

LUCA PARMESAN

ANALOGUE IC DESIGNER

Research and development of Single Photon Avalanche Diodes (SPADs) and imaging sensors. Supporting and teaching of design and test software and hardware and data analysis



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EDUCATION

2012-2018, PhD

The University of Edinburgh, UK

Photon Efficient, High Resolution, Time Resolved SPAD Image Sensors for Fluorescence Lifetime Imaging Microscopy.

keywords: IC design, laser and optics study, fluorescence measurements, TCAD simulator

2007-2011, Master degree in electronic engineering

University of Padua, IT

keywords: IC design, laser and optics study, effect of high energy particles on CMOS technology

2004-2007, Bachelor degree in electronic engineering

University of Padua, IT

Fundamentals of electronics and microelectronics, use of tools such as Matlab and Labview and use of laboratory equipment.

1999-2004

Istituto Tecnico Industriale

"G. Marconi", Rovereto, IT

Design and production of PCB

EXPERIENCE

RESEARCHER / ANALOGUE INTEGRATED CIRCUITS DESIGNER

Fondazione Bruno Kessler, IT |

07/2016 - 07/2022: Researcher
08/2022 - present day: Technologist

- Research in photonics application such as single photon imaging, THz and X ray imaging, Quantum Random Number Generation (QRNG) and conventional imaging for space applications
- Research and development of **SPADs** in **TCAD** tools
- Support and teaching (internally) LabView, Cadence and Python software
- Testing and measuring of ICs from single diodes characterisation to full chip functionality
- Firmware development for FPGA for IC testing
- Installation and maintenance of TCAD, Cadence and Mentor tools in Linux environment
- PDK installations and maintenance of different technology nodes and manufacturers

RESEARCHER / ANALOGUE INTEGRATED CIRCUITS DESIGNER

Fondazione Bruno Kessler, IT | 01/08/2011 - 31/01/2012

- IC design for sensor readout and driving using Mentor tools

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SKILLS

PROFESSIONAL

- Problem solving
- Communication
- Teamwork/team building
- Coaching
- Work under stress

PROGRAMMING

Python, C, verilog, LabView, skill scripting (Cadence), Matlab.

PERSONAL SKILLS

High adaptability, quick learning, honesty, practicality, perseverance, reliability, curiosity, positivity, relationship-building.

SELECTED PUBLICATIONS

Boughedda, A., Pancheri, L., [Parmesan, L.](#), Gasparini, L., Quarta, G., Perenzoni, D., Perenzoni, M. (2025). The modeling of a single-electron bipolar avalanche transistor in 150 nm CMOS. Sensors, 25(11), 3354. [doi:10.3390/s25113354](https://doi.org/10.3390/s25113354)

Gottardi, M., [Parmesan, L.](#), Tosato, P., Demenev, E., Lecca, M., Manuzzato, E., Gasparini, L. (2024). A 500 x 500 pixel image sensor with multiple regions of interest for center of mass-based event detection. IEEE Sensors Journal, 1–1. LINK [doi:10.1109/jsen.2024.3451019](https://doi.org/10.1109/jsen.2024.3451019)

Massari, N., Tontini, A., [Parmesan, L.](#), . . . Brenneis, A. (2022). A monolithic SPAD-based random number generator for cryptographic application. In ESSCIRC 2022- IEEE 48th european solid state circuits conference (ESSCIRC) (pp. 73–76). [doi:10.1109/esscirc55480.2022.9911498](https://doi.org/10.1109/esscirc55480.2022.9911498)

Massari, N., Zou, Y., Moreno Garcia, M., [Parmesan, L.](#), Tontini, A., Mazzucchi, S., Leone, N., Azzini, S., Pavesi, L., Herrmann, I., Strohm, T. (2022). Towards low-cost monolithic QRNGs. In S. Ducci, E. Diamanti, N. Treps, & S. Whitlock (Eds.), Quantum technologies 2022 (p. 20). [doi:10.1117/12.2621617](https://doi.org/10.1117/12.2621617)

Massari, N., Xu, H., Tarolli, A., [Parmesan, L.](#), . . . M., Maglione, A. (2020). Luximos: A 768 × 64 900-fps tileable pipelined x-ray CMOS image sensor for dental imaging with 2.6 LSB/nGy sensitivity. IEEE Solid-State Circuits Letters, 3, 406–409. [doi:10.1109/lssc.2020.3023333](https://doi.org/10.1109/lssc.2020.3023333)

Toppi, M., Battistoni, G., Bochetti, A., De Maria, P., De Simoni, M., Dong, Y., Fischetti, M., Franciosini, G., Gasparini, L., Magi, M., Manuzzato, E., Mattei, I., Mirabelli, R., Muraro, S., [Parmesan, L.](#), . . . Marafini, M., (2020). The mondo tracker: Characterisation and study of secondary ultrafast neutrons production in carbon ion radiotherapy. Frontiers in Physics, 8, 524. [doi:10.3389/fphy.2020.567990](https://doi.org/10.3389/fphy.2020.567990)

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PUBLICATIONS (CONTINUE)

Gasparini, L., Zarghami, M., Perenzoni, M., **Parmesan, L.**, Moreno Garcia, M., Valentin, M., . . . Stefanov, A. (2019). CMOS-SPAD arrays for quantum imaging applications. In Single Photon Workshop. [url](#)

