NEST Desktop in the Classroom

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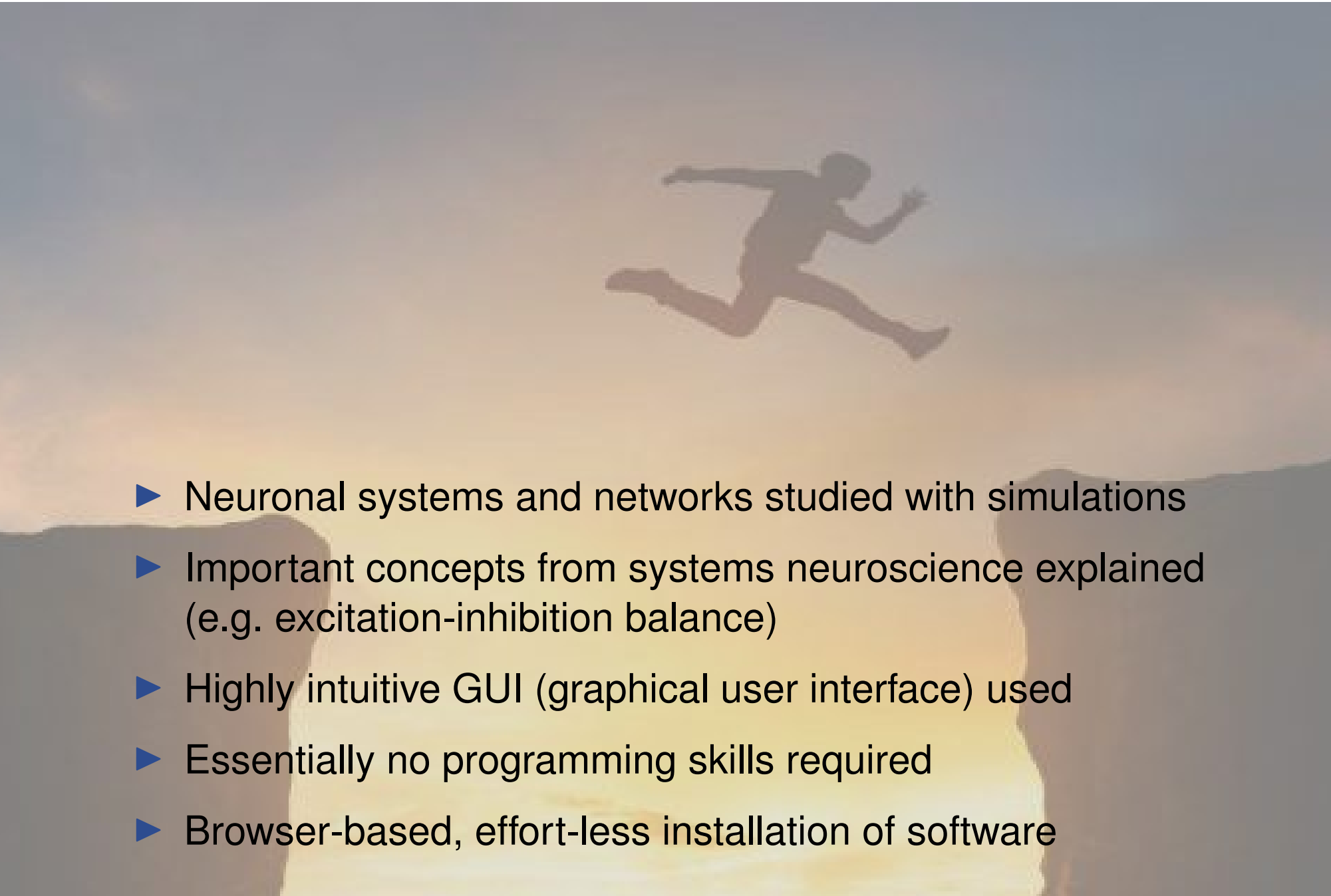
Challenges of teaching Computational Neuroscience

- Sufficient programming skills cannot be assumed
- Novice students often lack formal training in math/physics
- Biologists are uncomfortable with models and theory
- There is not enough time to learn everything from scratch
- Everybody wants to work on interesting problems quickly

