

Curriculum Vitae of Marco Sartore

PERSONAL INFORMATION

Name: Marco Sartore
Date of birth: May 24th, 1964
Nationality:
Gender:
Native tongue:
Other language:
Address:

Phone:
e-mail:

EDUCATION

University of Genova (Italy), Institute of Biophysics

Ph.D. in Biophysics, Nov 1992

Dissertation: design and realization of a silicon-based biosensor for the measurement of cell metabolism.

University of Genova (Italy), Department of Informatics, Biophysics and Electronics

Master Degree in Electronics Engineering, Apr 1989

Dissertation: design and development of a computer-driver electro-optical system for studying biopolymers *in situ*.

Liceo Classico Cassini High School of Sanremo (Italy)

High school Degree, Apr 1983

PROFESSIONAL EXPERIENCE

Current positions: - Contract Professor at the University of Genova, Italy
- Head of the R&D department of the company Elbatech Srl

Earlier positions: Research Contractor at the Institute of Biophysics
of the National Council of Research (Pisa, Italy)

Research Contractor at the Institute of Biophysics
of the National Council of Research (Genova, Italy)

Senior Researcher and head of the Neural Networks and Microscopy Lab
at Polo Nazionale Bioelettronica (Rome, Italy)

Senior Researcher and head of the Atomic Force Microscopy Lab
Technobiochip, Marciana Marina (Italy)

PROFESSIONAL COLLABORATIONS

I am honored to be currently working in strict collaboration with the following eminent Institutions and their bright scientists:

- The Rowland Institute at Harvard, Harvard University, Cambridge, USA
- Electronics Department, University of Glasgow, UK
- Department of Bioelectronics, Informatics and Robotics, University of Genova, Italy
- Institute of Complex Systems, National Council of Research, Florence, Italy

TEACHING EXPERIENCE

- ◆ Lecturer in Ph.D. courses, University of Genova, Italy
- ◆ Senior design project mentor, University of Glasgow, UK
- ◆ Senior design project mentor, University of Genova, Italy
- ◆ Assistant Supervisor in Master Degree, University of Rome “Campus Biomedico”, Italy
- ◆ Assistant Supervisor in Master Degree , University of Catania, Italy
- ◆ Teaching professor in High School, Institute R. Foresi, Portoferraio, Italy

RESEARCH EXPERIENCE

I started to do research concurrently to my Ph.D., then heading Research Laboratories of Italian Consortium, then establishing a hi-tech Company, working as its head of the R&D department and finally joining the National Council of Research. My experience covers the following macro-fields:

- ◆ Electronics, design of analog, digital and mixed-signals solutions
- ◆ Scientific Instrumentation, design of a wide spectrum of devices customized for specific biophysical experiments
- ◆ Programming, realization of low-level and high-level software, mainly devoted to driving specialized hardware and data acquisition
- ◆ Biosensors, especially but not limited to silicon-based types (LAPS, Isfet, Amperometric, ...)
- ◆ Scanning Probe Microscopy (I designed the 2nd Atomic Force Microscope in Italy)
- ◆ Bioelectronics, design of multichannel neuronal cell activity recorders

TECHNICAL SKILLS AND COMPETENCES

- ◆ Organization and implementation of teaching courses, laboratory activities, workshops
- ◆ Students assistance at various levels of their scholastic career
- ◆ Work in multidisciplinary and multi ethnic environments
- ◆ Research activities and projects
- ◆ Design and realization of scientific instruments
- ◆ Team leading

CASE STUDIES

Along my way I faced a widespread number of intriguing experimental problems to solve with the realization of related solution-devices. Here is a list of my most valuable achievements:

