

Ricardo Carmona-Galán

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Research interests

- Low power vision chips based on bioinspired massively parallel processing.
- Vision-enabled wireless sensor networks and distributed smart cameras.
- Vertical integration of sensor arrays, multispectral vision and silicon detectors for medical imaging and high-energy physics.
- CMOS-compatible 3D imaging, 2D-3D information interaction on-chip.

Short biography

Ricardo Carmona Galán received the degrees of *Licenciado* (B. Sc.) and *Doctor* (Ph. D.) in Physics, in the speciality of Electronics, both from the University of Seville, Spain, in June 1993 and June 2002, respectively. He designed his first chip, a smart CMOS image sensor delivering the Radon Transform of an input image binarized with an automatic threshold, as his graduation project. From 1994 to 1996 he was a graduate student at the Institute of Microelectronics of Seville. Later, from July 1996 to June 1998, he worked as a Research Assistant at Prof. Chua's laboratory at the EECS Department of the University of California, Berkeley. From 1999 to 2005 he was an Assistant Professor at the Dept. of Electronics and Electromagnetism at the School of Engineering of the University of Seville. He taught "Circuit Analysis and Synthesis" and "Circuit Synthesis Laboratory" for the degree on Telecommunication Engineering and "Smart Sensory Processing Microsystems" for the degree on Electronics Engineering. He was awarded with a Certificate of Teaching Excellence by the University of Seville.

Since 2005 he is a Tenured Scientist of CSIC at the Institute of Microelectronics of Seville (CSIC-University of Seville). His main research areas are vision chips, in particular, smart CMOS imagers for low-power vision applications like robotics, vehicle navigation and vision-enabled wireless sensor networks. He is also interested in CMOS-compatible sensing structures for LWIR and MWIR imaging, single-photon detection, and detectors for X-ray and high energy physics. He has designed several vision chips, some implementing bio-inspired nonlinear dynamics emulating the behavior of the retina. He also held a PostDoc at the University of Notre Dame, Indiana (2006-07), at Prof. Porod's laboratory, where he studied the interfaces for CMOS-compatible nanostructures for multi-spectral light sensing. He currently teaches "Interface Circuits for Integrated Sensors" at the Master in Microelectronics and the Doctoral Program in Physical Sciences and Technologies at the University of Seville.

Dr. Ricardo Carmona has authored more than 160 papers in refereed journals and conferences and several book chapters and has received best paper awards from the Int. J. of Circuit Theory and Applications, the IS&T/SPIE Electronic Imaging Conference on Image Sensors and the IEEE

ISCAS Technical Committee on Sensory Systems. He was co-recipient of an award of the ACET in 2002. He has participated in many international projects, holds several patents, and has collaborated with start-up companies in Seville (AnaFocus) and Berkeley (Eutecus). He is co-founder of Photonvis SL, a start-up dedicated to vision and imaging systems based in single-photon detection, established in July 2019.

He has been the Secretary of the Association of the Research and Teaching Staff of the University of Seville (ADIU). He was member of the University Senate, in representation of the Assistant Professors and Graduate Students. He was also a member of the University Council and of its commissions. He is currently the Secretary of the Scientific Staff Assembly of IMSE. He is a Senior Member of the IEEE, and belongs to the Circuits and Systems, Solid-State Circuits and Computer Societies. He is also Member of the ACM, the IEEE-CASS Technical Committees on Cellular Nanoscale Networks and Array Computing and on Sensory Systems, of which he has been recently designated Secretary-Elect. He belongs also to the IEEE Sensors Council. He has served as Associate Editor for the IEEE Transactions on Circuits and Systems-I: Regular Papers for the period 2012-13. He is currently Associate Editor of the Springer's Journal of Real-Time Image Processing. He is member of the steering committee of the Workshop on Architecture of Smart Cameras. He has been the General Chair of the 9th International Conference on Distributed Smart Cameras (ICDSC 2015) in cooperation with ACM SIGBED. He has been Technical Programme Chair of the IEEE International Symposium on Circuits and Systems 2020, first time organized in Spain and first time online.

Ricardo Carmona is the coordinator of ACHIEVE-ITN, an Innovative Training Network (H2020 Marie Skłodowska-Curie Action) dedicated to research on Advanced Hardware/Software Components for Integrated/Embedded Vision Systems. This research and training programme starts in Oct. 2017 and ends in Sept. 2021.

Education

Ph. D. Microelectronics, University of Seville, 2002

Dissertation: Analysis and Design of CNN-based VLSI Hardware for Real-Time Image Processing.

Advisor: Prof. Ángel Rodríguez-Vázquez

Licenciatura (5-year degree) in Electronic Physics, University of Seville, 1993

Academic positions

- Tenured Scientist (Associate Professor) at the National Council of Research (CSIC), Institute of Microelectronics of Seville (IMSE-CNM), Spain, 2005-present
- Visiting Scholar at the Center for Nanoscience and Technology, Department of Electrical Engineering, University of Notre Dame (Indiana, USA), 2006-2007
- Assistant Professor at the Department of Electronics and Electromagnetism, School of Engineering, University of Seville, Spain, 1999-2005.
- Assistant Researcher at the Institute of Microelectronics of Seville (IMSE-CNM), National Council of Research (CSIC), Spain, 1998-1999.
- Assistant Researcher at the Electronics Research Laboratory, Department of electrical Engineering and Computer Science, University of California, Berkeley (USA), 1996-1998.
- Graduate student at the Institute of Microelectronics of Seville (IMSE-CNM), National Council of Research (CSIC), funded by Iberdrola S. A., Spain, 1994-1996.

Awards

- 2016 Best paper award (co-author) at the meeting of the Technical Committee on Sensory Systems at the International Symposium on Circuits and Systems, for the paper "In-pixel Voltage-Controlled Ring-Oscillator for Phase Interpolation in ToF Image Sensors", Proceeding of ISCAS 2016, pp. 1906-1909, Montreal (Canada).
- 2014 Best paper award (co-author) at the IS&T/SPIE Electronic Imaging: Image Sensors and Imaging Systems Conference, for the paper "Smart imaging for power-efficient extraction of Viola-Jones local descriptors", Proceeding of SPIE, Vol. 9022, pp. 9022-09, San Francisco, California (USA).
- 2013 3rd Best student paper award (co-author) at the 21st European Conference on Circuit Theory and Design (ECCTD 2013), for the paper "A 176x120 Pixel CMOS Vision Chip for Gaussian Filtering with Massively Parallel CDS and A/D-Conversion", pp. 45:1-45:4, Dresden (Germany).
- 2010 Best student paper award (co-author) at the 12th International Workshop on Cellular Nanoscale Networks and Their Applications (CNNA 2010) for the paper "Robust Focal-Plane Analog Processing Hardware for Dynamic Texture Segmentation", pp.1-6, Berkeley, California.
- 1999 Best Paper Award (first author) of the International Journal of Circuit Theory and Applications for paper: "SIRENA: A CAD Environment for Behavioral Modeling and Simulation of VLSI Cellular Neural Network Chips", Vol. 27, No. 1, pp. 43-76.
- 2002 Premio Salvà i Campillo to the most original Project (co-recipient), Associació Catalana d'Enginyers de Telecomunicació. 7^a Nit de les Telecomunicacions, 7th Edition of the "Salvà i Campillo" Prizes Barcelona, Spain.
- 2001-2002 Certificate for Teaching Excellence, Vice-Chancellery of Quality and Information Technology, University of Seville.

