

## Curriculum Vitae

### Personal information

First name(s) / Surname(s) **Maria Francesca Santangelo**  
Address(es)  
Telephone(s)  
E-mail  
Pec  
Nationality Italian  
Date of birth 15/09/1988  
Gender Female

---

### Work experience

Dates 1/02/2019 → Today  
Occupation or position held Post Doc  
Main activities and responsibilities Electro-optical characterization of photodetectors and biosensing applications  
The research activity is focused on the development of compact and low cost sensor systems for biosensing applications, based on Silicon Photomultipliers (SiPMs). I design, fabricate using a 3D printer, and test microfluidic chips, for the handling of biological samples, which are coupled to SiPMs for bio/chemi-luminescence detection.  
Name and address of employer CNR-IMM sede di Catania. VIII Strada Z.I., 5 - 95121 Catania, Italy  
Type of business or sector Microelectronics and Microsystems

---

Dates 1/09/2017 - 31/12/2018  
Occupation or position held Post doc as Principal Research Engineer  
Main activities and responsibilities Development of Graphene- and 2D materials-based sensors for liquid phase detection  
The research activity is based on the electrical characterization of epitaxial graphene sensors, grown on silicon carbide 4H (0 0 0 1), to be implemented in sensing platforms for the detection of heavy metals in water. I designed, fabricated using a 3D printer, and tested a microfluidic chamber that allowed the confinement of the sample solutions on the active area of the graphene surface, reducing the reactants consumption thanks to the reduced volume of the chamber itself (a few microliters).  
In conclusion, I coupled the features offered by the microfluidic chip with the extreme sensitivity of graphene, to develop a platform able to perform real time monitoring of the concentrations of heavy metals (Pb and Cd) present in the water, obtaining limits of detection lower than established legal limits.  
Name and address of employer Applied Sensor Science Unit, Dept. of Physics, Chemistry and Biology (IFM), Linköping University, SE-58183 Linköping, Sweden.

---

Dates 13/07/2015 - 12/07/2017 (during the PhD)  
Occupation or position held Research Fellow  
Main activities and responsibilities Electro-optical characterization of photodetectors and applications to biosensors  
The research activity focused on the development of compact and low cost measurement systems for biosensing applications, based on Silicon Photomultipliers (SiPMs), for:  

- characterization of DNA samples labelled with CY5, spotted on a microscope slide;
- characterization of fluorophores, in liquid phase, spotted inside wells array;
- continuous and real-time monitoring of the bioluminescence emitted by adenosine triphosphate (ATP).

  
I designed, fabricated using a 3D printer, and tested microfluidic chips, for the handling of biological samples, which were coupled to SiPMs for ATP detection. From the optical characterization / calibration of those setup, I obtained a sensitivity of the developed platforms better than that of commercial instruments available for DNA analysis, and

