# David Stoppa Short CV


**Contact Information**

Smart Optical Sensors and Interfaces
Fondazione Bruno Kessler

Via Sommarive 18
Povo
38123 Trento, Italy

*Mobile:* +39 3346167733
*Office:* +39 0461 314531
*Fax:* +39 0461 302040
*E-mail:* stoppa@fbk.eu
*WWW:* Home Page


**Main Research Interests**

Design, analysis, fabrication and experimental characterization of CMOS integrated circuits mainly devoted to image sensors for advanced applications. Starting from 1997 David Stoppa has designed and supervised more than 50 integrated sensors aimed at the following applications:

- High dynamic range digital cameras
- Integrated systems for scannerless time-of-flight and triangulation-based 3D imaging
- Single-Photon Avalanche Detectors for biomedical imaging (FLIM,FRET) and high speed imaging
- Read-out channels for IR and THz vision, X-ray detection and gas sensors

**Curriculum Studiorum**

2002: Ph.D. degree in Microelectronics from the **University of Trento**, Trento, Italy.

1998: Laurea degree in Electronics Engineering from **Politecnico of Milan**, Milan, Italy.

**Current Position**

Head of Smart Optical Sensors and Interfaces Research Unit at **Fondazione Bruno Kessler**, Trento, Italy.

**University Teaching**

- *Design of CMOS Integrated Amplifiers*, Ph.D. course at the University of Trento, Faculty of Telecommunications, for the years 2011-2012.
- External professor for the course *Laboratory of Microelectronics* at the University of Trento, Faculty of Telecommunications, for the years 2002-2010.
- *Single-Photon Avalanche Diodes Image Sensors in CMOS Technologies*, Ph.D. Short-course IEEE Courses, Topics on Microelectronics, University of Pavia, 2011.
- *CMOS Image Sensors*, Ph.D. Short-course IEEE Courses, Topics on Microelectronics, University of Pavia, 2007.
- Teaching support for the course *Digital Electronics* at the University of Trento, Faculty of Telecommunications, for the years 1999-2002.
- Teaching activity at the second level professional master *Nano and Micro Systems*, organized by FBK-IRST and University of Trento in the years 2007-2009.

**Selected Refereed Journal Publications**


D. D.-U. Li, J. Arlt, D. Tyndall, R. Walker, J. Richardson, D. Stoppa, E. Charbon, R. K. Henderson, "Video-rate fluorescence lifetime imaging camera with CMOS single-photon avalanche diode arrays and high-speed imaging algorithm", *Journal Of Biomedical Optics*, vol. 16, n. 9, pp. 096012-1-096012-12, 2011.

M. Perenzoni, N. Massari, D. Stoppa, L. Pancheri, M. Malfatti, L. Gonzo, "A 160x120-Pixels Range Camera With In-Pixel Correlated Double Sampling and Fixed-Pattern Noise Correction", in *IEEE Journal of Solid-State Circuits*, vol. 46, n. 7, pp. 1672-1681, 2011.

L. Pancheri, D. Stoppa, "A low-cost picosecond laser module for time-resolved optical sensing applications", in *IEEE Sensors Journal*, vol. 11, n. 6, pp. 1380-1381, 2011.

G.-F. Dalla Betta, S. Donati, Q. D. Hossain, G. Martini, L. Pancheri, D. Saguatti, D. Stoppa, G. Verzellesi, "Design and Characterization of Current-Assisted Photonic Demodulators in 0.18um CMOS Technology",in *IEEE Transaction On Electron Devices*, vol. 58, n. 6, pp. 1702-1709, 2011.

D. Stoppa, N. Massari, L. Pancheri, M. Malfatti, M. Perenzoni, L. Gonzo, "A Range Image Sensor Based on 10-$\mu m$ Lock-In Pixels in 0.18-$\mu$m CMOS Imaging Technology", *IEEE Journal of Solid-State Circuits*, vol. 46(1), pp. 248-258, 2011.

O. Sgrott, D. Mosconi, M. Perenzoni, G. Pedretti, L. Gonzo, D. Stoppa, "A 134-pixel CMOS Sensor for Combined Time-of-Flight and Optical Triangulation 3D Imaging", *IEEE Journal of Solid-State Circuits*, vol. 45(7), pp. 1354-1364, 2010.

D.-U. Li, J. Arlt, J. Richardson, R. Walker, A. Buts, D. Stoppa, E. Charbon, and R. Henderson, "Real-time fluorescence lifetime imaging system with a 32x32 0.13$\mu m$ CMOS low dark-count single-photon avalanche diode array", *Optics Express*, vol. 18, n. 10, pp. 10257-10269, 2010.

G. Giraud, H. Schulze, D.-U. Li, T. T. Bachmann, J. Crain, D. Tyndall, J. Richardson, R. Walker, D. Stoppa, E. Charbon, R. K. Henderson, J. Artlt, "Fluorescence lifetime biosensing with DNA microarrays and a CMOS-SPAD imager", *Biomedical Optics Express*, Vol. 1, n. 5, pp. 1302-1308, 2010.

