



Special Lecture

BRAIN AND
MACHINE

LEARNING AND
MEMORY

Hugues Bersini
Paul Frankland

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Hugues Bersini is head of ULB's artificial intelligence laboratory, IRIDIA (about fifty researchers) and professor of computer science at the same university for engineers and business engineers. He is the author of more than 300 publications in the field of complex systems, bioinformatics and Artificial Intelligence. He is the author of a dozen books on information technologies, some of which are authoritative today in the academic world, and two collections of short stories about these same technologies: "Le Tamagotchi de Mme Yen" and "Le dernier Fado de l'Androïd". He teaches object-oriented technologies, data mining and web programming for companies. He is responsible for the creation of seven start-ups in the fields of e-commerce, genomics, traffic optimization, text-mining, and fraud detection.

CONSCIOUS AND UNCONSCIOUS ARTIFICIAL INTELLIGENCE

I will first briefly discuss how since the birth of AI two traditions have always been very productive, labelled for simplicity "conscious and unconscious", then how and why the second one, based on Big Data and Machine Learning, is dangerously taking the lead today. Thus I will discuss what more recent researches in neural networks such as deep learning (deep in space and time), self-adapting nets and chaotic Hopfield networks might bring to neurosciences.



Paul Frankland
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Paul Frankland is a Senior Scientist in the program in Neurosciences & Mental Health at the Hospital for Sick Children. He holds a Canada Research Chair in Memory Research (Tier 1), and is appointed as a Full Professor in the Department of Psychology, Department of Physiology and Institute of Medical Science at the University of Toronto. His research focuses on modeling cognitive function and dysfunction in genetically-engineered mice. In these studies he hopes to characterize the roles of different proteins in neuronal plasticity, how different brain regions contribute to distinct cognitive processes, and how these are altered in disease states.

THE PERSISTENCE AND TRANSIENCE OF MEMORY

The predominant focus in the neurobiological study of memory has been on remembering (persistence). However, recent studies have considered the neurobiology of forgetting (transience). In my talk I will draw parallels between neurobiological and computational mechanisms underlying transience. I will propose that it is the interaction between persistence and transience that allows for intelligent decision-making in dynamic, noisy environments. Specifically, I will argue that transience (1) enhances flexibility, by reducing the influence of outdated information on memory-guided decision making, and (2) prevents overfitting to specific past events, thereby promoting generalization. According to this view, the goal of memory is not the transmission of information through time, per se. Rather, the goal of memory is to optimize decision-making. As such, transience is as important as persistence in mnemonic systems.