

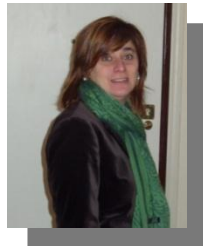


Laboratorio Biosensori

Dipartimento di Chimica "Ugo Schiff"
Università degli Studi di Firenze
Via della Lastruccia 3, 50019 Sesto Fiorentino
(FI) Italy



Giovanna Marrazza



Maria Minunni



Ilaria Palchetti



Marco Mascini



• Post-docs



Sara Tombelli



Serena Laschi



Francesca Bettazzi



Simona Scarano

• PhD students



Andrea Ravalli



Maria Laura Ermini

• Research Fellow



Diego Voccia

• Visiting Professor



A.P.F. Turner

• Erasmus Links:

Aristotele University of Thessaloniki (Greece)

Bucharest University (Rumania)

Cranfield University (UK)

Group's expertise

1. Development and evaluation of sensors and biosensors based on the coupling of electrochemical, optical and piezoelectric sensors with enzymes, antibodies, bacteria, whole tissues and nucleic acids
2. Solving analytical problems in clinical chemistry, experimental medicine, food chemistry and environmental analysis
3. Development of new immobilization chemistries of biomolecules (enzymes, proteins, nucleic acids, etc.) and in analytical procedures suitable for use with biosensor devices, i.e. flow injection analysis, flow systems, and microdialysis

Approaches in (bio)sensing as analytical chemists

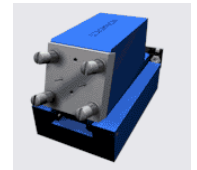
- **Optical sensing**
- **Piezoelectric sensing**
- **Electrochemical sensing**

Optical Instrumentation

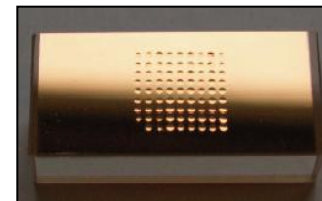
- Fully automated Biacore X™ (GE Healthcare)



- Spreeta™ (Texas Instruments Inc. USA)



- SPR-imaging (Genoptics- France)



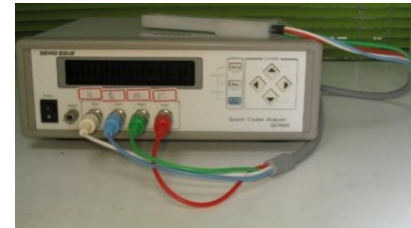
Piezoelectric Instrumentation (QCM)

- **Universal sensor**



• 9.5 MHz AT-Cut quartz crystal (14mm); Gold evaporated (42.6mm² area) on both sides Crystal Manufacturing (USA)

- **Seiko**



- **Elbatech QC magic (4 channels)**



Electrochemical Instrumentation

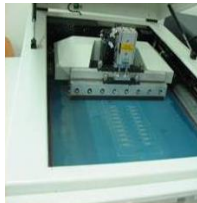
- Autolab Eco Chemie (NL)



- PalmSens[®]

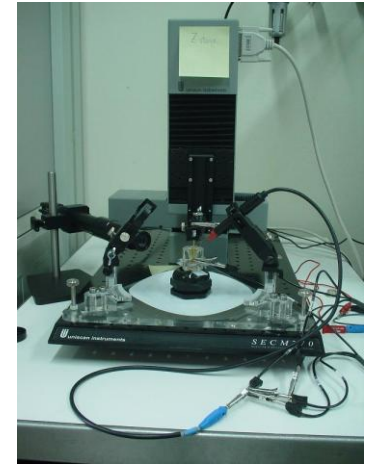


- Screen Printed Electrodes (SPE)



Electrochemical Instrumentation

- Scanning electrochemical microscope (SECM)
- Microfluidic systems



UNISCAN 270

DiagnoSwiss S.A.