Name and address of employer Type of business or sector	comparable to that of of full-size laboratory luminescence reader, for bioluminescence measurements. CNR-IMM sede di Catania. VIII Strada Z.I., 5 - 95121 Catania, Italy Microelectronics and Microsystems
Dates Occupation or position held Main activities and responsibilities	1/6/2016 - 30/09/2016 (during the PhD) Visiting Researcher Development of optical system for ATP luminescence detection based on SiPM technology (Tutor: Dr. W.C. Mak and Prof. Anthony P.F. Turner) The research activity aimed to the development of a miniaturized bioluminescence sensing system for high sensitive real-time adenosine triphosphate (ATP) detection, based on the coupling between an integrated and low-cost disposable microfluidic chamber, for handling of biological samples, and a very high sensitive silicon photomultiplier (SiPM). I worked on the design, fabrication and test of the 3D printed microfluidic chip, and I performed the calibration of the sensing platform. I characterized a full set of ATP concentrations demonstrating that the SiPM-based bioluminescence sensing system exhibits a similar analytical dynamic range for ATP detection to that of a full-size laboratory luminescence reader.
Name and address of employer	Biosensors and Bioelectronics Centre, Dept. of Physics, Chemistry and Biology (IFM), Linköping University, SE-58183 Linköping, Sweden.
Dates Occupation or position held Main activities and responsibilities	12/2013 - 30/06/2015 (during the PhD) Scholarship holder after examination Research project: Development of Micro and Nano-innovative technologies in the field of Healthcare: biosensors and drug delivery systems. Research supported by HIPPOCRATES - PON02_00355_2964193 The experience included: <ul style="list-style-type: none"> <li>• 12 months of teaching activities during which I acquired the main concepts in the area of integrated systems (micro, nano and microfluidic sensors) and chemical and biochemical technologies, in order to conceive, design and implement integrated biosensors for biomedical applications. These specific technological skills have been complemented by others, relating both to the technical aspects of the development phases of a product in the industrial sector and to the technical and administrative management of research projects.</li> <li>• 7 months internship in laboratory during which worked on the electro-optical characterization of silicon photomultipliers (sipm) for biosensing applications, through I-V characteristics (direct and inverse), dark count and gain measurements, in different operating conditions.</li> </ul>
Name and address of employer	Distretto Tecnologico Sicilia Micro e Nano Sistemi S.C.A.R.L., Catania, Italy
Dates Occupation or position held Main activities and responsibilities	5/2013 - 12/2013 Scholarship holder after examination Research project: Applications of silicon photomultipliers to biosensors Supervisor: Sebania Libertino The research activity was based on the electro-optical characterization of silicon photomultipliers (SiPM), of different sizes (1, 25, 100, 400 pixels) and different technologies (with and without optical trench) to be implemented in measurement platforms for biosensing applications. The developed platforms were used for the characterization of two different fluorophores (CY5 and Ru (bpy) <sub>3</sub> <sup>2+</sup> ), of which emission and absorption spectra and average lifetimes were measured, in different operating conditions (liquid and anhydrous phase). I have also optimized the experimental setup in order to perform photon counting

Name and address of employer	measurements on both fluorophores. CNR-IMM headquarters, Catania, Italy
<b>Other titles</b>	
Dates	10/2013
Title of qualification awarded	Enabling to the engineering profession
Name and type of organization providing	University of Palermo, Viale delle Scienze, bldg 9 - 90128 Palermo, Italy
<b>Partecipation to Scientific Projects</b>	
Dates	1/09/2017 - 31/12/2018
Project	Epitaxial graphene for metrology, sensing, and electronics
Project coordinator	Prof. Tomas Löfwander
Role	Research participant
Funded by	Swedish Foundation for Strategic Research (SSF)
Total financing amount	32 875 000 SEK
Purpose of the project	Experiments on field effect transistors gas sensors
References or protocol number	GMT14-0077 date 13/11/2015
Dates	15/05/2013 - 31/12/2015 (during the PhD)
Project	Hippocrates- Sviluppo di Micro e Nano-tecnologie e sistemi avanzati per la salute dell'uomo
Project coordinator	Dr Sabrina Conoci
Role	Research participant
Funded by	MIUR
Total financing amount	23.000.000 €
Financing amount per Operating Unit	CNR 4 200 000 € (CNR IMM 680 000 €)
Purpose of the project	Realization of sensor systems and drug delivery for diagnosis and treatment of high incidence diseases in Sicily
Results obtained	4 patents and about 50 publications
References or protocol number	prot. 245/2013 date 11/12/13
Other information	PON 02_00355_2964193 / F1
Dates	15/05/2013 - 31/12/2013
Project	Caratterizzazione durante e post irraggiamento di dispositivi microelettronici per applicazioni avioniche o spaziali
Project coordinator	Dr. Sebania Libertino
Role	Research participant
Funded by	Ministry of Foreign Affairs (MAE)
Total financing amount	190.000 €
Purpose of the project	Characterization of the damage induced by ionizing radiation of N-ROM memory elements
Results obtained	3 publications
References or protocol number	0003457 date 24/04/2013
<b>Teaching experience</b>	
Dates	11/2018 - 12/2018
Occupation or position held	Lab supervision of Electronics and Measurement Technology (TSTE05) course
Name and address of employer	Dept. of Physics, Chemistry and Biology (IFM), Linköping University, SE-58183 Linköping, Sweden.

