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AGENCIA
ESTATAL DE
INVESTIGACIÓN

CURRICULUM VITAE ABREVIADO (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION

First name	Ricardo		
Family name	Carmona Galán		
Gender (*)	Male	Birth date (dd/mm/yyyy)	05/12/1969
ID number	28906573N		
e-mail	ricardo.carmona@csic.es	URL Web http://www2.imse-cnm.csic.es/~rcarmona/	
Open Researcher and Contributor ID (ORCID) (*)		0000-0002-4230-3988	

(*) Mandatory

A.1. Current position

Position	Tenured Scientist (Científico Titular), internal promotion exam to Research Scientist (Investigador Científico) passed in Oct. 8, 2024		
Initial date	15/06/2005		
Institution	Consejo Superior de Investigaciones Científicas		
Department/Center	Instituto de Microelectrónica de Sevilla		
Country	Spain	Teleph. No.	+34654326149
Key words	Analog and mixed-signal microelectronics, CMOS image sensors, smart imagers and vision chips		

A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
11/1994-06/1996	Junior researcher/IMSE-CNM, CSIC (Spain) (starting a different grant)
07/1996-06/1998	Assistant researcher/UC Berkeley (USA) (end of grant)
08/1998-09/1999	Hired researcher/IMSE-CNM, CSIC (Spain) (start at University)
10/1999-06/2005	Assistant profesor/Universidad de Sevilla (Spain) (start at CSIC)
06/2005-today	Tenured Scientist/ IMSE-CNM, CSIC (Spain)
10/2006-30/2007	Visiting Scholar/Univ. Notre Dame (USA) (on sabbatical from IMSE)

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Licenciado (BSc) in Electronic Physics	Universidad de Sevilla	1993
PhD in Microelectronics	Universidad de Sevilla	2002

(Include all the necessary rows)

Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

Ricardo Carmona Galán received the degrees of *Licenciado* (B. Sc.) and *Doctor* (Ph. D.) in Electronic Physics from the University of Seville, Spain, in 1993 and 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. Since 2005 he is a Tenured Scientist of CSIC at the Institute of Microelectronics of Seville. His main research area is 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 behaviour of the retina. He also held a PostDoc at the University of Notre Dame, Indiana (2006-07), at Prof. Porod's laboratory, were he studied CMOS-compatible nanostructures for multi-spectral light sensing. His experience in smart cameras and sensors has allowed him to approach environmental monitoring. First, by collaborating with wildfire prevention and monitoring with a smart camera built from a smart sensor capable of dynamic textures detection (project MONDEGO). Second, collaborating with biologists, providing technological support for the monitoring of biodiversity. Projects like SIMMRE and ULTIMATE (a project for Ecological and Digital Transition), or SUMHAL, within the Lifewatch-ERIC program, has allowed him to contribute to the development of a smart camera trap with advanced adaptive and context learning capabilities.

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 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. And he has also been promoter of Biotfy, a spin-off that provides a platform for environmental and biodiversity tracking and management. Both initiatives were recognized by HiPEAC, in its Tech Transfer Awards.
He is a Senior Member of the IEEE, and belongs to the Circuits and Systems, Solid-State Circuits Societies. He is also Member of the ACM, HiPEAC and the IEEE-CASS Technical Committees on Cellular Nanoscale Networks and Array Computing and on Sensory Systems, of which he is the current Chair. He belongs also to the IEEE Sensors Council. He has served as Associate Editor for the IEEE TCAS-I for the period 2012-13, as Associate Editor of the Springer's JRTIP. He is member of the Senior Editorial Board of the IEEE JETCAS. He has been member of the steering committee of the Workshop on Architecture of Smart Cameras. He has been the General Chair of ICDSC 2015 in cooperation with ACM SIGBED.
He has been 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.
He has 5 recognized 6y-periods and 5 recognized 5y-periods of scientific productivity research excellence. 9 theses supervised (6 defended and 3 in progress). 60 JCR papers (29 are Q1), 853 cites in Google Scholar in the last 5 years and a H-index of 28.

