ALLEGATO B

UNIVERSITÀ DEGLI STUDI DI MILANO
selezione pubblica per n.1 posto/i di Ricercatore a tempo determinato ai sensi dell'art.24, comma 3, lettera b) della Legge 240/2010 per il settore concorsuale 02/D1 - Fisica Applicata, Didattica e Storia della Fisica, settore scientifico-disciplinare FIS/07 - Fisica Applicata (a Beni Culturali, Ambientali, Biologia e Medicina) presso il Dipartimento di BIOTECNOLOGIE MEDICHE E MEDICINA TRASLAZIONALE, (avviso bando pubblicato sulla G.U. n. Anno 164° - Numero 7 del 27/01/2023) Codice concorso 5203

Riccardo Funari
CURRICULUM VITAE

(N.B. IL CURRICULUM NON DEVE ECCEDERE LE 30 PAGINE E DEVE CONTENERE GLI ELEMENTI CHE IL CANDIDATO RITIENE UTILI AI FINI DELLA VALUTAZIONE.
LE VOCI INSERITE NEL FACSIMILE SONO A TITOLO PURAMENTE ESEMPLIFICATIVO E POSSONO ESSERE SOSTITUITE, MODIFICATE O INTEGRATE)

INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)

COGNOME	**FUNARI**
NOME	**RICCARDO**
DATA DI NASCITA	31/05/1988

TITOLI

TITOLO DI STUDIO
(indicare la Laurea conseguita inserendo titolo, Ateneo, data di conseguimento, ecc.)

M.S. Molecular and Industrial Biotechnology, University of Naples "Federico II", Naples, Italy 28/10/2011

Final mark 110/110 magna cum laude.

- Thesis: A novel UV light induced immobilization technology for the development of QCM based immunosensors.

B.S. Biomolecular and Industrial Biotechnology, University of Naples "Federico II", Naples, Italy 23/07/2009

Final Mark 110/110 cum laude.

- Thesis: Purification and structural characterization of the recombinant protein aidB From Pseudomonas putida.

TITOLO DI DOTTORE DI RICERCA O EQUIVALENTI, OVVERO, PER I SETTORI INTERESSATI, DEL DIPLOMA DI SPECIALIZZAZIONE MEDICA O EQUIVALENTE, CONSEGUITO IN ITALIA O ALL'ESTERO
(inserire titolo, ente, data di conseguimento, ecc.)

Ph.D. School in Industrial Engineering, University of Naples "Federico II", Naples, Italy 20/04/2015

- International PhD program in Novel technologies for materials, sensors, and imaging.
- Thesis: High-sensitive sensing by effective immobilization of UV photo-activated antibodies.

CONTRATTI DI RICERCA, ASSEGNI DI RICERCA O EQUIVALENTI
(per ciascun contratto stipulato, inserire università/ente, data di inizio e fine, ecc.)

Department of Physics, University of Bari "Aldo Moro", Bari, Italy

Assistant professor (non-tenured, RTDA) 01/04/2021 – present

- Advanced applications of Atomic Force Microscopy (AFM) to image and investigate the nano-mechanical properties of relevant biomolecules such as the Spike protein variants of the SARS-CoV-2, to correlate their folding, flexibility and stability with the mutations in the individual proteins and strain virulency.
- Development of an integrated AFM-transistor device to investigate in-situ the effects of the electric field on the Electrical Double Layer (EDL) on biofunctionalized metallic gates for sensing applications.

ATTIVITÀ DIDATTICA A LIVELLO UNIVERSITARIO IN ITALIA O ALL'ESTERO
(inserire periodo [gg/mm/aa inizio e fine], anno accademico, ateneo, corso laurea, numero ore, ecc.)

Department of Physics, University of Bari "Aldo Moro", Bari, Italy

Lecturer 01/04/2021 – present

- Laboratory of Physics for Biology (aa 20-21; 21-22; 22-23)
  - Course details: Fisica (Corso Integrato) - [003205] - Laboratorio Di Fisica (32 h, ~150 students)
  - Statics and basic physics experiments for undergraduate students.
- Condensed Matter Physics for Physics (aa 21-22; 22-23)
  - Course details: Condensed Matter Physics [063644] (32 h, ~20 students)
  - Advanced microscopy (AFM and SEM) of master students in Physics
- Optoelectronics and Nanotechnologies for Material Science and Physics (aa 21-22; 22-23)
  - Course details: Fotonica E Nanotecnologie [A000289] and [A000190] (32 h, ~25 students)
  - Basics of optoelectronic devices, nanofabrication techniques and clean room activities.