D. Stoppa, D. Mosconi, L. Pancheri, L. Gonzo, "Single-Photon Avalanche Diode CMOS Sensor for Time-Resolved Fluorescence Measurements", *IEEE Sensors Journal*, vol. 9(9), pp. 1084-1090, 2009.

F. Leonardi, D. Covi, D. Petri, D. Stoppa, "Accuracy Performance of a Time-of-Flight CMOS Range Image Sensor System", *IEEE Transaction on Instrumentation and Measurements*, Vol. 58, pp. 1563-1570, Feb. 2009.

L. Pancheri, M. Scandiuzzo, D. Stoppa, G.-F. Dalla Betta, "Low Noise Avalanche Photodiode in Standard 0.35$\mu m$ CMOS Technology", *IEEE Transaction on Electron Devices*, vol. 55, pp. 457-461, 2008.

D. Stoppa, M. Vatteroni, D. Covi, A. Baschirotto, A. Sartori, A. Simoni, "A 120-dB dynamic range CMOS image sensor with programmable power responsivity", *IEEE Journal of Solid-State Circuits*, vol. 42(7), pp. 1555-1563, July 2007.

D. Stoppa, L. Pancheri, M. Scandiuzzo, L. Gonzo, G.-F. Dalla Betta, A. Simoni, "A CMOS 3-D imager based on single-photon avalanche diode", *IEEE Transaction on Circuits and Systems I*, vol. 54(1), pp. 4-12, Jan. 2007.

F. De Nisi, F. Comper, L. Gonzo, M. Gottardi, D. Stoppa, A. Simoni, J. A. Beraldin, "A CMOS sensor optimized for laser spot position detection", *IEEE Journal of Sensors*, vol. 5(6), pp. 1296-1304, Dec. 2005.

N. Massari, M. Gottardi, L. Gonzo, D. Stoppa, A. Simoni, "A CMOS image sensor with programmable pixel-level analog processing", *IEEE Transaction on Neural Networks*, vol. 16(6), pp. 1673-1684, Nov. 2005.

L. Viarani, D. Stoppa, L. Gonzo, M. Gottardi, A. Simoni, "A CMOS smart pixel for active 3-D vision applications", *IEEE Sensors Journal*, vol. 4(1), pp. 145-152, Feb. 2004.

L. Gonzo, A. Simoni, M. Gottardi, D. Stoppa, A. J. Beraldin, "Sensors optimized for 3-D digitization", *IEEE Transaction on Instrumentation and Measurement*, vol. 52(3), pp. 903-908, June 2003.

D. Stoppa, A. Simoni, L. Gonzo, M. Gottardi, G.-F. Dalla Betta, "Novel CMOS image sensor with a 132-dB dynamic range", *IEEE Journal of Solid-State Circuits*, vol. 37(12), pp. 1846-1852, Dec. 2002.

## Selected Conference Publications

L. Pancheri, N. Massari, M. Perenzoni, M. Malfatti, D. Stoppa, "A QVGA-range image sensor based on buried-channel demodulator pixels in 0.18$\mu$m CMOS with extended dynamic range", *IEEE International Solid-State Circuits Conference, San Francisco, CA, USA*, vol. 55, 2012, pp. 394-396, 19-23 February 2012.

C. Veerappan, J. Richardson, R. Walker, D.-U. Li, M. W. Fishburn, Y. Maruyama, D. Stoppa, F. Borghetti, M. Gersbach, R. K. Henderson, E. Charbon, "A 160x128 Single-Photon Image Sensor with On-Pixel 55ps 10b Time-to-Digital Converter", *IEEE International Solid-State Circuits Conference, San Francisco, CA, USA*, vol. 54, 2011, pp. 312-313, 20-24 February 2011.

M. Perenzoni, D. Mosconi, D. Stoppa, "A 160x120-pixel Uncooled IR-FPA Readout Integrated Circuit with On-chip Non-uniformity Compensation", *36th European Solid-State Circuits Conference, Seville, Spain*, pp. 122-125, 2010.

M. Perenzoni, N. Massari, D. Stoppa, L. Pancheri, M. Malfatti, L. Gonzo, "A 160x120-Pixels Range Camera with On-Pixel Correlated Double Sampling and Non-uniformity Correction in 29.1$\mu m$ pitch", *36th European Solid-State Circuits Conference, Seville, Spain*, pp. 294-297, 2010.

L. Pancheri, D. Stoppa, N. Massari, M. Malfatti, L. Gonzo, Q. Delwar Hossain, G.-F. Dalla Betta, "A 120x160 pixel CMOS range image sensor based on current assisted photonic demodulators", *Proc. of SPIE 7726 Photonics Europe, Brussels, Belgium*, pp. 772615, 2010.

D. Stoppa, N. Massari, L. Pancheri, M. Malfatti, M. Perenzoni, L. Gonzo, "An 80x60 range image sensor based on 10$\mu m$ 50MHz lock-in pixels in 0.18$\mu m$ CMOS, *IEEE International Solid-State Circuits Conference Digest of Technical Papers (ISSCC)*, pp. 406-407, 2010.

