

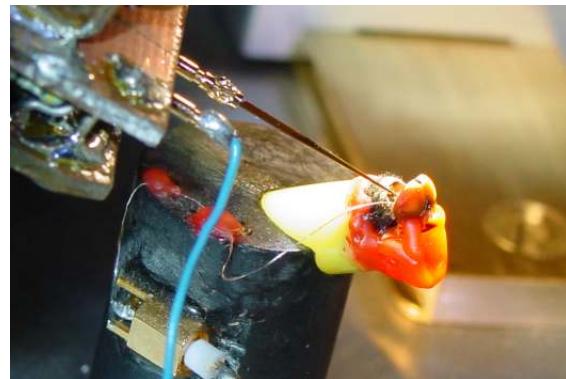


IFSC

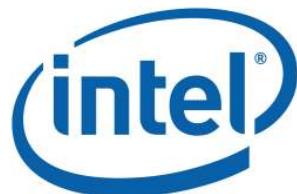
UNIVERSIDADE  
DE SÃO PAULO  
Instituto de Física de São Carlos



# An embedded system for real-time feedback neuroscience experiments



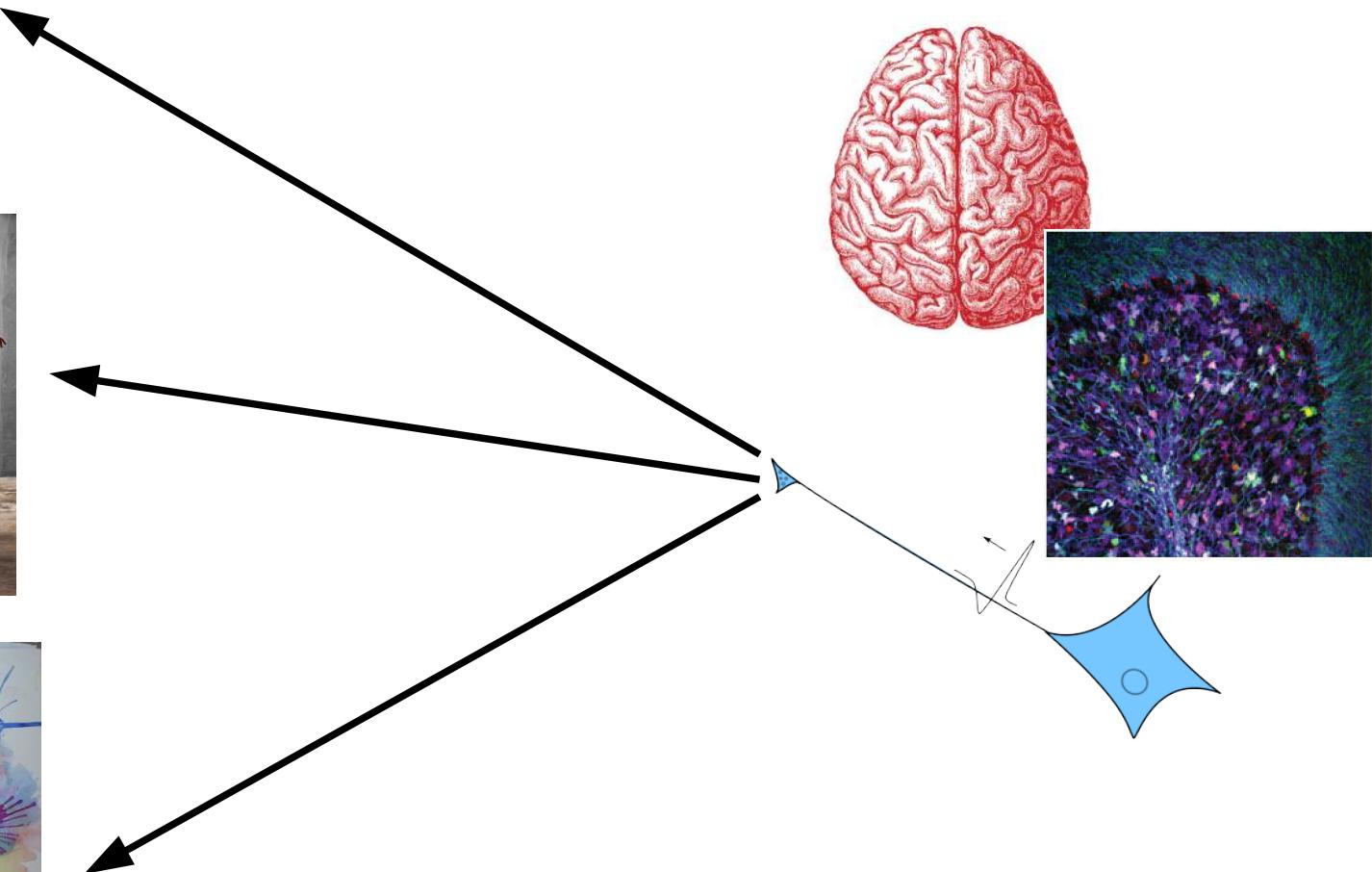
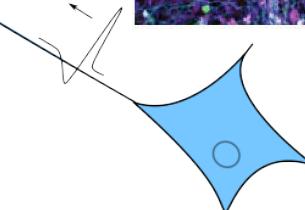
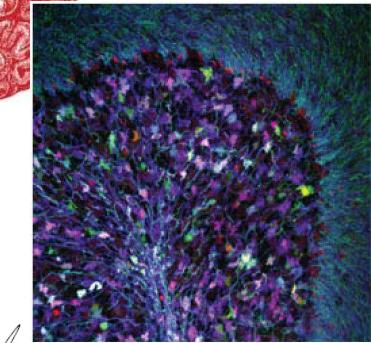
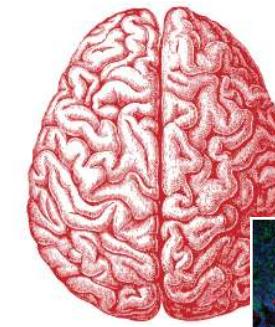
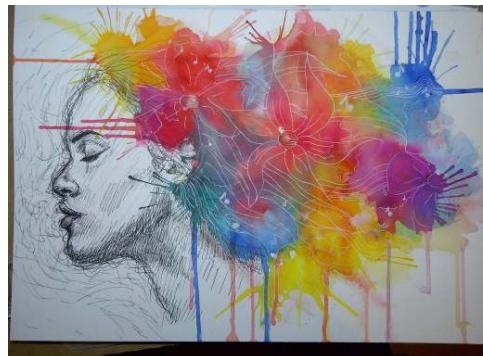
Lirio O B Almeida  
Paulo Matias  
Rafael T Guariento



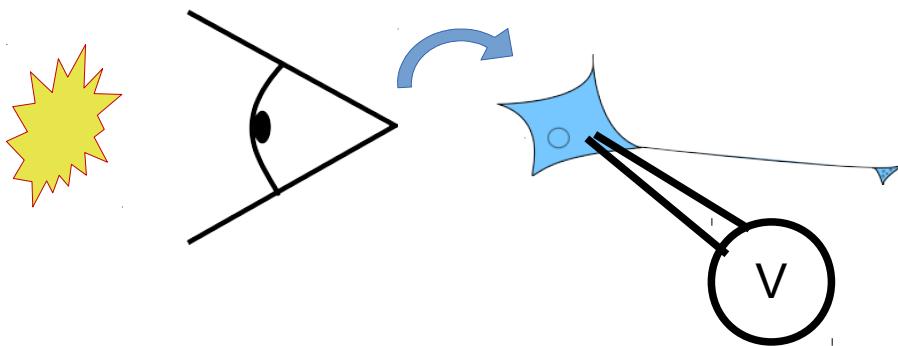
terasic  
[www.terasic.com](http://www.terasic.com)

ALTERA.