Reference lecturer for the master's degree course in Materials Science and Technology since 2021 (for further information contact the interclass coordinator prof. Luigi Gentile).

Micro/Bio/Nanofluidics Unit, Okinawa Institute of Science and Technology (OIST), Okinawa (Japan)

- Supervision and cooperation with final theses of 2 Master students in Bioengineering on:

o Development of a metal enhanced fluorescence-based biosensor for detecting cancer biomarkers.

o Realization of a microbial biofilm based microgravimetric device to quantify heavy metals in aqueous samples.

Department of Physics, University of Naples "Federico II", Naples (Italy)

- Guest lecturer in Advanced Physics for Biotechnologists (20 master students. 15 h). Topics: Biosensing, Introduction to laboratory practice. Main duties: Lab coordinator (Biotechnology and Biosensing).

- Supervision and cooperation with final theses of 2 Master students in Biotechnology and 1 Master student in Physics. Development of piezoelectric and optical biosensors for food contaminants and urine biomarkers.

National Interuniversity Consortium for the Physical Sciences of Matter, Rome (Italy)

Lecturer 11/11/2013 – 30/11/2013

- Polyciclic Aromatic Hydrocarbons (PAH) detection methods for mechanical engineers (30 h, 20 post-graduate students).

- External expert for project PON01_01517 – "Metodologie innovative di sviluppo di motopropulsori automobilistici" – "Qualità delle emissioni dei motori: sensing di idrocarburi policiclici aromatici" (Novel methodologies for car engines – Quality of engine emissions: sensing of polycyclic aromatic hydrocarbons).

DOCUMENTATA ATTIVITÀ DI FORMAZIONE O DI RICERCA PRESSO QUALIFICATI ISTITUTI ITALIANI O STRANIERI;
(inserire anno accademico, ente, corso, periodo, ecc.)

Department of Physics, University of Naples "Federico II", Naples, Italy

Post-doctoral researcher 21/04/2015 – 30/06/2017

- Design and development of immunosensors suitable for the quantification targets like gluten components in food extracts and α-amylase in human saliva.

- Studying of protein-protein and protein-ligand interaction phenomena by means of microgravimetric transducers.

- Surface chemistry and functionalization.

Bioelectronics (PGI-8/ICS-8), Institute of Complex Systems, Peter Grünberg Institute, Forschungszentrum Jülich GmbH, Jülich, Germany

Visiting researcher 04/09/2015 – 26/03/2016

- Detection of C-reactive protein in human serum by electrochemical immunosensing.

- Single protein imaging by AFM.

- Improvement of QCM sensors by means of electrochemical and physical treatments.

Bioelectronics (PGI-8/ICS-8), Institute of Complex Systems, Peter Grünberg Institute, Forschungszentrum Jülich GmbH, Jülich, Germany

Visiting PhD student 13/03/2014 – 30/08/2014

- Atomic Force Microscopy (AFM) imaging of nanostructures and antibodies.

- Design and development of microfluidic devices in Polydimethylsiloxane (PDMS) and glass for protein samples.

DOCUMENTATA ATTIVITÀ IN CAMPO CLINICO
(indicare, data, durata, ruolo, ente presso il quale si è prestata attività assistenziale, ecc.)

REALIZZAZIONE DI ATTIVITÀ PROGETTUALE
(indicare, data, progetto, ecc.)

Principal investigator of the project "Nuove Metodologie Di Analisi Di Superfici Nano Strutturate E Funzionalizzate Per Innovazione Nell'industria Biomedicale". 30/12/2020 – present

POR Puglia 2014/2020 – Asse X – Azione 10.4. Research for Innovation (REFIN)

ID: E3C61580

SSD FIS/03 – Fisica della materia

Activity focuses on three main objectives:

- Development of an integrated device to investigate in-situ at the nanoscale via AFM the properties of the biofunctionalized metallic surfaces of a transistor upon applying localized electric fields.

