

Curriculum vitae of Lucio Pancheri

Personal information

Family name, First name: Pancheri Lucio

Researcher unique identifier(s): orcid.org/0000-0002-3954-7308

Date of birth: December 5, 1977

Nationality: Italian

Education

- 2006 PhD in Information and Communication Technologies, University of Trento/Department of Information and Communication technologies, Italy, advisor: prof. Gian-Franco Dalla Betta
- 2002 Master in Materials Engineering (final evaluation of 110/110 cum laude)
University of Trento/Faculty of Engineering, Italy

Current position

- 2018 – present Associate professor
University of Trento/Department of Industrial Engineering, Italy

Previous positions

- 2012 – 2018 Assistant professor
University of Trento/Department of Industrial Engineering, Italy
- 2010 – 2012 Researcher, Fondazione Bruno Kessler, Trento, Italy
- 2007 – 2010 Postdoctoral fellow, Fondazione Bruno Kessler, Trento, Italy

Supervision of graduate students and postdoctoral fellows

- 2015 – 2018 Advisor of 2 PhD students, advisor or co-advisor of 4 master and 15 bachelor students,
University of Trento/ Department of Industrial Engineering, Italy
- 2007 – 2015 Co-advisor of 3 PhD students, co-advisor of 3 master students, advisor or co-advisor of 11
bachelor students, University of Trento/ Department of Information and Communication
Technologies, Italy
- 2014 - 2017 Co-advisor of 3 master students and 1 bachelor student
University of Trento/ Department Physics, Italy

Teaching activities

- 2003 – 2009 Teaching assistant – MS course “Electronic materials”, University of Trento, Italy
- 2004 – 2006 and 2012 Teaching assistant – MS course “Microelectronics”, University of Trento, Italy
- 2007 – 2009 Teaching assistant – course “Optical sensors and solar cells”, in “Nano Micro Master”
program, University of Trento, Italy
- 2012 – 2014 Teaching assistant – “Electric circuits”, University of Trento, Italy
- 2012 – 2014 Teaching assistant – “Electronics for telecommunications”, University of Trento, Italy
- 2013 PhD course, “Silicon photosensors and radiation detectors”, University of Trento,
Department of Information and Communication Technologies, Italy
- 2014 – 2018 Teaching assistant – “Electric and electronic systems”, University of Trento, Italy
- 2014 – 2018 PhD course, “Image sensors”, University of Trento, Department of Industrial Engineering,
Italy
- 2016 – 2018 Master course, “Electronic materials and technologies”, University of Trento, Italy

Organisation of scientific meetings and schools

Technical Program Chair at the 7th PhD Research Conference in Electronics and Microelectronics

(PRIME 2011), Madonna di Campiglio, TN, Italy (70 participants).
Co-chair of PhD school “Advanced School on Quantum Detectors”, SQUAD 2017, Trento, 26 – 28 Oct. 2017 (55 participants).

Responsibility in funded projects

Principal Investigator in the following project:

- Postdoctoral project call “post-doc 2006”, financed by Provincia Autonoma of Trento, title “Fluorescence Lifetime-based biosensors (LIFE-SENS), years 2007-2010.

Leader of Work Package 6: “System integration, testing and demonstration” in the following project: “Call grandi progetti 2006”, financed by Provincia Autonoma of Trento, title: “A NANO on MICRO approach to a multispectral analytical system for protein assays (NAoMI)”, scientific coordinator: Dr. Cecilia Pederzoli, FBK, years 2008-2012.

Local responsible for the section of Trento in 5 INFN projects, CSN5:

- “Enabling technologies, building blocks and architectures for advanced X-ray pixel cameras at FELs (PixFEL)”, years 2014 – 2016.
- “Development of an avalanche pixel sensor for tracking applications (APIX2)”, years 2014 – 2016.
- “Sensors with Embedded Electronics Development (SEED)”, year 2015 – 2018.
- “Array of Silicon Avalanche Pixels (ASAP)”, years 2018 – 2020.
- “Hybrid and monolithic pixel detectors for X-ray imaging at FELs and synchrotron light sources (XDET)”, years 2018 – 2020.

Leader of Work Package 3: “Architecture and packaging of MoS₂ photodetectors” in the following project:

- “Innovative Materials for UV-NIR Light Detection in Automotive, Environment and Agro-Food applications”, financed by CARITRO foundation, Italy, years 2018-2019.

Commission of trust

Associate editor of IEEE Tran. Electron Devices, 2018.

Lead guest editor of MDPI Sensors for the special issue “Image sensors”, 2018.

Editorial board member for Journal of Sensors (Hindawi).

Reviewer for the following journals: IEEE Tran. Electron Devices, IEEE J. Solid-State Circuits, IEEE J.

