Modeling the neuron
How can we represent neurons in a computational model?

In this workshops we will focus on Leaky integrate-and-Fire model. This model is one of the most widely used models for analyzing the behavior of neural systems. It describes the membrane potential of a neuron in terms of the synaptic inputs and the injected current that it receives.

After an hands-on tutorial on one LIF neuron, we will connect multiple neurons to have a network of spiking neurons and analyze its behavior.
We will then create a network with different populations of neurons: excitatory and inhibitory populations. We will study the neural dynamics in this more complex case.
How the two populations are interacting in the network? What can we change in the model to obtain different dynamical behaviors? How can you expand the model to make it more biological plausible? During the workshops we will answer these (and more!) questions.

Lastly, we will add to the LIF neurons different receptors types (GABA and AMPA) and therefore move to a more a biological realistic neuron model!
Experimentalists can measure Local field potential (LFP) in the brain, how can we measure LFP in a computational model?
We will use a Local field potential simulation to record LFP signal from our computational network.

Based on the discussed topics and exercises, you will prepare your own research proposal in teams of five people.

Looking forward,
Giulia Moreni

Preparation:
No programming skills necessary, but a brief online introduction to Python may help. Write to g.moreni@uva.nl, then I can send you some resources.