Manuzzato, E., Gasparini, L., Perenzoni, M., Zou, Y., **Parmesan, L.**, Battistoni, G., . . . Marafini, M. (2019). A 16×8 digital-SiPM array with distributed trigger generator for low SNR particle tracking. IEEE Solid-State Circuits Letters, 2(9), 75–78. [doi:10.1109/LSSC.2019.2934598](#)

Gasparini, L., Zarghami, M., Xu, H., **Parmesan, L.**, Garcia, M. M., Unternährer, M., . . . Perenzoni, M. (2018). A 32×32 -pixel time-resolved single-photon image sensor with $44.64 \mu\text{m}$ pitch and 19.48% fill-factor with on-chip row/frame skipping features reaching 800kHz observation rate for quantum physics applications. In 2018 IEEE International Solid-State Circuits Conference-(ISSCC) (pp. 98–100). IEEE. [doi:10.1109/isscc.2018.8310202](#)

You, Z., **Parmesan, L.**, Pellegrini, S., & Henderson, R. K. (2017). $3\mu\text{m}$ pitch, $1\mu\text{m}$ active diameter SPAD arrays in 130nm CMOS imaging technology. In International image sensor workshop (pp. 238–241). Hiroshima, Japan. [url](#)

Finlayson, N., **Parmesan, L.**, Dutton, N. A. W., Calder, N. J., & Henderson, R. K. (2016). TACImager: a high frame rate 320×256 SPAD time to amplitude converter array with adjustable time zoom. In Emerging Imaging and Sensing Technologies (Vol. 9992, p. 999200). International Society for Optics and Photonics. [doi:10.1117/12.2241381](#)

Gros d'Aillon, E., Verger, L., Bonifacio, D. A. B., Charbon, E., Bruschini, C., . . . Rae, B. (2016). First characterization of the SPADNET-II sensor: A smart digital silicon photomultiplier for ToF-PET applications. In IEEE Nuclear Science Symposium and Medical Imaging Conference. Pres. M08-6. [url](#)

Dutton, N. A. W., Gnechchi, S., **Parmesan, L.**, Holmes, A. J., Rae, B., Grant, L. A., & Henderson, R. K. (2015). 11.5 a time-correlated single-photon-counting sensor with 14GS/s histogramming time-to-digital converter. In 2015 IEEE International Solid-State Circuits Conference-(ISSCC) Digest of Technical Papers (pp. 1–3). IEEE. [doi:10.1109/isscc.2015.7062997](#)

Dutton, N. A. W., Gyongy, I., **Parmesan, L.**, Gnechchi, S., Calder, N., Rae, B. R., . . . Henderson, R. K. (2015). A SPAD-based QVGA image sensor for single-photon counting and quanta imaging. IEEE Transactions on Electron Devices, 63(1), 189–196. [doi:10.1109/ted.2015.2464682](#)

Gyongy, I., Dutton, N., **Parmesan, L.**, & Henderson, R. (2015). Bit-plane processing techniques for low-light, high speed imaging with a SPAD-based QIS. In International Image Sensor Workshop. [url](#)

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PUBLICATIONS (CONTINUE)

Parmesan, L., Dutton, N. A. W., Calder, N. J., Grant, L. A., & Henderson, R. K. (2015). A 256x256 SPAD array with in-pixel time to amplitude conversion for fluorescence lifetime imaging microscopy. In International image sensor workshop (pp. 8–11). Vaals, The Netherlands. [url](#)

Dutton, N. A. W., **Parmesan, L.**, Holmes, A. J., Grant, L. A., & Henderson, R. K. (2014). 320× 240 oversampled digital single photon counting image sensor. In 2014 Symposium on VLSI Circuits Digest of Technical Papers (pp. 1–2). IEEE. [doi:10.1109/VLSIC.2014.6858428](https://doi.org/10.1109/VLSIC.2014.6858428)

Parmesan, L., Dutton, N. A. W., Calder, N. J., Holmes, A. J., Grant, L. A., & Henderson, R. K. (2014). A 9.8 μm sample and hold time to amplitude converter CMOS SPAD pixel. In 2014 44th European Solid State Device Research Conference (ESSDERC) (pp. 290–293). IEEE. [doi:10.1109/ESSDERC.2014.6948817](https://doi.org/10.1109/ESSDERC.2014.6948817)

Others

Parmesan, L. (2018). Photon efficient, high resolution, time resolved SPAD image sensors for fluorescence lifetime imaging microscopy. PhD Thesis ([Edinburgh Research Archive](#)).

Parmesan, L. (2011). Progettazione di un circuito integrato per lettura e controllo di trasduttori di flusso e gas. Master thesis. University of Padua ([online archive](#)).

PATENTS

Parmesan, L. (2016). *Circuit for generating direct timing histogram data in response to photon detection*. U.S. Patent No. 9,502,458 B2. Filed Mar. 10, 2015. Issued Nov. 22, 2016. United States Patent. Retrieved from [Google Patents](#).

LANGUAGES

Italian (mother tongue); English (B2/C1)

REFERENCES (upon request)

Dott. Leonardo Gasparini
Dott. Matteo Perenzoni
Prof. Robert Henderson