



MSc and BSc projects in

Simulating and analyzing the brain

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Do you have an affinity for mathematics / programming? And would you like to work on the interface between mathematics / computer science / biology / physics?

The brain continuously processes information. The physical structure of the brain (its 'hardware') shapes this information processing and vice versa: the computations needed for information processing (the 'software') are adapted to the physical structure of the hardware. In my '[Biophysics of Neural Computation](#)' group, we study the relationship between the physical properties of the brain and its information processing: how are neurons and networks formed so that they can perform functions such as perception? Which characteristics of neurons and networks enhance or limit information transfer? We as humans still strongly outperform machines and computers in tasks such as facial recognition or adaptation to changes in illumination. Understanding how the brain does this can help us improve the performance of such devices.

My group studies these questions using a variety of theoretical methods, from (biophysical) neural network modelling to abstract coding models and advanced data analysis of experimental data. We collaborate closely with experimental neuroscientists, studying neurons, networks, and behaviour, unraveling together the fundamental functions of the brain.

Since we do mostly modelling, computer simulations and advanced data analysis (that means, bluntly said, computer programming and mathematics), some affinity and experience with math and programming would really help. If you're motivated and willing to learn, you don't have to be an expert of course, but especially for short internships it is better to be able to focus on the science than on learning how to program.

My lab is open to both BSc and MSc internships. Examples of open internship positions can be found here: fleurzeldenrust.nl/open-internship-projects/, but do not hesitate to contact me if you want to formulate a project yourself!