- Electrochemical nanostructuring of the gold gate prior to the biofunctionalization to enhance the sensing performances of the detection device.

- Understanding of the collective phenomena involving the structural modification of the biofunctionalized interfaces induced by the single-molecule biorecognition events.

Principal investigator of the project "Development of a dual-mode optical/microgravimetric biosensor for the detect ion of three prostate cancer biomarkers". 01/04/2019 – 31/03/2021

Japanese Society for the Promotion of Science – Grant No. 20K20237

Activity focused on two main objectives:

- Electrochemical nanostructuring of Quartz Crystal Microbalance to fabricate a dual mode optical/microgravimetric device.

- Quantification of the cancer biomarkers in real samples

Principal investigator of the project "High-sensitive sensing by effective immobilization of UV photo-activated antibodies". 04/09/2015 – 26/03/2016

Programma Star – Linea 2 – Mobilità Giovani Ricercatori; University of Naples "Federico II", Naples, Italy

Activity focused on two main objectives:

- Development of an electrochemical sensor based on ink-jet printed microelectrodes arrays for detecting C-reactive protein in human serum.

- Use of AFM to characterize the orientation of immobilized antibodies, upon different treatments, on sensing surfaces.

Collaborator on the project "Real-time piezoelectric biosensors for environmental, agricultural and food applications". 30/04/2013 – 30/07/2017

Fondazione con il Sud – project Nr. 2011-PDR-18

The results achieved during my master thesis were the basis of this project. My contribution focused on two major topics:

- Development of biosensors able to detect gliadin (the protein responsible for the coeliac disease), parathion (a pesticide) and patulin (a mycotoxin).

- Surface functionalization methodologies and microscopic characterization of proteins.

ORGANIZZAZIONE, DIREZIONE E COORDINAMENTO DI GRUPPI DI RICERCA NAZIONALI E INTERNAZIONALI, O PARTECIPAZIONE AGLI STESSI
(per ciascuna voce inserire anno, ruolo, gruppo di ricerca, ecc.)

Micro/Bio/Nanofluidics Unit, Okinawa Institute of Science and Technology (OIST), Okinawa, Japan

Post-doctoral researcher 01/07/2017 – 31/03/2021

- Development of an optofluidic device for quantifying antibodies against the SARS-CoV-2 Spike protein in human plasma.

- Investigation of studying bacterial biofilm assembly in real time and evaluation of the performance of different drugs in preventing biofilm formation using a nanoplasmonic biochip.

- Real-time detection of heavy metals by cell-based biosensors integrating nanoplasmonic and quartz crystal microbalance (QCM) transducers.

- Quantification of cancer biomarkers by an optical immunosensor based on metal enhanced fluorescence (MEF).

TITOLARITÀ DI BREVETTI
(per ciascun brevetto, inserire autori, titolo, tipologia, numero brevetto, ecc.)

- A. Yakushenko, R. Funari, K. J. Krause, J. H. Schnitker, D. Mayer, N. Y. Adly Hassan, A. Offenhäusser "A process for preparing a memory, storage, and use of the memory" German patent DE102016003770A1. Under industrial development at Forschungszentrum Jülich GmbH, Jülich, Germany.

- A. Yakushenko, R. Funari, K. J. Krause, J. H. Schnitker, D. Mayer, N. Y. Adly Hassan, A. Offenhäusser "Method for producing an accumulator and use of the accumulator" International patent WO2017162222A1. Under industrial development at Forschungszentrum Jülich GmbH, Jülich, Germany.

ATTIVITÀ DI RELATORE A CONGRESSI E CONVEGNI NAZIONALI E INTERNAZIONALI
(inserire titolo congresso/convegno, data, ecc.)

1. 107th National Congress of the Italian Physical Society, 13 – 17 September, 2021, online conference (invited talk).

2. 100th CSJ Annual Meeting, 22 – 25 March, 2020, Tokyo, Japan.

3. 7th International Symposium on Sensor Science (I3S 2019), 9 – 11 May, 2019, Naples, Italy.

4. Biosensors 2018, 12 – 15 June, 2018, Miami, USA.

5. Mini-symposium on Bacterial Biofilms: Transformative Measurements and Experimental Approaches for Bacterial Biofilms, 29 – 31, August, 2017, OIST, Okinawa, Japan.

