

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	Ángel		
Family name	Orte Gutiérrez		
Gender (*)		Birth date	
ID number			
e-mail		URL Web: @PPhotobiology	
Open Researcher and Contributor ID (ORCID) (*)	0000-0003-1905-4183		

A.1. Current position

Position	Full professor (Catedrático de Universidad)		
Initial date	20/12/2018		
Institution	University of Granada		
Department/Center	Dept. Físicoquímica	Facultad de Farmacia	
Country	Spain	Teleph. number	
Key words	Biophysics, Super resolution microscopy, Fluorescence, Single-molecule, Biosensors		

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

Period	Position/Institution/Country/Interruption cause
2021	5-month paternity leave
2012-2018	Profesor Titular de Universidad/University of Granada/Spain
2009-2012	Profesor Ayudante Doctor/University of Granada/Spain
2008-2009	Postdoctoral researcher/University of Granada/Spain
2007-2008	Marie Curie postdoctoral researcher/University of Cambridge/U.K.
2005-2006	Postdoctoral researcher/University of Cambridge/U.K.

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD Physical Chemistry	Univ. Granada (Spain)	2004
Chemistry degree	Univ. Córdoba (Spain)	2000

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

Prof Orte earned his degree in Chemistry (Univ. Cordoba, 2000), and completed his PhD in ultrafast proton-transfer reactions at the Univ. Granada (UGR) in 2004. After a 4-year postdoctoral stay at the Univ. Cambridge, UK, under Prof Sir D. Klenerman, he returned to UGR in 2009 to establish new research lines. In 2018, he became Full Professor in Physical Chemistry at UGR. Prof Orte heads the *Nanoscopy-UGR Singular Laboratory* (<https://sl.ugr.es/nanoscopyugr>) and the *Fotoquímica y Fotobiología* research group (@PPhotobiology), focusing on applying spectroscopy and advanced microscopy to design intracellular sensors and biophysical studies of biomedical relevance.

Scientific achievements. Dr Orte's transition from fundamental photophysics to biomedical applications occurred during his postdoc, where he developed dual-color single-molecule fluorescence (SMF) methods for the study protein aggregation, protein folding, and protein–DNA interactions. Dr Orte developed SMF-based analysis methods for early aggregates on pathway of amyloid aggregation (*PNAS* 2008). This was a seminal work that permitted a better understanding of amyloid fibrillization and contributed to many other subsequent studies of high impact (*Cell* 2012, *Nature Struct Mol Biol* 2012, *Sci Rep* 2017, *JACS* 2019). The paper published in *Cell* (2012) received the consideration of *Highly-Cited Paper* by the Web of Science (WoS) in 2018 and has received >700 cites (WoS). These SMF methods were applied to other biomedical problems such as the conformational space of ubiquitin dimers (published

in *Nature* 2012) and the telomerase enzyme structure (*Nature Chem Biol* 2008, *JACS* 2010), and they are still used by several international groups in the field of amyloid fibrillization (several publications reported by other groups in 2020-2023).

Prof Orte's research also focuses on advanced microscopy techniques such as photoluminescence lifetime imaging microscopy (PLIM) and super-resolution microscopy for developing quantitative intracellular sensors. Importantly, these sensor designs are supported by Dr Orte's strong photophysical background. For instance, studying the mechanism of excited-state proton transfer reactions in xanthene derivatives (*J Phys Chem A* 2005, *PCCP* 2010) set the basis for the first luminescent intracellular sensor for measuring phosphate levels using PLIM microscopy (patent WO2014198986-A1, *J Phys Chem B* 2013). This sensor was used to understand phosphate membrane fluxes in collaboration with Prof Friedmann at Pittsburgh University (*J Biol Chem* 2019) and received special attention by the biomedical phosphate community. This tandem of fundamental photophysical studies with subsequent sensor design and applications has constituted a pillar of Dr Orte research with several examples on acridones, BODIPYs, or quantum dots, resulting in several high-profile publications (*ACS Nano* 2013, *Sensor Actuat B* 2020, *ACS Sens* 2021, *Angew Chem Int Ed* 2024...), even applied to cancer metabolism (*Biology* 2021), biomarkers for diagnostics (*Chem Commun* 2019, *Sensor Actuat B* 2024), and characterizing novel luminescent materials (*Chem Sci* 2019, *Mater Chem Front* 2021, *JACS* 2022, *ACS Nano* 2023).

