

Part A. PERSONAL INFORMATION

CV date 22/05/2019

First and Family name	Jose Enrique ORTEGA		
Social Security, Passport, ID number	15960590Q	Age	56
Researcher numbers	Researcher ID	I-4445-2012	
	Orcid code		

A.1. Current position

Name of University/Institution	Universidad del Pais Vasco		
Department	Fisica Aplicada I		
Address and Country	Manuel Lardizabal 5, 20018 San Sebastian, Spain		
Phone number	+34943018750	E-mail	enrique.ortega@ehu.es
Current position	Professor	From	2013
Espec. cód. UNESCO			
Keywords			

A.2. Education

PhD	University	Year
Physics	Universidad Autónoma Madrid	1990

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

Sexenios de Investigación:.....5 (2016)
 Thesis Supervised.....9
 Total citations:> 5480
 Citations/year last 5 years.....> 250
 h index.....34

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

Enrique Ortega works on the synthesis and microscopic and spectroscopic characterization of nanostructures of varied nature. His technical expertise encompasses all electron spectroscopies and synchrotron radiation, particularly photoemission (ARPES and XPS). In fact, Ortega's most important scientific contributions derive from photoelectron spectroscopy experiments, undertaken as an external synchrotron user. His synchrotron activity began during his Ph. D. thesis, focused on the analysis of metal/semiconductor interfaces (over **350 citations in 5 papers**) with XPS. It soon intensified and extended to other techniques, such as ARPES, NEXAFS, XMCD, etc., for which he employed no less than 80 beam times at 15 different facilities worldwide. Ortega may be defined as an experienced "synchrotron" photoemission researcher. No wonder he is or has been a proposal reviewer (ESRF, Soleil, Max-Lab), SAC member (ALBA), and "reference user" of the new "LOREA" beamline in ALBA.

His renowned work on electronic states of metallic quantum wells (QW) is the keystone in Ortega's research career. He developed physics ideas and analytical frameworks to rationalize the ARPES spectra, which were later extended to other topics, such as vicinal surfaces. Metallic QW research began during his post-doc at IBM Labs in Yorktown Heights, and continued later, in San Sebastian. The results are mostly summarized in **5 fundamental articles with more than 2000 citations**, which made Ortega's work known worldwide. Although focused on model metallic thin films exhibiting vertically discretized electronic bands, the implications extended to film properties of technological relevance, such as magnetic coupling in multilayers.

Since the early times at IBM, Ortega examined the natural extension of QW's to one dimension less, namely to laterally-confined surface states. This became Ortega's most original work, his hallmark contribution to Science. Based on the popular STM observations of electron

interferences at surface steps, Ortega's idea was to "crystallize" such steps into 1D lattices using vicinal surfaces, such that ARPES can be used to probe step scattering in Fourier space. The approach revealed successful, leading to a number of papers (**the most important 5 have nearly 500 citations**) that work out fascinating aspects of the problem, which resulted, in the end, more complex and intriguing than the 2D metallic QW itself.

Work in vicinal surfaces demands experiments that combine ARPES and STM. This explains the philosophy behind Ortega's research Lab in San Sebastian: to combine STM and photoemission in the same setup. STM revealed necessary to describe surface structures that are later examined with ARPES, such as 2D alloys, dislocation networks, or magnetic nanodots, all explored by Ortega in recent years. Of particular impact, though, are supramolecular structures combining two distinct donor/acceptor species. Such systems have been examined with the battery of techniques in San Sebastian, plus synchrotron radiation. The impact of this work is notably increasing, with **5 articles having more than 300 citations** in the last years.

The accumulated knowledge in surface superstructures, particularly step lattices, has fueled the most ambitious project that Ortega has ever pursued: to utilize **curved crystal surfaces** as tunable templates for surface science studies. His particular crystal geometry enables simple processing in vacuum and easy-access to distinct surface orientations on the same sample. A start-up company (Bihurcrystal Ltd.) span-off to commercialize these fine crystals. Experiments using the first curved samples have been published (**15 articles since 2008**), aimed at revisiting controversial surface science problems that involve steps, such as faceting, scattering at steps, or chemistry and catalysis. Results are impressively clear and demonstrate the tremendous potential of Ortega's new approach of curved crystal surfaces.

