

## Curriculum Vitae - Gervasi Herranz

Institute for Materials Science of Barcelona, ICMAB-CSIC, Campus de la UAB,

E-08193 Bellaterra, Catalonia

Phone: +34 93 580 18 53; Fax: +34 93 580 57 29

Email: [gherranz@icmab.cat](mailto:gherranz@icmab.cat), WEB: <https://gervasi-herranz.blog/>

RESEARCHER ID: <http://www.researcherid.com/rid/G-2770-2014>

ORCID: <http://orcid.org/0000-0003-4633-4367>.

### PREVIOUS POSITIONS

2001-2004 : PhD Thesis at ICMAB-CSIC

2004- 2008 : Unité Mixte de Physique CNRS/THALES – Université Paris-Sud XI

2008 – now: CSIC Research staff at the Institute of Materials Science of Barcelona ICMAB-CSIC

### MY SCIENTIFIC PROFILE

I am leading a research in Functional Oxide Interfaces and Photonics at ICMAB-CSIC. My most relevant highlights over the last 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 119, 106102 (2017) 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)).

I have supervised several Master Theses and five PhD Theses (two more are in progress). My results have been published in 85 articles (over the last six years I have published 18 articles in journals with index of impact higher than 5) and my h-index is  $h = 24$ . I have been awarded with 19 invited lectures in international conferences over the last 6 years (among them, APS March Meeting (twice), MRS Spring, SPIE, CIMTEC and Intermag conferences). I have co-authored a book chapter in the field of photonics (2013) and another on the physics of oxide interfaces to appear soon. 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. Particularly, in the mid-to-long term I am interested in coupling plasmonics to functional materials such as ferroelectrics and ferromagnets. One of my strategic goals as a researcher is to investigate how plasmonic waveguides can be controlled by electric fields, with the ultimate vision of having plasmonic circuitry fully scalable into electronic circuits. 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/photonic circuitry.

## SELECTED PUBLICATIONS

**On the whole I have published 85 articles. The list includes 1 *Nature*, 1 *Nature Materials*, 2 *Nature Communications*, 1 *ACS Nano*, 8 *Physical Review Letters*, 10 *Applied Physics Letters* and 14 *Physical Review B*, among others. I have also published a book chapter on Photonics and another one on Oxide Interfaces that will appear soon.**

A selection of publications is given in the following:

*Two-dimensional electron gas with universal subbands at the surface of SrTiO<sub>3</sub>*. A. F. Santander-Syro, O. Copie, T. Kondo, F. Fortuna, S. Pailhès, R. Weht, X. G. Qiu, F. Bertran, A. Nicolaou, A. Taleb-Ibrahimi, P. Le Fèvre, G. Herranz, M. Bibes, N. Reyren, Y. Apertet, P. Lecoeur, A. Barthélémy and M. J. Rozenberg, **Nature** 469, pp 189-193 (2011)

*Magnetophotonic Response of Three-Dimensional Opals*. J. M. Caicedo, O. Pascu, M. López-García, V. Canalejas, A. Blanco, C. López, J. Fontcuberta, A. Roig, G. Herranz, **ACS Nano**, 5 (4), pp 2957–2963 (2011)

*High mobility conduction at (110) and (111) LaAlO<sub>3</sub>/SrTiO<sub>3</sub> interfaces*. G. Herranz, F. Sánchez, N. Dix, M. Scigaj, J. Fontcuberta, **Scientific Reports** 2, 758 (pp 1-5) (2012)

*Surface symmetry-breaking and strain effects on orbital occupancy in transition metal perovskite epitaxial films*. D. Pesquera, G. Herranz, A. Barla, E. Pellegrin, F. Bondino, E. Magnano, F. Sánchez, J. Fontcuberta, **Nature Communications** 3,1189 (pp 1-7) (2012)

*Electronic Subband Reconfiguration in a d<sup>0</sup>-Perovskite Induced by Strain-Driven Structural Transformations*. V. Laukhin, O. Copie, M. J. Rozenberg, R. Weht, K. Bouzehouane, N. Reyren, E. Jacquet, M. Bibes, A. Barthélémy, G. Herranz, **Physical Review Letters** 109, 226601 (pp 1-5) (2012).

