


PERSONAL INFORMATION **Gianluca Traversi**

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Nationality Italian

PROFESSIONAL ACTIVITY	
03/2017 – today	Associate Professor
	University of Bergamo

RESEARCH ACTIVITY
<p>Gianluca Traversi's professional expertise lies in the design of front-end circuits for radiation detectors, the study of electronic noise and ionizing radiation effects in semiconductor devices and circuits, and the development of instrumentation for solid-state device and circuit characterization. He began his career in 2000 in the Electronic Instrumentation group at the University of Pavia and, since 2004, has been with the Electronics group at the University of Bergamo.</p> <p>For over two decades, he has contributed to national and international projects with institutions such as CERN (European Organization for Nuclear Research, Geneva), the Fermi National Accelerator Laboratory (FNAL, Chicago), and the Lawrence Berkeley National Laboratory (LBNL, Berkeley), as well as to programs funded by the Italian Ministry of University and Research (PRIN projects) and by INFN (National Institute for Nuclear Physics). Within these projects, he has frequently served as work package leader or local coordinator, and he is currently a Technology Research Fellow at INFN, coordinating research activities in collaboration with leading international laboratories.</p> <p>His research has been extensively documented in over 250 publications in international journals and conferences. The main areas of his work include:</p> <ul style="list-style-type: none"> Monolithic Active Pixel Sensors (MAPS) in planar and 3D CMOS technologies; Readout electronics for semiconductor detectors in particle tracking; Electronic noise in semiconductor devices: characterization and modeling; Ionizing radiation effects in semiconductor devices: characterization and modeling; Electronics for X-ray imaging at Free Electron Lasers (FELs) and synchrotron light sources; Low-noise analog channels for high-energy physics detectors, including LHC beam luminosity monitors; <p>Gianluca Traversi has conducted extensive studies of noise sources in deep submicron and nanoscale CMOS devices, from the drain and gate currents down to the 65 nm generation, examining how scaling affects low-frequency and thermal noise, and its implications for low-noise front-end circuit design. He has also investigated noise degradation and static parameter changes after exposure to high doses of ionizing radiation, providing essential insights for radiation-hardened CMOS design for space, medical, and high-energy physics applications.</p> <p>Gianluca Traversi has also developed Monolithic Active Pixel Sensors (MAPS) in 100-nm CMOS technologies, integrating advanced analog and digital functions at the pixel level for applications in future high-luminosity collider experiments and high data rate imaging. He has contributed to</p>

	<p>INFN-funded projects including SLIM5, VIPIX, P-ILC, ARCADIA, and BELLE2, covering all phases from front-end design and characterization to irradiation tests, with MAPS applications extending to imaging and photon detection.</p> <p>In 2013, he joined the CMS experiment at CERN, contributing to the design of front-end electronic systems for pixel detector upgrades. Within the RD53 international collaboration, he designed key IP blocks—such as a radiation-tolerant bandgap voltage reference and a custom LVDS driver/receiver link—integrated into the RD53 chip for the innermost pixel layers of ATLAS and CMS. He also designed dedicated circuits for the Macro Pixel ASIC of CMS pixel-strip modules, developed alongside the RD53 program.</p> <p>Beyond particle tracking, Gianluca Traversi has contributed to the development electronics for X-ray imaging at FEL and synchrotron light sources within the PixFEL and XDET INFN R&D projects, implementing innovative front-end signal compression strategies via MOS capacitors in the CSA feedback network, enabling single-photon sensitivity over extended dynamic ranges.</p> <p>During his PhD, he has worked in the BEAMON project, designing a low-noise analog channel for charge measurements at 40 MHz in multi-gap ionization chamber detectors. This work included detector integration, laboratory characterization, and on-beam commissioning at CERN, validating linearity, noise performance, stability, and signal fidelity under realistic operational conditions.</p> <p>Over the years, his research has systematically extended to bulk CMOS, FD-SOI CMOS, and advanced scaled nodes down to 28 nm, evaluating the effects of ionizing radiation on static and dynamic device parameters, including studies on BJT, BiCMOS SOI, and JFET technologies. These results have informed the design of radiation-tolerant, low-noise analog circuits for space, medical, X-ray, and high-energy physics applications, establishing a coherent framework for advancing MAPS and front-end electronics across multiple technological nodes and experimental setups.</p>
<p>TEACHING ACTIVITY</p>	<p>Gianluca Traversi is currently responsible for the Course of Sensors (2015-today) at the University of Bergamo. In the previous years, Gianluca Traversi has been responsible of the following courses: Electronic Instrumentation and Measurements (2005-2017); Microelectronics (2013-2015); Electronics Laboratory (2005 - 2020). He has also contributed lectures to Electronic Systems Design, Fundamentals of Electronics, and Electronics for Biomedical Signals.</p>

