

CURRICULUM VITAE, ANNALISA TIRELLA

PERSONAL INFORMATION



EDUCATION

- 2011 PhD in Materials for Environment and Energy
Faculty of Engineering, University of Rome "Tor Vergata", Italy
Name of PhD Supervisor: Prof Arti Ahluwalia
- 2007 MSc in Biomedical Engineering (cum laude)
Faculty of Engineering, University of Pisa, Italy
- 2005 BSc in Biomedical Engineering (cum laude)
Faculty of Engineering, University of Pisa, Italy

CURRENT POSITION(S)

- 11/2021 – Assistant Professor in Bioengineering
Department of Industrial Engineering / University of Trento / Italy
- 11/2021 – Honorary Senior Lecturer in Pharmaceutics
Division of Pharmacy and Optometry / Faculty of Biology Medicine and Health Sciences / University of Manchester / United Kingdom

PREVIOUS POSITIONS

- 11/2014 – 11/2021 Lecturer in Pharmaceutics
Division of Pharmacy and Optometry / Faculty of Biology Medicine and Health Sciences / University of Manchester / United Kingdom
- 07/2014 – 11/2014 Research Associate
Faculty of Medical and Human Science / The University of Manchester / United Kingdom
- 02/2013 – 06/2014 Research Fellow
Institute of Clinical Physiology / National Research Council, Pisa / Italy
- 11/2012 – 12/2013 Temporary Lecturer in Biomaterials (Teaching only)
Faculty of Engineering / University of Cagliari / Italy
- 11/2010 – 02/2013 Research Associate
Faculty of Engineering / University of Pisa / Italy

FELLOWSHIPS AND AWARDS

- 2014 Young Lecturer Award, National Group of Bioengineering, Italy
- 2011 PhD Thesis Award, National Group of Bioengineering, Italy

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

- 2021 – 1 Postdocs / 1 PhD student / 6 Master Students / 2 Undergraduate Students
Department of Industrial Engineering / University of Trento / Italy
- 2014 – 3 Postdocs / 2 Postdoctoral Fellows / 15 PhD students (5 to completion as primary supervisor) / 9 Master Students
Division of Pharmacy and Optometry / Faculty of Biology Medicine and Health Sciences / University of Manchester / United Kingdom
- 2009 – 2014 2 PhD students / 5 Master Students / 8 Undergraduate Students
Faculty of Engineering / Research Centre "E. Piaggio", University of Pisa,

*Italy***TEACHING ACTIVITIES**

- 2021 – Assistant Professor in Bioengineering and Biomaterials, Department of Industrial Engineering / University of Trento / Trento / Italy
- 2014 – 2021 Lecturer in Pharmaceutics and Tissue Engineering, Faculty of Biology Medicine and Health Sciences / University of Manchester / United Kingdom
- 2019 Visiting Lecturer in Nanotechnologies, Nanotechnology and Integrated Bioengineering Centre / Ulster University / United Kingdom
- 2012 – 2013 Temporary Lecturer in Biomaterials, University of Cagliari / Faculty of Engineering / Cagliari / Italy
- 2010 – 2013 Demonstrator, Bioengineering lab activities, University of Pisa / Faculty of Engineering / Pisa / Italy

ORGANISATION OF SCIENTIFIC MEETINGS

- 2023 Scientific advisor and organizing committee member of the SHIFT Summer School / University of Trento (Italy)
- 2021 - Organizing scientific committee member of BIOTech seminars series / University of Trento (Italy)
- 2020 Scientific advisor and organizing committee member, TERMIS-EU 2020, Manchester (UK), with expected 4,000 participants. *Event postponed to 2023 due to Covid-19 outbreak.*
- 2017 Organizing committee member, Polymers for Advanced Technologies Conference, 200 participants, Manchester (UK)