Part C. RELEVANT MERITS

C.1 Publications

[1] D. Velasco-Montero, J. Fernández-Berni, **R. Carmona-Galán**, A. Sanglas, and F. Palomares, “Reliable and Efficient Integration of AI into Camera Traps for Smart Wildlife Monitoring Based on Continual Learning,” Ecological Informatics, vol. 83, 102815, Nov. 2024. DOI: 10.1016/j.ecoinf.2024.102815, ISSN: 1574-9541. Impact Factor 5.8, position 16/195 (Q1) in category Ecology, ISI JCR 2023.

[2] J. J. Sáenz-Noval, J. A. Leñero-Bardallo, **R. Carmona-Galán** and L. C. Gontard, "A Rad-Hard On-Chip CMOS Charge Detector With High Dynamic Range". IEEE Sensors Journal, Vol. 23, No. 21, pp. 25971-25979, Nov. 2023. (DOI: 10.1109/JSEN.2023.3315357) Print ISSN: 1530-437X, Electronic ISSN: 1558-1748. Datos del JCR 2022: Factor impacto 4.3; Cuartil Q1: 15/64 Categoría: Instruments and Instrumentation.

[3] M. Parsakordasiabi, I. Vornicu, Á. Rodríguez-Vázquez, and **R. Carmona-Galán**, "An Efficient TDC Using a Dual-Mode Resource-Saving Method Evaluated in a 28-nm FPGA". IEEE Transactions on Instrumentation and Measurement, Vol. 71, pp: 1-13, Art. No. 2000413. Dec. 2021. (DOI: 10.1109/TIM.2021.3136267) Print ISSN: 0018-9456, Online ISSN: 1557-9662. IF 5.332 Q1: 10/64 Category: Instruments and Instrumentation

[4] 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. 21, No. 4, pp: 4776-4785, Feb. 2021. (DOI: 10.1109/JSEN.2020.3032106) Print ISSN: 1530-437X, Online ISSN: 1558-2205. Data from JCR 2021: IF 4.325; Q1: 14/64 Categoría: Instruments and Instrumentation.

[5] M. Parsakordasiabi, I. Vornicu, Á. Rodríguez-Vázquez and **R. Carmona-Galán**, " A Low-Resources TDC for Multi-Channel Direct ToF Readout Based on a 28-nm FPGA". Sensors, Vol. 21, No. 1: 308, Jan. 2021. (DOI: 10.3390/s21010308) ISSN 1424-8220. Data from JCR 2020: IF 3.576; Q1: 14/64; Category: Instruments & Instrumentation.

[6] 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. Data from JCR 2020: IF 3.301; Q2: 96/273; Category: EE Engineering.

[7] D.Velasco-Montero, J. Fernández-Berni, **R. Carmona-Galán** and Á. Rodríguez-Vázquez, "PreVIous: 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. Data from JCR 2020: IF 9.471; Q1: 15/273; Category: Elec. and Electronic Engineering.

[8] 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 Trans. Circ. and Systems for Video Technology, Vol. 30, No. 2, pp: 387-399, Feb. 2020. (DOI: 10.1109/TCSVT.2019.2892178) Print ISSN: 1051-8215. Data from JCR 2020: IF 4.685; Q1: 43/273; Category: Elec. and Electronic Eng.

[9] 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) ISSN: 1530-437X. Data from JCR 2019: Impact factor 3.073; Quartile Q2: 18/64; Category: Instruments & Instrumentation.

[10] 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. Data from JCR 2018: IF 4.481; Q1: 42/266; Category: EEEng.

C.3 Research projects

(1) SEMIoTICs: Advanced SEnsing Modalities for intelligent IoT Components and Systems, **R. Carmona-Galán** and J. Fernández-Berni, PID2021-128009OB-C31, MICINN, Spain, 01/2022-12/2024. Participation: PI/Coordinator. Total budget: 534,820€

(2) SUMHAL: Sustainability for Mediterranean Hotspots in Andalusia integrating LifeWatch ERIC, Javier Bustamante y R. Carmona-Galán (PIs of WP4), LWE2103006, Ministerio de Ciencia e Innovación (cofinanciado por la Unión Europea, Fondo Europeo de Desarrollo Regional) 09/2019-06/2023. Participation: Co-PI of WP4 with Javier Bustamante (EBD). Total budget: ~13M€

(3) "ACHIEVE: AdvanCed Hardware/Software Components for Integrated/ Embedded Vision SystEms", IP: **Ricardo Carmona Galán**, H2020 MSCA-ITN 2017, Research Executive Agency, European Commission, 10/2017-09/2021. Participation: PI/Coordinator. Total budget: 2.266.907,76 €