<p>SCIENTIFIC PUBLICATIONS AND BIBLIOMETRIC INDICATORS</p>	<p>According to the Scopus database, Gianluca Traversi is author or coauthor of 268 papers on international scientific journals and conference proceedings. From the same database, the following bibliometric indicators can be extracted for Gianluca Traversi (Dec. 2025):</p> <p>h-index: 22 (Scopus) Times cited: 2137 https://orcid.org/0000-0003-3977-6976</p>
<p>PROJECT COORDINATION</p>	<p>Since 2000, Gianluca Traversi has been involved in several projects funded by the Italian Institute for Nuclear Physics (INFN), the Italian Ministry for Education, University and Research (PRIN projects), and the European Union (EU). In the framework of these activities, he has held positions of responsibility for the following national and international projects:</p> <ul style="list-style-type: none"> • DIAPIX (2011–2013) – INFN R&D Project (CSN 5) <i>Development of polycrystalline diamond detectors for high-radiation environments and radiotherapeutic dosimetry.</i> Gianluca Traversi was scientific coordinator for the INFN-Pavia Unit, leading a three-year program focused on the development and realization of high-quality, large-area polycrystalline diamond detectors for ultra radiation-hard tracking systems and for two-dimensional dosimetry in radiotherapy and hadrontherapy. • RD53 (2014–2024) – International Collaboration initiated and coordinated by CERN This collaboration involved universities and research institutes worldwide and was devoted to the design and development of a new generation readout ASIC for hybrid pixel detectors operating in experiments with extremely high event rates and radiation doses. Gianluca Traversi served as deputy team-leader for the Bergamo Unit. • CHIPIX65 (2014–2017) – INFN Call Project (CSN 5) <i>Development of a 65 nm CMOS readout ASIC for hybrid pixel detectors.</i> Gianluca Traversi was scientific coordinator for the INFN-Pavia Unit. The project focused on developing an innovative ASIC in 65 nm CMOS technology for the readout of hybrid pixel detectors in high-luminosity experiments such as HL-LHC and future-generation colliders. • ARCADIA (2019–2022) – INFN Call Project (CSN 5) <i>Monolithic active CMOS sensors for high energy physics and beyond.</i> Gianluca Traversi was scientific coordinator for the INFN-Pavia Unit. The project aimed to develop advanced monolithic active pixel sensors in CMOS technology, targeting applications from high-energy physics to space, medical imaging, and X-ray science, with the goal of replacing traditional hybrid pixel and silicon strip detectors. • FALAPHEL (2021–2023) – INFN Call Project (CSN 5) <i>Front-end electronics and silicon photonics for next-generation hybrid pixel detectors.</i> Gianluca Traversi led the Electronics Work Package, focusing on the design and characterization of microelectronic building blocks in 28 nm CMOS technology for radiation-hard hybrid pixel detectors capable of operating at very high event rates and integrating radiation-tolerant (≥ 1 Grad) silicon photonics modulators for ultra-high-speed data transmission (100 Gbps). • IGNITE (2023–2026) – INFN R&D Project (CSN 1) <i>INFN Ground-up iNITiative for Electronics developments.</i> Gianluca Traversi is the team leader of the INFN-Pavia group, responsible for designing and producing large-area ASICs to read out and process data from 4D pixel arrays (high-density sensor arrays with precise timing), meeting the requirements of future collider inner tracker upgrades. • ASIX (2025–2027) – INFN R&D Project (CSN 5) <i>Analog Spectral Imager for X-rays.</i> Gianluca Traversi leads the Work Package on readout ASIC design, verification, and development. ASIX develops a new class of X-ray detectors capable of spectroscopy and imaging with unprecedented spatial and energy resolution through fully analog processing of individual photons, targeting both future space missions and terrestrial applications such as material diagnostics and X-ray diffraction for crystalline structure characterization. • OBELIX / BELLE2 (2025–present) – INFN R&D Project (CSN 1) Gianluca Traversi is team leader of the INFN-Pavia and University of Bergamo groups. Together with IPHC (Strasbourg), they are developing OBELIX (Optimized BELLe II monolithic pIXel), a fully depleted Monolithic Active Pixel Sensor (DMAPS) for the future upgrade of the Belle II vertex detector (VTX) at the SuperKEKB collider in Japan.
<p>PARTICIPATION IN EUROPEAN</p>	<p>AIDA (2011–2014): Four-year research program funded by the European Commission under the European call FP7 INFRASTRUCTURES 2010-1. Gianluca Traversi contributed to</p>

PROJECTS	<p>Workpackage 3, which aimed to create a European network for access to 3D microelectronic interconnection technologies and semiconductor detectors.</p> <p>AIDA-2020 (2015–2019): Four-year research program funded by the European Commission under the “Advanced European Infrastructures for Detectors at Accelerators” call (H2020 INFRAIA-1-2014-2015). Gianluca Traversi contributed to Workpackage 4, dedicated to microelectronics and interconnections.</p>
MENTORING	<p>Since 2003 Gianluca Traversi has supervised numerous MS, BS and Ph.D. students.</p>
ROLES IN UNIVERSITY AND FOR PRIVATE AND PUBLIC INSTITUTIONS	<p>Since 2008, he has been a member of the Institute of Electrical and Electronics Engineers (IEEE), and a Senior Member since 2012;</p> <p>Since 2000 he is a Technology Research Fellow with INFN;</p> <p>Member of the Academic Board of the Ph. D. School in Microelectronics, University of Pavia (2017- 2021);</p> <p>Member of the Academic Board of the Ph. D. School in Health and Longevity, University of Bergamo (2023- today);</p> <p>Member of the Academic Senate of the University of Bergamo (2015-2017);</p> <p>In 2025, Gianluca Traversi was elected as Program Director of the new bachelor’s degree in Engineering of technologies for electronics and automation at the University of Bergamo.</p>

Bergamo, 01-12-2025

Gianluca Traversi