INSTITUTIONAL RESPONSIBILITIES

- 2021 - Faculty member of University of Trento, Department of Industrial Engineering, Italy
- 2021 - Member of Doctoral School in Materials, Mechatronics and System Engineering, University of Trento, Italy
- 2014 - Post-Graduate Student Advisor, University of Manchester, UK
- 2019 - 2021 Post-Graduate Mentor, University of Manchester, UK
- 2014 - 2021 Graduate Student Advisor, University of Manchester, UK
- 2019 - 2021 Lead for Tissue Engineering theme, Advanced Material in Medicine, University of Manchester, UK
- 2018 - 2021 Member of Environmental Sustainability Committee; Divisional Lead, University of Manchester, UK
- 2016 - 2021 Member of NorthWest Centre for Advanced Drug Delivery; University of Manchester, UK
- 2014 - 2021 Faculty member, University of Manchester, Division of Pharmacy and Optometry, UK

REVIEWING ACTIVITIES

- 2023 Expert Review panel member, Cancer Research UK / United Kingdom
- 2023 PhD Examiner, University of Trento / Italy
- 2022 PhD Examiner, University of Trento / Italy
- 2022 PhD Examiner, University of Pavia / Italy
- 2022 PhD Examiner, University of Pisa / Italy
- 2020 Evaluator grant proposal, ANR, France
- 2016 – Evaluator grant proposals, EPSRC & MRC, UK
- 2016 – 2021 PhD Examiner, University of Manchester, UK

- 2016 - Evaluator grant proposals PRIN, MIUR, Italy
 2012 – Reviewer of original research manuscripts for International Peer-Reviewed Journals (Activity tracked on Publons)

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- 2023 - Member COC committee, TERMIS-EU
 2020-23 Member, Academy of Pharmaceutical Sciences (APS), UK
 2020-23 Secretary & Treasurer, APS Focus Group: Emerging Technologies, UK
 2016-22 Member, Royal Society of Chemistry, UK
 2009 - Member, International Society for Tissue Engineering and Regenerative Medicine (TERMIS)
 2017 - Fellow, Higher Education Academy, UK
 2017 - Member of Manchester Regenerative Medicine (MaRM) network, University of Manchester, UK
 2017 - Member, Research Network “*BIOMAT*”, University of Manchester, UK

PUBLICATIONS

Since 2008, Dr A Tirella has authored 44 research papers in peer-reviewed journals with an h-index of 22 (source Scopus), and 5 book chapters. All publications (ORCID: 0000-0002-3743-3593), are in journal ranked in the 1st quartile of bioengineering, physics, and chemistry. Dr A Tirella has presented her work as invited keynote/oral speaker to over 30 inter/national conferences.

SCIENTIFIC TRACK RECORD

Dr Annalisa Tirella was awarded the PhD on a research project pioneering the use of 3D bioprinting in 2011. As post-doctoral researcher, she focused on the mechanical characterization of hydrogels and highly hydrated biomaterials for tissue engineering and biomedical applications. Her independent research career started as Research Fellow (IFC-CNR, 2013), being awarded a collaborative grant (International Collaborative Project, €10k) and working on the EU-FP7 HEALTH-INNOV2 (2012-2015, €4.2M). Dr A Tirella established her own manufacturing lab equipped with cutting-edge jetting systems to precisely deposit materials (in collaboration with i-JET, Olivetti) and fabricate multifunctional composite hydrogel microbeads. In 2014, she joined the University of Manchester (UoM, UK) as Research Associate and was appointed Lecturer in Pharmaceutics few months later. At UoM, Dr A Tirella consolidated her expertise on nanoparticles manufacturing and characterization of targeted delivery of novel therapies for oncology, with a research project funded by InnovateUK (£230k, co-I) and other funded initiatives. At UoM, Dr A Tirella established her research group attracting international PhD students (£200k research project costs), advancing knowledge on multifunctional hydrogels with controlled stiffness and nanoparticles manufacturing using emerging technologies, such as microfluidic. Since Dr A Tirella joined the University of Trento (BIOTech Research Centre / Department of Industrial Engineering), she has been working on the manufacturing and characterisation of multifunctional and natural polymers for biomedical applications using sustainable approaches. Dr A Tirella is now engaged with few activities on circular economy natural derived materials, mainly for food and medical applications.

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Short CV of Gian-Franco Dalla Betta

Education and academic career

Gian-Franco Dalla Betta received the "Laurea" degree in Electronics Engineering (summa cum laude) from the University of Bologna, Italy, in 1992, and the Ph.D. degree in Electronic Devices from the University of Trento in 1997.