- ◆ Langmuir-Blodgett troughs design and realization
- ◆ SPMagic, a first generation open-source Scanning Probe Microscopy controller
- ◆ NanoUp, a second generation IoT type Atomic Force Microscope controller
- ◆ High voltage amplifiers for physics and biophysics
- ◆ IoT framework dedicated to the realization scientific instruments with network topologies
- ◆ Force-sensing device for the detection of single cells membrane elasticity
- ◆ Cantilever-based viscosity sensor
- ◆ Quartz Crystal Microbalance sensors and biosensors
- ◆ Multichannel Impedance-based sensor for the detection of epithelial cell-coverage in artificial tissue cultures
- ◆ Acoustofluidic interferometric device to measure physical properties of single cells in suspension in a microfluidic environment
- ◆ System for the detection of small pH variations in Light-Addressable Potentiometric biosensors
- ◆ Health subcutaneous biosensor for *in vivo* amperometric detection of lactic acid

PUBLICATIONS

I started publishing during my Ph.D. course, lessen during my Company work and restarted in the last years (in fact during my work as head of the R&D, I was not allowed to publish several of my scientific results that are listed above as “case studies” and can be documented upon request). Here is a list of my scientific publications:

Dynamical response and noise limit of a parametrically pumped microcantilever sensor in a Phase-Locked Loop – **Nature portfolio Scientific Reports** 13(1), DOI: 10.1038/s41598-023-29420-3 – J. Mouro, P. Paoletti, M. Sartore, B. Tiribilli

Low Limit of Detection Gas Density Sensing With a Digitally PI-Controlled Microcantilever - **IEEE Sensors Journal** PP(99):1-1, DOI: 10.1109/JSEN.2023.3251865 – J.Mouro, P.Paoletti, M.Sartore, B.Tiribilli

Photothermal Self-Excitation of a Phase-Controlled Microcantilever for Viscosity or Viscoelasticity Sensing- **Sensors** 2022, Vol.22, 8421, DOI: 10.3390/s22218421 - J.Mouro, P.Paoletti, M.Sartore, M.Vassalli, B.Tiribilli

Probing Italy: A Scanning Probe Microscopy Storyline, **Micro** Vol.3, 549–565, DOI: 10.3390/micro3020037 – F.Dinelli, M.Brucale, F.Valle, C.Ascoli, B.Samorì, M.Sartore, M.Adami, R.Galletti, S.Prato, B.Troian, C.Albonetti

A Quartz Crystal Microbalance Based on a dsPIC ® Digital Signal Controller – **MicroSolutions**, issue Mar-Apr 2018, 22-24 – M.Sartore, R.Galletti, M.Adami

Extending a RaspberryPi Mini PC with real-time capabilities for advanced Atomic Force Microscopy applications – **MicroSolutions**, issue Jan-Feb 2016, 25-27 – M.Sartore, M.Adami, M.Vassalli

Prototypes of Newly Conceived Inorganic and Biological Sensors for Health and Environmental Applications - **Sensors** 12(12) 17112-17127, DOI: 10.3390/s121217112 – C.Nicolini, M.Adami, M.Sartore, N.Bragazzi, S.Bavastrello, R.Spera, E.Pechkova

Label-free detection of NAPPA via Atomic Force Microscopy – **book chapter in “Functional Proteomics and Nanotechnology-Based Microarrays”** - Edition: Pan Stanford Series on Nanobiotechnology, Singapore, Volume 2, Chapter 6, 109-120 - DOI: 10.1201/9780429111594-6 – C.Nicolini, J.LaBaer, M.Sartore, R.Eggenhoffner, T.Terencio

Label-free NAPPA via nanogravimetry - – **book chapter in “Functional Proteomics and Nanotechnology-Based Microarrays”** - Edition: Pan Stanford Series on Nanobiotechnology, Singapore, Volume 2, Chapter 4, 95-108 – M.Adami, S.Sallam, R.Eggenhoffner, M.Sartore, E.Hainsworth, J.LaBaer, C.Nicolini

Atomic force microscopy of protein films and crystals - **The Review of Scientific Instruments** 78(9):093704 - DOI: 10.1063/1.2785032 – E.Pechkova, M.Sartore, L.Giacomelli, C.Nicolini

