

Course content

- (1) Introduction and syllabus
- (2) Analytical performance of biosensors.
 - Definition of biosensor and biochips. Examples.
 - Definitions of performance parameters of a biosensors such as sensitivity, selectivity and limit of detection.
- (3) Surface ligand binding biosensors
 - Fundamental mechanisms and laws that regulate the binding of target molecules to ligands arranged on a surface.
 - Miniaturization of the sensing area
 - Peculiarities and effects of scaling the surface size
- (4) Assay configurations, matrix-dependent performance
 - Classifications and configurations of molecular assays
 - Homogenous and heterogeneous
 - Direct, sandwich, competition, inhibition assays
 - Main issues and performance-limiting factors in surface sensing
 - Techniques for the creation of patterns of molecular ligands on the surface of a sensors- Biosensors arrays
- (5) Sensor performance in presence of convection. Microfluidics systems
 - Physical and biochemical phenomena predominant in microfluidic sensing devices.
 - How to evaluate the sensing speed and performance of a sensor working in flow conditions.
- (6) Binary Diagnostic tests (screening assays)
- (7) Solid-liquid interfaces: Electrodes and Electrical impedance sensing
- (8) Dr. Gloria Porro. Bioanalytics with Electrodes
- (9) Bioanalytics with Field-effect transistors
- (10) Translation and Commercialization of biosensors. Dr. Fabien Rebeaud.
Director Biomedical Sciences @ [Liom](#)
- (11) Dr. Erick Garcia Cordero. REA Diagnostics
 - Interfacing and packaging of biochips
 - Microfluidics, electronics and packaging interfaces to bring a biosensor to the end-user