

BORSA N. 2

DAUSY

Borsa CNR

Tematica: “Advanced learning and control methods with life science applications”

Research theme title:

Advanced learning and control methods with life science applications

Contacts:

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Curriculum of DAUSY:

C1 AS for Automation

Hosting University/Research Centre

Consiglio Nazionale delle Ricerche

Department:

DIITET - Dipartimento di Ingegneria, ICT e Tecnologie per l'Energia e i Trasporti

Prospective Supervisors:

Alessandro Borri (alessandro.borri@iasi.cnr.it)

Fabrizio Dabbene (fabrizio.dabbene@ieiit.cnr.it)

Description:

The core activities of this PhD will be centered on efficient techniques for modeling, learning and control of complex systems arising in life sciences, with focus on biological and medical systems. Examples of such models involve molecular systems biology, glucose-insulin regulatory system, tumor growth and treatment, cardio-respiratory dynamics and control, neurosciences. On the methodological side, the PhD will investigate modern machine learning techniques for the modeling and identification of the system, and advanced control techniques such as hybrid and model predictive control approaches.

Specific Information:

A good background in systems and control theory and machine learning is required. A good mathematical background is preferred. Some background in biology is welcome.

References:

- [1]. G. Pillonetto, T. Chen, A. Chiuso, G. De Nicolao, L. Ljung, *Regularized System Identification - Learning Dynamic Models from data*, Springer, 2022.
- [2]. U. Alon, *An introduction to systems biology: design principles of biological circuits*, CRC press, 2019.
- [3]. J. Keener, J. Sneyd, eds., *Mathematical physiology*, New York, NY: Springer New York, 2009.
- [4]. K. J. Åström, R. M. Murray, *Feedback Systems*, Princeton university press, 2010.

Type of scholarship:

Project funded by the Hosting Institution

Study and research period outside the Hosting Institution:

A possible period of 6 to 12 months of the study may be optionally performed as a research period abroad, in an institution to be defined later.