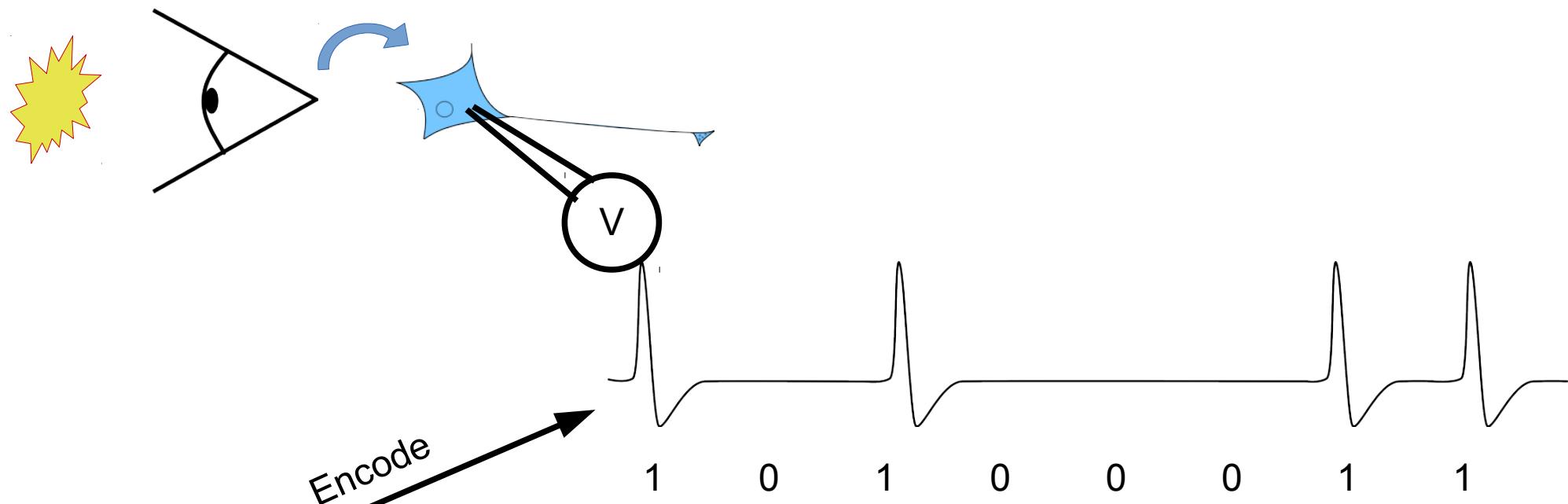
# Why study neuroscience?



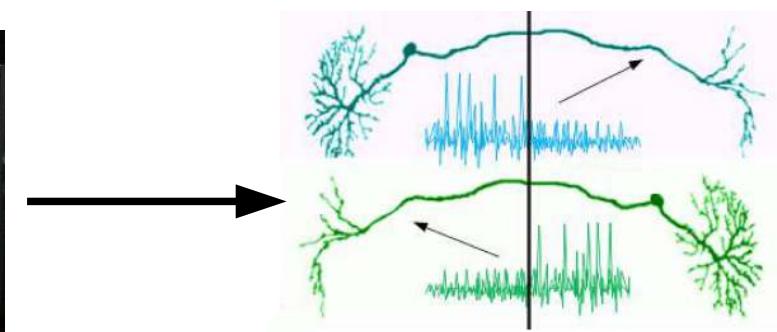
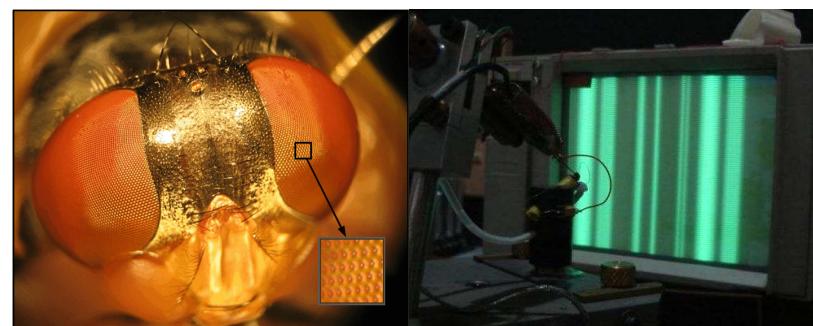
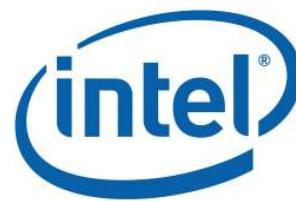
# Neural Code



