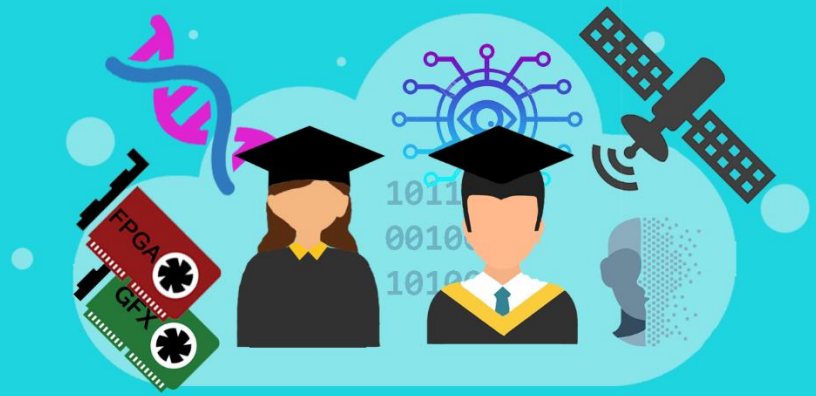


# Diploma Thesis

Microprocessors and  
Digital Systems  
Laboratory



## **COMPUTATIONAL NEUROSCIENCE: ANALYSIS, OPTIMIZATIONS AND ACCELERATION OF STATE-OF-ART SIMULATION MODELS OF BIOLOGICAL NEURAL NETWORKS.**

In recent years we are witnessing an increased interest in researching biological neural networks, like the human brain. Only Europe is committing 1 Billion EUR to the project “Human Brain Project (HBP)”, with other continents and countries following with their own projects. This trend, to discover the mysteries of the brain, is happening now partly because only in recent years we have a fighting chance against such a difficult problem due to the increase of available processing power!

This thesis will be completed in conjunction with the Erasmus Medical Center, Rotterdam. The scope of this thesis is the study and optimization of the solvers/simulators of an extended Hodgkin-Huxley, ADEX and Izhikevich neural models in various hardware platforms.

### **PREREQUISITES**

Good knowledge of C and data structures; concurrent development; Linux;

### **OPTIONAL**

Python; Linear Algebra; Differential equation solvers, OpenMP, Docker Containers

### **EXTRA INFORMATION**

[Pynn](#), simulator-independent language for building neuronal network models.

[Human Brain Project \(HBP\)](#)

[Neurasmus B.V.](#)

### **CONTACT INFORMATION**

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