*Two-Dimensional Electron Gases at LaAlO<sub>3</sub>/SrTiO<sub>3</sub> 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 LaAlO<sub>3</sub>/SrTiO<sub>3</sub> 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).

*Giant Optical Polarization Rotation Induced by Spin-Orbit Coupling in Polarons.* Blai Casals, Rafael Cichelero, 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).

CHAPTER OF A BOOK: 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.*

## RESEARCH PROJECTS

*Reference:* CSD2007-00041

*Title:* Materiales avanzados y nanotecnologías para dispositivos y sistemas eléctricos, electrónicos y magnetoelectrónicos innovadores/Advanced materials and nanotechnologies for innovative devices and electric, Electronic and magnetoelectronic devices" (NANOSELECT)

*Funding Agency:* Spanish Ministry of Science Education & Innovation (CONSOLIDER);

*Main researcher and coordinator:* X. Obradors (ICMAB-CSIC).

*Period:* 2007-2014, *Participation:* Researcher

*Reference:* PICS2008FR1

*Title:* POSTIT (Polar Surfaces and Transport Phenomena in Oxide Interfaces / Surfaces Polaires et Phénomènes de Transport dans des Interfaces d'Oxydes)

*Funding Agency:* Project for Scientific Cooperation PICS CNRS-CSIC;

*Main researcher and coordinator:* Gervasi Herranz (CSIC) / Manuel Bibes (CNRS).

*Period:* 01/01/2009-31/12/2011, *Amount:* 15 k€, *Participation:* Coordinator

*Reference:* MAT2009-06885-E

*Title:* Metaferroelectrics: towards a new generation of ferroelectrics

*Funding Agency:* Acción Complementaria EXPLORA from Spanish Min. of Science & Innovation

*Main researcher and coordinator:* Gervasi Herranz (CSIC).

*Period:* 01/03/2010 - 30/06/2011, *Amount:* 70 k€, *Participation:* Coordinator

*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

## **Organization of Conferences and Schools**

*International School of Oxide Electronics 2011*, 3-15 October 2011, Cargèse, Corsica (France). Organization committee: Manuel Bibes (UMR CNRS/Thales, Palaiseau, France), Patrycja Paruch (Université de Genève, Switzerland), Gervasi Herranz (ICMAB-CSIC, Bellaterra, Spain), Frédéric Petroff (UMR CNRS/Thales, Palaiseau, France)

*2011 MRS Spring Meeting*, April 25 - 29, 2011, San Francisco, California. Symposium G: Complex Oxide Materials for Emerging Energy Technologies Symposium Organizers: Ho Nyung Lee, Oak Ridge Nat. Lab., Akira Ohtomo, Tokyo Inst. of Technology, Gervasi Herranz., Institut of Materials Science of Barcelona ICMAB-CSIC, John Perkins, National Renewable Energy Laboratory

*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 Organizers: Gervasi Herranz (lead coordinator), Institut of Materials Science of Barcelona, Ho Nyung Lee, Oak Ridge National Laboratory, Jens Kreisel, Luxembourg University, CRP Lippmann - Materials Sciences, Hiromichi Ohta, Nagoya University, Graduate School of Engineering

*2015 EMRS Spring Meeting*, May 11-15, 2015, Lille, France. Symposium: O: Fundamentals of oxide heterostructures. Organizers: Gervasi Herranz., Institut of Materials Science of Barcelona, Mark Huijben, Univ. of Twente, Daniel Sando SNU, Seoul, Hans Boschker, Max Planck Institute

## **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:*

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, November 2014, University of the Basque Country, June 2015.