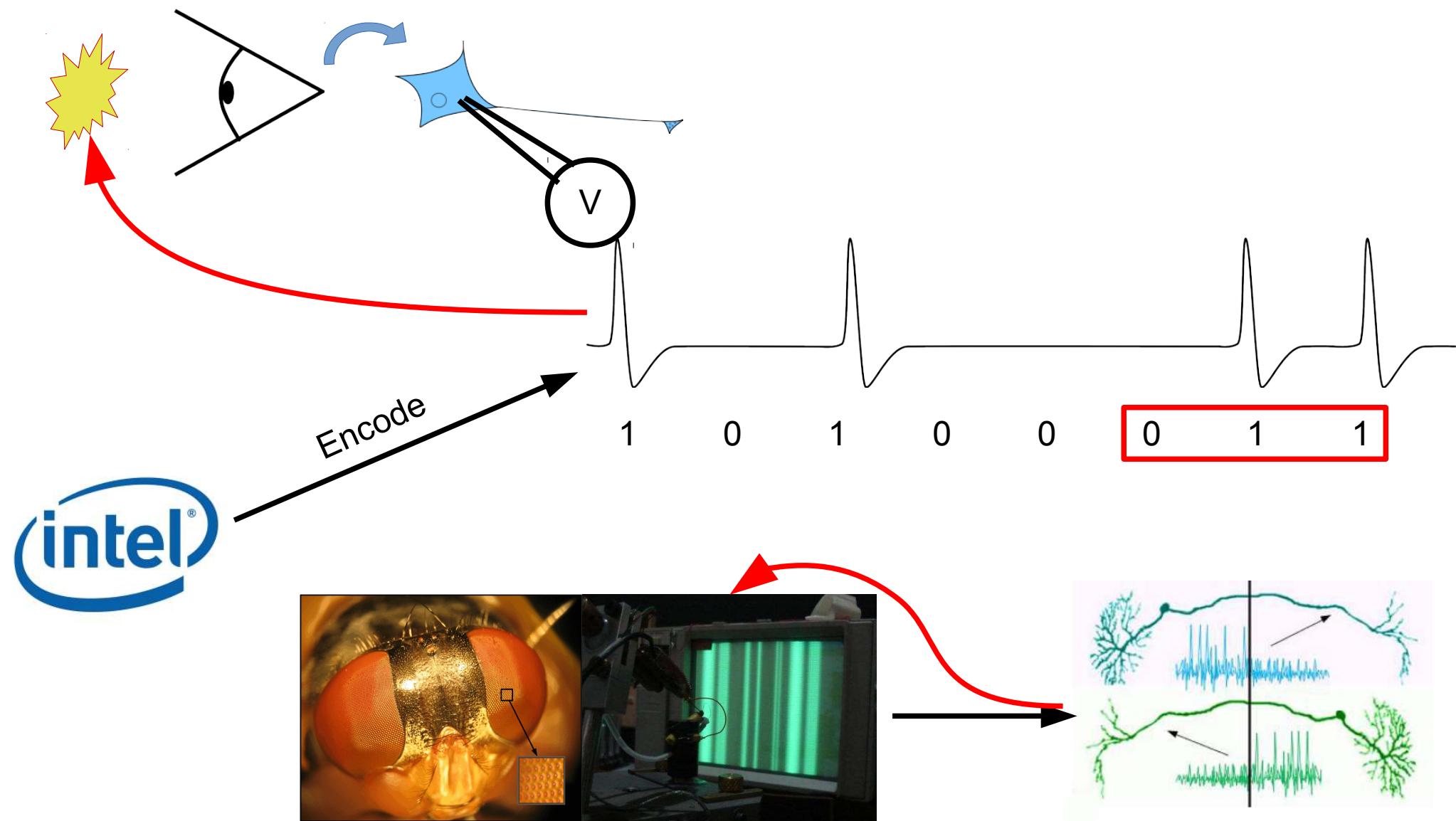
# Neural Code



# Neural Code

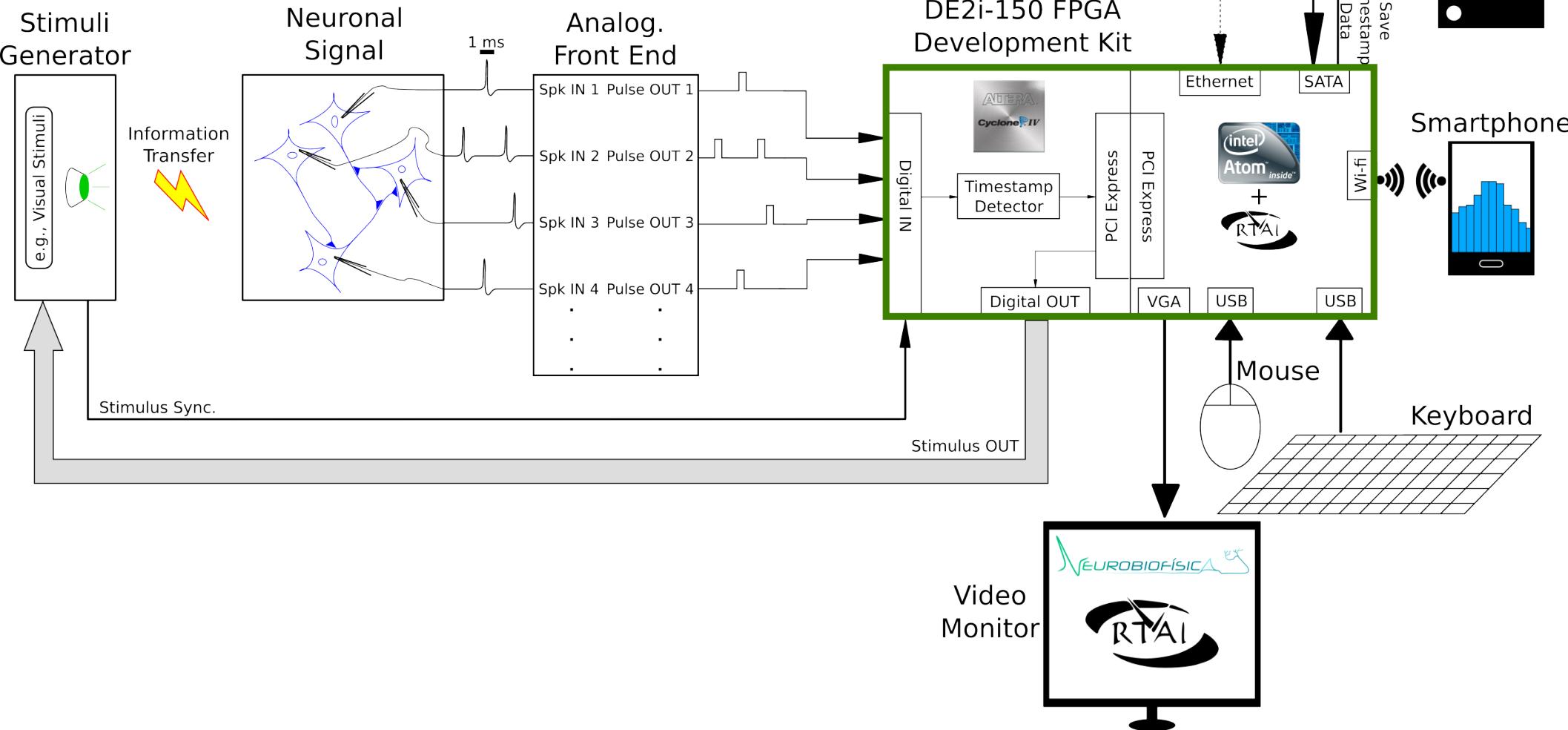


# Neural Code





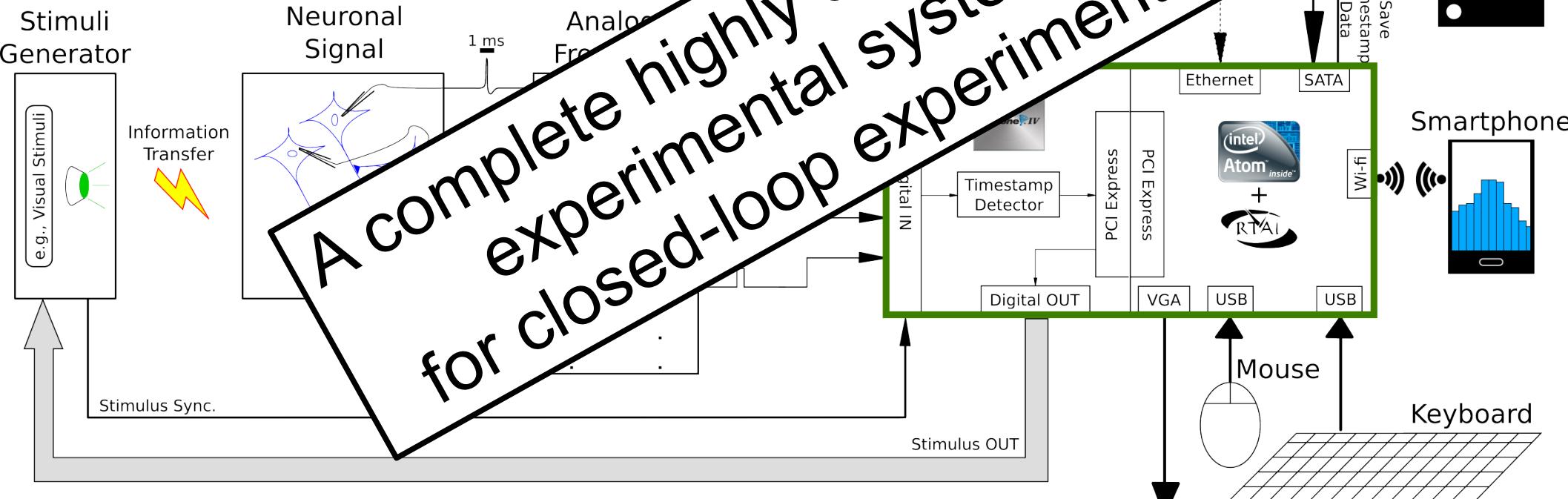