A Potentiometric Stripping Analyzer for Multianalyte Screening - **Electroanalysis** 19(12):1288 – 1294 - DOI: 10.1002/elan.200603850 – M.Adami, M.Sartore, C.Nicolini

Controlled-atmosphere chamber for atomic force microscopy investigations - **The Review of Scientific Instruments** 71(6):2409-2413 - DOI: 10.1063/1.1150628 – M.Sartore, R.Pace, P.Faraci, D.Nardelli, M.Adami M.K. Ram, C.Nicolini

Towards a Neural Networks based AFM - **Probe Microscopy** - Vol.1 333-344, M.Salerno, M.Sartore, C. Nicolini

Comparative studies on Langmuir–Schaefer films of polyanilines - **Synthetic Metals**, Vol 100, 249-259, DOI: 10.1016/S0379-6779(99)00024-7 – M.K. Ram, M.Adami, M.Sartore, M.Salerno S.Paddeu, C.Nicolini

Towards light-addressable transducer bacteriorhodopsin based - **Nanotechnology** 9(3):223, DOI: 10.1088/0957-4484/9/3/013 – C.Nicolini, V.Erokhin, S.Paddeu, M.Sartore

Instrument for depositing Langmuir–Blodgett films of alternatine monolayers using a protective layer - **The Review of scientific instruments** 67(12):4216 – 4223, DOI: 10.1063/1.1147571 - V. I. Troitsky, M.Sartore, T.Berzina, D.Nardelli, C. Nicolini

Potentiometric and nanogravimetric biosensors for drug screening and pollutants detection - **Food Technology and Biotechnology** 34(4):125-130 - M. Adami, M.Sartore,C. Nicolini

Object-oriented data model for scanning probe microscopy image processing - **Image and Vision Computing** Vol.14-6 435-443, DOI: 10.1016/0262-8856(95)01069-6 – I.Nevernov M. Sartore, R.Galletti

Comparison between a LAPS and an FET-based sensor for cell-metabolism detection - **Sensors and Actuators B Chemical** vol.32 n.1, 41-48, DOI: 10.1016/0925-4005(96)80107-9 A. Fanigliulo, P. Accossato ,M. Adami, M. Sartore, M.Grattarola, M.Lanz, S.Martinoia, S.Paddeu, M.T.Parodi, L.Vergani, C. Nicolini

PAB: a newly designed potentiometric alternating biosensor system - **Biosensors and Bioelectronics** 10(1):155-167, DOI: 10.1016/0956-5663(95)96803-7 - M. Adami, M.Sartore,C. Nicolini

A new instrument for the simultaneous determination of pH and redox potential -
The Review of scientific instruments 66(8):4341 – 4346, DOI: 10.1063/1.1145325 – C.Nicolini,
M.Sartore, M.Zunino, M.Adami

Characterization of silicon transducers with Si₃N₄ sensing surfaces by an AFM and a PAB system -
Sensors and Actuators B Chemical vol.25 n.1-3 889-893, DOI: 10.1016/0925-4005(95)85196-8
M.Adami, D.Alliata, C.Del Carlo, M.Martini, L.Piras, C.Nicolini

High-sensitivity biosensor based on LB technology and on nanogravimetry -
Sensors and Actuators B Chemical vol.24 n.1-3 121-128, DOI: 10.1016/0925-4005(95)85026-0
C.Nicolini, M.Adami, T.Dubrovsky, V.Erokhin, P.Facci, P.Paschkevitsch, M.Sartore, C.Nicolini

Comparison Between a LAPS- and a FET-based Potentiometric Cell Biosensor – **book chapter in:**
“**Biosensors**”, DOI: 10.1016/B978-1-85617-242-4.50261-5 - A. Fanigliulo, P. Accossato, M.
Adami, M. Sartore, M.Grattarola, M.Lanz, S.Martinoia, S.Paddeu, M.T.Parodi, L.Vergani, C. Nicolini