Since 1997 to 2002, he was with the Microsystems Division of the Center for Scientific and Technological Research (IRST) of Trento, Italy, as a Researcher.

Since November 2002, he has been with the University of Trento, first as an Associate Professor (2002-2015) and later as a Full Professor of Electronics .

At the Department of Industrial Engineering of the University of Trento, he has been also: member of the Committee for Graduate Studies and the Steering Committee (since 2013) for the International Doctorate School in "Materials, Mechatronics and System Engineering", Dean of the same School (since November 2018).

In 2005 he was a Visiting Scientist at the Santa Cruz Institute for Particle Physics, University of California Santa Cruz, USA.

Teaching activity

He has been the official instructor of 71 courses in Electronics at the University of Trento, at both the undergraduate (34) and graduate (37) level, covering the following fields: semiconductor devices, microelectronic technologies, basic analog and digital circuits, solid-state sensors and detectors, numerical simulations.

He was advisor or co-advisor for 22 PhD theses (+ 4 under way), 6 theses of the II level professional master in Nano & MicroElectromechanical Systems, and about 300 bachelor and master of science theses.

Research activity

His research activity has been dealing with the design, simulation, fabrication and experimental characterization of silicon integrated devices and circuits, with emphasis on:

a) Radiation and particle detectors on high resistivity silicon.

In this field, the main results he achieved are:

- the development of special fabrication technologies for advanced silicon radiation detectors aimed at high-energy physics and space experiments (particle tracking) and at medical imaging applications (digital radiography, scintigraphy);
- the development of radiation detectors with integrated front-end electronics (JFET-MOSFET) for applications in high-resolution X-ray spectroscopy and X-ray imaging in medical and industrial field;
- the development of radiation detectors based on the bipolar junction transistor concept for environmental monitoring applications (co-founder of RSens spin-off);

- the design and the implementation of termination structures with multiple guard rings aimed at enhancing the breakdown voltage (>1000V) and the stability properties of silicon radiation detectors;
- the development of ultra radiation-hard detectors by means of substrate engineering (oxygen enrichment, pre-irradiation, use of epitaxial and/or Czochralsky material) and new detector concepts (3D detectors, thin detectors) for high energy physics experiments in next generation colliders;
- the development of hybrid detectors of neutrons based on microstructured silicon sensors;
- the development of pixellated Low Gain Avalanche Detectors providing excellent timing resolution (~10s of ps) besides the high spatial resolution;
- the development of active edge and slim edge sensors for high energy physics and X-ray free electron laser experiments.

b) Optical sensors and advanced CMOS imagers

In this field, the main results he achieved are:

- the development of full custom photosensors for industrial (optical encoders) and environmental (electro-optical nose) applications;
- the development of silicon photomultipliers (SiPM) for medical imaging (PET) and material science (PALS) applications;
- the design, modeling and experimental characterization of CMOS avalanche based photodetectors, operated either in the linear mode (APD) or in the Geiger mode (SPAD);
- the design and the experimental characterization of CMOS image sensors for automotive applications, featuring novel active pixels able to yield a very high dynamic range (>130 dB);
- the design and the experimental characterization of CMOS image sensors for three dimensional vision, featuring novel non standard photosensors (APD, SPAD, MSM, photonic mixers)
- the design and characterization of a prototype hybrid camera based on a CMOS chip coupled to an array of organic photodiodes, aimed at the development of an image sensor with chemically-tunable spectral response also extending to the infrared.

Publications, ERC fields, bibliometric indicators, awards

On the above topics, he has co-authored one European patent, one US patent, four Italian patents, and more than 500 papers, among them ~295 papers published in refereed international journals (including ~50 papers in IEEE journals), ~180 papers published in proceedings of international conferences, 1 book, and 3 book chapters. Moreover, he gave more than 20 invited talks/lectures at International Conferences and Schools.