# DE2i-150



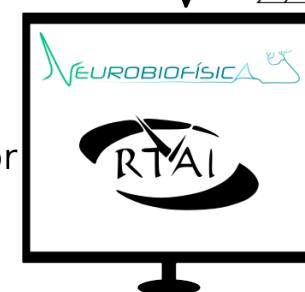


# DE2i-150

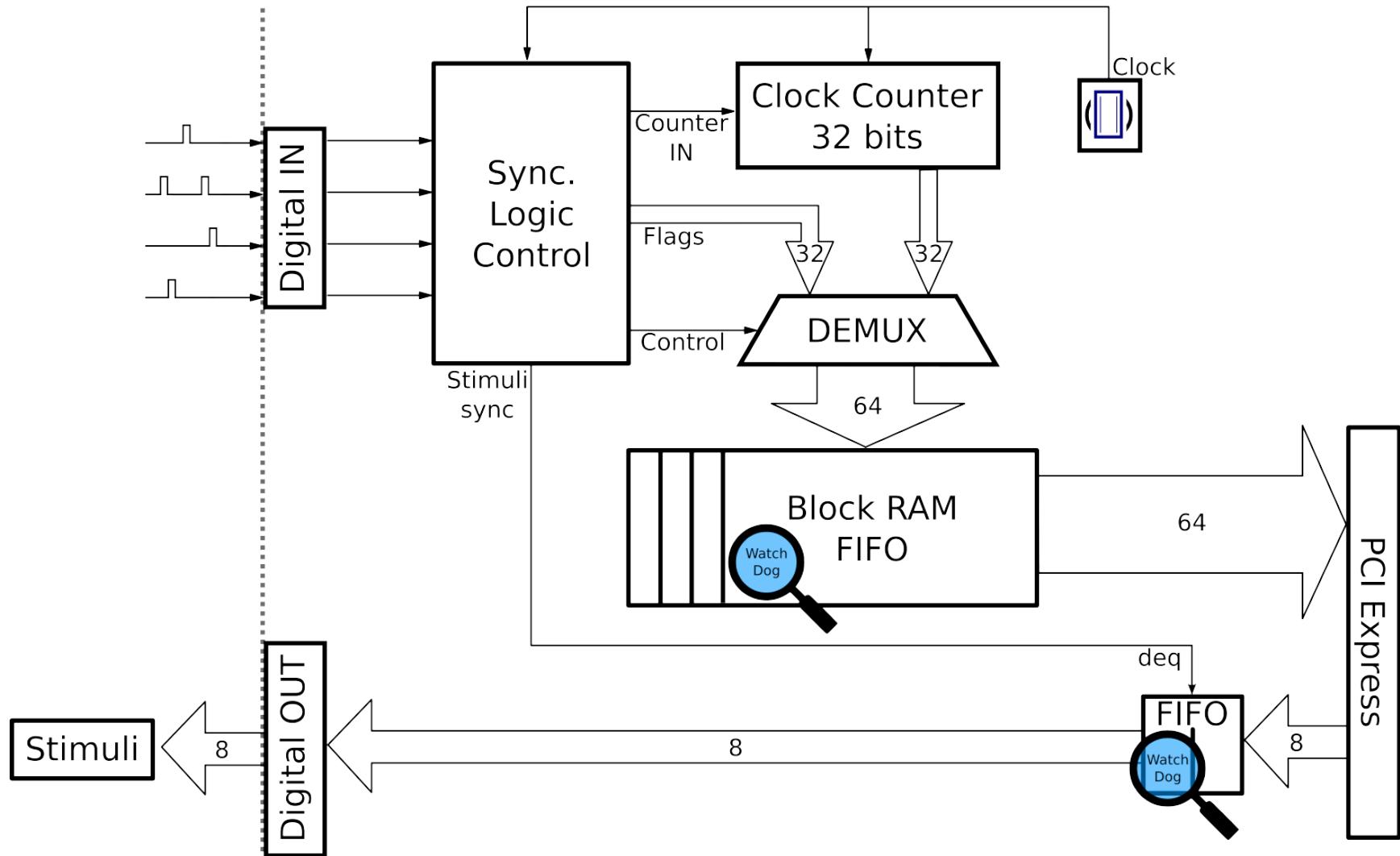
A complete highly configurable  
experimental system  
for closed-loop experiments



