Statistical mechanics of information processing in shallow networks
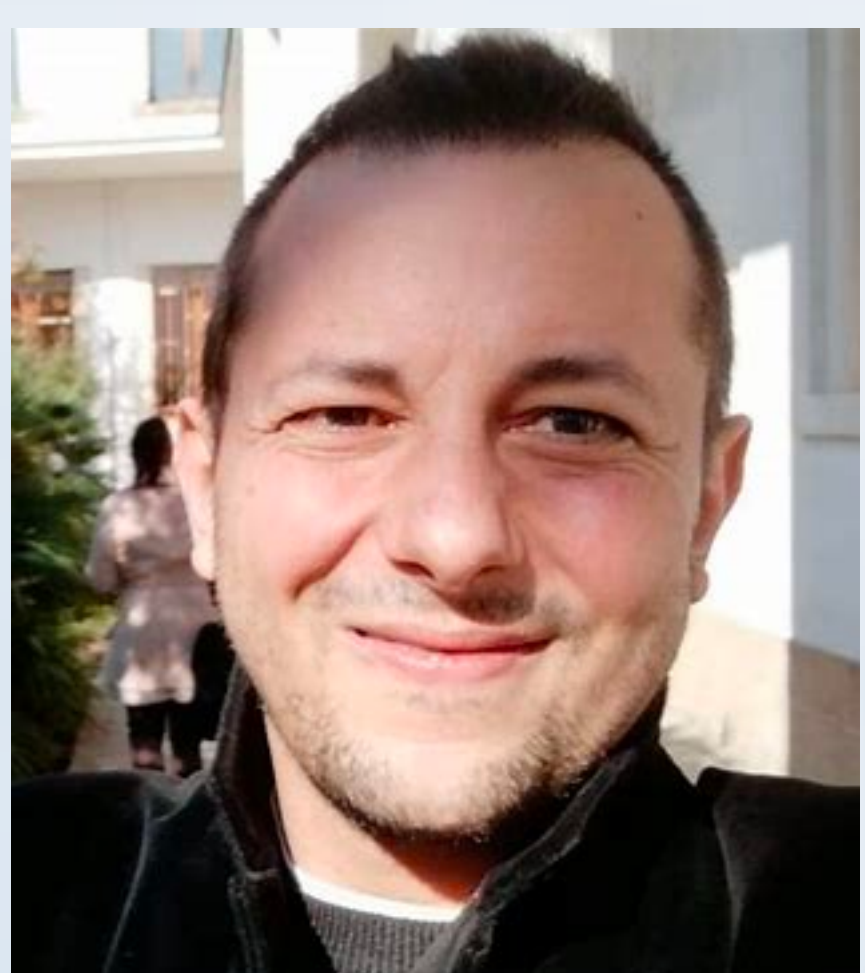
Speaker： Adriano Barra (University of Salento, Italy)

Host： Haiping Huang

Abstract：

We consider the acts of learning, storing and retrieving patterns of information as emergent properties spontaneously shown by shallow networks and we inspect the universality of these mechanisms by proving how they naturally arise both in biologically inspired models as well as in the machine-learning counterpart. Further we discuss how to extend this analysis toward dense and deep architectures. The underlying mathematical methodology to address the emerging picture of spontaneous information processing networks will be the "statistical mechanics of spin glasses".

About speaker：

Adriano Barra received the master's degree in theoretical physics from the Sapienza University of Rome (2004), and the Ph.D. degree in applied mathematics from King's College London (2008). He is currently associate professor of mathematical physics with the University of Salento, moderator for the arXiv preprint server and fellow of Laboratorio Nazionale di Intelligenza Artificiale, Istituto Nazionale di Alta Matematica and Istituto Nazionale di Fisica Nucleare. He has published more than 100 papers in refereed journals mainly working on the statistical mechanical formalization of neural networks.

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