

## Education

- 2009 Advanced Course of Flow Cytometry, Milan University-Maggiore Hospital
- 2008 PhD Human Pathology, Dept of Experimental Medicine, University of Rome La Sapienza. Thesis title: *Molecular and functional study of apoptotic damage in cellular model NG108-15. Possible strategies for recovery.*
- 2003 Italian Laurea (MSc) Physics (Physics of Biosystems curriculum), University of Rome La Sapienza. Thesis title : *Effects of low frequency electromagnetic fields on an in vitro cell line.*

## Research interests

Development of optical microscopy and spectroscopy methods for the investigation of biological systems at a cellular level. Organs on chip models: microfabrication and coculture protocols. Label free approaches to study complex processes like apoptosis and differentiation. Hyperspectral imaging, image analysis, multivariate data analysis. Spectral characterization of food: fluorescence spectroscopy, visible reflectance, imaging and combination of techniques to study mycotoxin contamination.

## Research Experience

- 2016-today Researcher at Institute for Photonics and Nanotechnologies (Italian National Research Council). Participation in EU funded project PhasmaFOOD (Portable photonic miniaturised smart system for on-the-spot food quality sensing) and Italian ISS ricerca finalizzata project: "On chip technology as a novel tool to investigate the crosstalk between cancer and immune cells: role of the transcription factors Interferon Regulatory Factor 1 and 8 (IRF1-IRF8) in melanoma systems". In 2016, 2018, 2022 Visiting scientist at department of Medicine, division of Hematological Malignancies and Cell Therapy at Duke University with short term mobility CNR project investigating on chip models of tumoral microenvironment.
- 2023-2025 ▪ Team Coordinator of PRIN 2022 "GREEN<sup>3</sup>Green-to-Green-to-Green: A Green detection system of chlorinated pesticides in veg/spices/herbs based on Green syntheses of highlighting particles within the Green Deal" Project ref n 2022F4YZP9 Total amount funding 193 800 €
- 2021-2023 ▪ Team Coordinator of POR FESR LAZIO 2014-2020, Avviso Pubblico "Gruppi di Ricerca 2020", "multidisciplinary Platform for NEurodegenerative diseases drug testing On-chip" - PERSEO -numero A0375- 2020-36643, total amount € 144.095,09 PI Tor Vergata University
- 2020-2022 ▪ Team coordinator in POR FESR Lazio 2014-2020 - programma "Progetti Strategici 2019" - "ITHACA - Integrazione di Tecnologie High-throughput per lo screening veloce di AntiCorpi per terapie Antitumorali", identificato dalla domanda n. PROT. A0320-2019-28177 in collaboration with Takis s.r.l., Università Campus Biomedico total amount 416.810,64 €

- 2009-2015 Researcher at ISC-Institute for Complex Systems  
Skintarget project: design, realization and test of a confocal reflectance hyperspectral microscope to perform spectral analysis of biological samples (cell cultures and tissues). Experimental design, hyperspectral data acquisition and analysis.
- 2004-2008 PhD student in the laboratory of molecular and cellular pathology and Microscopy Facility coordinator at IRCCS San Raffaele Pisana. Molecular mechanisms of apoptosis in degenerative diseases cellular models. Visiting at Physics Department, university of Genova (Prof A. Diaspro)
- 2004 CNR Institute of Neurobiology and Molecular Medicine (Prof. S. Grimaldi, Dr A. Lisi). Software development for the analysis of intracellular Calcium concentration.
- 2003-2005 CNR Institute of Neurobiology and Molecular Medicine (Dr. Parasassi). Analysis of interaction between LDL and isoflavones. Spectrofluorimetry of lipoproteins.

## Additional training

- 2004 “The principles of fluorescence techniques” school Genova, june
- “From microscopy to nanoscopy” Genova
- 2009 CNR Cell model systems summer school. Rome
- X School of Pure and Applied Biophysics
- on "Time resolved spectroscopic methods in Biophysics"
- XI School of Pure and Applied Biophysics
- on "Advanced Optical Microscopy Methods in Biophysics"
- 2013 International school of physics and technology of matter. Otranto. “Towards new frontiers of Smart Sensing and Integration: Materials, Technologies and Applications”

## Teaching experience

- At IVSLA International School on Nanoscale Optical Microscopy organized by IIT in Venice June 2018 Lesson on “Hyperspectral microscopy and multivariate analysis for label-free cell imaging”
- In academic years 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008, University of Rome La Sapienza – II graduate school in Clinical Pathology  
Seminars on *Optical, confocal and multiphoton microscopy* within Biomedical Technologies course
- In 2007-2008, 2008-2009  
University of Rome La Sapienza, IRCCS San Raffaele Pisana – Degree course in nursing  
*Statistics in scientific and technological development.*
- 2008-2009  
University of Rome La Sapienza, IRCCS San Raffaele Pisana – Degree course in physiotherapy  
*Physics*