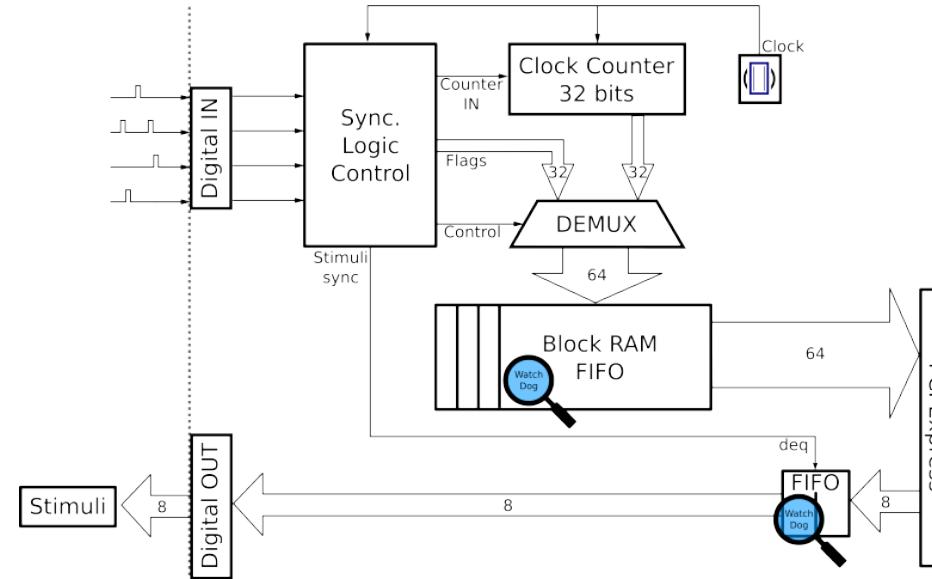
Video  
Monitor



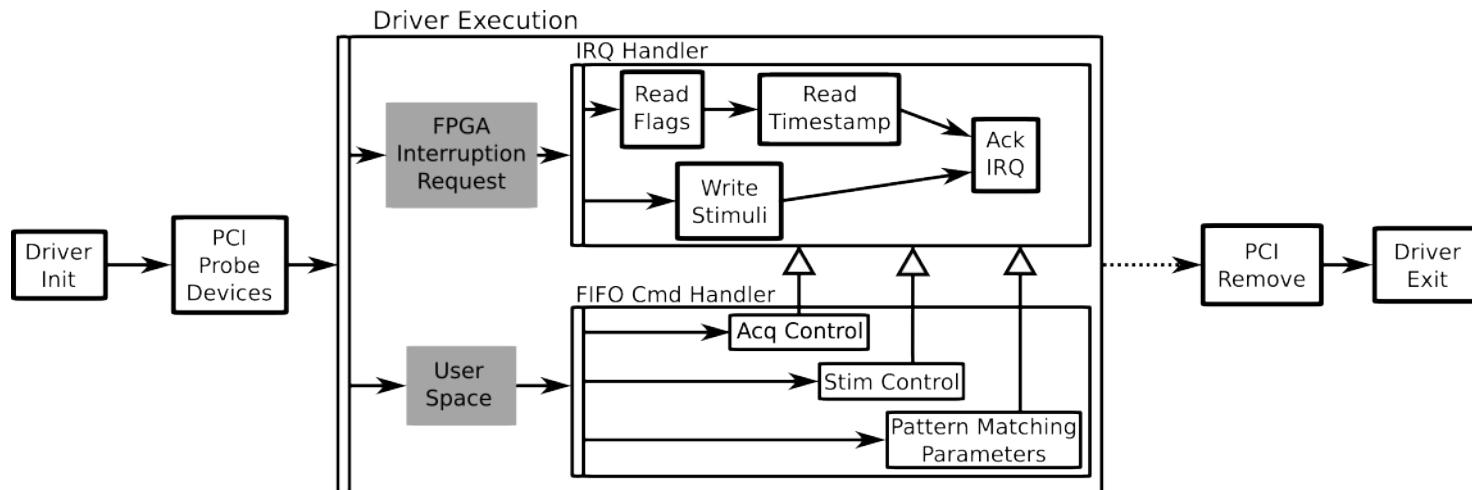
# FPGA Altera Cyclone IV



# FPGA Altera Cyclone IV



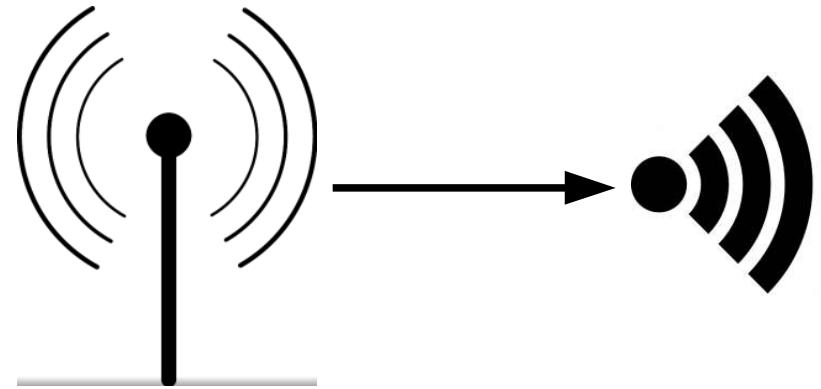
## RTAI Kernel Module



# User Space - Server

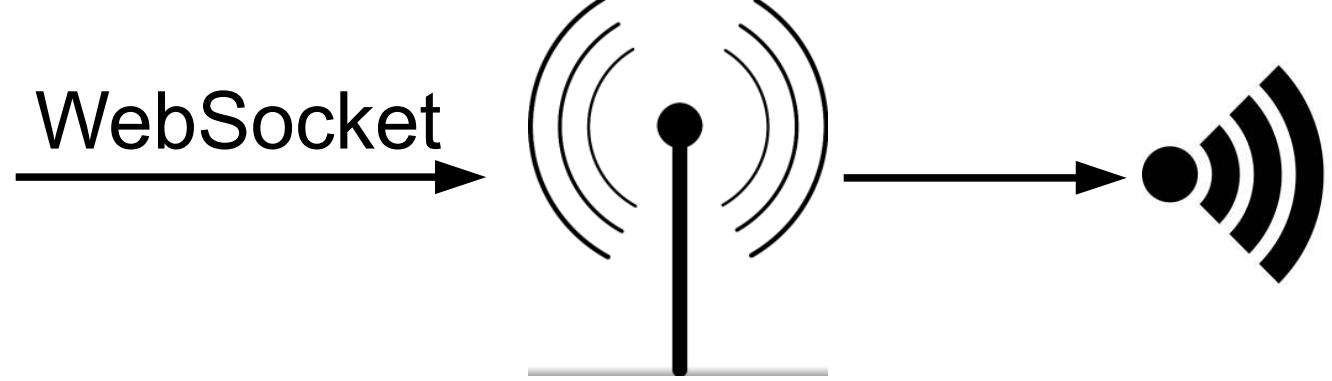
