

Seminario “Unconventional computation”

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SEMINARIOS UPM

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Motivación – Introducción

Unconventional computation is an interdisciplinary research area with the main goal to enrich or go beyond the standard models, such as the von Neumann computer architecture and the Turing machine, which have dominated computer science for more than half a century. This quest, in both theoretical and practical dimensions, is motivated by the huge gap between information processing in nature and in artifacts and by the hope that certain challenges that computational sciences face today might be tackled efficiently by alternative paradigms. For example, developments in synthetic biology, biochemistry, neuroscience, or optics, show that complex computations are omnipresent in physical systems, but that they cannot always be easily described or reproduced in the context of standard computing models. Given a physical, biological, or chemical system, the question is whether such a system computes, and if yes, then what and how? What are the limits and characteristics of such a computation? and how could we "exploit" and "program" the system to perform a specific task in an efficient manner?

Títulos de las charlas - seminarios

- Biologically Uninspired Computer Science.
- Novel Computing Paradigms: Quo Vadis?
- Hypercomputation: Hype or Computation?
- Exploring Logic Artificial Chemistries: An Illogical Attempt?
- Self-Organizing Topology Evolution of Turing Neural Networks.
- Beyond the Standard Models and Machines of Computation

Bibliografia

[C. Teuscher](#). Biologically Uninspired Computer Science. *Communications of the ACM*, 49(11):27-29, 2006.

[C. Teuscher](#). The Quest for Novel Computational Paradigms and Machines. [ERCIM News](#), Vol. 60, pages 66-67, January 2005

[C. Teuscher](#) and [M. Sipper](#) . Hypercomputation: Hype or Computation? *Communications of the ACM*, 45(8):23-24, August 2002

[C. Teuscher](#). Exploring Logic Artificial Chemistries: An Illogical Attempt? Proceedings of the 2007 IEEE Symposium on Artificial Life, [CI-ALife 2007](#), IEEE Computational Intelligence Society, pages 61-68, 2007

[C. Teuscher](#), [I. M. Nemenman](#), and F. J. Alexander. Novel Computing Paradigms: Quo Vadis? Editorial to *Physica D* special issue on Novel Computing Paradigms, 23:v-viii, 2008