PDF file** and upload it. **Make sure the size of the page is A4 (210mm x 297mm)** and not letter (215,9mm x 279,4mm).
2. The abstract should have as a main author a PhD candidate or a PostDoc researcher. In the case of the abstracts of the PhD candidates, no more than 3 authors are allowed, including the applicant's main supervisor.
3. Include your short bio with recent photo at the end of the Extended Abstract as per the template.
4. Please take the time to spell check carefully your paper and bio.
5. Please follow exactly the IEEE templates provided and do not omit or add additional type of affiliation information and do not change the outline or formatting.
    - For BSC affiliated applicants, please use the document **"Guidelines for expressing BSC Affiliation in Publications"**
6. Fill in the registration form. Please indicate whether you would like to present a talk or a poster.

The submitted abstracts must be formatted according to the Doctoral Symposium "How to Submit" regulations and not exceeding the maximum length. Submission implies the willingness of the main author to register and present the talk/poster.

Requirements for the Extended Research Abstract

Your Abstract should contain:

- Title
- Your name, affiliation and e-mail address
- Your supervisor's name, affiliation and e-mail address
- The content of your abstract should relate to your research work and include at least one of the following :
    - Description of the research problem you are investigating with justification of its importance and expected contributions of your thesis
    - Results so far and their analysis and/or plans for future development
    - Outline of prior unsuccessful work with proposed approaches for solution
    - Short bio as formated in the IEEE template

Evaluation Criteria

The applications will be evaluated and the accepted ones will be given a presentation or a poster slot. The reviewers will be looking at the quality of the research work and its relevance to the scope of the event and the quality of the Extended Abstract.

When the Selection Committee is allocating a presentation or a poster slot, the stage of the research will be taken into account.

Key Note Speaker

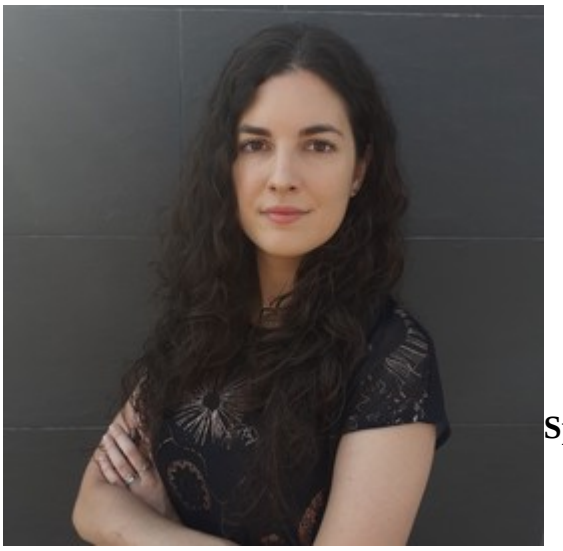
May 9th, 2023 9am

Keynote title: The quest for the quantum computer

Abstract: Multiple technological advances marked the second half of the 20th century. Among these, the invention of the transistor carried out the development of the computational era. It was also a golden century for fundamental physics, with the standard model and its experimental validation being one of its greatest exponents. However, advances in the study of the most fundamental properties of matter, described by quantum mechanics, highlighted the experimental limits to understanding it. Even the newest and most advanced computers were insufficient to describe large quantum systems due to a fundamental limitation: the space to perform the simulation grows exponentially with the number of particles we want to study. That's when, in the 1980s, some physicists suggested why not design a computer that obeys the same quantum laws of the systems we want to study, i.e., a quantum computer. Although quantum physics had already given rise to applications such as GPS, magnetic resonance, or the laser, the technology was not ready for this new and ambitious proposal at that time. Second-generation quantum technologies (communication, computing, and sensors) were developed mainly at the theoretical level, giving rise to unique potential applications not only in fundamental physics, but also in cryptography, mathematics, chemistry and material science.

A universal fault-tolerant quantum computer that can efficiently solve such challenging problems requires millions of quantum bits (qubits) with low error rates and long coherence times. While the experimental advancement toward realizing such devices will potentially take decades of research, noisy intermediate-scale quantum (NISQ) computers are now a reality. These computers are composed of hundreds of noisy qubits, i.e., not error-corrected qubits, and perform imperfect operations in a limited coherence time. In the search for quantum advantage with these devices, algorithms have been proposed for applications in various disciplines. Such algorithms aim to leverage the limited available resources to perform classically challenging tasks. HPC infrastructures will play a central role in developing these near-term applications of quantum computers. The quantum processing units (QPU) will be integrated into these infrastructures and become accelerators for some algorithms.

In this talk, I will explain the brief history of quantum technologies, with particular emphasis on near-term quantum computation, where we are, and the challenges and applications of this technological revolution.



Speaker: Alba Cervera-Lierta is a Senior Researcher at the Barcelona Supercomputing Center. She earned her PhD in 2019 at the University of Barcelona, where she studied her physics degree and a Msc in particle physics. After her PhD, she moved to the University of Toronto as a postdoctoral fellow at the Alán Aspuru-Guizik group. She works on near-term quantum algorithms and their applications, high-dimensional quantum computation, and artificial intelligence strategies in quantum physics. Since October of 2021, she is the coordinator of the Quantum Spain project,

an initiative to boost the quantum computing ecosystem that will acquire and operate a quantum computer at the BSC-CNS.

Further information

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The final program will be defined once the presenters are selected. It will be available under the **AGENDA** section.

Please note that the tutorial sessions are **limited to a certain number of attendees**.

Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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