 python™  
 Tornado

WebSocket



# User Space - Server

 python™  
 Tornado



# User Space - Client

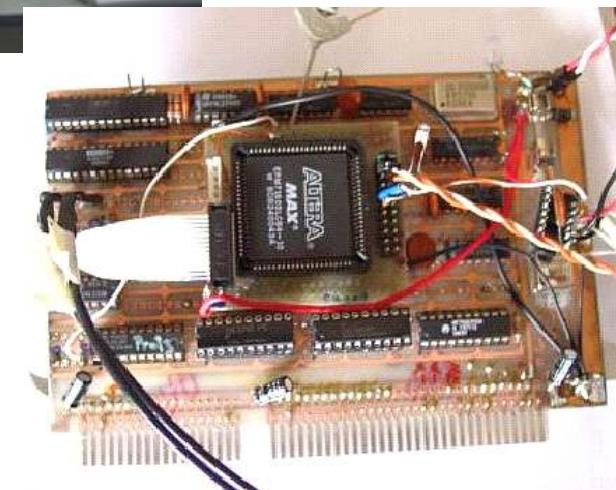
 elm



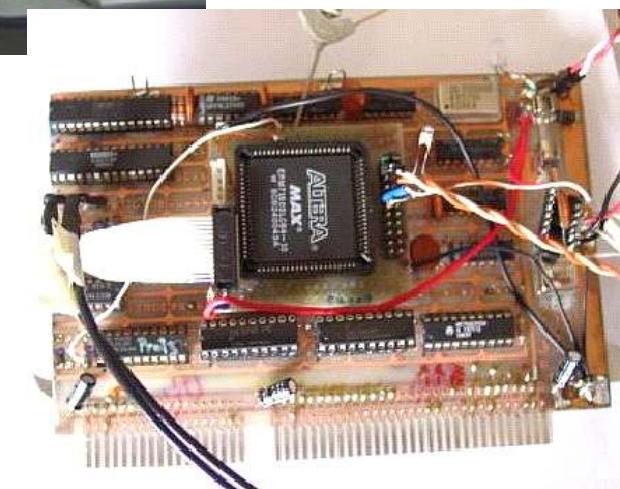
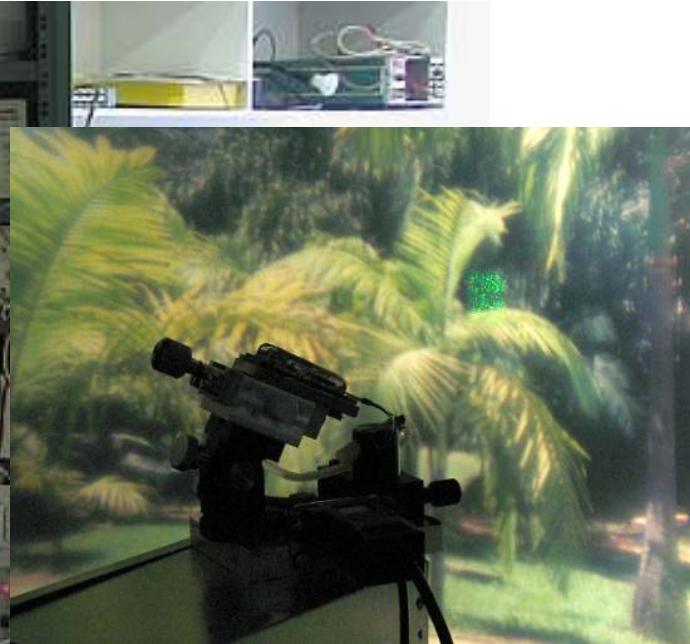
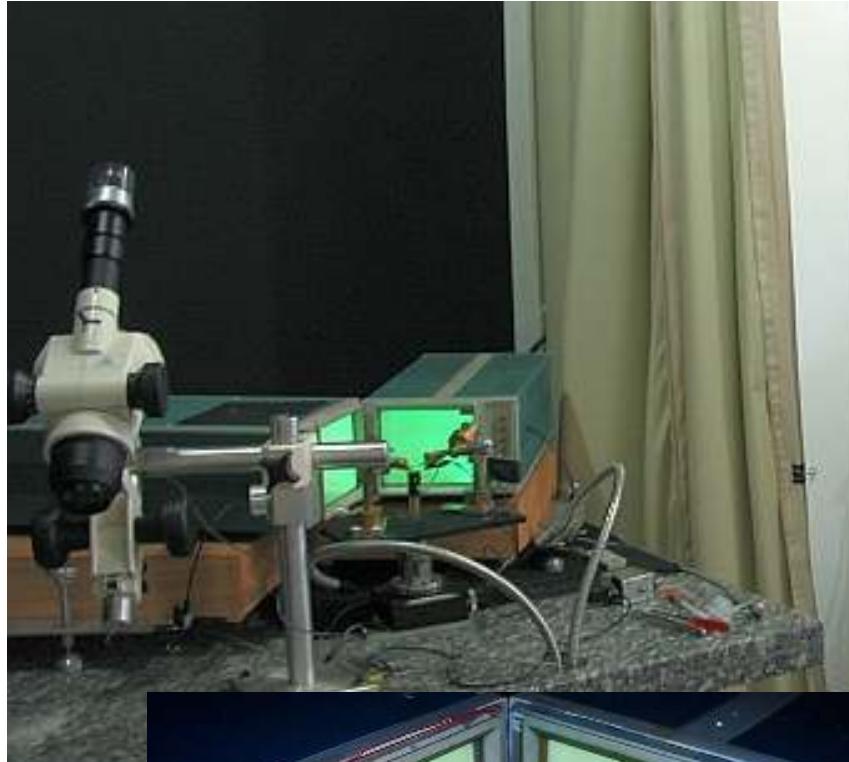
Flot