Research grants and contracts

1. Research Colaboration Photonvis SL-CSIC, R. Carmona-Galán (PI) , 11/2019-12/2020.
2. "SPADARCH: Flexible SPAD-based CMOS chip architectures for time-correlated single-photon counting", J. A. Leñero-Bardallo and A. Rodríguez-Vázquez (PIs), US-1264940, Proyectos I+D+i FEDER Andalucía, Junta de Andalucía (Consejería de Economía y Conocimiento) , 02/2020-01/2022.
3. "Envisage: Enabling Vision Technologies for Integrated Intelligent Transportation", R. Carmona-Galán and J. Fernández-Berni (PIs), RTI2018-097088-B-C31, Ministerio de Ciencia, Innovación y Universidades, Spain, 01/2019-12/2021.
4. "3DLPSENSE: Low-power sensor architectures for 2D-3D imaging and vision", A. Rodríguez-Vázquez (PI), N00014-19-1-2156, Office of Naval Research, USA, 01/2019-02/2023.
5. "ACHIEVE: AdvanCed Hardware/Software Components for Integrated/ Embedded Vision SystEms", R. Carmona-Galán (PI and Coordinator), H2020 MSCA-ITN 2017, Research Executive Agency, European Commission, 10/2017-09/2021.
6. "iCaveats: Integración de Componentes y Arquitecturas para la Visión Embebida en Aplicaciones de Transporte y Seguridad", R. Carmona-Galán (PI), TEC2015-66878-C3-1-R, Ministerio de Economía Industria y Competitividad, Spain, 01/2016-12/2018.
7. "Sistemas de visión on-a-chip para la captura de imágenes a alta velocidad, alto rango dinámico y alta resolución, basados en arquitecturas celulares e híbridas", A. Rodríguez-Vázquez (PI), CSIC, 07/2015-06/2018.

8. "Hybrid cellular architectures and circuits for high-sensitivity, high-speed, high-resolution vision systems with reduced swap" A. Rodríguez-Vázquez (PI), N00014-14-1-0355, Office of Naval Research, USA, 07/2014-06/2017.
9. "Smart CIS3D. Sensores de imágenes inteligentes para captación de tiempos de vuelo y análisis embebido de imágenes 3D", A. Rodríguez-Vázquez (PI), P12-TIC-2338, Junta de Andalucía, Spain, 01/2014-01/2018.
10. "MONDEGO: Surveillance and monitoring based on low-power integrated vision devices", R. Carmona-Galán (PI), TEC2012-38921-C02-01, Ministerio de Economía y Competitividad, Spain, 01/2013-12/2015.
11. "Investigación y desarrollo de tecnología para convoyes no tripulados con aplicación a misiones logísticas militares y de seguridad", A. Rodríguez-Vázquez (PI), ITC-20111009, CDTI, Spain, 01/2012-12/2014.
12. "Sensores inteligentes en tecnologías CMOS de chips apilados", A. Rodríguez-Vázquez (PI), IPT-2011-1625-430000, Ministerio de Ciencia e Innovación, Spain, 05/2011-12/2014.
13. "Design of high-performance heterogeneous, ultra-high speed cellular sensor-processors for multispectral light sensing" A. Rodríguez-Vázquez (PI), BAA-11-001, Office of Naval Research, USA, 01/2011-12/2013.
14. "Wireless and smart vision sensors for networked surveillance and monitoring", R. Carmona-Galán (PI), TEC2009-11812, Ministry of Science and Innovation, Spain, 01/2010-12/2012.
15. "V-mote: Bioinspired VLSI implementation of concurrent image sensing/processing at the nodes of a wireless sensor network", R. Carmona-Galán (PI), 2006-TIC-2352, Junta de Andalucía, 04/2007-12/2010.
16. "Microelectronic design of autonomous programmable systems for artificial vision", J. L. Huertas (PI), Innovaciones Microelectrónicas, 01/2008-12/2010
17. "Vision systems on-a-chip for driving safety in CMOS technology", G. Liñán-Cembrano (PI), Ministry of Education and Science, Spain, 10/2006-03/2010.
18. "Advanced technologies for fabrication equipment", G. Liñán-Cembrano (PI), FAGOR, 01/2006-12/2009.
19. "Study and design of interfaces for CMOS-compatible sensing nanostructures for the integration of nanoelectronic systems", R. Carmona-Galán (PI), Ministry of Education and Science, 10/2006-09/2007.
20. "Modeling of light-effects on humans of a flash-bang", R. Carmona-Galán (PI), Ministry of Defense, Spain, 12/2006-12/2007.
21. "Design of a vision system on-a-chip using concurrent sensing and processing", R. Carmona-Galán (PI), CSIC, 07/2006-12/2007.
22. "Microelectronic design of a programmable artificial vision system", E. Roca (PI), Ministry of Industry, Spain, 01/2006-12/2006
23. "Design of sensing-processing-actuation systems on-a-chip: 4th generation vision systems" A. Rodríguez-Vázquez (PI), Ministry of Science and Technology, Spain, 12/2003-11/2006.
24. "Focal-plane adaptive sensor-supercomputer technologies with retina-like multichannel visual processing", A. Rodríguez-Vázquez (PI), N000140210884, Office of Naval Research, USA, 07/2002-07/2005.
25. "Dynamic image computing using tera-speed analog visual microprocessors", A. Rodríguez-Vázquez (PI), IST-1999-19007, European Commission, 01/2000-06/2003.
26. "Implementation of programmable opto-electronic analogic CNN computer embedding CNN universal chips and polymer optical memories", A. Rodríguez-Vázquez (PI), N000140210884, Office of Naval Research, USA, 11/2000-11/2003.
27. "Design of high density and neuromorphic CNN universal chips and image processors", A. Rodríguez-Vázquez (PI), Office of Naval Research, USA, 02/1998-02/2001.

Patents

1. L. Cervera Gontard, J. A. Leñero Bardallo, R. Carmona Galán, "Detector para medir la energía de electrones en microscopios electrónicos de barrido". CSIC-Universidad de Cádiz-Universidad de Sevilla. Núm. P202030673, 01-JUL-2020. OEPM (España)
2. I. Vornicu, R. Carmona Galán, Á. Rodríguez Vázquez, "Fotomultiplicador digital de combinación OR de pulsos". CSIC-Universidad de Sevilla. Núm. P202030127, 14-FEB-2020. OEPM (España).
3. I. Vornicu, R. Carmona Galán, Á. Rodríguez Vázquez, "Método y dispositivo de detección de pico del histograma comprimido de los valores de píxel en sensores de tiempo de vuelo de alta resolución". CSIC-Universidad de Sevilla. Núm. P201830870, 05-SEP-2018. OEPM (España).
4. M. Trevisi, R. Carmona Galán, Á. Rodríguez Vázquez, "Sensor de imágenes con muestreo compresivo on-chip". CSIC-Universidad de Sevilla. Núm. P201730285, 02-MAR-2017. OEPM (España).
5. J. Fernández Berni, R. Carmona Galán, Á. Rodríguez Vázquez, M. Niemier, X. S. Hu, "Pixel having a reset device with asymmetric conduction". University of Notre Dame-Universidad de Sevilla-CSIC. No. 15220473, 27-JUL-2016. USPTO (USA).
6. L. Cervera Gontard, R. Carmona Galán, "Sensor de electrones para microscopía electrónica". CSIC. Núm. P201630925, 07-JUL-2016. OEPM (España).
7. J. Fernández Berni, Á. Rodríguez Vázquez, R. del Río Fernández, R. Carmona Galán, "Hardware para cómputo de la imagen integral". Universidad de Sevilla-CSIC. Núm. P201400224, 20-MAR-2014. OEPM (España).
8. J. Fernández Berni, Á. Rodríguez Vázquez, R. Carmona Galán, "Dispositivo para la detección de bordes y mejora de la calidad en una imagen". Universidad de Sevilla-CSIC. Núm. P201200474, 03-MAY-2012. OEPM (España).
9. J. Fernández Berni, Á. Rodríguez Vázquez, R. Carmona Galán, "Hardware para la detección de extremos locales en una calidad en una imagen". Universidad de Sevilla-CSIC. Núm. P201201011, 08-OCT-2012. OEPM (España).
10. M. Suárez Cambre, V. Brea Sánchez, F. Pardo Seco, Á. Rodríguez Vázquez, R. Carmona Galán, "Procesador de imágenes para extracción de características". Universidad de Santiago de Compostela-Universidad de Sevilla-CSIC. Núm. P201200090, 01-JAN-2012. OEPM (España).
11. M. Suárez Cambre, V. Brea Sánchez, F. Pardo Seco, Á. Rodríguez Vázquez, R. Carmona Galán, "Image processor for feature extraction". Universidad de Santiago de Compostela-Universidad de Sevilla-CSIC. No. 13/417,279, 11-MAR-2012. USPTO (USA).