Dates	9/2018 - 12/2018
Occupation or position held	Supervisor in Project Course in Applied Physics, CDIO (TFYA92) course
Name and address of employer	Dept. of Physics, Chemistry and Biology (IFM), Linköping University, SE-58183 Linköping, Sweden.
Dates	4/2018 - 5/2018
Occupation or position held	Lab assistant of Contemporary Sensor Systems (TFMT18) course
Name and address of employer	Dept. of Physics, Chemistry and Biology (IFM), Linköping University, SE-58183 Linköping, Sweden.
Dates	2/2018 - 2/2018
Occupation or position held	Lab supervision of Measurement Technology (TFMT14) course
Name and address of employer	Dept. of Physics, Chemistry and Biology (IFM), Linköping University, SE-58183 Linköping, Sweden.
Dates	11/2017 - 12/2017
Occupation or position held	Lab supervision of Electronics and Measurement Technology (TSTE05) course
Name and address of employer	Dept. of Physics, Chemistry and Biology (IFM), Linköping University, SE-58183 Linköping, Sweden.
<b>Education and training</b>	
Dates	1/1/2014 - 28/2/2017
Title of qualification	PhD in Energy and Information Technologies
Principal subjects/occupational skills covered	Applications of silicon photomultipliers to biosensors Thesis Project: The Silicon Photomultiplier: a promising photodetector for biosensing applications Supervisors: Prof. Alessandro Busacca and Dr. Sebania Libertino The thesis aimed at developing compact measurement systems for biosensing applications based on Silicon Photomultipliers (SiPMs). In particular, the applications examined concerned the analysis of DNA (DNA microarray and Real Time PCR) and the measurement of the bioluminescence emitted by adenosine triphosphate (ATP, key element for intracellular energy transfer). SiPM of 25 pixels were used, which I characterized both electrically and optically. In addition, I also designed and manufactured using 3D printer, and tested microfluidic chips, for handling biological samples, which were coupled to SiPMs for continuous and real-time monitoring of bioluminescence emitted by ATP. The results obtained showed a better sensitivity than commercially available tools for DNA analysis, and dynamic range of analyte concentration similar to that of full-size laboratory luminescence reader for ATP detection.
Name and type of organization providing	University of Palermo, Viale delle Scienze, bldg 9 - 90128 Palermo, Italy
Level in national or international classification	PhD
Dates	23/07/2012-27/07/2012
Title of qualification awarded	Modulo 1: Nozioni di base di calcolo scientifico e di programmazione MATLAB
Name and type of organization providing	Scuola di Calcolo Scientifico con MATLAB (SCSM), Via San Marco 89, 90017 Santa Flavia (PA), Italy
Dates	4/2012-11/2012
Title of qualification	Student
Principal subjects/occupational	Design and development of a prototype eight-channel pulse oximeter with SiPM