# Our laboratory

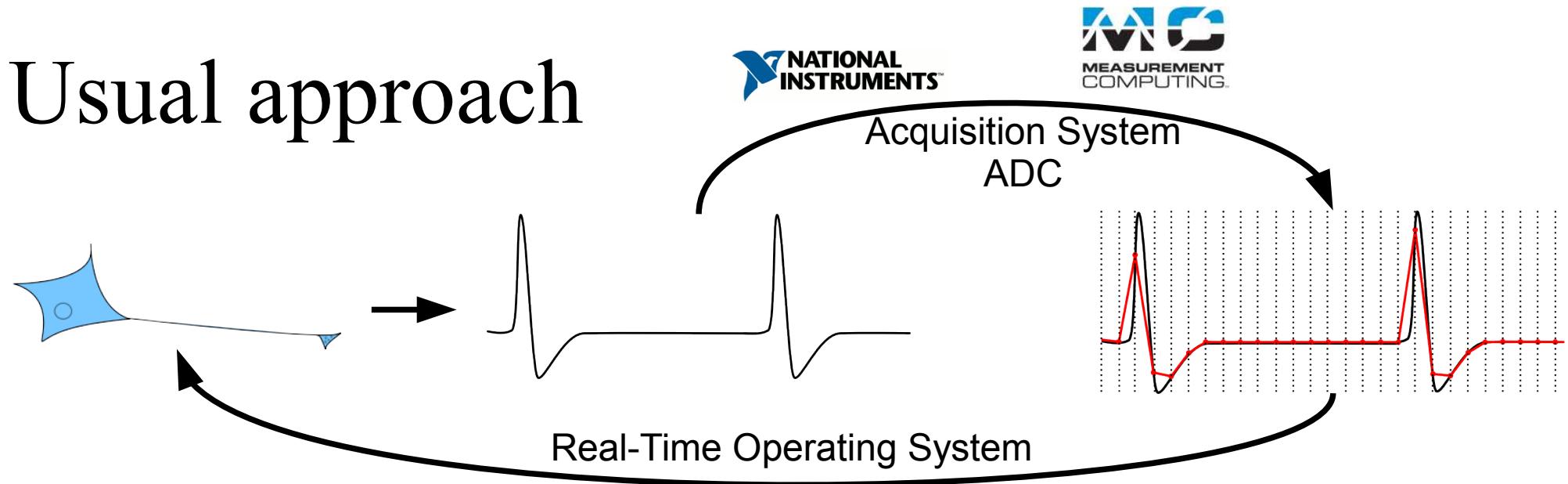


# Our laboratory

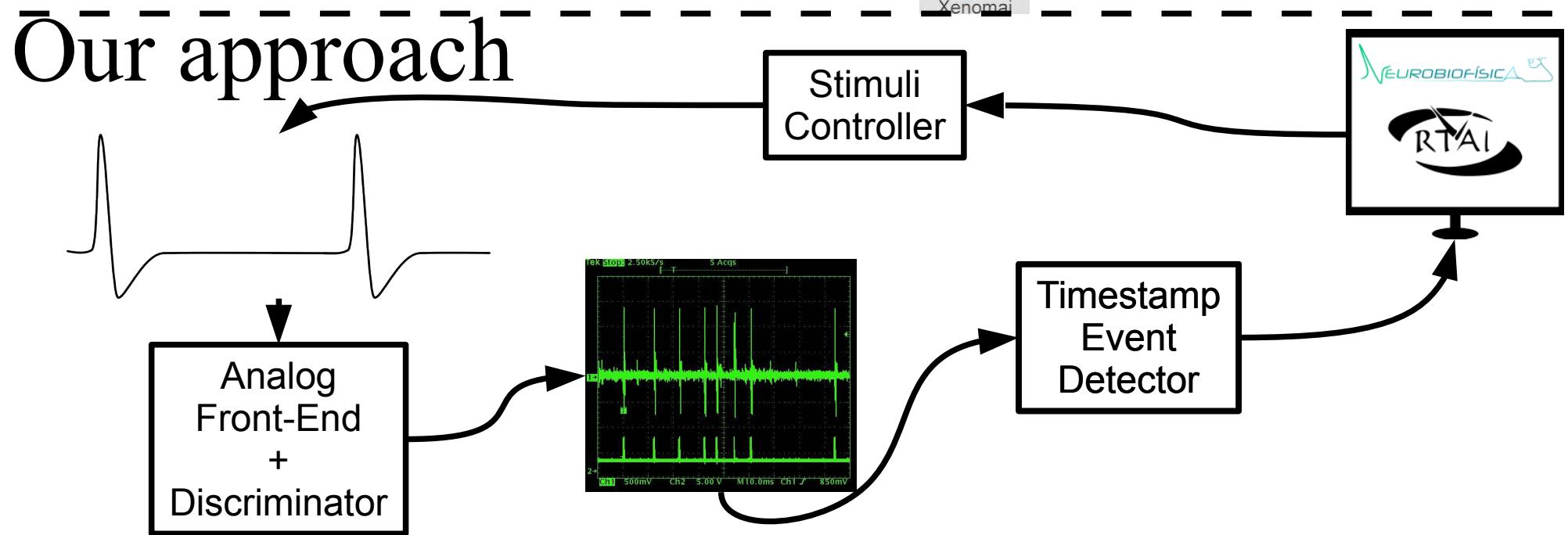




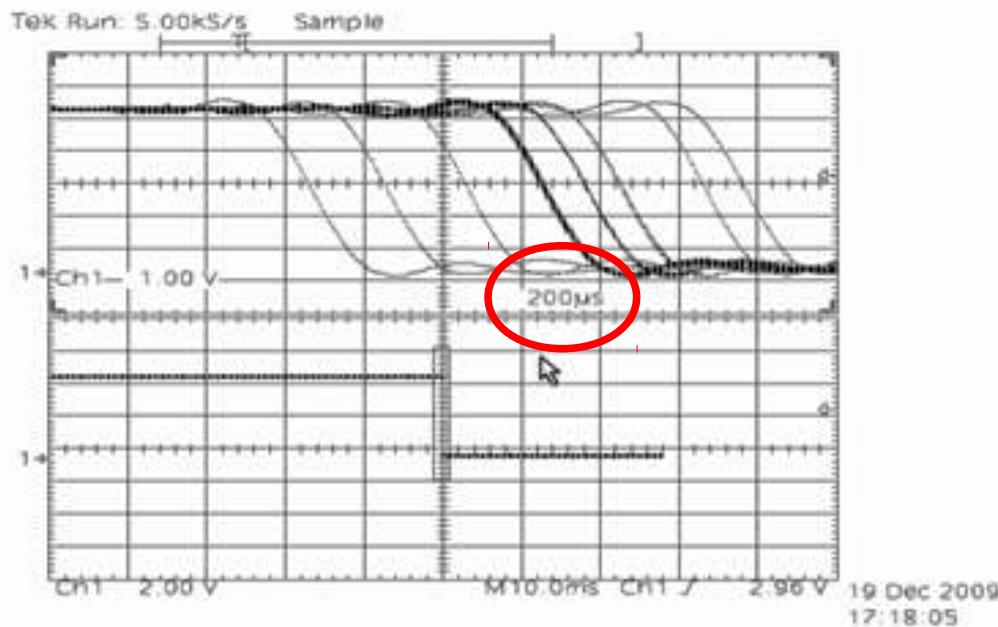
# Usual approach



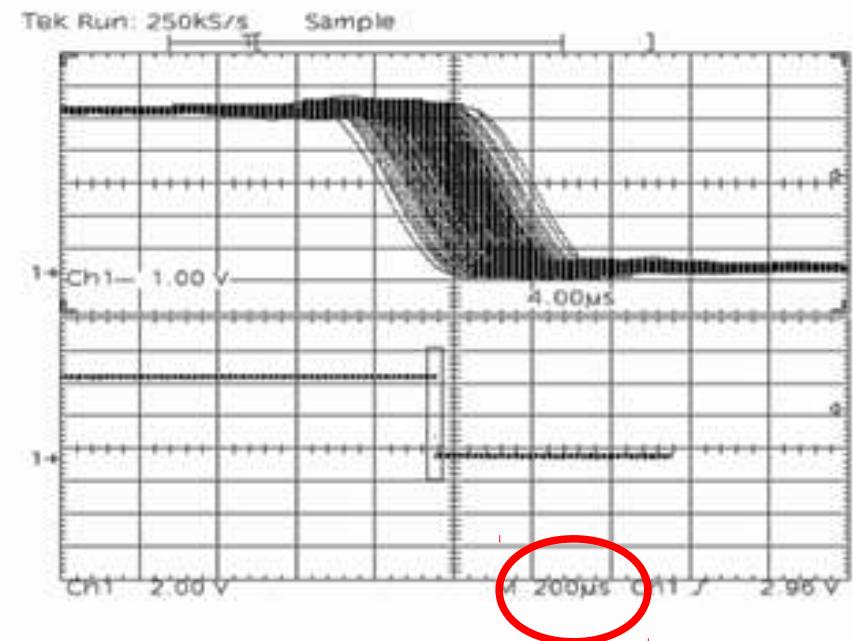
# Our approach



# Why RTOS?

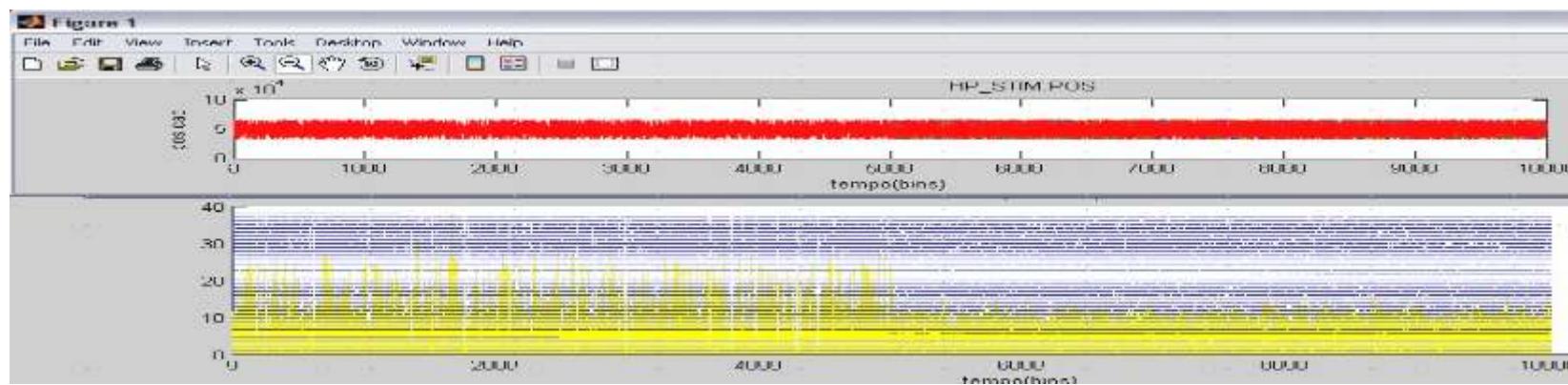