Graduate and postgraduate research advisees

PhD Thesis advising

- Franco Bandi, Ph. D. Degree at the University of Seville, 05/2020 (co-directed with Prof. Ángel Rodríguez-Vázquez. Ph. D. Thesis: Design of CMOS Digital Silicon Photomultipliers with ToF for Positron Emission Tomography. Currently at: CSIC
- Manuel Suárez Cambre, Ph. D. Degree at the University of Santiago de Compostela, 04/2015 (co-directed with Dr. Víctor Brea and Prof. Ángel Rodríguez-Vázquez. Ph. D. Thesis: Low power CMOS vision sensors for scale and rotation invariant feature

detectors using CMOS heterogeneous smart pixel architectures. Currently at: analog designer in Vienna

- Jorge Fernández-Berni, Ph. D. Degree at the University of Seville, 06/2011. Ph. D. Thesis: Power-efficient VLSI implementation of vision hardware on wireless sensor network nodes. Currently at: University of Seville

Master Thesis advising

- Jorge Isidro Rubio Cota, Master Degree at the University of Seville, 07/2020. Master thesis: Evaluación del impacto del escalado tecnológico sobre el diseño físico de circuitos. Currently at: SemTech (México).
- José Ángel Martínez Trejo, Master Degree at the University of Seville, 07/2020. Master thesis: Metodología y Herramientas para el Desarrollo de Aplicaciones de Visión Artificial basadas en OpenCV/OpenVX sobre FPGA. Currently at: Central Research Laboratory (UK)
- Roland Jaha, Dual-Master Degree at the Universities of Seville and Münster, 08/2019. Master Thesis: Design of a cryogenic Low Noise Amplifier based on SiGe-transistors. Currently at: Westfälische Wilhelms-Universität Münster.
- Nil Franch Masdeu, Master Degree at the University of Seville, 11/2016. Master thesis: A Low Cost Fluorescence Lifetime Measurement System Based on SPAD Detectors and FPGA Processing. Currently at: Universitat de Barcelona (Spain)
- Juan N. Olmo Camacho, Master Degree at the University of Seville, 03/2016. Master thesis: Estudio de la eficiencia computacional asociada a la arquitectura. Currently at: Anafocus-e2v, Sevilla (Spain)
- Juan Lara Cabeza, Master Degree at the University of Seville, 01/2016. Master thesis: Filtrado de rango en el plano focal basado en PWM y lógica umbral. Currently at: Valeo, Jaen (Spain)
- Franco N. Bandi, Master Degree at the University of Seville, 01/2016. Master thesis: Especificación y diseño de Si-PM para aplicaciones en imagen médica. Currently at: Instituto de Microelectrónica de Sevilla-CNM (CSIC-Universidad de Sevilla)
- Cristina Villegas Pachón, Master Degree at the University of Seville, 07/2015. Master thesis: Modelado de hardware para sensado y procesado de imágenes en OpenCV. Currently at: Autoliv Inc. Dachau (Germany)
- José Padilla Alcaide, Master Degree at the University of Seville, 07/2014. Master thesis: Diseño y construcción de un demostrador de evaluación para chips de driver de nueva generación. Currently at: Infineon, Munich (Germany)
- Fernando Martínez Martí, Master Degree at the University of Seville, 12/2012. Master thesis: Design of a chemical microsensor system based on MEMS. Currently at: University of Granada , Spain
- Lionel Cervera Gontard, Master Degree at the University of Seville, 11/2011. Master thesis: Front-end circuit for single-electron event detection by silicon microstripes. Currently at: Universidad de Cádiz (Spain)
- Francisco Pozas-Flores, Master Degree at the University of Seville, 11/2011. Master thesis: Analysis, design and verification of avalanche diodes in Geiger mode and quenching circuits. Currently at: Inntelia Soluciones Tecnológicas, Huelva, Spain
- Carlos M. Domínguez-Mata, Certificate of Advanced Studies, Univ. of Seville, 06/2004. Master project: CMOS integrated circuits for vision systems on a chip with adaptive sensing and bioinspired processing. Currently at: SSE SL, Seville, Spain
- Francisco Sánchez-Fernández, Certificate of Advanced Studies, Univ. of Seville, 06/2005. Master project: A microcontroller unit based on SIMPLEZ for embedded control of a vision SoC. Currently at: Quietnode, Madrid, Spain.

Graduation projects

- Manuel Piña Martínez, Engineering Degree at the University of Seville, 07/2020. Graduation project: Diseño de un convertidor de tiempo a digital para la estimación del tiempo de vuelo de fotones.
- Martin Bölter, Practicum for an Engineering Degree at TU Dresden, 02/2009. Graduation project: Design of low noise amplifier structures exploiting carbon nanotube field effect transistor models. Currently at: X-FAB, Erfurt, Germany.
- Gábor Csordás, Practicum for and Engineering Degree at PPKU, Budapest, 08/2008. Graduation project: An eye-tracking algorithm on an embedded system developed in NIOS and Matlab environment.
- Manuel Hernández-Méndez, Engineering Degree at the University of Seville, 06/2008. Graduation project: Implementation of a model of the visual stimuli capture and non-desired effects on the retina on SW and HW platforms. Currently at: MDU, Militärtechnologie, Dienst und Überwachung, S.A. Seville, Spain
- Raúl González-Marcelo, Engineering Degree at the University of Seville, 07/2006. Graduation project: Motion detection and tracking on a commercial image processing platform: performance evaluation. Currently at: Abengoa Solar, Seville, Spain
- José Fernández-Pérez, Engineering Degree at the University of Seville, 05/2006. Graduation project: Implementation of a vision system on a single reconfigurable chip: evaluation and performance. Currently at: NXP, Eindhoven, Netherlands
- Martin Claus, Practicum for an Engineering Degree at TU Dresden, 07/2004. Graduation project: Sample and Hold Switched Capacitor Circuits for the Storage of Multiple Samples. Currently at: Technical University Dresden, Germany
- Rocío Maldonado-López, Engineering Degree at the University of Seville, 03/2004. Graduation project: Test and application development platform based on FPGAs for massively parallel mixed-signal processors. Currently at: EMPA-ETH Domain, Switzerland