- 2008-2009  
University of Rome La Sapienza, IRCCS San Raffaele – Degree course for laboratory technician  
*Physics, statistics and informatics.*

## Outreach

- Participation to European Researcher Night in 2010, 2012, 2013, 2014 editions with laboratory activities open to the public
- In the organizing committee of Biophysics@Rome conference ([www.biophysicsatrome.org](http://www.biophysicsatrome.org)) 2014, 2015, 2017 and 2019 editions as a member of Tech4Bio ([www.tech4bio.eu](http://www.tech4bio.eu)) interdisciplinary group.
- Participation in Maker Faire Rome European Edition in 2020, 2021, 2022
- Participation in Festival della Scienza Genova 2022
- Coordinator of tech4bio group 2018-2020
- Collaboration with activities for “alternanza scuola lavoro” project of Italian Ministry of Education in 2016-2017 and 2017-2018

## Selected Publications

- **Carbohydrate polymer-based nanocomposites for breast cancer treatment**  
Carbohydrate Polymers  
Volume 304, 15 March 2023, 120510
- **Microfluidic Co-Culture Models for Dissecting the Immune Response in in vitro Tumor Microenvironments.**  
A De Ninno, FR Bertani, A Gerardino, G Schiavoni, M Musella, C Galassi, ...  
Journal of Visualized Experiments: Jove
- **The spectral treasure house of miniaturized instruments for food safety, quality and authenticity applications: A perspective**  
J Müller-Maatsch, FR Bertani, A Mencattini, A Gerardino, E Martinelli, ...  
Trends in Food Science & Technology
- Adele De Ninno, Riccardo Reale, Alessandro Giovino, Francesca R Bertani, Luca Businaro, Paolo Bisegna, Claudia Matteucci, Federica Caselli  
**High-throughput label-free characterization of viable, necrotic and apoptotic human lymphoma cells in a coplanar-electrode microfluidic impedance chip**  
Biosensors and Bioelectronics 150, 111887
- FR Bertani, L Businaro, L Gambacorta, A Mencattini, D Brenda, D Di Giuseppe, A De Ninno, M Solfrizzo, E Martinelli, A Gerardino  
**Optical detection of aflatoxins B in grained almonds using fluorescence spectroscopy and machine learning algorithms**  
Food Control 112, 107073
- A Mencattini, D Di Giuseppe, MC Comes, P Casti, F Corsi, FR Bertani, L Ghibelli, L Businaro, C Di Natale, MC Parrini, E Martinelli  
**Discovering the hidden messages within cell trajectories using a deep learning approach for in vitro evaluation of cancer drug treatments**  
Scientific reports 10 (1), 1-11
- **Organ-on-chip model shows that ATP release through connexin hemichannels drives spontaneous Ca<sup>2+</sup> signaling in non-sensory cells of the greater epithelial ridge in the developing cochlea**  
F Mazzarda, A D'Elia, R Massari, A De Ninno, FR Bertani, L Businaro, ...

Lab on a chip 20 (16), 3011-3023

- Luigi Racioppi, Erik R Nelson, Wei Huang, Debarati Mukherjee, Scott A Lawrence, William Lento, Anna Maria Masci, Yiquin Jiao, Sunghee Park, Brian York, Yaping Liu, Amy E Baek, David H Drewry, William J Zuercher, Francesca R Bertani, Luca Businaro, Joseph Geradts, Allison Hall, Anthony R Means, Nelson Chao, Ching-yi Chang, Donald P McDonnell

**CaMKK2 in myeloid cells is a key regulator of the immune-suppressive microenvironment in breast cancer**

Nature communications 10 (1), 1-16

- Stylianos Georgoulas, Paraskevas Bourgos, Milenko Tomic, Susanne Hintschich, Francesca Romana Bertani, Panos Tsakanikas, Benedikt Gross, Martin Alewijn, Eugenio Martinelli

**Food Analysis for All: The PhasmaFOOD Project Approach**

Smart Systems Integration; 13th International Conference and Exhibition on Integration Issues of Miniaturized Systems 978-3-8007-4919-5

- Benedikt Groß, Susanne Hintschich, Milenko Tošić, Paraskevas Bourgos, Konstantinos Tsoumanis, Francesca Romana Bertani

**PhasmaFOOD-A miniaturized multi-sensor solution for rapid, non-destructive food quality assessment**

CM 2019-Optical Characterization of Materials: Conference Proceedings

- Marie Nguyen, Adele De Ninno, Arianna Mencattini, Fanny Mermet-Meillon, Giulia Fornabaio, Sophia S Evans, Mélissande Cossutta, Yasmine Khira, Weijing Han, Philémon Sirven, Floriane Pelon, Davide Di Giuseppe, Francesca Romana Bertani, Annamaria Gerardino, Ayako Yamada, Stéphanie Descroix, Vassili Soumelis, Fatima Mechta-Grigoriou, Gérard Zalcmann, Jacques Camonis, Eugenio Martinelli, Luca Businaro, Maria Carla Parrini

**Dissecting effects of anti-cancer drugs and cancer-associated fibroblasts by on-chip reconstitution of immunocompetent tumor microenvironments**

Cell reports 25 (13), 3884-3893. e3

- Bertani FR, Mozetic P, Fioramonti M, Iuliani M, Ribelli G, Pantano F, Santini D, Tonini G, Trombetta M, Businaro L, Selci S, Rainer A.