His main ERC Field is: PE7 "Systems and communication engineering: electronic, communication, optical and systems engineering" with subfields:

- PE7_2 "Electrical and electronic engineering: semiconductors, components, systems"
- PE7_6 "Micro- and nanoelectronics, optoelectronics"

His **bibliometric indicators** are:

- Google Scholar: entries ~500, H index 42, citations ~8550
- Scopus: entries ~470, H index 34, citations ~4890
- Web of Science: entries ~425, H index 30, citations ~3960

In 2004, he has been awarded a "Certificate for outstanding contributions in the field of nuclear radiation measurements" from the Radiation Instrumentation Steering Committee of the IEEE Nuclear and Plasma Science Society.

In 2023, he received the "2023 Emilio Gatti Radiation Instrumentation Technical Achievement Award" for the original design of double-sided 3D silicon pixel detectors from the Radiation Instrumentation Steering Committee of the IEEE Nuclear & Plasma Science Society.

Scientific and industrial collaborations

During his research activity, he has collaborated with several universities in Italy and many universities and research institutes worldwide. Among them: Fondazione Bruno Kessler (Trento, Italy), CERN (Geneve, Switzerland), SLAC (Stanford, USA); FERMILAB (Batavia, USA); INFN (Italy); Jozef Stefan Institute (Ljubljana, Slovenia); Santa Cruz Institute for Particle Physics (Santa Cruz, USA); Purdue University (West Lafayette, USA); University of New Mexico (Albuquerque, USA); Technical University of Munich (Munich, Germany); University of Freiburg (Freiburg, Germany); Czech Technical University in Prague (Prague, Czech Republic); University of Manchester (UK); University of Edinburgh (UK); SINTEF (Oslo, Norway); CNM and IFAE (Barcelona, Spain); LPNHE (Paris, France).

Partecipation in funded research programs

He has participated in several funded research programs. Among them:

(a) as national scientific coordinator:

- MIUR, 2007 PRIN project, Title: "Time-of-Flight Range Image Sensor", years 2008-2010.
- INFN CSN5 Project, TRIDEAS experiment "Development and optimization of silicon detectors with 3-D Electrodes and Active edges", years 2009-2012;
- INFN CSN1 Project , ATLAS ITk RD_FASE2 experiment years 2015-2017;

(b) as a head of the Trento research unit:

- MIUR, 2003 PRIN project, Title: "Development of monolithic pixel detectors with integrated electronics", Coordinator: Prof. Marcello Giorgi, University of Pisa; years 2004-2005.
- MIUR, 2005 PRIN project, Title: "Development of monolithic active pixel and thin strips detectors for charged particle trackers" Coordinator: Prof. Marcello Giorgi, University of Pisa; years 2006-2007
- INFN CSN5 Project, TREDI experiment "Development of fabrication technologies and design solutions for the realization of silicon radiation detectors with three-dimensional electrodes and active edge", Coordinator Prof. Luciano Bosisio, INFN Trieste, years 2005-2008.
- INFN CSN5 Project, DASIPM and DASIPM2 experiments "Development and Applications of SiPM to Medical Physics and Space Physics", Coordinator Prof. Alberto Del Guerra, INFN Pisa, years 2006-2010;
- INFN CSN5 Project, VIPIX experiment "Vertical Integrated PIXels", Coordinator Prof. Valerio Re, INFN Pavia, years 2009-2011;
- Project VIGONI 2008, Title "CMOS image sensors based on Organic Photodetectors (CIOP)", Partner Technical University of Munich, Germany (Prof. Paolo Lugli), years 2009-2010;

- INFN CSN1 Project, ATLAS experiment, Coordinator Prof. Massimo Corradi Cobal, University and INFN Rome 1, years 2011-on;
- INFN CSN5 Project, HYDE experiment "HYbrid DETectors for Neutrons", Coordinator Prof. Alberto Quaranta, INFN Legnaro, years 2012-2014;
- INFN CSN1 Project, P-SUPERB experiment, Coordinator Dr. Roberto Calabrese, INFN Ferrara, years 2012-2013;
- European Project H2020-INFRAIA-1-2014-2015 Excellent Science "Advanced Infrastructure for Detectors at Accelerators (AIDA-2020)", Coordinator Dr. Laurent Serin, CERN, years 2015-2019;
- INFN CSN5 Project, TIMESPOT experiment "TIME and SPace real-time Operating Tracker", Coordinator Dr. Adriano Lai, INFN Cagliari, years 2018-2020.
- European Project ATTRACT (grant Agreement 777222), "INSTANT (Imaging iN Space-Time ANd Tracking)", Coordinator Dr. Adriano Lai, INFN Cagliari, years 2019-2020
- European Project H2020-INFRAINNOV-2020-2 "Advancement and Innovation for Detectors at Accelerators (AIDAInnova)", Coordinator Dr. Felix Sefkow, CERN, years 2021-2025
- INFN CSN5 Project, OPTIME experiment "One-ps-Timing-using-MEMS technology", Coordinator Dr. Adriano Lai, INFN Cagliari, years 2022-2024.