Thesis juries and committees

- Official member of the jury. Candidate: Wissam Benjilali, Advisors: Gilles Sicard, William Guicquero; Title: “Etude d'architectures d'imageurs exploitant l'acquisition compressive pour la classification d'images à basse consommation énergétique”. Ph. D. Degree, CEA-LETI Grenoble, France, December 2019.
- Official member of the jury. Candidate: Bilal Demir, Advisors: Yusuf Leblebici and Jeal-Philippe Thiran; Title: “ Real-Time, High-Resolution 3D and Panoramic Multiview Vision Systems”. Ph. D. Degree, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, June 2020.
- Official member of the jury. Candidate: Selman Ergünay, Advisor: Yusuf Leblebici; Title: “ A Smart Camera Architecture for Wireless and Multiple Camera Applications”. Ph. D. Degree, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, November 2018.
- Official backup of the jury, Candidate: Manuel Velasco Jiménez, Advisor: Rafael Castro López y Elisenda Roca Moreno. Title: “Diseño Sistemático de Circuitos Analógicos y de Señal Mixta Reconfigurables”. Ph. D. Degree, Universidad de Sevilla, Spain, September 2017.
- Official member of the jury. Candidate: Elisa Calvo Gallego, Advisor: Santiago Sánchez Solano y Piedad Brox Jiménez; Title: “Hardware Dedicado para Sistemas Empotrados de Visión”. Ph. D. Degree, Universidad de Sevilla, Spain, September 2017.
- Official member of the jury. Candidate: Francisco Javier Jiménez Garrido, Advisor: Ángel Rodríguez Vázquez y Rafael Domínguez Castro; Title: Diseño CMOS de un Sistema de

Visión “on-Chip” para Aplicaciones de muy Alta Velocidad. Ph. D. Degree, Universidad de Sevilla, Spain, February 2016.

- Official backup of the jury, Candidate: Ignacio García Vargas, Advisor: Raouf Senhadji Navarro. Title: Máquinas de Estados Finitos con Multiplexión de Entradas: Una Contribución al Diseño e Implementación Electrónica de Máquinas de Estados. Ph. D. Degree, Universidad de Sevilla, Spain, February 2016.
- Opponent, Candidate: Mikko Pänkäälä; Advisor: Mika Laiho; Title: Potential and Challenges of analog Reconfigurable Computation in Modern and Future CMOS. Ph. D. Degree, University of Turku, Finland, December 2014.
- External Viva Examiner. Candidate: Przemyslaw Mrosczyk, Advisor: Piotr Dudek; Title: Computation with continuous mode CMOS circuits in image processing and probabilistic reasoning. Ph. D. Degree, University of Manchester, United Kingdom, June 2014.
- Official member of the jury. Candidate: Betsaida Alexandre Barajas, Advisors: Gustavo Liñán Cembrano and Elisenda Roca Moreno; Title: Diseño de circuitos intEGrados en tecnologías CMOS para adquisición y procesamiento de señal en codificadores ópticos basados en técnicas interferenciales. Ph. D. Degree, Universidad de Sevilla, Spain, May 2014.
- Official member of the jury. Candidate: Albert Comerma i Montells, Advisor: David Gascón Fora; Title: Development of a multichannel integrated circuit for Silicon Photo-Multiplier arrays readout. Ph. D. Degree, Universidad de Barcelona, Spain, January 2014.
- Opponent, Candidate: Eero Lehtonen; Advisor: Mika Laiho; Title: Memristive Computing. Ph. D. Degree, University of Turku, Finland, January 2013.
- Official backup of the jury, Candidate: Francisco Fernández Bootello, Advisors: Manuel Delgado Restituto and Ángel Rodríguez Vázquez. Ph. D. Degree, Universidad de Sevilla, Spain, January 2013.
- Official member of the jury. Candidate: Diego Botero; Advisors: Michel Devy; Title: Development of algorithms and architectures for driving assistance in adverse weather conditions using FPGAs. Ph. D. Degree, Univerisité de Toulouse, France, December 2012.
- Official member of the jury. Candidate: Natalia A. Fernández García; Advisors: Diego Cabello Ferrer and Víctor Manuel Brea Sánchez; Title: Split and Shift Methodology: Overcoming Hardware Limitations on Cellular Processor Arrays for Image Processing. Ph. D. Degree, Universidade de Santiago de Compostela, Spain, November 2012.
- Official backup of the jury. Candidate: Beatriz Blanco Filgueira; Advisor: Paula López Martínez; Title: Modeling and Characterization of Small Photosensors in Advanced CMOS Technologies. Ph. D. Degree, Universidade de Santiago de Compostela, Spain, October 2012.
- Official member of the jury. Candidate: Rocío Maldonado López, Advisors: Gustavo Liñán Cembrano and Fernando Vidal Verdú; Title: Contributions to the Design of Tactile Co-processors based on Mixed-signal Integrated Circuits. Ph. D. Degree, Universidad de Sevilla, Spain, October 2012.
- Official backup of the jury. Candidate: Sonia Vargas Sierra; Advisors: Gustavo Liñán Cembrano and Elisenda Roca Moreno; Title: Proposal of Architecture and Circuits for Dynamic Range Enhancement of Vision Systems on Chip designed in Deep Submicron Technologies. Ph. D. Degree, Universidad de Sevilla, Spain, September 2012.
- Official member of the jury. Candidate: Jordi Albó Canals, Advisors: Jordi Riera Barburés; Title: Cellular Nonlinear Networks: optimized implementation on FPGA and applications to robotics. Ph. D. Degree, Universidad Ramón Llull-La Salle, Barcelona, June 2012.
- Official member of the jury. Candidate: Mauricio de Jesús Vanegas-Fernández, Advisors: Eduardo Ros Vidal y Javier Díaz Alonso; Title: Arquitectura Basada en Tecnología FPGA para la Estimación y Análisis de Información de Flujo Óptico en Tiempo Real. Ph. D. Degree, Universidad de Granada, Spain, July 2010.

- Official backup of the jury. Candidate: Piedad Brox Jiménez; Advisors: Iluminada Baturone Castillo and Santiago Sánchez Solano; Title: Fuzzy Logic-Based Algorithms for Video de-Interlacing. Ph. D. Degree, Universidad de Sevilla, Spain, June 2009.
- Opponent, Candidate: Asko Kananen; Advisor: Ari Paassio; Title: A VLSI array processor architecture for emulating resistive network filtering. Ph. D. Degree, Helsinki University of Technology, Finland, April 2007.
- External reviewer. Candidate: Mika Laiho; Advisor: Ari Paassio, Title: Mixed-mode Cellular Array Processor Realization for Analyzing Brain Electrical Activity in Epilepsy. Ph. D. Degree, Helsinki University of Technology, Finland, June 2003.

Teaching

- "Integrated Sensor Technologies", Master in Microelectronics, University of Seville, 2009-present.
- "Interface Circuits for Signal Conditioning and Data Conversion", Doctorate program in Microelectronics, University of Seville, 2003-2004.
- "Microelectronic systems, sensors and intelligent processing", Electronics Engineering, University of Seville, 2004-2005.
- "Circuit Analysis and Synthesis", Telecommunication Engineering, University of Seville, 1999-2005.
- "Laboratory of Circuit Synthesis", Telecommunication Engineering, University of Seville, 1999-2005.
- "EE129: Cellular Neural Networks", Laboratory practices of Prof. Chua's course. University of California, Berkeley, 1996-1998.