L. Pancheri, D. Stoppa, "A SPAD-based Pixel Linear Array for High-Speed Time-Gated Fluorescence Lifetime Imaging", *IEEE European Solid-State Circuits Conference (ESSCIRC'09)*, pp. 428-43, 2009.

M. Gersbach, Y. Maruyama, E. Labonne, J. Richardson, R. Walker, L. Grant, R. Henderson, F. Borghetti, D. Stoppa, E. Charbon, "A Parallel 32x32 Time-to-Digital Converter Array Fabricated in a 130nm Imaging CMOS Technology", *European Solid-State Circuits Conference (ESSCIRC'09)*, pp. 196-199, 2009.

D. Stoppa, F. Borghetti, J. Richardson, R. Walker, L. Grant, R. Henderson, M. Gersbach, E. Charbon, "A 32x32-Pixel Array with In-Pixel Photon Counting and Arrival Time Measurement in the Analog Domain", *European Solid-State Circuits Conference (ESSCIRC'09)*, pp. 204-207, 2009.

L. Pancheri, D. Stoppa, A. Simoni, "SPAD-based Time-gated Active pixel for 3D Imaging Applications", *EOS Conference on Frontiers in Electronic Imaging*, Munich, 2009.

L. Pancheri, D. Stoppa, N. Massari, M. Malfatti, C. Piemonte, and G.-F. Dalla Betta, "Current Assisted Photonic Mixing Devices Fabricated On High Resistivity Silicon", *IEEE Sensors Conference*, pp. 981-984, Oct. 2008.

L. Pancheri, D. Stoppa, "Low-Noise CMOS Single-Photon Avalanche Diodes with 32 ns Dead Time", *Proc. of IEEE European Solid-State Device Research Conference (ESSDERC07)*, pp. 362-365, Sept. 2007.

M. Mosconi, D. Stoppa, L. Pancheri, L. Gonzo, A. Simoni, "CMOS single-photon avalanche diode array for time-resolved fluorescence detection", *Proc. of IEEE European Solid-State Circuits Conference (ESSCIRC06)*, pp. 564-567, Sept. 2006.

D. Stoppa, L. Pancheri, M. Scandiuzzo, A. Simoni, L. Viarani, G-F. Dalla Betta, "A CMOS Sensor based on Single Photon Avalanche Diode for Distance Measurement Applications", *Proc. IEEE Instrumentation and Measurement Technology Conference*, pp. 1162-1165, May 2005.

D. Stoppa, L. Pancheri, M. Scandiuzzo, M. Malfatti, G. Pedretti and L. Gonzo, "A Single-Photon-Avalanche-Diode 3D Imager", *Proc. of IEEE European Solid-State Circuits Conference (ESSCIRC05)*, pp. 12-16, Sept. 2005.

D. Stoppa, L. Viarani, A. Simoni, L. Gonzo, M. Malfatti, G. Pedretti, "A 50x30-pixel CMOS Sensor for TOF-based Real Time 3D Imaging", *IEEE Workshop on Charge-Coupled Devices and Advanced Image Sensors*, June 2005.

D. Stoppa, L. Viarani, A. Simoni, L. Gonzo, M. Malfatti, G. Pedretti, "A 16x16-pixel Range-finding CMOS image sensor", *European Solid-State Circuits Conference ESSCIRC*, 2004.

**Book Chapter**

G.-F. Dalla Betta, L. Pancheri, D. Stoppa, R. Henderson and J. Richardson, book chapter on "Avalanche Photodiodes in Submicron CMOS Technologies for High-Sensitivity Imaging", *Advances in Photodiodes*, IntechOpen, Chapter 11, pp. 226-248, ISBN: 978-953-307-163-3, March 2011.

D. Stoppa and A. Simoni, Chapter 12 "Single-Photon Detectors for Time-of-Flight Range Imaging", pp. 275-298, *Single-Photon Imaging*, Springer Series in Optical Sciences, ISBN: 978-3-642-18442-0, 2011.

**Referee Service**

- *IEEE Journal of Solid-State Circuits*
- *IEEE Transaction on Electron Devices*
- *IEEE Transaction on Circuits and Systems*
- *IEEE Journal of Quantum Electronics*
- *IEEE Transaction on Nuclear Science*
- *IEEE Sensors Journal*
- *Optics Express*
- *Technical committee member of International Image Sensors Workshop, IISW 2009*
- *Program committee member of SPIE Vol. 8085 Videometrics, Range Imaging and Applications, 25-26 May 2011*
- *Member of the International Technical Program Committee of IEEE International Solid-State Circuits Conference, ISSCC 2012 and 2013*

**Awards**

Best Paper Award at ESSCIRC06 for the paper A 120-dB Dynamic Range CMOS Image Sensor with Programmable Power Responsivity.

**Scientific Events**

General Chair of *IEEE 7th Conference on PhD Research in Microelectronics and Electronics*, 4-8 July 2011.

General Chair of *International Workshop on Range-Imaging Sensors and Applications*, 27-28 January 2011.