skills covered	
Name and type of organization providing	University of Palermo, Viale delle Scienze, bldg 9 - 90128 Palermo, Italy
Dates	10/2010 -03/2013
Title of qualification awarded	Master Degree in Electronic Engineering and Photonics, with a marks of 110/110 cum laude
Principal subjects/occupational skills covered	Photonics, Microwaves, Optical Communications, Electronic microwaves, electronic communications, Microtechnologies, Integrated optics, Design of digital electronic systems. Thesis in "Implementation of a photoluminescence system for biosensor applications with SiPM technology." - Prof. Alessandro Busacca. Tutor: Dr. Sebania Libertino The thesis aimed at the development of an experimental setup for the detection of fluorescence emitted by biological samples, taking advantage of the characteristics of silicon photodetectors (SiPM), sensitive to the single photon, such as the high speed of response to incident optical signal and rapid recovery of the characteristics of the sensor itself. In order to identify which was the best detector to implement in the measurement apparatus, I characterized SiPMs with different sizes (1, 25, 100, 400 pixels) and technologies (with or without optical trenches), performing IV characteristics (direct and inverse) and Dark Count measurements. After identifying the best device for the application under consideration, I characterized the experimental setup by performing photoluminescence measurements on CY5 samples, which had average lifetimes of few nanoseconds.
Name and type of organization providing	University of Palermo, Viale delle Scienze, bldg 9 - 90128 Palermo, Italy
Level in national or international classification	Master Degree in Electronic Engineering and Photonics, Class 32 / S of specialist degrees in Electronic Engineering
Dates	10/2012-3/2013
Occupation or position held	Training / Thesis
Main activities and responsibilities	Characterization of silicon photodetectors and implementation of a measurement system for biosensor applications.
Name and type of organization providing	CNR-IMM sede di Catania. VIII Strada Z.I., 5 - 95121 Catania, Italy
Dates	09/2007 - 16/11/2010
Title of qualification awarded	Bachelor's Degree in Electronic Engineering, with a marks of 109/110
Principal subjects/occupational skills covered	Analog Electronics, Digital Electronics, Digital electronic systems, Electromagnetic fields, Automatic Controls, Fundamentals of electrical communications. Thesis in "Project of an optical component for the generation of THz." Prof. Alessandro Busacca.
Name and type of organization providing	University of Palermo, Viale delle Scienze, bldg 9 - 90128 Palermo, Italy
Level in national or international classification	Bachelor's Degree in Electronic Engineering, Class 9 Degrees in Engineering
<b>Awards</b>	1. Biosensors & Bioelectronics Best Paper Award 2018 (June 2018): <b>M.F. Santangelo</b> , S. Libertino, A.P.F. Turner, D. Filippini, W.C. Mak, "Integrating printed microfluidics with silicon photomultipliers for miniaturised and highly sensitive ATP bioluminescence detection", Biosensors & Bioelectronics, vol. 99, pp. 464-470, 2018.

## Commission of trust

Reviewer of scientific articles  
and/or books

- 1 paper for Journal of Sensors and Sensor Systems (2018)
- 1 paper for Sensors MDPI (2018)
- 1 paper for Vacuum, Elsevier (2017)
- Book review: Gupta, Banshi Dhar, Mohan Shrivastav, Anand, Usha, Sruthi Prasood (Eds.), Optical Sensors for Biomedical Diagnostics and Environmental Monitoring. CRC Press Taylor & Francis Group, (ISBN: 978-1-4987-8906-6, £ 95.00), Biosensors & Bioelectronics, 113, 72-73, 2018.

Memberships

- 1/2014 - 12/2016 to Associazione Società Italiana di Elettronica
- 1/2014 - 12/2014 to International society for optics and photonics (SPIE)

Session chair

Biosensors 2018 Conference, Miami (USA), 12–15 June 2018.

---

**H-index**

6 (Source: Scopus)

---

**Publications**

### Articles in Scientific Journals

1. **Santangelo, M.F.**, Shtepliuk, I., Filippini, D., Ivanov, I.G., Yakimova, R., Eriksson, J., “Real-time sensing of lead with epitaxial graphene-integrated microfluidic devices”, Sensors and Actuators, B: Chemical, 288, pp. 425-431, 2019.  
DOI: 10.1016/j.snb.2019.03.021  
ISSN: 09254005  
Document Type: Article  
Source: Scopus  
Journal impact factor: 6.393  
Role: Development of the experimental setup for water samples characterization; electrical system characterization/calibration and related data analysis; drafting of the article.
2. **Santangelo, M.F.**, Shtepliuk, I., Filippini, D., Puglisi, D., Vagin, M., Yakimova, R., Eriksson, J., “Epitaxial graphene sensors combined with 3D-printed microfluidic chip for heavy metals detection”, Sensors MDPI, 19(10), 2393, 2019.  
DOI: 10.3390/s19102393  
ISSN: 14248220  
Document Type: Article  
Source: Scopus  
Journal impact factor: 3.031  
Role: Development of the experimental setup for water samples characterization; electrical system characterization/calibration and related data analysis; drafting of the article.
3. Sciuto, E.L., Villaggio, G., **Santangelo, M.F.**, Laudani, S., Federico, C., Saccone, S., Sinatra, F., Libertino, S., “Study of a miniaturizable system for optical sensing application to human cells”, Applied Sciences MDPI, 9(5),975, 2019.  
DOI: 10.3390/app9050975  
ISSN: 20763417  
Document Type: Article  
Source: Scopus  
Journal impact factor: 2.217  
Role: Development of the experimental setup; optical characterization of sensor system and related data analysis.
4. I. Shtepliuk, **M.F. Santangelo**, M. Vagin, I.G. Ivanov, V. Khranovskyy, T. Iakimov, J. Eriksson, R. Yakimova, “Understanding Graphene Response to Neutral and Charged Lead Species: Theory and Experiment”, Materials, 11(10), 2059, 2018.  
DOI: 10.3390/ma11102059  
ISSN: 19961944  
Document Type: Article  
Source: Scopus

