Neuroinformatics

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Brief course intro

Organizational info

Course website (CZ only):
`https://cw.felk.cvut.cz/wiki/courses/a6m33nin/start`
Conditions: `https:`
`//cw.felk.cvut.cz/wiki/courses/a6m33nin/podminky`

Passing conditions:

- ▶ 30+ points from assignments during semester (out of 60)
- ▶ 20+ points from exam test (out of 40)
- ▶ Submission of all assignments during exercises
- ▶ max 2 absences during exercises

What is Computational Neuroscience?

Computational Neuroscience is the theoretical study of the brain to uncover the principles and mechanisms that guide the development, organization, information processing and mental abilities of the nervous system.
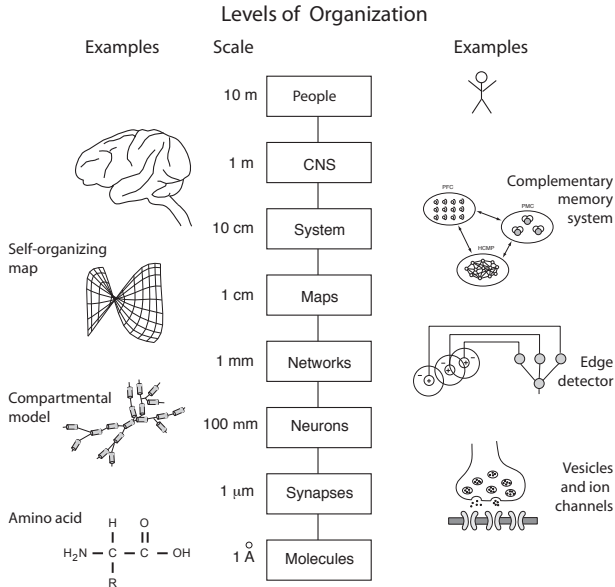
What is neuroscience

- ▶ How does the brain work?
- ▶ What are the biological mechanism involved?
- ▶ How is organised?
- ▶ How did evolve?
- ▶ How does it change during lifetime?
- ▶ What are the origins of the degenerative diseases and the possible rehabilitation?

Tools in Neuroscience

- ▶ Brain slices
- ▶ Anatomical imaging
- ▶ Functional neuroimaging (fMRI, PET, SPECT)
- ▶ Electrophysiology (unit activity, EEG)
- ▶ Genetic manipulations (animal models)
- ▶ Psychophysiological measurements
- ▶ Computational simulations (analytic solutions & Numeric simulations !!!)

Levels of organizations in the nervous system

Levels of Organization

In this course you will especially

- Spend one nice semester with computational neuroscience!
- Understand organization and hierarchy in neural structures
- Understand generation and transmission of information in the brain
- Understand synaptic plasticity and learning processes
- Get idea of cognitive processes
- Learn to calculate and evaluate models of all of the above