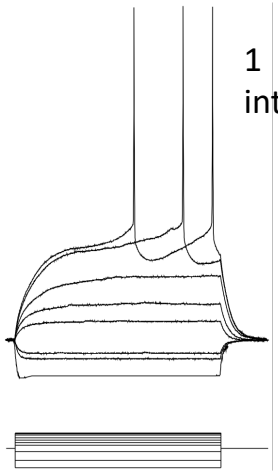
New courses based on NEST Desktop



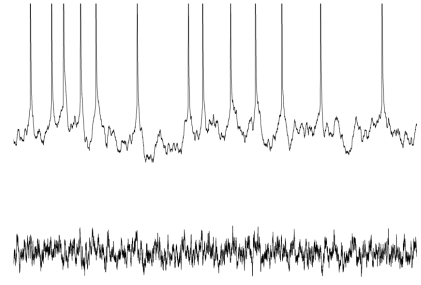
- Neuronal systems and networks studied with simulations
- Important concepts from systems neuroscience explained (e.g. excitation-inhibition balance)
- Highly intuitive GUI (graphical user interface) used
- Essentially no programming skills required
- Browser-based, effort-less installation of software

New course in the BSc Biology

Simple Neuron Models

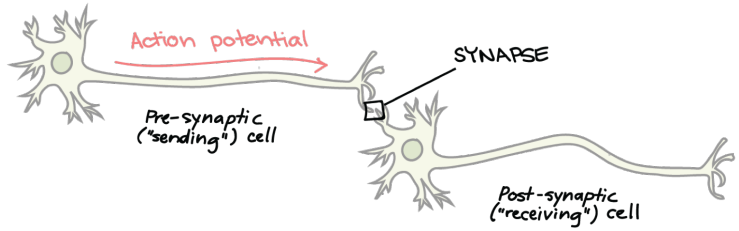


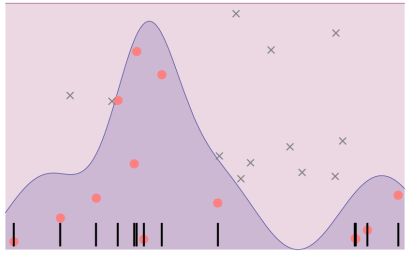
1 Direct current injection into isolated neurons



2 Noise current input into isolated neurons

3 Excitatory and inhibitory synaptic input into neurons





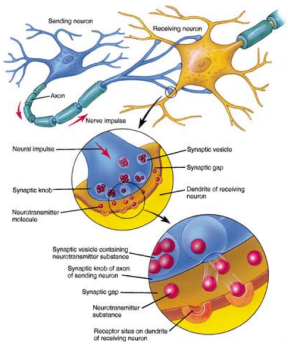
4 The Poisson process as a spike train model

Additional topics:

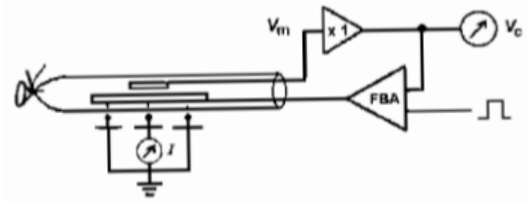
- Equivalent circuit model
- Different noise concepts
- Numerical integration

New course in the MSc Biology / MSc Neuroscience

Biophysics of Neurons and Networks

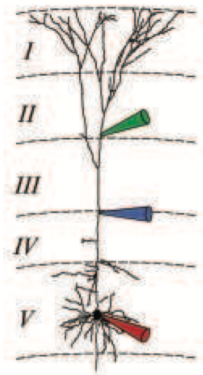


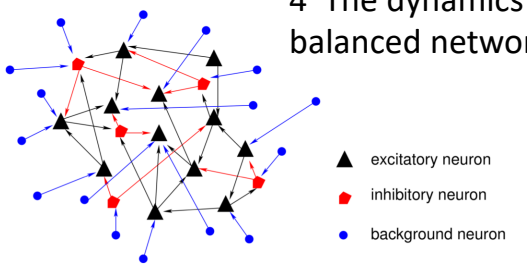
1 Synaptic interaction studied with leaky integrate-and-fire neurons



2 The Hodgkin-Huxley theory of the action potential

3 Point neuron models and multi-compartment neuron models





4 The dynamics of balanced networks

Additional topics:

- Poisson process
- Numerical integration
- Graphs & networks

Useful links related to NEST Desktop

NEST Desktop repository & download
https://github.com/babsey/nest-desktop

NEST Desktop documentation
https://nest-desktop.readthedocs.io