C.1. Publications (including books)

Total: 155 (+4 submitted) peer-reviewed publications

- **38 In highly-ranked journals with impact factor >7:** 13 Phys. Rev. Letters, 1 Nature Nanotechnology, 2 Nature Communications, 1 Adv. in Physics, 1 Adv. Materials, 2 Adv. Functional Materials, 3 Nanoletters, 9 ACS-Nano, 1 ACS Catalysis, 1 Nanoscale, 1 Small, 2 JACS, 2 2D-Materials
- **Also in the first quartil:** 31 Phys. Rev. B, 4 Appl. Phys. Lett., 10 Surf. Sci., 4 J. Phys. Cond. Mat., 4 New J. Phys., and 27 papers in several Physical-Chemistry Journals.
- Co-authoring **6 Book Chapters**.

In the last 5, years the most important 10 are the following:

1. "X-ray photoemission analysis of clean and carbon monoxide-chemisorbed platinum(111) stepped surfaces using a curved crystal", A. L. Walter, F. Schiller, M. Corso, L. R. Merte, F. Bertram, J. Lobo-Checa, M. Shipilin, J. Gustafson, E. Lundgren, A. X. Brión-Ríos, P. Cabrera-Sanfeliix, D. Sánchez-Portal, and J. E. Ortega, Nature Commun. **6**, 8903 (2015).
2. "Multi-component organic layers on metal substrates ", E. Goiri, A. El-Sayed, P. Borghetti, J. E. Ortega, and D. G. de Oteyza, Advanced Materials **28**, 1340–1368 (2016).
3. "Interplay between steps and oxygen vacancies on curved TiO₂(110)", L. A. Miccio, M. Setvin, M. Abadía, I. Piquero, J. Lobo-Checa, F. Schiller, C. Rogero, M. Schmid, U. Diebold, and J. E. Ortega, Nanoletters **16**, 2017–2022 (2016).
4. "Tunable Band Alignment with Unperturbed Carrier Mobility of On-Surface Synthesized Organic Semiconducting Wires", A. Basagni, G. Vasseur, C. A. Pignedoli, M. Vilas-Varela, D. Peña, L. Nicolas, L. Vitali, J. Lobo-Checa, D. G. de Oteyza, F. Sedona, M. Casarin, J. E. Ortega, and M. Sami, ACS Nano **10**, 2644–2651 (2016).

5. "π band dispersion along conjugated organic nanowires synthesized on a metal oxide semiconductor", G. Vasseur, M. Abadi, L. A. Miccio, J. Brede, A. Garcia-Lekue, D. G. de Oteyza, C. Rogero, J. Lobo-Checa, and J.E. Ortega, J. Am. Chem. Soc. **138**, 5685–5692 (2016).
6. "High temperature ferromagnetism in a GdAg₂ monolayer", M. Ormaza, L. Fernández, M. Ilyn, A. Magaña, B. Xu, M. J. Verstraete, M. Gastaldo, M. A. Valbuena, P. Gargiani, A. Mugarza, A. Ayuela, L. Vitali, M. Blanco-Rey, F. Schiller, and J. E. Ortega, Nanoletters, **16**, 4230–4235 (2016).
7. "Precise engineering of quantum dot array coupling through their barrier widths", I. Piquero-Zulaica, J. Lobo-Checa, A. Sadeghi, Z. M. Abd El-Fattah, C. Mitsui, T. Okamoto, R. Pawlak, T. Meier, A. Arnau, J. E. Ortega, J. Takeya, S. Goedecker, E. Meyer, and S. Kawai, Nature Commun. **8**, 787 (2017).
8. "Polymerization of extraordinarily aligned organic nanowires on a rare-earth surface alloy", M. Abadia, M. Ilyn, I. Piquero-Zulaica, P. Gargiani, C. Rogero, J. E. Ortega, and J. Brede ACS Nano **11**, 12392–12401 (2017).
9. "Electronic Structure Tunability by Periodic meta-Ligand Spacing in One-Dimensional Organic Semiconductors", I. Piquero-Zulaica, A. Garcia-Lekue, L. Colazzo, M. S. G. Mohammed, Z. M. Abd-el-Fattah, C. K. Krug, J. M. Gottfried, D. G. de Oteyza, J. E. Ortega, and J. Lobo-Checa, ACS Nano **12**, 10537–10544 (2018).
10. "Catalytic oxidation of carbon monoxide on a curved Pd crystal: spatial variation of active and poisoning phases in stationary conditions", F. Schiller, M. Ilyn, Virginia Pérez-Dieste, C. Escudero, C. Huck-Iriart, N. Ruiz del Arbol, B. Hagman, L. R. Merte, F. Bertram, M. Shipilin, S. Blomberg, J. Gustafson, E. Lundgren, and J. E. Ortega, J. Am. Chem. Soc., **140**, 16245–16252 (2018).