- Journal impact factor: 2.467  
Role: Development of the experimental setup for experimental measurements performed on water samples containing heavy metals; electrical characterization of sensor system and related data analysis; collaboration in drafting the article.
5. S. Petralia, E.L. Sciuto, **M.F. Santangelo** et al., "Sulphide Species Optical Monitoring by Miniaturized Silicon Photomultiplier", *Sensors MDPI*, 18(3), 727-734, 2018.  
DOI: 10.3390/s18030727  
ISSN: 14248220  
Document Type: Article  
Source: Scopus  
Journal impact factor: 2.475  
Class according ANVUR classification: Area 08  
Role: Development of the experimental setup for experimental measurements performed on water samples; electro-optical characterization of samples and related data analysis.
  6. **M.F. Santangelo** et al., "Integrating printed microfluidics with silicon photomultipliers for miniaturised and highly sensitive ATP bioluminescence detection", *Biosensors & Bioelectronics*, 99, 464-470, 2018.  
DOI: 10.1016/j.bios.2017.07.055  
ISSN: 09565663  
Document Type: Article  
Source: Scopus  
Journal impact factor: 8.173  
Class according ANVUR classification: Area 13  
Role: Development of the experimental setup for experimental measurements performed on ATP samples; electro-optical system characterization/calibration and related data analysis; drafting of the article.
  7. **M.F. Santangelo** et al., "Si photomultipliers for bio-sensing applications", *IEEE Journal of Selected Topics in Quantum Electronics*, 22(3), 335-341, 2016.  
DOI: 10.1109/JSTQE.2015.2504979  
ISSN: 1077260X  
Document Type: Article  
Source: Scopus  
Journal impact factor: 3.367  
Role: Development of the experimental setup for experimental measurements performed on fluorescent samples; electro-optical system characterization/calibration and related data analysis; drafting of the article.
  8. **M.F. Santangelo** et al., "SiPM as miniaturized optical biosensor in DNA-microarray applications", *Sensing and Biosensing research*, 6, 95-98, December 2015.  
DOI: 10.1016/j.sbsr.2015.08.003  
ISSN: 22141804  
Document Type: Article  
Source: Scopus  
Role: Development of the experimental setup for experimental measurements performed on DNA samples labelled with CY5; electro-optical system characterization/calibration and related data analysis; drafting of the article.
  9. E.L.Sciuto, **M.F. Santangelo** et al., "Photo-physical characterization of fluorophore Ru(bpy)<sub>3</sub><sup>2+</sup> for optical biosensing applications", *Sensing and Biosensing research*, 6, 65-71, December 2015.  
DOI: 10.1016/j.sbsr.2015.09.003  
ISSN: 22141804

Document Type: Article

Source: Scopus

Role: Development of the experimental setup for experimental measurements performed on Ru(bpy)<sub>3</sub><sup>2+</sup> samples; electro-optical system characterization/calibration and related data analysis.

---

### Proceeding in International Conference

1. **M.F. Santangelo** et al., "CY5 Fluorescence measured with Silicon Photomultipliers", Biomedical Circuits and Systems Conference (BioCAS), 2014 IEEE, pp. 284 - 287, Lausanne (Switzerland), 22-24 Oct. 2014.

DOI: 10.1109/BioCAS.2014.6981718

ISBN: 9781479923465

Document Type: Conference Paper

Source: Scopus

Role: Development of the experimental setup for experimental measurements performed on fluorescent samples (CY5); electro-optical system characterization/calibration and related data analysis; drafting of the article.

2. **M.F. Santangelo** et al., "Silicon Photomultipliers application to biosensors", Proc. SPIE 8990, Silicon Photonics IX, 89900T (8 March 2014), San Francisco (USA), February 2014.

