

Abbreviated CV

Part A. PERSONAL INFORMATION		CV date	22/05/2019
First and Family name	Gervasi Herranz Casabona		
Social Security, Passport, ID number	43425913G	Age	48
Researcher numbers	Researcher ID	G-2770-2014	
	Orcid code	0000-0003-4633-4367	

A.1. Current position

Name of University/Institution	Agencia Estatal Consejo Superior de Investigaciones Científicas		
Department	Institut de Ciència de Materials de Barcelona		
Address and Country	Campus de la UAB, 08193 Bellaterra, Catalonia, Spain		
Phone number	935801853	E-mail	gherranz@icmab.cat
Current position	Tenured CSIC Scientist (C. Titular)	From	07/2008
UNESCO codes	221124, 221117, 221111, 221126		
Keywords	Functional Oxides, Magnetism, Optics, Photonics		

A.2. Education

PhD	University	Year
Physics	University of Barcelona	2004

A.3. JCR articles, h Index, thesis supervised...

- Co-Supervisor of 3 PhD thesis: Dr. J.M. Caicedo (2012), Dr. O. Pascu (2012), Dr. M. Scigaj (2016); Supervisor of 3 PhD Thesis: Dr. O. Vlasin (2014). B. Casals (2017), R. Cichelero (2019), C. Yu (to be defended in Fall 2019).
- Citations (Web of Science) over the last five years (2014-18): **1436** (ca. 287/year)
- Publications in 1st Quartile journals: **55** (out of 90)
- Publications in 1st Decile journals: **20** (out of 90)
- h Index: **26** (Web of Science as of March 2019)

Part B. CV SUMMARY (max. 3500 characters, including spaces)

I am leading a research in **Functional Oxide Interfaces and Photonics**. I got my PhD in 2004 at ICMAB-CSIC. Until 2008, my focus was on the research on functional oxides, exploiting their magnetic and transport, with emphasis on the potential use for electronics. During my period at the Unité Mixte Physique CNRS/Thales (2004-2008), my efforts were aimed at spintronics applications. By then, my scientific experience led me to the conviction that exploiting the optical properties of functional interfaces could pave the way to new developments in electronics. In 2008, my new permanent position at ICMAB-CSIC gave me the opportunity to bring these new ideas and concepts into life.

This background has brought about my major achievements in the fields of oxide functional interfaces and photonics. My most notorious highlights in the last five years include: (i) The possibility of manipulating the electronic structure of oxide quantum wells to realize tailored properties for applications, mainly in electronics (**Physical Review Letters** 109, 226601 (2012), **Scientific Reports** 2, 758 (2012), **Physical Review Letters** 113, 156802 (2014), **Nature Communications** 6, 6028 (2015), **Physical Review Letters**, (2017), **Nature Materials** (2019); ii) the tuning of electronic orbital polarization at oxide surfaces (**Nature Communications** 3, 1189 (2012)); the tailoring of the magneto-optic activity exploiting photonic-band effects (**ACS Nano**, 5, 2957(2011), **Nanoscale** 3, 4811 (2011)) or polarons (**Physical Review Letters**, 2016) and (iv) exploiting plasmons for enhanced magneto-optics (**Langmuir**, 28, 9010 (2012), **Physical Review Applied** 2, 054003 (2014), **Optics Express**, 2018), (v) Using advanced optical tools to map multifunctional responses **Physical Review Letters**, (2018); **Nature Physics**, (2019) .

I have supervised three Master Theses and **six PhD Theses** (one more is in progress). My results have been **published in 90 articles** (over the last six years I have published 10 articles in journals with index of impact higher than 5, including **1 Nature Materials, 1 Nature Physics, 5 Physical Review Letters, 2 Nature Communications**) and my h-index is $h = 26$. I have been awarded with 14 invited lectures in international conferences during the last 8 years (among them, APS March Meeting (twice), MRS Spring, SPIE, CIMTEC, E-MRS Fall and Intermag conferences). I have co-authored a book chapter in the field of photonics (2013). My full scientific record is available at <http://www.researcherid.com/rid/G-2770-2014> and ORCID ID: <http://orcid.org/0000-0003-4633-4367>. Also, one of my endeavors has been to be in contact with the scientific community and boost the communication and knowledge exchange. With this in spirit, I have been organizer of two MRS Spring symposia (one as lead coordinator) and I also led the organization of one symposium in EMRS 2015 in functional oxides. At the same time, I have been invited as lecturer in different Schools worldwide to lecture on oxide physics and photonics.

