

## Scientific and Academic Curriculum

# Andrea Galliani

Last update: October, 2024

I am a computer engineer with a strong interest in the design of CMOS Integrated Circuits, multisensors embedded platforms and the way they can be connected into bigger networks.

### Education

Sep 2022 - present **Engineering and Applied Science PhD** student at the University of Bergamo inserted in the Technologies for computer science, automation, electronic engineering and mechatronics curriculum

Dec 2021 **Master Degree in Computer Engineering** from the University of Bergamo

Apr 2020 **Bachelor's Degree in Computer Engineering** from the University of Bergamo

### Research Activity

May 2024 - present **Research Fellow** at Università degli Studi di Bergamo, Engineering and Applied Science department

- As part of the Progetti di Rilevante Interesse Nazionale (PRIN), I am working on the project dedicated to Front-end channels in a 28 nm CMOS process for Pixel detectors in future High Energy physics colliders and advanced X-ray imaging instrumentation (PiHEX).

Jun 2022 - Apr 2024 **Research Fellow** at National Institute for Nuclear Physics, section of Pavia

- I work to the Falaphel project. My professional duties are the design, test and characterisation of front-end circuits in a 28 nm CMOS technology for next generation High Energy Physics pixel detectors.

### Communication at scientific conferences

2024 **SIE** "28 nm CMOS analog front-end electronics for future High Energy Physics colliders", Poster session, SIE 2024 LV Annual Meeting of the Italian Society of Electronics, 26-28 June, 2024, Genoa, Italy.

2023 **ApplePies** "Acquisition System for a 28 nm flash-ADC based programmable front end channel for HEP experiments", Oral session, International Conference on Applications in Electronics Pervading Industry, Environment and Society (ApplePies), 2023, 28-29 September, Genova

**EUROCON** "A zero dead-time front-end channel in 28 nm CMOS for future high energy physics detectors", Oral session, IEEE EUROCON 2023, 6-8 July, Torino, Italy.

**MOCAS** "DAQ system for the readout of a flash-AD based front-end channel matrix", Poster session, International Conference on Modern Circuits and Systems Technologies (MOCAS) on Electronics and Communications, 28-30 June, Athens, Greece.

## Lectures Attendee

2024 **Electronics for Health** "The 2024 SIE Ph.D. school "Electronics for Health" aims to promote research, development, and dissemination of knowledge in microelectronics and system-level approaches in biological and medical applications. Hosted by Genova, the interdisciplinary school will showcase academic and industrial perspectives on cutting-edge healthcare systems and technologies.", SIE, 24-26 June, 2024, Genoa, Italy.

**SystemVerilog for Design** "The course starts by covering the core SystemVerilog language features. It then progresses to examining coding for synthesis before moving on to FSM design and parameterization.", 2023 Mar 18-21, STFC, Didcot, Oxfordshire, UK.

2023 **SIE PhD School** "The 2023 PhD School in Electronics aims at providing an in-depth discussion of the role of Electronics as an enabling and pervasive discipline. Professionals and researchers with industrial and academic backgrounds will also provide non-trivial examples of the transformative effect that dedicated and innovative design approaches, as well as advances in materials and devices, have had, and are expected to have, in the most promising and advanced innovation fields.", 2023 Sep 4-6, Messina, Italy.

**EURIZON Detector School** "The EURIZON Detector School is organized for training young scientists on state-of-the-art particle detection technologies in the fields of particle-, heavy-ion- and neutron-physics. The main program of the school comprises morning lectures by world experts in their fields, and hands-on exercises on various technologies in the afternoons.", 2023 Jul 17-28, Wuppertal, Germany,

**28nm Mixed-Signal Design Workshop** "Analog, Digital and Mixed-Signal design workshop in 28nm", 2023 Mar 6-10, Geneva, Switzerland.

2022 **Operational Amplifiers: Theory and Design** "Theory and design of operational amplifiers; Discusses low-voltage rail-to-rail input and output stages for design of low-power OpAmps; Presents frequency

compensation techniques for all nine OpAmp configurations and compensation techniques for amplifiers with high capacitive loads; Includes design of  $\mu$ V-offset operational amplifiers and precision instrumentation amplifiers by applying chopping, auto-zeroing, and dynamic element-matching techniques”, 2022 Nov 7 - 19, MEAD Course, J.F. Witte, S. Javvaji, R. Hogervorst, J.H. Huisjing, R.G.H. Eschauzier, K.J. de Langen, Q. Fan, Online class

## Academic Activity

My academic activity currently concerns being tutor and teacher assistant to Bachelor's and Master Engineering courses:

### *Academic Year 2021-present*

- Tutor for the Course: Sensing Devices Lab (3 cfu)
- Tutor for the Course: Strumentazione Elettronica (6 cfu)
- Tutor for the Course: Elettronica e elaborazione segnali biomedici (6 cfu)
- Tutor for the Course: Laboratorio di Elettronica (3 cfu)

## Collaborations

Jun - Oct 2024 I won third place prize with the Oxymeter project in the StartCup Bergamo, an entrepreneurial training program by UniBG with over 60 hours of lectures, discussions, and projects.