6. 5th International Conference on Bio-Sensing Technology, 7 – 10 May, 2017, Riva del Garda, Italy.

7. Biosensors 2016, 25 – 27 May, 2016, Gothenburg, Sweden.

8. 2nd EIP Water Conference 2014, 5 – 6 November, 2014, Barcelona, Spain.

9. 9th International conference on Photo-Excited Processes and Applications (ICPEA-9) 29 September – 3 October 2014, Matsue, Japan.

10. Secondo Workshop, Gruppo Biosensori Ottici e Biofotonica della Società Italiana di Ottica e Fotonica, 19-20 September 2013, Sestri Levante, Italy.

11. 5th EOS Topical Meeting on Optical Microsystems (OμS'13) 12-14 September 2013, Capri, Italy.

12. Ettore Majorana foundation and center for scientific culture, International school of atomic and molecular spectroscopy, Nano-structures for optics and photonics, Optical Strategies for Enhancing Sensing, Imaging, Communication, and Energy Conversion, 4-19 July 2013, Erice, Sicily, Italy.

13. SPIE Optics + Optoelectronics, Optical Sensors 2013, 15-17 April 2013, Prague, Czech Republic.

CONSEGUIMENTO DI PREMI E RICONOSCIMENTI NAZIONALI E INTERNAZIONALI PER ATTIVITÀ DI RICERCA
(inserire premio, data, ente organizzatore, ecc.)

Marie Sklodowska-Curie Actions Seal of Excellence for the project proposal 74560 "FOBS - Fibre optic biosensors for effective detection of environmental pollutants" 24/04/2017

POSSESSO DEL DIPLOMA DI SPECIALIZZAZIONE EUROPEA RICONOSCIUTO DA BOARD INTERNAZIONALI (relativamente a quei settori concorsuali nei quali è prevista)
(indicare diploma, data di conseguimento, ecc.)

TITOLI DI CUI ALL'ARTICOLO 24 COMMA 3 LETTERA A) E B) DELLA LEGGE 30 DICEMBRE 2010, N. 240
(indicare se contratto di tipologia A o B, Ateneo, data di decorrenza e fine contratto, ecc.)

Department of Physics, University of Bari "Aldo Moro", Bari, Italy

Assistant professor (non-tenured, RTDA) 01/04/2021 – present

- Advanced applications of Atomic Force Microscopy (AFM) to image and investigate the nano-mechanical properties of relevant biomolecules such as the Spike protein variants of the SARS-CoV-2, to correlate their folding, flexibility and stability with the mutations in the individual proteins and strain virulency.

- Development of an integrated AFM-transistor device to investigate in-situ the effects of the electric field on the Electrical Double Layer (EDL) on biofunctionalized metallic gates for sensing applications.

PRODUZIONE SCIENTIFICA

PUBBLICAZIONI SCIENTIFICHE

(per ciascuna pubblicazione indicare: nomi degli autori, titolo completo, casa editrice, data e luogo di pubblicazione, codice ISBN, ISSN, DOI o altro equivalente)

JOURNAL PAPERS

1. R. Funari, N. Bhalla, and L. Gentile – "Measuring the Radius of Gyration and Intrinsic Flexibility of Viral Proteins in Buffer Solution Using Small-Angle X-ray Scattering" ACS Meas. Sci. Au, 2022, in press, DOI: 10.1021/acsmeasuresciau.2c00048.

2. R. Funari, H. Fukuyama and A.Q. Shen – "Nanoplasmonic multiplex biosensing for COVID-19 vaccines" Bios. Bioel., 2022, 208, 114193, DOI: 10.1016/j.bios.2022.114193.

3. R. Iqbal, A. Matsumoto, D. Carlson, K. Toda Peters, R. Funari, A. K. Sen, A. Q. Shen – "Evaporation driven smart patterning of microparticles on a rigid-soft composite substrate" J. Colloid Interface Sci., 2022, 623, pp 927-937, https://doi.org/10.1016/j.jcis.2022.05.087.