Professional Societies, book, journal and conference roles

He has been a Member of the "Italian Electronics Group" (GE, now SIE) since 1994, belonging to the Trento Unit, for which he has been scientific coordinator from 2004 to 2017.

Since 1994, he has been a member of the Institute of Electrical and Electronics Engineers (IEEE), and a Senior Member since 2006.

From 2016 to 2021, he was the Chair of the Italian Chapter of the IEEE Nuclear and Plasma Sciences Society. He was also a Member of the Radiation Instrumentation Steering Committee of the IEEE Nuclear and Plasma Sciences Society for the 2017-2019 term, and the Chair of the Joint Oversight Subcommittee (JOS) for the 2020-2021 term.

Since 2011, he has been a member of the international society for optics and photonics (SPIE) and of the Optical Society of America (OSA, now OPTICA).

He has been a co-author of the book "Radiation sensors with three-dimensional electrodes", ISBN 9781498782234, CRC Press, Boca Raton (USA), January 2019.

He has been the editor of the open-access book "Advances in photodiodes", ISBN 978-953-7619-X-X, INTECH, Rijeka, Croatia, March 2011. The book was cited 160 times on Web of Science), with a total of more than 75,000 downloads of all chapters (as of September 2023).

He has been an Associate Editor of the "IEEE Transactions on Nuclear Science" (ISSN 0018-9499) since May 2008. He has been a Senior Editor for Radiation Instrumentation for the same journal since June 2020.

He has been an Associate Editor of the “Frontiers in Physics - Radiation Detectors and Imaging” (Electronic ISSN 2296-424X) since 2019.

He has been a member of the Editorial Board of “Informacije MIDEM – Journal of Microelectronics, Electronic Components and Materials” (ISSN 0352-9045) since May 2012.

He has been a member of the Editorial Board of “Sensors and Materials” (ISSN 0914-4935) since November 2012.

He has been a member of the Editorial Board of “MDPI Sensors” (ISSN 1424-8220) since November 2018.

He has been a member of the Editorial Board of “MDPI Electronics” (ISSN) since March 2021.

He has been a reviewer for PhD theses, scientific books, scientific projects, and for more than 25 international scientific journals. He has also been a member of the technical program committee or scientific board of several international conferences (e.g., IEEE NSS-MIC, RESMDD, ANIMMA, PRIME, ICECS, ISCAS, IWORID, IPRD).

He was the General co-chair for the “7th Conference on Ph.D. Research in Microelectronics and Electronics (PRIME 2011)”, Madonna di Campiglio (Italy), July 4-8, 2011.

He has organized a number of scientific and educational events, among them the “Trento Workshop on Advanced Silicon Radiation Detectors”, that celebrated its 19th edition in Torino on February 20 - 22, 2024.

Trento, 23 March 2024

I hereby express my consent to process and use my data provided in this CV in compliance with law 679/2016 of the Regulation of the European Parliament of 27th April 2016.

In witness whereof

Gian-Franco Dalla Betta

A handwritten signature in black ink, appearing to read 'Gian-Franco Dalla Betta', with a long horizontal stroke extending to the right.