Impact and Recognition. Prof Orte's research has gained international visibility, with over 3500 citations in WoS across >100 peer-reviewed papers. Scopus reports that 34% of his published papers in the last 10 years are among the top 25% most cited documents worldwide. He secured over €2 million in funded research grants, contracts with SMEs, and partnerships with charities. He also holds a large network of collaborators (48% of manuscripts with international coauthors) including technological companies (Optoi Microelectronics; DestiNA Genomics), and the Universities of Trento, K.U. Leuven, Anhui Normal, Pittsburgh, Edinburgh, Mount Sinai Hospital, or the CNRS, among others. Dr Orte's expertise led to invitations to speak at national and international conferences and serve as an expert evaluator for various research agencies (REA, MSCA postdoc fellowships, 2013-2022, and Horizon Cluster 6 FARM2FORK topic in 2024; AEI/ANEP, since 2018; the French Research Agency ANR, 2023; and the Czech Academy of Sciences, 2023).

Mentorship. Committed to training new scientists, Prof. Orte has supervised 6 PhD theses, with most receiving international doctorate awards and accolades from scientific societies (specialized group in organic chemistry of the RSEQ, P. Herrero; the applied spectroscopy society, M.C. González; and the *Modesto Laza Palacio* award, J.M. Paredes and M.C. González). He has also attracted talent from abroad by tutoring a Ramón y Cajal fellow (A. Pérez Lara) and supervising a MSCA postdoctoral fellowship (R. Contreras).

Societal impact. Dr. Orte actively collaborates with companies and charities, engaging in intersectorial secondments with technological companies in European consortia. He is dedicated to science outreach, organizing hands-on workshops uninterruptedly since 2014 (European Researcher's Night, Science Week,...) and delivering lectures in schools, high schools, and cultural centers.

Part C. RELEVANT MERITS

C.1. Publications (10 selected contributions, last 10 years; for a full list, check the ORCID profile or the Web of Science ResearcherID: J-4810-2012. References to impact factor have been removed)

1) A. Ruiz-Arias, F. Fueyo-González, C. Izquierdo-García, ..., **A. Orte***, J. A. González-Vera*. Exchangeable Self-Assembled Lanthanide Antennas for PLIM Microscopy. *Angew. Chem. Int. Ed.* (2024), **63**, e202314595. DOI: 202314510.202311002/anie.202314595. Position: 10/11. Corresponding autor. *VIP paper*. Citations: 5.

