MICRO-614

Electrochemical nano-bio-sensing and bio/CMOS interfaces

Carrara Sandro

Cursus	Sem.	Type
Génie électrique		Obl.
Microsystèmes et microélectronique		Obl.

Language	English
Credits	1
Session	
Exam	Project report
Workload	30h
Hours	**15**
Lecture	15

Frequency

Every year

Remarque

Next time: June 18 to 22, 2018

Summary

Main aim of the course is to develop the new approach of a co-design of three layers Bio/Nano/CMOS for biochips: Bio for Specificity, Nano for Sensitivity, CMOS for autonomy. Recent improvements for m-Health due to nano/biostructures and special CMOS architectures are presented and deeply discussed.

Content

1. Bio for Probes/Targets building blocks: Proteins and DNA
2. Bio for Probes/Targets interactions with DNA and Antibodies
3. Bio for Probes/Targets interactions with Oxidases and Cytochromes
4. Bio for Detection principles: Dna, Antobodies, Enzimes
5. Bio for Detection principles: Redox Reactions
6. Nano for Probes immobilization: Methods and Mechanisms
7. Nano for Probes layer quality: SPR, SEM, and AFM
8. Nano for Memristive Biosensors
9. Nano to prevent the Electron Transfer
10. Nano to enhance the Electron Transfer
11. CMOS for metabolite in fixed voltage
12. CMOS for metabolite in scanning voltage
13. CMOS for multi-metabolites monitoring
14. CMOS for DNA detection
15. CMOS for Applications in Animals and Humans Remote Telemetry

Keywords

Nano-Bio-Technology; Carbon Nanotubes; Metallic Nanoparticles; Op Amp; Analog Design; Electrochemical Sensing; CMOS

Learning Prerequisites

Recommended courses

Classical mechanics; Geometrical optics; Electro-magnetism; ohm law on steady current and some theorems on alternate current; Laplace transforms

Assessment methods

by home-works

Resources

Bibliography

Bio/CMOS Interfaces and Co-Design, Sandro Carrara (author), Springer (Editor), 2011

Ressources en bibliothèque

- Bio/CMOS Interfaces and Co-Design / S. CARRARA