

Luca Boarino

PERSONAL DATA

Born in Torino, on the 19.08.1961.

Work address: Istituto Nazionale Ricerca Metrologica

Nanofacility Piemonte, Strada delle Cacce 91, Torino

Tel.: +39 011 3919343-640 Fax.: +39 011 346384

E-mail l.boarino@inrim.it

BIO AND EDUCATION

He achieved the Physics Laurea in 1987 at University of Torino. He worked as a free-lance in the field of computer graphics and multimedia (IBM Italy, Apple Italy) he joined the Istituto Elettrotecnico Nazionale "Galileo Ferraris", Department of Acoustics, with a grant on the development of modulated photothermal reflectance for the study of transport phenomena in semiconductors at IENGF. In 1994 he obtained a permanent position of researcher in the same Department.

UNIVERSITY CAREER

2001-2016	Senior Technologist, Division Nanoscience & Materials, Istituto Nazionale di Ricerca Metrologica (ex- Elettrotecnico Nazionale "Galileo Ferraris")
1994-2001	Researcher, Dept. Acoustics, Istituto Elettrotecnico Nazionale "Galileo Ferraris"
1989-1994	Research grant, Istituto Elettrotecnico Nazionale "Galileo Ferraris"

UNIVERSITY POSITIONS

2006-2016	Contract Professor at UPO, Laboratory of Material Science
2001-2006	Responsible of Protection and Prevention Service at Istituto Elettrotecnico Nazionale "Galileo Ferraris"

SCIENTIFIC POSITIONS

2009-2016	Founder & Responsible of Nanofacility Piemonte INRiM, a nanofabrication laboratory by ion and electron beams supported by "Compagnia di San Paolo" foundation
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MAIN FIELDS OF INTEREST

1. Nanofabrication
2. Nanolithography
3. Self-assembly
4. Silicon Nanowires
5. Metrology

CURRENT ISSUES OF RESEARCH

From 1998 to 2007 works with molecular doping Silicon nanostructure discovering and proving the chemisorption of nitrogen dioxide (NO₂) on highly doped Silicon nanostructures obtained by electrochemical etching. In addition to clarifying the effects of interaction between NO₂ and NH₃ and porous silicon, and the reactivation of impurities dopants in the presence of these gases, he contributes to the development of a nitrogen dioxide sensor compatible with CMOS technology, operating at room temperature and sensitive to concentrations of tens of ppb (parts per billion), well below the threshold of concern and alarm of the European and national legislation.

From 2009 to 2016 sets up the laboratory "Nanofacility Piedmont INRiM," which under his responsibility takes care of nanomanufacturing, nanomanipulation and TEM preparation. The activities of the laboratory produced over 60 international publications in 5 years and a few million Euro in terms of participation to national and European projects.

From 2007 to 2016 focuses his research activity on Nanofabrication by self-assembly, either through individual nano-objects such as polystyrene nanospheres, which by means of block copolymers. Among the applications of this activity it is possible to quote a new standard of lateral lengths at the nanoscale, SERS substrates for Raman Spectroscopy, nanostructured anodes for solid state batteries and nanomembrane filtering.

CURRENT FUNDED PROJECTS

PROGRAMME	FUNDED PROJECT
EMRP 2013 call "SI Broader scope"	SIB61 "CRYSTAL": Il progetto si propone di sviluppare nuovi standard dimensionali per le altezze di gradino e per le lunghezze laterali alla nanoscala mediante approcci innovativi basati sulle costanti reticolari dei materiali, sul self-assembly e sul DNA origami.
EMPIR 2014 call "Industry"	14IND01 "3DMetChemIT", the project develops three-dimensional models for the analysis of surfaces and heterogeneous materials by SIM and X ray techniques.
EMPIR 2015 call "Health"	15HLT01 "MetVBadBugs", the project studies the resistance to antibiotics of bacteria and biofilms.

Compagnia di San Paolo 2015	The project deals with the set-up and acquisition of equipments dedicated to fabrication of silicon-polymers micro and nanostructures in the field of photonics.
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TOP FIVE PAPERS

1. J. Frascaroli, S. Brivio, F. Ferrarese Lupi, G. Seguini, L. Boarino, M. Perego, and S. Spiga, Resistive Switching in High-Density Nanodevices Fabricated by Block Copolymer Self-Assembly, *ACS Nano*, 9 (3), 2518–2529 (2015). DOI: 10.1021/nn505131b IF 12.03
2. J. Rongé, T. Bosserez, D. Martel, C. Nervi, L. Boarino, F. Taulelle, G. Decher, S. Bordiga, and J. A. Martens, Monolithic cells for solar fuels, *Chemical Society Reviews* (2014). IF 33.383
3. S. Borini, L. Boarino, G. Amato, “Coulomb blockade tuned by NO₂ molecules in nanostructured silicon” *Advanced Materials* 18 (18): 2422+ SEP 18 2006 IF 17.493
4. E. Garrone, F. Geobaldo, P. Rivolo, G. Amato, L. Boarino, M. Chiesa, E. Giamello, R. Gobetto, P. Ugliengo, A. Viale “A Nanostructured Porous Silicon Near Insulator Becomes Either a p- or an n-Type Semiconductor upon Gas Adsorption”, *Advanced Materials* 17 (5), 528-531, 2005. DOI: 10.1002/adma.200401200 IF 17.493
5. M. Rocchia, S. Borini, A.M. Rossi, L. Boarino, and G. Amato, “Submicrometric Functionalization of Porous Silicon by Electron Beam Litography”, *Advanced Materials*, Vol. 15, no. 17, 1465-1469, 2003. DOI: 10.1002/adma.200304919 IF 17.493