Selected Topics in Quantum Electron., IEEE Tran. on Circuits and Systems I and II, IEEE Photonics J., IEEE Photonics Technology Lett., IEEE Tran. Nuclear Sci., Optics Lett., Solid-State Electron., J. of Circuits, Systems, and Computers, Nuclear Instr. Meth. A

Reviewer for the French National Research Agency (ANR) for the call of proposal of the 2014 Work Programme

Reviewer for the Canadian national program call of proposal “MITACS elevate application”, 2016.

External reviewer of 4 PhD Thesis, 2013 – 2018.

Research activity

My on-going research projects in the past years have been related to the development of **radiation and particle detectors in CMOS technologies**. From 2014, I have been local responsible for the research unit of Trento in 5 different projects funded by the Italian National Institute of Nuclear Physics (INFN). In particular, I have taken part in the development of monolithic CMOS sensors in the framework of CSNV project SEED, two-layer particle sensors based on Geiger-mode avalanche detectors in projects APIX2 and ASAP and X-ray pixel sensors for FELs in projects PixFEL and XDET. In addition, I have contributed to the development of Low-Gain Avalanche Detectors fabricated by FBK.

In the period 2006-2012, I have been working in Fondazione Bruno Kessler (FBK) in the development of CMOS-integrated detectors, focusing both on device and IC design. I have conducted some pioneering work on image sensors based on **Single-Photon Avalanche Diodes** with time-gated readout circuits, proposing the use of analog counters inside the pixels to reduce the pixel pitch and improve the fill factor. Currently, I am still collaborating with FBK on SPAD-related topics.

I have also participated to the early stages of FP7 project SPADnet, contributing to the definition of the pixel architecture signal compression techniques (EP patent submission EP2541219).

In the field of **3D imaging**, my work has been focused on sensor design using TCAD software tools. I have developed several CMOS demodulating pixels based on different physical principles and contributed to Time-of-Flight 3D cameras design and characterization.

During this term, I have also collaborated with the Technical University of Munich, in the development of CMOS-compatible organic photodiode arrays.

During and immediately after my master thesis, I worked on **gas sensors** made of porous silicon, being in charge of the processing of the material, the setup of the test bench and the characterization of the devices.

Overview of scientific publications

I have authored or co-authored 4 Italian patents, 2 European patents and 139 scientific publications, which can be divided in:

- 62 papers on international peer-reviewed journals
- 72 papers on international conference proceedings
- 5 book chapters

H-index:

Scopus: 21

Web of science: 18

Google scholar: 25

I have given **18 oral presentations** in international scientific conferences. Among others: International Solid-State Circuit Conference, ISSCC (2012), European Solid-State Circuit Conference, ESSCIRC (2009, 2013), European Solid-State Device Conference, ESSDERC (2007, 2011, 2014), International Image Sensor Workshop, IISW (2013, 2015), Vienna Conference on Instrumentation (2016), Nuclear Science Symposium (2016).

European patents:

1. **L. Pancheri**, D. Stoppa, N. Massari, "Electro-optical demodulator based on buried photodiode", EP 2348537 B1, 23 Jan. 2013. **Granted**
2. L. H. Campos Braga, D. Stoppa, **L. Pancheri**, L. Gasparini, "Photodetector", EP2541219 A1, 2 Jan. 2013. **Submitted**

Invited talks:

- L. Pancheri, "APiX: a Geiger-mode avalanche digital sensor for charged particle detection", 11th International Meeting on Front-End Electronics (FEE 2018), Jouvence, QC, CA, 20-25 May 2018.
- L. Pancheri, "Ultra-Fast Silicon Detectors", Frascati Detector School, Frascati (RM), 21-23 March 2018.
- L. Pancheri, "CMOS MAPS: design challenges and state of the art", XXVII giornate di studio sui rivelatori, Cogne (AO), 12-16 February 2018.
- L. Pancheri, "State of the art and perspectives of CMOS silicon avalanche detectors", CERN seminar, Geneva, CH, 20 January 2017.
- L. Pancheri, "Vertically-integrated CMOS Geiger-mode avalanche pixel sensors", 14th Topical Seminar on Innovative Particle and Radiation Detectors (IPRD16), Siena, 3-6 Oct. 2016.
- L. Pancheri, "CMOS SiPM design and signal compression", Training school on quantum detection, single-photon imaging, SiPMs, SPADs, University of Delft, NL, 22-24 May 2013.
- D. Stoppa, L. Pancheri, M. Perenzoni, "Sensors Architectures for 3D Time-of-Flight Imaging", Tutorial at Image Sensors 2012, London, UK, 20-22 March 2012.