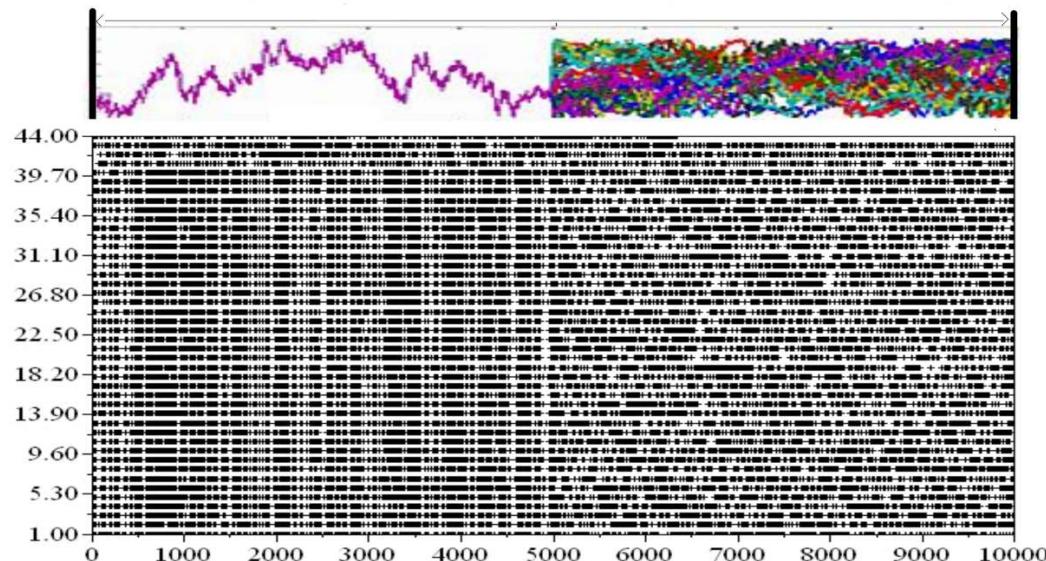


(a) Sinal gerado com Linux

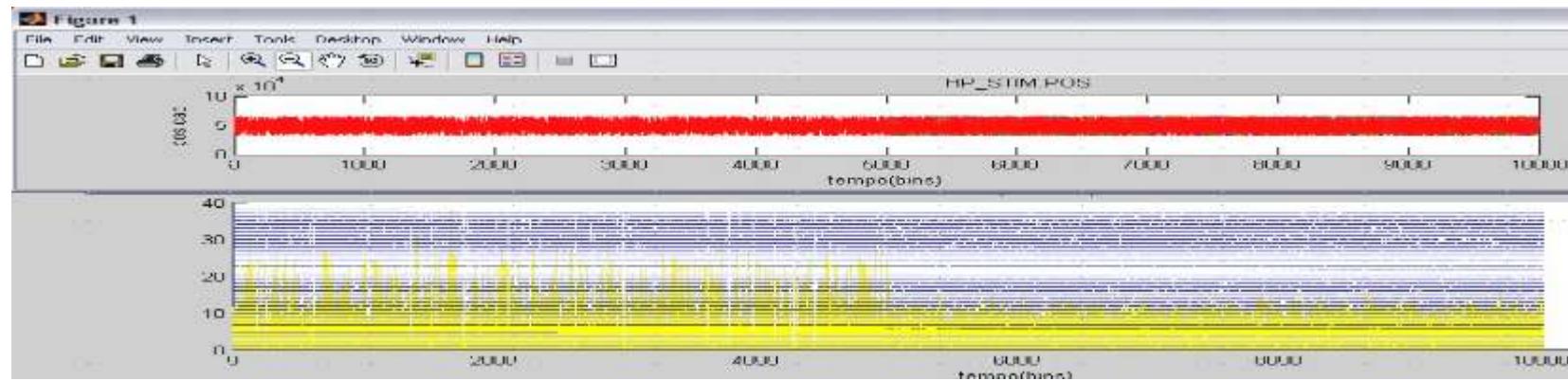


(b) Sinal gerado com Linux-RTAI

# Word Finder



# Word Finder



Periodic Signal of 500ms  
Each 10s, a specific word is generated

Video