**Classification of M1/M2-polarized human macrophages by label-free hyperspectral reflectance confocal microscopy and multivariate analysis.**

Sci Rep. 2017 Aug 21;7(1):8965. doi: 10.1038/s41598-017-08121-8

- Biselli E., Agliari E., Barra A., Bertani F.R., Gerardino A., De Ninno A., Mencattini A., Di Giuseppe D., Mattei F., Schiavoni G., Lucarini V., Vacchelli E., Kroemer G., Di Natale C., Martinelli E. & Businaro L.

**Organs on chip approach: a tool to evaluate cancer - immune cells interactions.** Scientific Reports, doi:10.1038/s41598-017-13070-3 (2017)

- De Ninno A, Errico V, Bertani FR, Businaro L, Bisegna P, Caselli F.

**Coplanar electrode microfluidic chip enabling accurate sheathless impedance cytometry.**

Lab Chip. 2017 Mar 14;17(6):1158-1166. doi: 10.1039/c6lc01516f.

- Errico V, De Ninno A, Bertani FR, Businaro L, Bisegna P, Caselli F

**Mitigating positional dependence in coplanar electrode Coulter-type microfluidic devices**

Sensors and Actuators B: Chemical Volume 247, August 2017, Pages 580-586

- S. Parlato, A. De Ninno, R. Molfetta, E. Toschi, D. Salerno, A. Mencattini, G. Romagnoli, A. Fragale, L. Roccuzzello, M. Buoncervello, I. Canini, E. Bentivegna, M. Falchi, F. Romana Bertani, A. Gerardino, E. Martinelli, C. Natale, R. Paolini, L. Businaro & L. Gabriele.

**3D Microfluidic model for evaluating immunotherapy efficacy by tracking dendritic cell behaviour toward tumor cell.**

Scientific Reports 7, Article number: 1093 (2017), doi:10.1038/s41598-017-01013-x.

- Bertani FR, Botti E, Ferrari L, Mussi V, Costanzo A, D'Alessandro M, Cilloco F, Selci S

**Label-free and non-invasive discrimination of HaCaT and melanoma cells in a co-culture model by hyper-spectral confocal reflectance microscopy**

Journal of Biophotonics DOI: 10.1002/jbio.201500122

- Visentin S, Barbero N, Bertani FR, Cestelli Guidi M, Ermondi G, Viscardi G, Mussi V

**Multivariate Analysis Applied to Raman Mapping of Dye-Functionalized Carbon Nanotubes: a Novel Approach to Support the Rational Design of Functional Nanostructures**

Analyst 2015,140, 5754-5763

- Ledda M, De Bonis A, Bertani FR, Cacciotti I, Teghil R, Lolli MG, Ravaglioli A, Antonella Lisi A, Rau JV  
**Interdisciplinary Approach to Cell-Biomaterial Interactions: Biocompatibility and Cell Friendly Characteristics of RKKP Glass-Ceramic Coatings on Titanium**  
Biomedical Materials 2015 10, 035005
- Bertani F.R., Botti E., Costanzo A., Ferrari L., Mussi V., D'Alessandro M., Selci S.  
**Label-free discrimination of cells undergoing apoptosis by hyperspectral confocal reflectance imaging**  
Journal of the European Optical Society -Rapid publications 2013, 8,13078-1:13078-6
- Bertani F.R., Ferrari L., Mussi V., Botti E., Costanzo A., Selci S.  
**Living Matter Observations with a Novel Hyperspectral Supercontinuum Confocal Microscope for VIS to Near-IR Reflectance Spectroscopy**  
Sensors 2013, 13, 14523-14542

## Patent

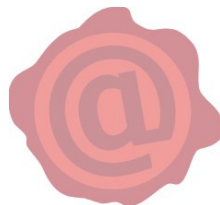
Bertani F.R., Botti E., Cilloco F., Costanzo A., Ferrari L., Selci S.  
PCT number PCT/IT2011/000181

**Confocal, wide band spectral reflection microscope, and relevant spectral imaging method**

Si dichiara che il presente documento è una copia conforme all'originale.

Autorizzo il trattamento dei miei dati personali presenti nel cv ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali" e dell'art. 13 del GDPR (Regolamento UE 2016/679).

Roma 20 settembre 2023



FRANCESCA  
ROMANA  
BERTANI  
25.09.2023  
09:59:51  
GMT+00:00