May 2024 Participated in the Giro-E for the MOST project as a stand representative and technician managing prototype devices on race bikes, following stages from Siena to Naples (May 9-13, 2024).

Nov 2022 - Apr 2023 Member of the team winner of the "Bosch Sensortec Making Sensor Tec! Challenge" with the project "Exhaust gas pattern analysis for environmental monitoring and predictive maintenance"

Nov 2022 - Jan 2023 "Implementation of algorithms in Gas Meter firmware" under the BELLFIOR22 research contract - responsible for the project prof. Andrea Belleri

Jan 2022 - present Web developer and software architect to the MangroviaIoT platform - responsible for the project Sorint.tek

Jun 2020 - Jan 2022 Front-end web developer for Sorint.lab internal projects

## Publications

- [Gai+23a] L Gaioni et al. "Development of the Analog Front-End Circuit for the CMS Pixel Readout Chip at the HL-LHC". In: *X-ray Photon Processing Detectors: Space, Industrial, and Medical applications*. Springer, 2023, pp. 129–154.

- [GGT23a] Luigi Gaioni, Andrea Galliani, and Gianluca Traversi. “A Charge Sensitive Amplifier in a 28 nm CMOS Technology for Pixel Detectors at Future Particle Colliders”. In: *Electronics* 12.9 (2023), p. 2054.
- [Gai+23b] Luigi Gaioni et al. “28 nm CMOS analog front-end channels for future pixel detectors”. In: *Nuclear instruments and methods in physics research section a: accelerators, spectrometers, detectors and associated equipment* 1045 (2023), p. 167609.
- [GGT23b] Andrea Galliani, Luigi Gaioni, and Gianluca Traversi. “DAQ system for the readout of a flash-ADC based front-end channel matrix”. In: *2023 12th International Conference on Modern Circuits and Systems Technologies (MOCASST)*. IEEE. 2023, pp. 1–4.
- [GGT23c] Andrea Galliani, Luigi Gaioni, and Gianluca Traversi. “Data Acquisition System for a 28 nm Flash-ADC Based Programmable Front End Channel for HEP Experiments”. In: *International Conference on Applications in Electronics Pervading Industry, Environment and Society*. Springer. 2023, pp. 168–174.
- [Gal+23] Andrea Galliani et al. “A zero dead-time front-end channel in 28 nm CMOS for future high energy physics detectors”. In: *IEEE EUROCON 2023-20th International Conference on Smart Technologies*. IEEE. 2023, pp. 128–132.
- [Tra+23] G Traversi et al. “Perspective of a 28nm CMOS Technology for Future Vertex Tracking Applications”. In: *2023 IEEE Nuclear Science Symposium, Medical Imaging Conference and International Symposium on Room-Temperature Semiconductor Detectors (NSS MIC RTSD)*. IEEE. 2023, pp. 1–1.
- [Bot+24] Stefano Botticini et al. “Index Air Quality Monitoring for Light and Active Mobility”. In: *Sensors* 24.10 (2024), p. 3170.
- [Gai+24] Luigi Gaioni et al. “28 nm front-end channels for the readout of pixel sensors in future high-rate applications”. In: *Journal of Instrumentation* 19.04 (2024), p. C04001.
- [TGG24] Gianluca Traversi, Luigi Gaioni, and Andrea Galliani. “From 65 nm to 28 nm CMOS: design of analog building blocks of frontend channels for pixel sensors in high-energy physics experiments”. In: *e+ i Elektrotechnik und Informationstechnik* 141.1 (2024), pp. 11–19.
- [Ver+24] Matteo Verzeroli et al. “Empowering Smart Mobility with a Component-based Data Acquisition System for Multi-sensor Readout”. In: *2024 19th Conference on Ph. D Research in Microelectronics and Electronics (PRIME)*. IEEE. 2024, pp. 1–4.