- 2) M. Padial-Jaudenes, M. Tabreue-Chávez, S. Detassis,..., **A. Orte***. Multiplexed MicroRNA biomarker detection by bridging lifetime filtering imaging and dynamic chemical labeling. *Sensors Actuact. B* (2024) **417**, 136136. Position: 13/13. Corresponding author.
- 3) M. C. Gonzalez-Garcia, E. Garcia-Fernandez, J. L. Hueso, P. M. R. Paulo, **A. Orte***. Optical Binding-Driven Micropatterning and Photosculpting with Silver Nanorods. *Small Methods* (2023) **7**, 2300076. Position: 5/5. Corresponding author. Journal cover.
- 4) M. Singh, A. Ingle, A. González, ..., **A. Orte***, J. M. Dominguez-Vera*, V. Bansal*. Repairing and Preventing Photooxidation of Few-Layer Black Phosphorus with β -Carotene. *ACS Nano* (2023) **17**, 8083-8097. Position: 16/18. Corresponding author. Citations: 4.
- 5) M. Kazem-Rostami, **A. Orte**, A. M. Ortuño, ..., J. F. Stoddart*. Helically Chiral Hybrid Cyclodextrin Metal–Organic Framework Exhibiting Circularly Polarized Luminescence. *J. Am. Chem. Soc.* (2022) **144**, 9380-9389. Position: 2/11. Citations: 52.
- 6) A. Ruiz-Arias, R. Jurado, F. Fueyo-Gonzalez, ..., **A. Orte***. A FRET pair for quantitative and superresolution imaging of amyloid fibril formation. *Sensors Actuact. B* (2022) **350**, 130882. Position: 7/7. Corresponding author. Citations: 18.
- 7) M. C. Gonzalez-Garcia, C. Salto-Giron, P. Herrero-Foncubierto, ..., **A. Orte***. Dynamic Excimer (DYNEX) Imaging of Lipid Droplets. *ACS Sensors* (2021), **6**, 3632-3639. Position: 10/10. Corresponding author. Citations: 6. Journal cover.
- 8) M. C. Mañas-Torres, C. Gila-Vilchez, J. A. Gonzalez-Vera, ..., **A. Orte***, L. Alvarez de Cienfuegos*. In situ real-time monitoring the mechanism of self-assembly of short peptide supramolecular polymers. *Mater. Chem. Front.* (2021), **5**, 5452-5462. Position: 8/9. Corresponding author. Citations: 23.
- 9) F. Fueyo-Gonzalez, J. A. Gonzalez-Vera,* I. Alkorta, ..., **A. Orte**, R. Herranz*. Environment-Sensitive Probes for Illuminating Amyloid Aggregation *in vitro* and in Zebrafish. *ACS Sensors* (2020) **5**, 2792-2799. Position: 9/10. Citations: 25. Journal cover.
- 10) E. Garcia-Fernandez, M. C. Gonzalez-Garcia, S. Pernagallo, ..., **A. Orte***. miR-122 direct detection in human serum by time-gated fluorescence imaging. *Chem. Commun.* (2019) **55**, 14958-14961. Position: 11/11. Corresponding author. Citations: 15.

C.2. Conferences

- 1) *Invited lecture*. 18th Conference on Methods and Applications in Fluorescence (MAF). Valencia (Spain), September 2024. *Title*: Multiplexed PLIM Imaging for Biomarker Detection and Following Regulatory Cell Functionality.
- 2) *Invited lecture*. Gordon Research Conference on Physiology, Biology and Pathology of Phosphate. Galveston (USA), February 2023. *Title*: Pi-FLIM – A Novel Method to Assess Intracellular Phosphate.
- 3) *Invited lecture*. Annual Spanish-Portuguese Meeting on Advanced Optical Microscopy (SPAOM2022). Salamanca (Spain), November 2022. *Title*: Advanced time-resolved and super-resolution microscopy.
- 4) *Invited lecture*. XXVII National Spectroscopy Meeting (RNE) – XI Iberian Spectroscopy Conference (CIE). Málaga (Spain), July 2022. *Title*: Microenvironment sensing by multiparametric microscopy and nanoscopy
- 5) *Plenary lecture*. 21st International Symposium on Bioluminescence and Chemiluminescence and XIX International Symposium on Luminescence Spectrometry (21st ISBC & XIX ISLS). Gijón (Spain), May 2022. *Title*: Multiparametric microscopy and nanoscopy for quantitative imaging and sensing
- 6) *Invited lecture*. Bioluminescence, Chemiluminescence and Luminescence Spectrometry Online Symposium. June 2021. *Title*: Multidimensional fluorescence lifetime imaging and sensing.
- 7) *Invited lecture*. V Spanish-Portuguese Conference on Photochemistry. Toledo (Spain), September 2016. *Title*: Fluorescence lifetime sensing: A multidimensional approach.

C.3. Research projects.