DOI: 10.1117/12.2037765

ISSN: 0277786X

ISBN: 978081949 9035

Document Type: Conference Paper

Source: Scopus

Role: Development of the experimental setup for experimental measurements performed on fluorescent samples; electro-optical system characterization/calibration and related data analysis; drafting of the article.

---

### Proceeding in National Conference

1. **M.F. Santangelo** et al., "SiPM as novel Optical Biosensor-Transduction and applications", Photonics Technologies, 2014 Fotonica AEIT Italian Conference, pp. 1-4, Naples (Italy), 12-14 May 2014.

DOI: 10.1109/Fotonica.2014.6843944

ISBN: 9788887237177

Document Type: Conference Paper

Source: Scopus

Role: Development of the experimental setup for experimental measurements performed on fluorescent samples; electro-optical system characterization/calibration and related data analysis; drafting of the article.

---

### Conference International Conference

#### Keynote:

1. **M.F. Santangelo** et al., "Highly sensitive silicon photomultipliers for ATP bioluminescence detection on 3D printed lab-on-a-chip", Biosensors 2018, Miami (USA), 12-15 June 2018.

#### Oral:

1. **M.F. Santangelo** et al., Real time ATP bioluminescence monitoring on 3D printed LoC by highly sensitive SiPM", Optical Microsystems OμS19, Anacapri (Italy), 9-11 September 2019.
2. **M.F. Santangelo** et al., "Epitaxial graphene sensors combined with 3D printed



- microfluidic chip for heavy metals detection", Eurosensors 2018, Graz (Austria), 9–12 September 2018.
3. **M.F. Santangelo** et al., "Bioluminescence detection system based on Silicon Photomultiplier" Micro-Nano-Bio-ICT Convergence conference, Otranto (Italy), 25–29 June 2016.
  4. **M.F. Santangelo** et al., "Silicon photomultipliers application to biosensors", 6th EOS Topical Meeting on Optical Microsystems, Capri (Italy), 17-19 September 2015.
  5. **M.F. Santangelo** et al., "DNA-chip platform based on SiPM technology", Micro-Nano-Bio-ICT Convergence conference, Otranto (Italy), 13-15 July 2015.
  6. **M.F. Santangelo** et al., "SiPM as miniaturised optical biosensor for DNA microarray applications", Spring Meeting EMRS 2015, European Materials Research Society conference 2015, Lille (France), 11-15 May 2015.
  7. S. Libertino, **M.F. Santangelo** et al., "Optical and electrical Si-based biosensors: first results" 5th International Conference and Exhibition on Analytical & Bioanalytical Techniques, Beijing (Cina), 18-20 August 2014.
  8. **M.F. Santangelo** et al., "Silicon Photomultipliers application to biosensors", Photonics West 2014, San Francisco, California, United States, February 2014.
  9. S. Libertino, S. Conoci, **M.F. Santangelo** et al., "Optical and Electrical Si-Based Biosensors: Fabrication and Trasduction Issues", 4th International Conference and Exhibition on Analytical & Bioanalytical Techniques Las Vagas (Nevada, USA), 15-17 October 2013.

#### **Poster:**

1. **M.F. Santangelo** et al., "Silicon photomultipliers application to gene analysis ", Biosensors 2016, Gothenburg (Sweden), 25-27 May 2016.
2. R. Pagano, E.L. Sciuto, **M.F. Santangelo** et al., "Continuous Wave fNIRs with Silicon Photomultiplier", 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society of the IEEE Engineering in Medicine and Biology Society in MiCo, Milano Conference Center, Milano (Italy), 25-29 August 2015.
3. E.L.Sciuto, **M.F. Santangelo** et al., "Photo-physical characterization of fluorophore Ru(bpy)<sub>3</sub><sup>2+</sup> for optical biosensing applications", 4th International Conference on Bio-Sensing Technology, May 2015.
4. **M.F. Santangelo** et al., "CY5 Fluorescence measured with Silicon Photomultipliers", Biomedical Circuits and Systems Conference (BioCAS), 2014 IEEE, pp. 284 - 287, Lausanne, Switzerland, 22-24 Oct. 2014.