4. R. Funari and A. Q. Shen – "Detection and Characterization of Bacterial Biofilms and Biofilm-Based Sensors" ACS Sensors, 2022, 7 (2), pp 347-357, DOI: 10.1021/acssensors.1c02722.

5. R. Funari, K. Chu and A. Q. Shen – "Detection of antibodies against SARS-CoV-2 spike protein by gold nanospikes in an opto-microfluidic chip" Bios. Bioel., 2020, 169, 112578, DOI: 10.1016/j.bios.2020.112578.

6. B. Miranda, K. Chu, P. L. Maffettone, A.Q. Shen and R. Funari– "Metal-enhanced fluorescence immunosensor based on plasmonic arrays of gold nanoislands on an etched glass substrate" ACS Applied Nano Materials, 2020, 3 (10), pp 10470-10478, DOI: 10.1021/acsanm.0c02388.

7. R. Funari, A. Matsumoto, J. R. de Bruyn and A. Q. Shen – "Rheology of the Electric Double Layer in Electrolyte Solutions" Anal. Chem., 2020, 92, (12), pp 8244-8253 DOI: 10.1021/acs.analchem.0c00475.

8. R. Ripa, A. Q. Shen and R. Funari – "Detecting E. coli biofilm development stages on gold and titanium by quartz crystal microbalance" ACS Omega, 2020, 5, (5), pp 2295-2302, DOI: 10.1021/acsomega.9b03540.

9. B. Della Ventura, M. Banchelli, R, Funari, A. Illiano, M. De Angelis, P. Taroni, A. Amoresano, P. Matteini and R. Velotta – "Biosensor surface functionalization by a simple photochemical immobilization of antibodies: experimental characterization by mass spectrometry and surface enhanced Raman spectroscopy" Analyst, 2019, 144, pp 6871-6880, DOI: 10.1039/C9AN00443B

10. R. Funari, R. Ripa, B. Soderström, U. Skoglund and A. Q. Shen – "Detecting gold biomineralization by Delftia acidovorans biofilms on a quartz crystal microbalance" ACS Sensors, 2019, 4 (11), pp 3023-3033, DOI: 10.1021/acssensors.9b01580.

11. R. Funari, N. Bhalla, K. Chu, B. Soderström and A. Q. Shen – "Nanoplasmonics for Real-Time and Label-Free Monitoring of Microbial Biofilm Formation" ACS Sensors, 2018, 3 (8), pp 1499-1509, DOI: 10.1021/acssensors.8b00287.

12. B. Della Ventura, N. Sakač, R. Funari and R. Velotta – "Flexible immunosensor for the detection of salivary α-amylase in body fluids" Talanta, 2017, 174 (11), pp 52–58, DOI: 10.1016/j.talanta.2017.05.075.

13. B. Della Ventura, M. Iannaccone, R. Funari, M. Pica Ciamarra, C. Altucci, R. Capparelli, S. Roperto and R. Velotta – "Effective Antibodies Immobilization and Functionalized Nanoparticles in a Quartz-Crystal Microbalance-based Immunosensor for the detection of parathion" PloS ONE, 2017, 12 (2), e0171754, DOI: 10.1371/journal.pone.0171754.

14. R. Funari, I. Terracciano, B. Della Ventura, S. Ricci, T. Cardi, N. D'Agostino and R. Velotta – "Label-free detection of gliadin in food by quartz crystal microbalance-based immunosensor" J. Agric. Food Chem., 2017, 65 (6), pp 1281–1289, DOI: 10.1021/acs.jafc.6b04830.

15. B. Della Ventura, A. Ambrosio, A. Fierro, R. Funari, F. Gesuele, P. Maddalena, D. Mayer, M. Pica Ciamarra, R. Velotta, and C. Altucci – "Simple and Flexible Model for Laser-Driven Antibody–Gold Surface Interactions: Functionalization and Sensing" ACS Appl. Mater. Interfaces, 2016, 8 (33), pp 21762–21769, DOI: 10.1021/acsami.6b04449.

16. R. Funari, B. Della Ventura, C. Altucci, A. Offenhäusser, D. Mayer, and R. Velotta – "Single Molecule Characterization of UV-Activated Antibodies on Gold by Atomic Force Microscopy" Langmuir, 2016, 32 (32), pp 8084–8091, DOI: 10.1021/acs.langmuir.6b02218.