Curriculum vitae of Lucio Pancheri

Personal information

Family name, First name: Pancheri Lucio

Education

- 2006 PhD in Information and Communication Technologies, University of Trento/Department of Information and Communication technologies, Italy
- 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 Senior researcher, Fondazione Bruno Kessler, Trento, Italy
- 2007 – 2010 Postdoctoral fellow, Fondazione Bruno Kessler, Trento, Italy
- 2007 – 2010 Junior researcher, Fondazione Bruno Kessler, Trento, Italy

Supervision of graduate students and postdoctoral fellows

- 2015 – present Advisor of 4 PhD students, advisor or co-advisor of 12 master and 78 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 – 2021 Teaching assistant – “Electric and electronic systems”, University of Trento, Italy
- 2014 – 2024 PhD course, “Image sensors”, University of Trento, Department of Industrial Engineering,
Italy
- 2016 – 2022 Master course, “Electronic materials and technologies”, University of Trento, Italy
- 2022 – 2024 Undergraduate course, “Electric systems and data acquisition systems”, 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.

Co-chair of PhD schools “Advanced School on Quantum Detectors”, SQUAD 2017 and SQUAD 2019, Trento, Italy.

Co-chair of PhD schools “Summer School on Neutron Detectors”, NDRA 2018 and NDRA 2022, Riva del Garda (TN), Italy.

Member of the local organizing committee at the “23rd International Workshop on Radiation Imaging Detectors” (iWoRiD 2022), Riva del Garda, TN, Italy.

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 coordinator for the section of Trento in 5 INFN projects, CSNV:

- “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.
- “Advanced Readout CMOS Architectures with Depleted Integrated sensor Arrays (ARCADIA)”, INFN calls, years 2019 – 2022. Leader of WP1: “CMOS sensors”.

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.

Principal Investigator of the following project: “HyPoSiCX: Hybrid Perovskite on Silicon CMOS X-ray Detectors”, PRIN2022, years 2023 – 2025.

Commission of trust

- Chair of ODI subcommittee in IEEE IEDM 2023
- Technical Committee member in IEEE IEDM 2021 and IEEE IEDM 2022
- Associate editor of IEEE Tran. Electron Devices, 2018 - present.
- Guest editor of MDPI Sensors for the special issue “SPAD image sensors”, 2020-2021.
- Guest editor of MDPI Sensors for the special issue “Image sensors”, 2018-2019.
- Editorial board member for Journal of Sensors (Hindawi), 2017 - 2020.
- Reviewer for the following journals: Nature Electronics, 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.
- Reviewer for the Austrian Science Fund (FWF), 2020.
- 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 projects SEED and ARCADIA, two-layer particle sensors based on Geiger-mode avalanche detectors in projects APIX2 and ASAP and X-ray pixel sensors for FELs in project PixFEL. 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, 4 international patents and 206 scientific publications

H-index:

Scopus: 31

Web of science: 28

Google scholar: 34

I have given **20 contributed 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, 2019).

International 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 B1, 2 Jan. 2013. **Granted**
3. N Cartiglia, GF Dalla Betta, **L Pancheri**, M Boscardin, G Paternoster, Particle detector capable of separating in-time signals from out-of-time signals, US Patent 10,811,555, 2017. **Granted**
4. A. Rivetti, **L. Pancheri**, P. Giubilato, M. Rolo, G. Margutti, D. Onorato, Integrated sensor of ionizing radiation and ionizing particles, US Patent App. US20200328321A1. **Granted**

Invited talks:

- L. Pancheri, "Characterization and modeling of displacement damage in CMOS SPAD sensors", The International SPAD Sensor Workshop (ISSW 2022), online event, June 13 - 15, 2022.

- L. Pancheri, "Silicon based sensors for Time Of Flight measurement," Terzo Incontro di Fisica con Ioni Pesanti alle Alte Energie, 25 - 26 November 2021, Padova
- L. Pancheri, "Timing detectors", ALICE 3: First workshop on physics and detector, CERN on-line event, 13-15 October, 2020
- L. Pancheri, "Resource sharing in CMOS SPAD arrays: application requirements and design solutions", 26th IEEE International Conference on Electronics Circuits and Systems (ICECS 2019), Genova, Italy, 27-29 Nov. 2019.
- L. Pancheri, "CMOS Pixel Sensors on Thick Fully-depleted Silicon Substrates for NIR Imaging", PIERS 2019, Rome, Italy, 17-20 June 2019.
- 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.

Trento, 22 March 2024



Lucio Pancheri