Keynotes, invited talks and workshops

- "Feature extraction at sensor level in CMOS vision chips", ACM International Conference on Distributed Smart Cameras (ICDSC'18), Eindhoven (Netherlands), Sept. 3-4, 2018.
- "Smart image sensors for efficient low-level feature extraction", Image Sensors Europe 20018, The Park Plaza Victoria Hotel --organized by Smithers Apex--, London, UK, March 14-15, 2018.
- "Introduction to ACHIEVE: a European Training Network based on the experience of EUNEVIS", Workshop on Architecture of Smart Camera (WASC 2017), Instituto de Estudios Sociales Avanzados (CSIC), Córdoba, Spain, June 5-6, 2017.
- "Image dynamic range extension by using stacked (unmatched) photodiodes in CMOS", Workshop on Architecture of Smart Camera (WASC 2016), Le2i-Université de Bourgogne, Dijon, France, July 4-5, 2016.
- "Assessment of circuit non-idealities' effect on algorithm performance via OpenCV modeling", Workshop on Architecture of Smart Camera (WASC 2015), CiTIUS (Research Center on Information Technologies) Universidade de Santiago de Compostela, Spain, June 29-30, 2015.
- "Parallel Processing Architectures and Power Efficiency in Smart Camera Chips", Workshop on Architecture of Smart Camera (WASC 2014), TeCIP Institute, CNIT-Scuola Superiore Sant'Anna, Pisa, Italy, June 30-July 1, 2014.
- "Low-Power Vision Chips based on Focal-Plane Feature Extraction for Visually-Assisted Autonomous Navigation", Workshop on Smart Cameras for robotic applications,

IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS 2012), Vilamoura, Algarve, Portugal, October 11, 2012.

- "Progress on CMOS Smart Imagers and Vision Systems", Int. Workshop on Cellular Nanoscale Networks and their Applications (CNNA 2012), Politecnico di Torino, Italy, August 29-31 2012.
- "Design of a smart camera system on a single chip in a 3D integrated circuit technology", Workshop on Architecture of Smart Camera (WASC 2012), Université Blaise Pascal, Clermont-Ferrand, April 5-6, 2012.

Seminars and tutorials

- "In-sensor processing for high-speed low-power 2D and 3D imaging", EP-ESE Electronics Seminars. CERN, Geneva, Switzerland, Feb. 25, 2020.
- "Efficient low-level feature extraction in smart CMOS image sensors", Third Barcelona Technoweek: Course on Semiconductor Detectors. Institut de Ciències del Cosmos, Universitat de Barcelona, Spain, July 2-6, 2018.
- "CMOS Image Sensors for Time-of-Flight Estimation", Course on CMOS Image Sensors @WASC 2018. Instituto de Sistemas e Robótica, Universidade de Coimbra, Portugal, June 27-28, 2017.
- "Time-of-Flight Image Sensors in CMOS Technology" Gast-Vortrag at the Dept. of Physics, Westfälische Wilhelms-Universität Münster, Germany, Nov. 30, 2017.
- "ACHIEVE: A European Training Network for Advanced Integrated/Embedded Vision Systems" Gast-Vortrag at the Dept. of Physics, Westfälische Wilhelms-Universität Münster, Germany, Nov. 29, 2017.
- "CMOS Image and Vision Sensors for 2-D and 3-D (II)", First Barcelona Technoweek: Course on Semiconductor Detectors. Institut de Ciències del Cosmos, Universitat de Barcelona, Spain, July 11-15, 2016.
- "Efficient Feature Extraction in CMOS Vision Sensors", 1st Workshop on Advancements on Circuits and Imaging (ACI 2015), European Doctorate in Image Sensors and Optical Nanotechnology (EDISON) Dept. of Engineering Science, University of Oxford, UK, September 28-29, 2015.
- "Smart CMOS Imagers for 2D and 3D Vision ", Seminar at the PhD. School of the GE Annual Meeting, University of Siena, Italy, June 22-24, 2015.
- "Photon detection in CMOS technology: from photodiode physics to vision chips" (in cooperation with Dr. Jorge Fernández-Berni), Block Seminar at the Dept. of Physics, Westfälische Wilhelms-Universität Münster, Germany, March 17-26, 2015.
- "Smart Image and Vision Sensor Chips based on Focal-Plane Processing". Seminar at the Dept. of Applied Mathematics, School of Computer Engineering, University of Seville, June 2, 2014.
- "CMOS Smart Image and Vision Sensors (Part II): SPADs and 3D vision in CMOS", Seminar at the Institut de Ciències del Cosmos, Universitat de Barcelona, Spain, January 2014.
- "Foundations and Practical Design of CMOS Image Sensors" (in collaboration with Prof. Á. Rodríguez-Vázquez), IEEE International Conference on Electronics, Circuits, and Systems (ICECS 2013) Tutorials, Abu Dhabi, UAE, December 2013.
- "Smart CMOS Image Sensors for 2-D and 3-D Capture and Processing: Pixels, Circuits, Architectures and Practical Design Guidelines" (in collaboration with Prof. Á. Rodríguez-

Vázquez), IEEE International Symposium on Circuits and Systems (ISCAS 2012) Tutorials, Seoul, Korea, May 2012.

- "CMOS Mixed-Signal Blocks for a Focal-Plane Programmable Array Processor", Colloquia Series, Institute of Neuroinformatics, ETH Zürich, Switzerland 2004.
- "Design of Analog Integrated Circuits for Image Processing", IEEE-CAS Tour 2, Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil, 1999.

Scientific dissemination, interviews and media appearances

- Hablamos con: Ricardo Carmona, Experto en Mini LED y Micro LED, EnRed, AndalucíaTV, Mar. 2020.
- Panel 1: Artificial Intelligence in DIGITAL world, H2020 MSCA "Artificial Intelligence" cluster event, Brussels, Dec. 2019.
- Yo investigo: Ricardo Carmona (IMSE), Canal YouTube: CSIC Andalucía y Extremadura, Oct. 2019.
- Jornada Informativa - HORIZONTE 2020 Acciones Marie Skłodowska Curie (MSCA) - Innovative Training Networks (ITN), Agencia Andaluza del Conocimiento, Universidad Pablo de Olavide, Sevilla, Oct. 2019.
- El potencial investigador de la UAL apunta a Europa con el Horizonte 2020, Noticias de Almería, Nov. 12, 2018.
- Jornada Informativa - HORIZONTE 2020 Acciones Marie Skłodowska Curie (MSCA) - Innovative Training Networks (ITN), Agencia Andaluza del Conocimiento, Universidad de Almería, Nov. 2018.
- Ricardo Carmona, ciencia en red para sacar lo mejor de sensores y chips de visión inteligentes, Con Luz Propia - Historias de Luz, Oct. 2017.
- Ricardo Carmona leads 'Achieve' with the support of Horizon 2020, Sevilla World, Oct. 2017.
- ¿Puedes ver los fotones de uno en uno?, La Noche Europea de I@s Investigador@s 2017, Fundación Descubre, Sevilla, Spain, Sept. 29, 2017.
- Sensores de imagen inteligentes, La Noche Europea de I@s Investigador@s 2016, Fundación Descubre, Sevilla, Spain, Sept. 30, 2016.
- Ojos para el Internet de las cosas, La Cuadratura del Círculo., Eldiario.es, May 5, 2015.
- Un invento contra el fuego, Diario de Córdoba, November 26, 2011.

