Neuroscience Lecture

Friday, 24 May 2024

12.00 o'clock

Inselspital, Kursraum Neurologie
INO B118, Entrance 34
Rosenbühlgasse 25 3010 Bern

Computing with physics: Intelligence in carbon and silicon

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Whether biological or artificial, intelligence ultimately boils down to the ability of physical substrates to perform (complex) computations efficiently. Understanding intelligence thus requires overcoming a set of interrelated - and interdisciplinary - challenges. As computational neuroscientists, we need to figure out which aspects of biological dynamics are relevant for information processing. As physicists, we need to build appropriate theories and models thereof. As computer scientists, we need to understand which algorithms can "run" on such dynamics. And as engineers, we seek to build devices that emulate them efficiently.

In my talk, I will try to formulate some of our answers to certain subsets of these grand challenges. In particular, I will address the following questions:

1. How can cortical hierarchies perform credit assignment?
2. How can deep networks learn precise spike timing?
3. How can spiking neurons learn statistical models?
4. And how can we efficiently emulate such neuro-synaptic dynamics in silicon?

Chair: Prof. Antoine Adamatidis

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