#### **National Conferences**

##### **Oral:**

1. **M.F. Santangelo** et al., "Highly sensitive atp bioluminescence detection based on SiPM and 3D printing technology", CNS 2018, Catania (Italy), 21-23 February 2018.
2. **M.F. Santangelo** et al., "Silicon photomultipliers as transducers for DNA hybridization detection", Italian National Conference on Condensed Matter Physics conference (FisMat) 2015, Palermo, 28 September – 2 October 2015.
3. **M.F. Santangelo** et al., "SiPM as novel Optical Biosensor-Transduction and applications", Photonics Technologies, 2014 Fotonica AEIT Italian Conference, Naples (Italy), 12-14 May 2014.
4. **M.F. Santangelo** et al., "SiPM as novel Optical Biosensor", GE 2014, Cagliari (Italy), June 2014.

##### **Poster:**

1. S. Petralia, E. L. Sciuto, M. A. Messina, **M. F. Santangelo** et al., "A novel chemsensor based on a miniaturized silicon photomultipliers for the monitoring of sulphide species", CNS 2018, Catania (Italy), 21-23 February 2018.

2. **M.F. Santangelo** et al., "Silicon Photomultipliers for DNA microarray applications", GE 2015, Brescia, June 2016.
3. **M.F. Santangelo** et al., "Real Time PCR platform based on SiPM technology", 2016 Fotonica Convegno Italiano delle Tecnologie Fotoniche, Rome, 6-8 June 2016.
4. **M.F. Santangelo** et al., "Real Time PCR platform based on SiPM technology", GE 2015, Siena (Italy), June 2015.

**Personal skills and competences**

Mother tongue(s)  
Other language(s)  
Self-assessment  
European level

**Italian**

**English**

**French**

Understanding		Speaking		Writing	
Listening	Reading	Listening	Reading	Listening	Reading
B2 Indep. user	B2 Indep. user	B2 Indep. user	B2 Indep. user	B2 Indep. user	B2 Indep. user
A2 Basic user	A2 Basic user	A2 Basic user	A2 Basic user	A2 Basic user	A2 Basic user

**Social skills and competences**

Excellent communication properties developed during the university experience, as a speaker of thesis, and as a speaker at national and international conferences. I am a dynamic and proactive person with highly developed skills in problem identification and implementation of effective solutions. I love challenges and achieve new goals. I am able to work well both on my own initiative and as part of a team. I get on well with people at all levels, easily making good working relationships.

During the short or long periods spent abroad, I developed an excellent inclination to integrate easily into new environments, promoting cultural exchanges and taking part in collaborations.

Strong organizational skills developed during the study period and the work experience. I had the opportunity to work in several research projects in which the organization and collaboration with all members of the research team was needed.

**Organizational skills and competences**

Ability to work in stressful situations, mostly related to the workload and time pressure, developed in a variety of deadline oriented situations.

**Technical skills and competences**

- Use of electronic equipment such as oscilloscope, spectrum analyzer, digital multimeter, Keithley 236 and 2600 series, signal generator, monochromator, lock in Amplifier.
- Implementation of optical systems both free space and in fiber.
- Electro-optical characterization of semiconductor devices (SiPM, SPAD, photodetectors)
- Design and fabrication of analog and digital circuits of medium complexity.
- Design and fabrication of 3D printed Lab-on-chip. CAD experience (kicad, Autodesk Fusion 360).
- Optical simulations using raytracing.
- Ability to work with pulsed and continuous wave laser and optical accessories (lens, mirrors, filters).
- Programming Microcontrollers in C and Assembly. Arduino platform and Labview experience.
- Data analysis software such as Matlab and Origin.
- Ability to work with biological equipment (pipettes, vortex, MilliQ water system, etc.)

**Computer skills and competences**

- Knowledge of Microsoft applications and Microsoft Office (especially Excel, Word and Power Point)
- Good ability to browse the Internet and use the email tool.
- Software for digital image processing and for creating vector animations (Photoshop,

CorelDraw)

- Data analysis software such as Matlab and Origin.
- Experience programming in Assembly, C language and Labview.

---

**Driving licence**

---

B

---

**City, date** Catania, 26/03/20