Professional activities, service and honors

Society memberships

- Institute of Electrical and Electronic Engineers (IEEE): 1998-present (SM'16, M'04, StM'98).
- Association for Computing Machinery (ACM): 2016-present (M'16).
- High-Performance Embedded Architecture and Compilation (HiPEAC): 2018-present (M'18)
- IEEE Circuit and Systems Society (IEEE-CASS), 1998-present.
- IEEE Solid-State Circuits Society (IEEE-SSCS), 1998-present.
- IEEE Sensors Council (IEEE-SC), 2016-present.
- IEEE Computer Society, 2010-2012.
- Researchers and Scholars University Association, University of Seville, (ADIUS), 2002-present (Secretary 2002-2004).

Technical committees

- IEEE-CASS Cellular Nanoscale Networks and Array Computing Technical Committee, 2004-present.
- IEEE-CASS Sensory Systems Technical Committee, 2012-present. Currently Secretary since May 2019.

Conference program and organizing committees

- Technical Programme Committee Chair of the IEEE International Symposium on Circuits and Systems, Seville, Spain, October 2020
- Co-organizer of the 8th Workshop on Architecture of Smart Cameras (WASC), Rennes, France, July 2019.
- Co-organizer of the 7th Workshop on Architecture of Smart Cameras (WASC), Coimbra, Portugal, June 2018.
- Co-organizer of the 6th Workshop on Architecture of Smart Cameras (WASC), Córdoba, Spain, June 2017.
- Chair of the 9th International Conference on Distributed Smart Cameras (ICDSC), in cooperation with ACM SIGBED, Seville, Spain, September 2015.
- Demo and exhibit co-chair of the 14th International Workshop on Cellular Neural Networks and their Applications (CNNA), Notre Dame, Indiana (USA), July 2014.
- Special Session on “Vision Chips based on Inter-Pixel Dynamics and Parallel Array Processing” co-chair at the 14th International Workshop on Cellular Neural Networks and their Applications (CNNA), Notre Dame, Indiana (USA), July 2014.
- Member of the steering committee of the 3rd Workshop on Architecture of Smart Cameras (WASC), Pisa, Italy, June 2014.
- Chair of the 2nd Workshop on Architecture of Smart Cameras (WASC), Seville, Spain, June 2013.
- Demo and exhibit co-chair of the 13th International Workshop on Cellular Neural Networks and their Applications (CNNA), Torino, Italy, August 2012.
- Local arrangements co-chair of the 19th IEEE International Conference on Electronics, Circuits, and Systems (ICECS), Seville, Spain, December 2012.
- Special Session on “Advances in embedded vision hardware” co-chair at the 19th IEEE International Conference on Electronics, Circuits, and Systems (ICECS), Seville, Spain, December 2012.
- Co-chair of 2011 SPIE’s Conference on Microtechnologies: Bioelectronics, Biomedical, and Bio-inspired Systems. Prague, Czech Republic, May 2011.
- Local arrangements co-chair of the 36th European Solid-State Circuits Conference (ESSCIR/ESSDERC), Seville, Spain, September 2010.
- Co-chair of 2009 SPIE’s Conference on Microtechnologies: Bioengineered and Bioinspired Systems. Dresden, Germany, May 2009.
- Tutorials co-chair of 2007 18th European Conference on Circuit Theory and Design (ECCTD). Seville, Spain, August 2007.
- Co-chair of 2005 SPIE’s Conference on Microtechnologies: Bioengineered and Bioinspired Systems. Seville, Spain, May 2005.
- Co-chair of 2003 SPIE’s Conference on Microtechnologies: Bioengineered and Bioinspired Systems. Mas Palomas, Gran Canaria, Spain, May 2003.
- Session chair at IEEE International Symposium of Circuits and Systems (ISCAS), IEEE International Workshop on Cellular Neural Networks and their Applications (CNNA), European Conference on Circuit Theory and Design (ECCTD), etc.

Publication edition and project review

- Guest Editor for the Special Issue on “Advances on Smart Vision Chips and Near-Sensor Inference for Edge AI” of Sensors, MDPI.
- Guest Editor for the Special Issue on “Embedded vision architectures for machine learning” of the Journal of Signal Processing Systems, Springer.
- Track Chair for ISCAS 2017 and 2018
- Associate Editor for the Journal of Real-Time Image Processing, Springer, for the period 2016-20.
- Guest Editor for the Special Issue on “Smart Camera Architectures for Real-Time Image and Video Processing” of the Journal of Real-Time Image Processing, Springer.
- Associate Editor for the IEEE Transactions on Circuits and Systems-I: Regular Papers for the period 2012-13.
- Guest Editor for the Special Issue on “Smart Camera Architectures” of the Journal of System Architecture, Elsevier.
- Reviewer for IEEE Transactions on Circuits and Systems I and II, International Journal of Circuit Theory and Applications, International Journal on Bifurcation and Chaos, International Journal on Electronics, Sensors, Journal on Circuits, Systems and Computers, IEE Electronics Letters, Integration: the VLSI Journal, Journal of Universal Computer Science.
- Review Committee member of the IEEE International Symposium on Circuits and Systems.
- Reviewer of the IEEE International Symposium on Circuits and Systems (ISCAS), IEEE Int. Workshop on Cellular Neural Networks and their Applications (CNNA), European Conference on Circuit Theory and Design (ECCTD), Design of Integrated Circuits and Systems (DCIS), IEEE Latin-American Circuits and Systems Conference (LASCAS), IEEE Biomedical Circuits and Systems Conference (BioCAS) .
- Reviewer and panelist of the 2010 Call of the National Plan for Research, Area of Information Technology and Communications, Ministry of Science and Innovation, Spain.
- Reviewer for the 2011 Call of the National Plan for Research, National Agency for Evaluation and Prospective Analysis (ANEP), Ministry of Science and Innovation, Spain.
- Reviewer for the 2011 Call of the National Fund for Scientific Research (FONCYT), Ministry of Science, Technology and Productive Innovation, Argentina.
- Reviewer for the 2012 Call of the National Plan for Research, National Agency for Evaluation and Prospective Analysis (ANEP), Ministry of Science and Innovation, Spain.

University service

- Member of the University Senate, University of Seville, 2002-2004.
- Co-chair of the University Senate, University of Seville, 2002.
- Member of the Norms and Regulations Commission of the University Senate, University of Seville, 2002-2004.
- Member of the University Council, 2002-2004.
- Secretary of the Scientific Staff Meeting, Institute of Microelectronics of Seville, 2009-present.
- Member of the Institute Board, Institute of Microelectronics of Seville, 2012-present.

Publications

Books

1. J. Fernández-Berni, R. Carmona-Galán, Á. Rodríguez-Vázquez, *Low-Power Smart Imagers for Vision-Enabled Sensor Networks*, Springer, New York, 2012). ISBN 978-1-4614-2391-1.