17. B. Della Ventura, I. Rea, A. Caliò, P. Giardina, A. M. Gravagnuolo, R. Funari, C. Altucci, R. Velotta and L. De Stefano – "Vmh2 hydrophobin layer entraps glucose: A quantitative characterization by label-free optical and gravimetric methods" Appl. Surf. Sci., 2016, 364, pp 201-207, DOI:10.1016/j.apsusc.2015.12.080.

18. B. Della Ventura, R. Funari, Anoop K.K, S. Amoruso, F. Gesuele, R. Velotta, and C. Altucci, "Nano-machining of bio-sensor electrodes through gold nanoparticles deposition produced by femtosecond laser ablation" Appl. Phys. B, 2015, 119 (3), pp 497-501, DOI: 10.1007/s00340-015-6091-3.

19. S. Longobardi, A. M. Gravagnuolo, R. Funari, B. Della Ventura, F. Pane, E. Galano, A. Amoresano, G. Marino, P. Giardina - "A simple MALDI plate functionalization by Vmh2 hydrophobin for serial multi-enzymatic protein digestions" Anal. Bioanal. Chem., 2015, 407 (2), pp 487-496, DOI: 10.1007/s00216-014-8309-3.

20. R. Funari, B. Della Ventura, R. Carrieri, L. Morra, E. Lahoz, F. Gesuele, C. Altucci, R. Velotta - "Detection of parathion and patulin by quartz-crystal microbalance functionalized by the photonics immobilization technique" Bios. Bioelectron., 2015, 67, pp 224-229, DOI: 10.1016/j.bios.2014.08.020.

21. S. Lettieri, A. Avitabile, B. Della Ventura, R. Funari, A. Ambrosio, P. Maddalena, M. Valadan, R. Velotta, C. Altucci - "Nano- and femtosecond UV laser pulses to immobilize biomolecules onto surfaces with preferential orientation" Appl. Phys. A, 2014, 117 (1), pp 185-190, DOI: 10.1007/s00339-014-8340-4.

22. R. Funari, B. Della Ventura, L. Schiavo, R. Esposito, C. Altucci and R. Velotta - "Detection of Parathion Pesticide by Quartz Crystal Microbalance Functionalized with UV-Activated Antibodies" Anal. Chem., 2013, 85 (13), pp 6392–6397, DOI: 10.1021/ac400852c.

CONFERENCE PROCEEDINGS AND BOOK CHAPTERS

1. A. Di Nardo, …, R. Funari, et al. - “New Perspectives for Smart Water Network monitoring, partitioning and protection with innovative On-line Measuring Sensors” in E-proceedings of the 36th IAHR World Congress 28 June–3 July, 2015, The Hague, the Netherlands, 2015.

2. R. Funari and B. Della Ventura - “Antibody Anchoring on QCM Gold Surfaces by UV Based Strategy”, in Nano-Structures for Optics and Photonics; Springer Netherlands, 2015; pp 447–448 DOI: 10.1007/978-94-017-9133-5_24.

3. B. Della Ventura, R. Funari, C. Altucci and R. Velotta - “UV-light-assisted functionalization of Quartz-Crystal-Microbalance” in Photonics Conference, 2014 Third Mediterranean; IEEE, Trani 7-9 May, 2014, pp 1–3, DOI: 10.1109/MePhoCo.2014.6866462.

4. B. Della Ventura, R. Funari, S. Lettieri, R. Esposito, C. Altucci and R. Velotta - “Effective Antibody Anchoring on Gold Plate by Ultra-short UV Pulses”, in Sensors: Proceedings of the First National Conference on Sensors, Rome 5-17 February, 2012, Lecture Notes in Electrical Engineering 162, Springer Science+Business Media New York, 2014, DOI: 10.1007/978-1-4614-3860-1_20.

5. R. Funari, B. Della Ventura, A. Ambrosio, S. Lettieri, P. Maddalena, C. Altucci and R. Velotta - “UV-light-assisted functionalization for sensing of light molecules”, in SPIE Optics + Optoelectronics 2013, 8774, 87740K, SPIE, 2013 DOI: 10.1117/12.2018510.

Data 26/02/2027 Luogo Bari