- 1) PID2023-148243OB-I00: *PoTraSens*: Detección de modificaciones post-traduccionales en células T. Hacia nuevas aplicaciones en inmunología. Ministerio de Ciencia, Innovación y Universidades/Agencia Estatal de Investigación. *PI: A. Orte* / J. A. González-Vera. September 2024 – December 2027. *Funding*: 187,500€.
- 2) PID2020-114256RB-I00: *Treg-KinSens*: Sensores luminiscentes inteligentes para imagen molecular de súper-resolución de cascadas de quinasas en células T reguladoras. Ministerio de Ciencia e Innovación/Agencia Estatal de Investigación. *PI: A. Orte*. September 2021 – May 2025. *Funding*: 145,200€.
- 3) diaRNAgnosis (101007934): A novel platform for the direct profiling of circulating cell-free ribonucleic acids in biofluids. MSCA-RISE from Horizon 2020. *Coordinator*: S. Pernagallo (DestiNA Genómica). January 2021 – May 2025. *Funding*: 759,000€. A. Orte is the leading researcher from the University of Granada within the consortium (*Funding*: 87,400€).
- 4) EQC2018-004333-P: Nanoscopio de súper-resolución con capacidades multidimensionales para la Unidad de Excelencia de Química Aplicada a Biomedicina y Medioambiente (UEQ). Ministerio de Ciencia, Innovación y Universidades. *PI: A. Orte*. January 2019 – March 2021. *Funding*: 630,350€.
- 5) CTQ2017-85658-R: *TG-DiAG*: Nuevas Estrategias de Diagnóstico Basadas en Fluorescencia con Ventana Temporal. Ministerio de Economía y Competitividad. *PI: A. Orte*. January 2018 – September 2021. *Funding*: 116,160€.
- 6) miRNA-DisEASY (690866): microRNA biomarkers in an innovative biophotonic sensor kit for high-specific diagnosis. MSCA-RISE from Horizon 2020. *Coordinator*: Cristina Ress. December 2015 – December 2019. *Funding*: 445,500€. A. Orte is the leading researcher from the University of Granada within the consortium (*Funding*: 27,000€).
- 7) CTQ2014-56370-R: Una Plataforma de Multi-Imagen para la Evaluación del Metabolismo Celular. Aplicación al Diagnóstico del Cáncer y la Citotoxicidad de Oligómeros Amiloides. Ministerio de Economía y Competitividad. *PI: A. Orte*. January 2015 – December 2018. *Funding*: 99,000€.
- 8) Project with charity: Diagnóstico del Cáncer mediante una Plataforma de Nanosensores Metabólicos. Fundación Ramón Areces. *PI: A. Orte*. April 2015 – April 2018. *Funding*: 83,430€.

C.4. Contracts, technological or transfer merits

- 1) *Contract*. AT17_5105_OTRI-UGR: Prueba de concepto de un sistema de detección de microRNA21 como biomarcador tumoral mediante fluorimetría con ventana temporal. Junta de Andalucía. *PI: A. Orte*. *Institutions*: Universidad de Granada, DestiNA Genómica SL. November 2019 – April 2021. *Funding*: 45,818.39€.
- 2) Tech transfer contract (OTRI) with the company DestiNA Genómica S.L. *PI: A. Orte*. March 2015 – June 2016. *Funding received from the company*: 58,964.44 €.
- 2) *International patent Ref*: WO 2021/152197 A1. *Title*: 8-metoxo-2-oxo-1,2-dihydrocyclopenta[de]quinoline derivatives and use thereof as reagents for labelling lanthanide luminescence. *Inventors*: R. Herranz, F. Fueyo González, M. Gutiérrez, C. Izquierdo, J. A. González Vera, **A. Orte Gutiérrez**, E. García Fernández, M. V. Cano Cortés. *Date*: 05/08/2021
- 3) *International patent Ref*: WO/2018/224719. *Title*: Sondas Dual probes for flow cytometry and mass cytometry. *Inventors*: A. Delgado González; R.M. Sánchez Martín; J.J. Díaz Mochón; M.T. Valero Griñán; **A. Orte Gutiérrez**; E. García Fernández. *Date*: 13/12/2018.
- 3) *International patent Ref*: WO 2014/198986 A1. *Title*: Method for estimating the concentration of phosphates in live cells, xanthene colourant and synthesis thereof. *Inventors*: J. M. Alvarez Pez; L. Crovetto; J. M. Cuerva; M. D. Giron; J. R. Justicia; **A. Orte**; M. J. Ruedas; R. Salto; E. M. Talavera; Á. Martínez; J. M. Paredes. *Date*: 18/12/2014.