DOCTORAL INPhINIT FELLOWSHIPS PROGRAMME – INCOMING - CALL 2020

PhD POSITION IN RESERVOIR COMPUTING FOR THE INTEGRATION OF PARTIAL DIFFERENTIAL EQUATIONS - APPLICATIONS IN QUANTUM CHEMISTRY- AT THE ICMAT FOR THE INPhINIT PROGRAMME

Job Position title: PhD in Reservoir Computing for the integration of partial differential equations. Applications in Quantum Chemistry

Research project/ group description

Artificial Intelligence is a strategic line for many Institutions and companies for the next decade, as it offers many development and innovation opportunities in different fields.

There have appeared recently in the literature a good number of relevant papers under the title of Reservoir Computing which successfully apply Neural Networks and Deep Learning techniques to the integration of non-trivial differential equations in partial derivatives. We propose to apply the above mentioned tools to the study of the Schrödinger equation, both in the time-independent and time-dependent versions, for its interest in quantum problems. In particular, we propose application in Quantum Chemistry and Quantum Chaos in which the group leader has extensive experience).

Job position description

The position that it is offered is to a good candidate with a degree in Mathematics or Physics, with knowledge of programming techniques and an interest in theoretical aspects.

Along the Ph.D. Thesis he/she should develop programs to integrate the Schrödinger equation using Deep Learning and Reservoir Computing techniques. Also he/she should apply these programs to study quantum mechanically the vibrations of small floppy polyatomic molecules with chaotic classical behavior. Finally, it is expected that the candidates characterized the networks used in the calculations from the point of view of the field Complex Networks, trying to understand the origin of their good performance.

Group Leader: Prof. Florentino Borondo Rodríguez
Email: f.borondo@uam.es

Other relevant websites:
Florentino Borondo’s Webpage: https://portalcientifico.uam.es/ipublic/agent-personal/profile/iMarinaID/04-260097#en
Links to the INPhINIT 2020 Incoming Open Call:


Application website: [https://www.lacaixafellowships.org/index.aspx](https://www.lacaixafellowships.org/index.aspx)

Programme rules [here](https).

PhD position finder: [https://hosts.lacaixafellowships.org/finder](https://hosts.lacaixafellowships.org/finder)