(4) "iCaveats: Integración de Componentes y Arquitecturas para la Visión Embebida en Aplicaciones de Transporte y Seguridad", IP: **Ricardo Carmona Galán**, Plan Nacional de I+D+i (Proyecto coordinado). MINECO, Ref. TEC2015-66878-C3-1-R, 01/2016-12/2018. Participation: PI/Coordinator. Total budget: 499.125,00€

(5) "MONDEGO: Monitorización y vigilancia basada en dispositivos integrados de visión con bajo consumo de potencia". PI: **Ricardo Carmona Galán**, Plan Nacional de I+D+i (Proyecto coordinado). MINECO (cofinanciado por FEDER). Ref. TEC2012-38921-C02-01, 01/01/2013-31/12/2015. Participation: PI/Coordinator.Total budget: 308,412.00€

C.4 Contracts, technological or transfer merits

(1) Contrato de colaboración Photonvis SL- CSIC, **R. Carmona-Galán** (PI) , 11/2019-12/2020.

(2) "PLATINO: Investigación y desarrollo de tecnología para convoyes no tripulados con aplicación a misiones logísticas militares y de seguridad". IP: Ángel Rodríguez Vázquez. Subcontrato. Programa FEDER-Interconecta. CDTI. Ref. ITC-20111009. 01/012012-31/12/2014. Participation: Researcher. Budget: 305,000.00€

(3) "FLEX-CMOS: Diseño microelectrónico de un sensor CMOS de área flexible y adaptativo para uso industrial" IP: Ángel Rodríguez Vázquez. Subcontrato Innov. Microelec. S. L. Ref. 010204080002. 01/12/2010-31/12/2011. Participation: Researcher. Budget: 90,000.00€

(4) "ADAPTA: Tecnología de funciones de protección lateral, inteligentes y adaptativas". IP: José Luis Huertas Díaz. Subcontrato CENIT-Innovaciones Microelectrónicas S. L. Ref. 010204100001. 19/02/2008-31/12/2011. Participation: Researcher.

C.5 Patents

(1) Y. Lamouaraa Sedlackova, J. Fernández Berni, **R. Carmona Galán**, "Asynchronous pixel array for single-shot concurrent auto-exposure and HDR imaging". CSIC-Universidad de Sevilla. Núm. P202330881, 26-OCT-2023. 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). Licenciada a PhotonvisSL en Nov. 2019.

(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).

C.6 Scientific societies, technical and programme committees

(1) Member of IEEE (Senior Member), ACM, IEEE Circuit and Systems Society, IEEE Solid-State Circuits Society (since 1998), IEEE Computer Society (2010-2012) and HiPEAC.

(2) Member of the Association of the Research and Teaching Staff of the University of Seville (ADIUS) (from 2002, Secretary from 2002 to 2004)

(3) Member of the Technical Committees of IEEE-CASS on Cellular Nanoscale Networks and Array Computing (from 2004) and Sensory Systems (from 2012, Secretary 2019).

(4) Chairman of the 9th International Conference on Distributed Smart Cameras, Seville (Spain), September, 8-11, 2015, in-cooperation with ACM SIGBED

(5) Technical Programme Chair of IEEE ISCAS 2020. Member of the organizing committees of: CNNA 2014, WASC 2013, CNNA 2012, IEEE-ICECS 2012, SPIE's Microtechnologies 2011, ESSCIR/ESSDERC 2010.

C.7 Editorial duties, review committees and project and thesis evaluation

(1) Guest Editor Special Issues IJCTA 2017-18, JRTIP 2013-14 y JSA 2012-13.

(2) Associate Editor IEEE TCAS-I 2012-13.

(3) Review Committee Member ISCAS 2010-11-12

(4) Reviewer and panellist of Plan Nacional de I+D+i, Área TIC, MICINN, 2010.

(5) Reviewer of ANEP 2011-2012, 2015, 2017, 2018

(6) Thesis tribunals at CEA-LETI (2019, 2021), EPFL (2018, 2020), Univ. Sevilla (2012, 2014, 2017), Helsinki (2007), Turku (2013, 2014), Granada (2010), Barcelona (2014 y 2020) Santiago de Compostela (2012), Ramón-Llull (2012) Toulouse (2012), Manchester (2014)