Book chapters

1. J. Fernández-Berni, M. Suárez-Cambre; R. Carmona-Galán, V. Brea; R. del Río, D. Cabello and Á. Rodríguez-Vázquez, "Image feature extraction acceleration", in Ali Ismail Awad, M. Hassaballah (Eds.) *Image Feature Detectors: Foundations, Innovations and Applications*. Studies in Computational Intelligence Series, Vol. 630. Springer, New York, 2016. ISBN 978-3-319-28852-9.
2. Á. Zarándy, Cs. Rekeczky, P. Földesy, R. Carmona-Galán, G. Liñán-Cembrano, G. Sós, Á. Rodríguez-Vázquez, T. Roska, "VISCUBE: a multi-layer vision chip", in Á. Zarandy (Editor): *Focal-Plane Sensor-Processor Chips*, pp. 181-208. Springer, New York, 2011. ISBN 978-1-4419-6474-8.
3. J. Fernández-Berni and R. Carmona-Galán, "Focal-plane dynamic texture segmentation by programmable binning and scale extraction", in Á. Zarandy (Editor): *Focal-Plane Sensor-Processor Chips*, pp. 105-124. Springer, 2011. ISBN 978-1-4419-6474-8.
4. Á. Zarandy, P. Foldesy, R. Carmona, Cs. Rekeczky, J. Bean, W. Porod, "Cellular Multi-core Processor Carrier Chip for Nanoantenna Integration and Experiments", in Ch. Baatar, W. Porod and T. Roska (Editors): *Cellular Nanoscale Sensory Wave Computing*, pp-147-168. Springer, New York, 2010. ISBN 978-1-4419-1010-3.
5. R. Carmona, A. Rodríguez-Vázquez, R. Domínguez-Castro and S. Espejo, "Vertebrate Retina Emulation using Multi-Layer Array-Processor Mixed-Signal Chips", in Maurizio Valle (Editor): *Smart Adaptive Systems on Silicon*, pp. 85-101. Springer, 2004.
6. R. Carmona, R. Domínguez-Castro, S. Espejo and A. Rodríguez-Vázquez, "Chapter 2, Part C- Behavioural Modelling and Simulation of CNN Chips", in T. Roska and A. Rodríguez-Vázquez (Editors): *Towards the Visual Microprocessor: VLSI Design and the Use of Cellular Neural Network Universal Machine Computers*, pp. 56-86. John Wiley & Sons, Chichester, 2001. ISBN 0-471-95606-6.
7. A. Rodríguez-Vázquez, M. Delgado-Restituto, E. Roca, G. Liñán, R. Carmona, S. Espejo and R. Domínguez-Castro, "Chapter 3- CMOS Analog Design Primitives", in T. Roska and A. Rodríguez-Vázquez (Editors): *Towards the Visual Microprocessor: VLSI Design and the Use of Cellular Neural Network Universal Machine Computers*, pp. 87-132. John Wiley & Sons, Chichester, 2001. ISBN 0-471-95606-6.
8. A. Rodríguez-Vázquez, M. Delgado-Restituto, E. Roca, R. Carmona, G. Liñán, S. Espejo and R. Domínguez-Castro, "Chapter 4- On the Implementation of Linear and Nonlinear Interaction Operators for CNNs", in T. Roska and A. Rodríguez-Vázquez (Editors): *Towards the Visual Microprocessor: VLSI Design and the Use of Cellular Neural Network Universal Machine Computers*, pp. 133-182. John Wiley & Sons, Chichester, 2001. ISBN 0-471-95606-6.
9. R. Domínguez-Castro, S. Espejo, A. Rodríguez-Vázquez and R. Carmona, "Chapter 6, Part A- A 20x22 CNN-UM Chip with On-Chip Optical Sensors", in T. Roska and A. Rodríguez-Vázquez (Editors): *Towards the Visual Microprocessor: VLSI Design and the Use of*

Cellular Neural Network Universal Machine Computers, pp. 213-237. John Wiley & Sons, Chichester, 2001. ISBN 0-471-95606-6.

10. R. Carmona, A. Rodríguez-Vázquez, S. Espejo, R. Domínguez-Castro and M. Delgado-Restituto, "Chapter 7- Short-Term Storage of Analogue Signals for CNUM-Based Image Processing", in T. Roska and A. Rodríguez-Vázquez (Editors): *Towards the Visual Microprocessor: VLSI Design and the Use of Cellular Neural Network Universal Machine Computers*, pp. 281-318. John Wiley & Sons, Chichester, 2001. ISBN 0-471-95606-6.
11. R. Carmona, A. Rodríguez-Vázquez, R. Domínguez-Castro, S. Espejo and T. Roska, "Chapter 15- Learning with CNN Universal Machine Chips" in G. Cauwenberghs (Editor): *Learning on Silicon*, pp. 369-396. Kluwer Academic Publishers, Norwell, 1999. ISBN 0-7923-8555-1

Journal papers (indexed)

1. I. Vornicu, J. M. López-Martínez, F. Bandi, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Design of High-Efficiency SPADs for LiDAR Applications in 110nm CIS Technology". *IEEE Sensors Journal*, Vol. xx, No. xx, pp: xxx-xxx, Early View Oct. 2020. (DOI: 10.1109/JSEN.2020.3032106) Print ISSN: 1530-437X, Online ISSN: 1558-2205.
2. I. Vornicu, F. Bandi, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Compact Macro-Cell With OR Pulse Combining for Low Power Digital-SiPM". *IEEE Sensors Journal*, Vol. 20, No. 21, pp: 12817-12826, Nov. 2020. (DOI: 10.1109/JSEN.2018.2885960) Print ISSN: 1530-437X, Online ISSN: 1558-2205.
3. G.M.S. Nunes, F.D.V.R. Oliveira, M.C.Q. Farias, J.G.R.C. Gomes, A. Petraglia, J. Fernández-Berni, R. Carmona-Galán, Á. Rodríguez-Vázquez, "Comparison between Digital Tone-Mapping Operators and a Focal-Plane Pixel-Parallel Circuit". *Signal Processing: Image Communication*, Vol. 88, p.115937, 2020. (DOI: 10.1016/j.image.2020.115937) ISSN 0923-5965.
4. D.Velasco-Montero, J. Fernández-Berni, R. Carmona-Galán and Á. Rodríguez-Vázquez, "PreVlous: A Methodology for Prediction of Visual Inference Performance on IoT Devices". *IEEE Internet of Things Journal*, Vol. 7, No. 10, pp: 9227-9240, Oct. 2020. (DOI: 10.1109/JIOT.2020.2981684) Electronic ISSN: 2327-4662.
5. M. Trevisi, A. Akbari, M. Trocan, Á. Rodríguez-Vázquez and R. Carmona-Galán, "Compressive Imaging using RIP-compliant CMOS Imager Architecture and Landweber Reconstruction". *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 30, No. 2, pp: 387-399, Feb. 2020. First published on-line on Jan. 2019 (DOI: 10.1109/TCSVT.2019.2892178) Print ISSN: 1051-8215, Online ISSN: 1558-1748.
6. I. Vornicu, A. Darie, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Compact Real-Time Inter-Frame Histogram Builder for 15-Bits High-Speed ToF-Imagers based on Single-Photon Detection". *IEEE Sensors Journal*, Vol. 19, No. 6, pp: 2181-2190, Mar. 2019. (DOI: 10.1109/JSEN.2018.2885960) Print ISSN: 1530-437X, Online ISSN: 1558-2205.
7. D.Velasco-Montero, J. Fernández-Berni, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Optimum Selection of DNN Model and Framework for Edge Inference". *IEEE Access*, Vol. 6, pp: 51680-51692, Sep. 2018. (DOI: 10.1109/ACCESS.2018.2869929) Electronic ISSN: 2169-3536.
8. J. A. Leñero-Bardallo, M. Delgado-Restituto, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Asynchronous Spiking Pixel with Programmable Sensitivity to Illumination". *IEEE Transactions on Circuits and Systems I: Regular Papers*, Vol. 65, No. 11, pp: 3854-3863, Aug. 2018. (DOI: 10.1109/TCSI.2018.2857220) ISSN: 1549-7747.