C.2. Research projects and grants

Personal grants as Principal Investigator (1997-2018)

- **25 Research projects**, in competitive calls: 6 minor University or regional grants (total managed €38,600), 3 major regional projects (€560,000), 2 minor Spanish Ministry projects (€26,000), 5 regular Spanish Ministry projects (€504,400), 1 Spanish Ministry International Collaboration Project (general coordinator, €85,200 managed), 1 ESF-European collaboration project (general coordinator, €81,650 managed), 7 Regional Infrastructure projects (€550,000).

Total managed money in personally awarded grants **€1,850,000**

- **4 Industry and Technology Development Projects projects**, at the regional level.

C.4. Spin-off companies

- Founding partner of "Bihurcrystal S. L." in 2013
- Currently, holding 15.17% of "Bihurcrystal S. L."

C.5. Patents

1 patent "Procedimiento para la preparación de una red de islas metálicas para almacenamiento de información", N. de solicitud. P 200900162, País de prioridad: España, Fecha presentación 21.01.2009, Fecha de publicación: 22.07.2010

C.6. Abstracts, conferences and seminars

- **300 abstract contributions** to conferences
- **43 invited seminars** in Universities/Research centers
- **37 invited talks** in international conferences and workshops

- **1 plenary talk** “Electronic states in nanostructures”, *Statistical Physics and Low Dimensional Systems*, SPLDS 2007, Nancy (France) May 2007.

C.7. Scientific tutoring

- Director of **11 PhD students** (9 Thesis presented, 2 running)
- Supervisor of **17 postdoctoral researchers**, among them, **4 Marie Curie post-docs**: Jens Kuntze, (HPMF-CT-1999-00280, 2001-2002). Frederik Schiller (HPMF-CT-1999-00280, 2005-2006), Dimas García de Oteyza, International outgoing fellow, (FP7-PEOPLE-2010-IOF271909, 2012), Laura Fernández (MagicFACE 797109).

C.8. Institutional responsibilities, memberships of scientific societies

- *Secretario Académico*, Escuela de Arquitectura, Universidad del País Vasco, 1998-2000; *Coordinador Erasmus*, Escuela de Arquitectura, Universidad del País Vasco, 1998-1999
- 9 times appointed for International or Scientific Committees of conferences
- Organizer of 7 different workshops, conferences, and summer schools.
- Member of the Editorial Panel of the Journal of Physics C- Condensed Matter.
- European Commission, FP7 program evaluator.

C.7. Synchrotron activities

- 45 synchrotron beam time proposals as PI in Europe and USA, among which 27 funded by European Mobility Programs, and 5 by Spanish programs in ALBA
- Co-proposer and reference user of the low-energy beam line LOREA in the new synchrotron ALBA in Barcelona, currently under commissioning (€5,000,000 budget).
- Member of the Scientific Advisory Committee of ALBA
- Synchrotron ESRF beam time proposal reviewer.
- Synchrotron Soleil beam time proposal reviewer.
- Synchrotron Max-IV beam time proposal reviewer.

C.9. Science Outreach Activities

- 11 seminars on “Nanoscience and Nanotechnology” for the general audience, all over Spain.
- 5 seminars to High School and University people, on “Scientific career and opportunities”.
- 3 times jury member in High School student contests on “Nanotechnology”
- Organizer of a 6-seminar series “Nanotechnology” at Mitxelena Cultur Centre, San Sebastian.
- Organizer of a 6-seminar series “Energy” at Mitxelena Cultur Centre, San Sebastian.
- Co-editor of the book “¿Qué es la Nanotecnología?”, disseminated in Spain (Poliedro Collection).

C.10. Distinctions and awards

- “Manuel Laborde Werlinden 2012” award, for Entrepreneurial Ideas within the University of the Basque Country to “Bihurcrystal” (founding partner Enrique Ortega)
- “Toribio Echeverria 2012” award, for Entrepreneurial Ideas in the province of Gipuzkoa to “Bihurcrystal” (founding partner Enrique Ortega)
- CSIC distinction 2012-2013 Academic Year, for “Scientific Merits”.