Based on my previous experience, I identify innovative research paths exploiting the fusion of the fields of functional oxides and photonics. One of my strategic goals is to couple **plasmonics to functional materials such as ferroelectrics and ferromagnets** to control optical waveguides by electric fields, with the ultimate vision of having plasmonic circuitry fully scalable into electronic circuits. In particular, I envisage also the development of **topological photonic crystals**, where the propagation of electromagnetic waves is protected by special symmetries. On the other hand, I am interested in the use of **photoconductive two-dimensional electron gases to mimic the functioning of biological neurons** using optical inputs, with the view put on artificial vision systems. That would be extremely relevant to one of today's challenges of the semiconductor industry, namely, to solve the interconnect bottleneck by building hybrid electronic/photonics circuitry.

Part C. RELEVANT MERITS

C.1a. Publications (Most relevant over the last five years)

Two-Dimensional Electron Gases at $\text{LaAlO}_3/\text{SrTiO}_3$ Interfaces: Orbital Symmetry and Hierarchy Engineered by Crystal Orientation. D. Pesquera, M. Scigaj, P. Gargiani, A. Barla, J. Herrero-Martín, E. Pellegrin, S. M. Valvidares, J. Gázquez, M. Varela, N. Dix, J. Fontcuberta, F. Sánchez, and G. Herranz, **Physical Review Letters** 113, 156802 (pp 1-6) (2014).

Engineering two-dimensional superconductivity and Rashba spin-orbit coupling in $\text{LaAlO}_3/\text{SrTiO}_3$ quantum wells by selective orbital occupancy. Gervasi Herranz, Gyanendra Singh, Nicolas Bergeal, Alexis Jouan, Jérôme Lesueur, Jaume Gázquez, María Varela, Mateusz Scigaj, Nico Dix, Florencio Sánchez, Josep Fontcuberta, **Nature Communications** 6, 6028 (2015).

Interface Magnetoelectric Coupling in $\text{Co/Pb}(\text{Zr,Ti})\text{O}_3$. Ondřej Vlašín, Romain Jarrier, Rémi Arras, Lionel Calmels, Bénédicte Warot-Fonrose, Cécile Marcelot, Matthieu Jamet, Philippe Ohresser, Fabrice Scheurer, Riccardo Hertel, Gervasi Herranz, and Salia Cherifi-Hertel, **ACS Appl. Mater. Interfaces** 8, 7553 (2016).

Giant Optical Polarization Rotation Induced by Spin-Orbit Coupling in Polarons. Blai Casals, Rafael Cicheler, Pablo García-Fernández, Javier Junquera, David Pesquera, Mariano Campoy-Quiles, Ingrid C. Infante, Florencio Sánchez, Josep Fontcuberta, Gervasi Herranz, **Physical Review Letters**, Phys. Rev. Lett. 117, 026401 (2016).

Competition between Polar and Nonpolar Lattice Distortions in Oxide Quantum Wells: New Critical Thickness at Polar Interfaces. J. Gázquez, M. Stengel, R. Mishra, M. Scigaj, M. Varela, M. A. Roldan, J. Fontcuberta, F. Sánchez and G. Herranz, **Physical Review Letters**, 119, 106102 (2017).

Non-reciprocal diffraction in magnetoplasmonic gratings. Rafael Cichelero, Mikko Kataja, Mariano Campoy-Quiles, and Gervasi Herranz, **Optics Express**, Phys. Rev. Lett. 26, 34842 (2018).

Low-Temperature Dielectric Anisotropy Driven by an Antiferroelectric Mode in SrTiO₃. Blai Casals, Andrea Schiaffino, Arianna Casiraghi, Sampo J. Hämäläinen, Diego López González, Sebastiaan van Dijken, Massimiliano Stengel, and G. Herranz, **Phys. Review Letters**, 120, 217601 (2018).

Giant topological Hall effect in correlated oxide thin films. Lorenzo Vistoli, Wenbo Wang, Anke Sander, Qiuxiang Zhu, Blai Casals, Rafael Cichelero, Agnès Barthélémy, Stéphane Fusil, Gervasi Herranz, Sergio Valencia, Radu Abrudan, Eugen Weschke, Kazuki Nakazawa, Hiroshi Kohno, Jacobo Santamaria, Weida Wu, Vincent Garcia & Manuel Bibes, **Nature Physics**, 15, 67 (2019).

Gap suppression at a Lifshitz transition in a multi-condensate superconductor. G. Singh, A. Jouan, G. Herranz, M. Scigaj, F. Sánchez, L. Benfatto, S. Caprara, M. Grilli, G. Saiz, F. Couedo, C. Feullet-Palma, J. Lesueur, N. Bergeal **Nature Materials**, (2019).