9. J. A. Leñero-Bardallo, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Applications of Event-based Image Sensors —Review and Analysis". *International Journal of Circuit Theory and Applications*, Vol. 46, No. 9, pp: 1620-1630, Sep. 2018. (DOI: 10.1002/cta.2546) ISSN: 0098-9886..
10. J. A. Leñero-Bardallo, J. M. Guerrero-Rodríguez, R. Carmona-Galán and Á. Rodríguez-Vázquez, "On the analysis and detection of flames with an asynchronous spiking image sensor". *IEEE Sensors Journal*, Vol. 18, No. 16, pp: 6588-6595, June 2018. (10.1109/JSEN.2018.2851063) ISSN: 1530-437X.
11. Á. Rodríguez-Vázquez, J. Fernández-Berni, J. A. Leñero-Bardallo, I. Vornicu and R. Carmona-Galán, "CMOS Vision Sensors: Embedding Computer Vision at Imaging Front-Ends". *IEEE Circuits and Systems Magazine*, Vol. 18, No. 2, pp: 90-107, Second quarter 2018. (DOI: 10.1109/MCAS.2018.2821772) Print ISSN: 1531-636X, Online ISSN: 1558-0830.
12. I. Vornicu, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Real-Time Inter-Frame Histogram Builder for SPAD Image Sensors". *IEEE Sensors Journal*, Vol. 18, No. 4, pp: 1576-1584, Feb. 2018. (DOI: 10.1109/JSEN.2017.2784484) Print ISSN: 1530-437X, Online ISSN: 1558-1748.
13. J. A. Leñero-Bardallo, Lukasz Farian, J. M. Guerrero -Rodríguez, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Sun sensor based on a luminance spiking pixel array". *IEEE Sensors Journal*, Vol. 17, No. 20, pp: 6578-6588, Sept. 2017. (DOI: 10.1109/JSEN.2017.2749414) ISSN: 1530-437X.
14. F. D. V. R. Oliveira, J. G. R. C. Gomes, J. Fernández-Berni, R. Carmona-Galán, R. del Río and Á. Rodríguez-Vázquez, "Gaussian Pyramid: Comparative Analysis of Hardware Architectures". *IEEE Transactions on Circuits and Systems-I: Regular Papers*, Vol. 64, No. 9, pp. 2308-2321, Sept. 2017. (DOI: 10.1109/TCSI.2017.2709280) ISSN: 1549-8328. (Published on-line on June 20, 2017)
15. I. Vornicu, R. Carmona-Galán, and Á. Rodríguez-Vázquez, "Arrayable Voltage-Controlled Ring-Oscillator for Direct Time-of-Flight Image Sensors". *IEEE Transactions on Circuits and Systems--I: Regular Papers*, Vol. 64, No. 11, pp. 2821-2834, November 2017. (DOI: 10.1109/TCSI.2017.2706324) Print ISSN: 1549-8328, Online ISSN: 1558-0806. (Published on-line on June 16, 2017)
16. I. Vornicu, R. Carmona-Galán, and Á. Rodríguez-Vázquez, "Compensation of PVT Variations in ToF Imagers with In-Pixel TDC". *Sensors*, Vol. 17, No. 5, p. 1072, May 2017. (DOI: 10.3390/s17051072) ISSN: 1424-8220.
17. J. A. Leñero-Bardallo, R. Carmona-Galán and Á. Rodríguez-Vázquez, "A Wide Linear Dynamic Range Image Sensor Based on Asynchronous Self-Reset and Tagging of Saturation Events". *IEEE Journal of Solid-State Circuits*, Vol. 52, No. 6, pp. 1605-1617, June 2017 (DOI: 10.1109/JSSC.2017.2679058) ISSN: 0018-9200. (Published on-line on April 12, 2017).
18. J. Fernández-Berni, M. Niemier, X. S. Hu, H. Lu, W. Li, P. Fay, R. Carmona-Galán, Á. Rodríguez-Vázquez, "TFET-based well capacity adjustment in active pixel sensor for enhanced high dynamic range". *Electronics Letters*, Vol. 59, No. 9, pp. 622-624, April 2017 (DOI: 10.1049/el.2016.4548) ISSN: 1350-911X. (Published on-line on March 13, 2017).
19. I. Vornicu, F. Bandi, R. Carmona-Galán and Á. Rodríguez-Vázquez, "A CMOS Digital SiPM With Focal-Plane Light-Spot Statistics for DOI Computation". *IEEE Sensors Journal*, Vol. 17, No. 3, pp. 632-643, (DOI: 10.1109/JSEN.2016.2632200). ISSN: 1530-437X.

20. M. Suárez, V. M. Brea, J. Fernández-Berni, R. Carmona-Galán, D. Cabello and Á. Rodríguez-Vázquez, "Low Power CMOS Vision Sensor for Gaussian Pyramid Extraction". *IEEE Journal of Solid-State Circuits*, Vol. 52, No. 2, pp. 483-495, Feb. 2017 (DOI: 10.1109/JSSC.2016.2610580) ISSN: 0018-9200. (Published on-line on Oct. 27, 2016).
21. J. A. Leñero-Bardallo, M. Delgado-Restituto, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Enhanced sensitivity of CMOS image sensors by stacked diodes". *IEEE Sensors Journal*, Vol. 16, No. 23, pp. 8448-8455, (DOI: 10.1109/JSEN.2016.2611759). ISSN: 1530-437X.
22. J. Fernández-Berni, F. D. V. R. Oliveira, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Image Sensing Scheme Enabling Fully-Programmable Light Adaptation and Tone Mapping With a Single Exposure". *IEEE Sensors Journal*, Vol. 16, No. 13, pp. 5121-5122, July 2016 (DOI: 10.1109/JSEN.2016.2559158). ISSN: 1530-437X.
23. J. Fernández-Berni, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Single-Exposure HDR Technique Based on Tunable Balance Between Local and Global Adaptation". *IEEE Transactions on Circuits and Systems II: Express Briefs*, Vol. 63, No. 5, pp. 488-492, May 2016 (DOI: 10.1109/TCSII.2015.2505263). ISSN: 1549-7747.
24. I. Vornicu, R. Carmona-Galán and Á. Rodríguez-Vázquez, "Time interval generator with 8ps resolution and wide range for large TDC array characterization". *Analog Integrated Circuits and Signal Processing*, Vol. 87, No. 2, pp. 181-189, May 2016, Springer (First published on-line on Oct. 11, 2015. DOI: 10.1007/s10470-015-0641-9). ISSN: 0925-1030 (Print) 1573-1979 (Online).
25. J. A. Leñero-Bardallo, Philipp Häfliger, R. Carmona-Galán and Á. Rodríguez-Vázquez, "A bio-inspired vision sensor with dual operation and read-out modes". *IEEE Sensors Journal*, Vol. 16, No. 2, pp. 317-330, January 2016 (First published on-line on Sept. 29, 2015. DOI: 10.1109/JSEN.2015.2483898). ISSN: 1530-437X.
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