A Newly Designed Silicon-Based Biosensor for Biomedical Applications– **book chapter in:**
“**Biosensors**”, DOI: 10.1016/B978-1-85617-242-4.50074-4 - C. Nicolini, P.Gavazzo, M. Lanzi,
M.Sartore

Investigation of carrier transport through silicon wafers by photocurrent measurements -
Journal of Applied Physics 75(8):4000 – 4008, DOI: 10.1063/1.356022 – L.Bousse, S.-
Mostarshed, D.Hafeman, M.sartore, M.Adami, C.Nicolini

Study of the relationship between extracellular acidification and cell viability by a silicon-based sen-
sor - **Sensors and Actuators B Chemical** vol.19 n.1-3 368-372, DOI: 10.1016/0925-
4005(93)00999-F - P.Gavazzo, S.Paddeu, M.Sartore, C.Nicolini

Biosensors: A Step to Bioelectronics - **Physics World** 5(5):30-34, DOI: 10.1088/2058-7058/5/5/27
C.Nicolini, M.Adami, F.Antolini, F.Beltram, M.Sartore, S.Vakula

Computer simulation and optimization of a light addressable potentiometric sensor -
Biosensors and Bioelectronics 7(1):57-64 DOI: 10.1016/0956-5663(92)90031-H - M.Sartore,
M.Adami, C.Nicolini

New measuring principle for LAPS devices - **Sensors and Actuators B Chemical** vol.9 n.1 25-31,
DOI: 10.1016/0925-4005(92)80189-5 - M. Adami, M.Sartore, E.Baldini, A.Rossi, C.Nicolini

Minority carrier diffusion length effects on light-addressable potentiometric sensor (LAPS) devices -
Sensors and Actuators A Physical vol.32 n.1-3 431-436, DOI: 10.1016/0924-4247(92)80025-X –
M.Sartore, M. Adami, C. Nicolini, S. Mostarshed, L.Bousse, D. Hafeman

Possible developments of a potentiometric biosensor - **Sensors and Actuators B Chemical** vol.7
n.1-3 343-346, DOI: 10.1016/0925-4005(92)80321-N - M. Adami, M.Sartore, A.Rapallo, C. Nicolini

3D representation of biostructures imaged with an optical microscope -
Image and Vision Computing 8(2):130-141, DOI: 10.1016/0262-8856(90)90028-4, A.Diaspro,
M.Sartore, C Nicolini

IMAGO a complete system for acquisition, processing and 2D/3D and temporal display of micro-
scopic bioimages - **Computer Methods and Programs in Biomedicine** 31(3-4):225-36, DOI:
10.1016/0169-2607(90)90007-V – A.Diaspro, M.Adami, M.Sartore, C.Nicolini

Rechargeable Battery Based on Substituted LS Polyanilines - **Conference paper of the 6th Fore-
sight conference MNT** – M.K.Ram, M.Adami, M.Sartore, M.Salerno, S.Paddeu, C.Nicolini

I have also published a book not belonging to science in the true sense, but indeed close to it. The book (in Italian) deals with some mathematical and geometrical aspects of the underwater sea life:

“Mirabilia Maris – Le straordinarie forme del mondo sommerso”, Marco Sartore, IRECO Ed., 2021
ISBN 978-8-89-412243-5

NON-SCHOLASTIC TEACHING EXPERIENCES

I am a 3-Stars Instructor (Level M3) of the Confédération Mondiale des Activités Subaquatiques (CMAS). I have attended many workshops about teaching, interacting with people, organizing activities, facing non-uniform audiences and other topics. In my life I have been teaching in many dive courses and formed tens of newbies up to the highest technical level.

OTHER INTERESTS AND HOBBIES

- ◆ Scientific topics out of my direct range of competences
- ◆ Nature, especially sea life
- ◆ Photography
- ◆ Sport
- ◆ Diving