C.1b. Book Chapters: Responsive Photonic Nanostructures (Smart Nanoscale Optical Materials) Edited by Royal Society of Chemistry 2013, Editor: Prof. Yadong Yin, ISBN: 978-1-84973-653-4, DOI:10.1039/9781849737760 Oana Pascu, Gervasi Herranz and Anna Roig. CHAPTER 10: *Chemical Routes to Fabricate Three-Dimensional Magnetophotonic Crystals.*

C.2. Research projects and grants (over the last five years)

Reference: MAT2011-29269-C03-01 *Title:* Responsive Multifunctional Oxides and Hybrid Structures (REMS) *Funding Agency:* Plan Nacional I+D Spanish Ministry of Science Education & Innovation *Main researcher and coordinator:* Florencio Sánchez (ICMAB-CSIC). *Period:* 01/01/2012 AL 31/12/2015, *Amount:* 490 k€, *Participation:* Researcher

Reference: MAT2014-56063-C2-1-R *Title:* Metals and Oxides for a Sustainable Electronics (MOSES) *Funding Agency:* Plan Nacional I+D Spanish Ministry of Economy and Competitiveness

Main researcher and coordinator: Gervasi Herranz (ICMAB-CSIC). *Period:* 2015 – 2017, *Amount:* 350 k€, *Participation:* Coordinator

Reference: MAT2017-85232-R *Title:* Oxide Responses Inspired by Nature (ORION) *Funding Agency:* Plan Nacional I+D Spanish Ministry of Economy and Competitiveness *Main researcher and coordinator:* F. Sánchez & G. Herranz (ICMAB-CSIC). 2018 – 2017, *Amount:* 242 k€

Reference: 748429 — EMPHASIS *Title:* Enabling Multifunctional Plasmonics on Hybrid Artificial Scale-Integrated Systems *Funding Agency:* EU- Horizon 2020 Framework, H2020-MSCA-IF-2016 Fellowship (Dr. M. Kataja)

C.3. Contracts. Ramon y Cajal contract Period: 01/02/2008 – 30/06/2008

C.4. Organization of Conferences and Schools.

Organization committee of *International School of Oxide Electronics 2011*, 3-15 October 2011, Cargèse, Corsica (France).

2011 MRS Spring Meeting, April 25 - 29, 2011, San Francisco, California. Symposium G: Complex Oxide Materials for Emerging Energy Technologies Symposium

2013 MRS Spring Meeting, April 1 - 5, 2013, San Francisco, California, Symposium XX: Oxide Thin Films and Heterostructures for Advanced Information and Energy Technologies Symposium Gervasi Herranz (lead coordinator)

2015 EMRS Spring Meeting, May 11-15, 2015, Lille, France. Symposium: O: Fundamentals of oxide heterostructures. Gervasi Herranz (lead coordinator)

C.5 Invited Lectures at Schools, Universities & Research Centers

Schools:

6th European School on Multiferroics (ESMF6) July 21-26, 2013 Wittenberg, Germany
International School of Oxide Electronics 2013 Lectures, September 2-14, 2013, Cargèse, Corsica

Seminars in Research Centers & Institutions (those delivered over the last five years are in bold italics):

University of Geneva (Switzerland) May 2004, SPEC-CEA Saclay (France), June 2004, Laboratoire CRISMAT, Caen (France), February 2006, Seoul National University, Seoul (South Korea) October 2007, University of Zagreb (Croatia) October 2007, Oak Ridge National Laboratory (USA) March 2008, University of Groningen (The Netherlands) May 2008, Universidad Nacional Autónoma de México (UNAM) July 2008, Chalmers University, Göteborg (Sweden) February 2010, University of Mainz (Germany) January 2012, ESPCI-ParisTech (Paris, France) November 2013, Technical **University of Darmstadt**, Germany, November 2014, **University of the Basque Country**, June 2015, **Institute for Basic Science Center for Correlated Electron Systems (IBS CCES) Seoul**, South Korea, December 2017; **INN-CNEA, Buenos Aires**, Argentina, December 2017.

Invited talks over the last five years (selection): **APS March Meeting 2015**, New Orleans (USA), March, 2015; **10th Int. Conf. on Advanced Materials and Devices (ICAMD2017)** Jeju (South Korea), December, 2017; **EMRS Fall Meeting 2018**, Warsaw, Poland, September 2018, **META 2019, 10th Intl. Conference on Metamaterials, Photonic Crystals and Plasmonics**, Lisbon, Portugal, July 2019, **SPIE Optics + Photonics**, San Diego, USA, August 2019.