IMMUNOSPEED



GRAVI™ - CHIP

Other Instrumentation

Nanodispensing systems

Spin coater

Optical microscope

Themocyclers Biorad for PCR

Electrophoresis apparatus

Spectrofluorimeter

Spectrophotometer

Fiber optic spectrophotometer-Ocean optic

ELISA plates reader



National On-going Projects

Project Title	Date and Duration	Funding organisation
Biosensori realizzati con nanomateriali per una rapida identificazione di biomarcatori tumorali	2011-2013	MIUR
Valutazione dell'impiego di nanoparticelle d'oro funzionalizzate per diagnostica e terapia dei tumori	2011-2013	Regione Toscana
Bio Elettricità Microbica	2010-2012	MiPAAF
Development of biosensors for point mutations detection	2010-2011	Fondazione ARPA
Minimally invasive microsystem for glucose monitoring in diabetic patients	2011-2013	Regione Toscana

International On-going Projects



Project Title	Date and Duration	Funding organisation
Bioinspired nanotechnologies: from concepts to applications	2010-2013	EU COST Action
Nanobiosensors for tumors biomarker detection	2010-2011	Italy-Spain Action
Detection of Hepcidin As A New Biomarker of Erythropoiesis Stimulators Abuse: A Pilot Study	2010-2011	WADA
SILCO Innovative electrodes to control trace metal ionization used to treat Legionella and other pathogens in water distribution systems	2009-2011	EU (FP7) SME-2008-1 Grant N. 232249

Selected Publications

- Simultaneous detection of transgenic DNA by Surface Plasmon Resonance imaging with potential application to gene doping detection. Scarano, S.; Ermini, M. L.; Spiriti, M. M.; Mascini, M.; Bogani, P.; Minunni, M. *Analytical Chemistry* (2011), in press
- Cannabinoid receptor gene detection by electrochemical genosensor. Berti, F.; Eisenkolbl, C.; Minocci, D.; Nieri, P.; Rossi, A. M.; Mascini, M.; Marrazza, G. *Journal of Electroanalytical Chemistry* (2011), 656, 55-60.
- A New Electrochemical Multiplexed Assay for PSA Cancer Marker Detection. Zani, A.; Laschi, S.; Mascini, M.; Marrazza, G. *Electroanalysis* (2011), 23(1), 91-99
- A rational approach in probe design for nucleic acid-based biosensing. Ermini, M.L.; Scarano, S.; Bini, R.; Banchelli, M. ; Berti, D.; Mascini, M.; Minunni, M. *Biosensors and Bioelectronics*, 26 (2011), 4785-4790
- Surface plasmon resonance imaging (SPRi)-based sensing: A new approach in signal sampling and management. Scarano, S.; Scuffi, C.; Mascini, M.; Minunni, M. *Biosensors and Bioelectronics* (2010), 26(4), 1380-1385
- Quasi-monodimensional polyaniline nanostructures for enhanced molecularly imprinted polymer-based sensing, Berti, F.; Todros, S; Lakshmi, D.; Whitcombe, M.I J.; Chianella, I; Ferroni, M; Piletsky, S.A.; Turner, A. P. F.; Marrazza, G., *Biosensors and Bioelectronics* (2010), 26, 497-503
- A new gravity-driven microfluidic-based electrochemical assay coupled to magnetic beads for nucleic acid detection. Laschi, S.; Miranda-Castro, R.; González-Fernández, E.; Palchetti, I.; Reymond, F.; Rossier, J. S.; Marrazza, G. *Electrophoresis* (2010) 31, 1–10
- Surface Plasmon Resonance Imaging for Affinity-Based Biosensors. Scarano, S.; Mascini, M.; Turner, A.P.F.; Minunni, M. , *Biosensors and Bioelectronics*, (2010), 25, 5, 957-966
- Detection of C reactive protein (CRP) in serum by an electrochemical aptamer-based sandwich assay. Centi, S.; Sanmartin, Bonel, L. ; Tombelli, S.; Palchetti, I.; Mascini, M. *Electroanalysis* (2009), 21(11), 1309-1315
- Aligned carbon nanotube thin films for DNA electrochemical sensing. Berti, F.; Lozzi, L.; Palchetti, I.; Santucci, S., Marrazza, G., *Electrochim. Acta* (2009), 54, 5035-5041