

## Part A. PERSONAL INFORMATION

CV date 27-10-2021

|                       |                             |                     |  |
|-----------------------|-----------------------------|---------------------|--|
| First and Family name | María Luisa González Martín |                     |  |
|                       |                             |                     |  |
| Researcher numbers    | Researcher ID               | L-3476-2014         |  |
|                       | Orcid code                  | 0000-0002-9207-444X |  |

### A.1. Current position

|                     |                                                                                          |        |                                                    |
|---------------------|------------------------------------------------------------------------------------------|--------|----------------------------------------------------|
| Name of University  | University of Extremadura                                                                |        |                                                    |
| Department          | Applied Physics                                                                          |        |                                                    |
| Address and Country | Av. Elvas s/n, 06006-Badajoz, Spain                                                      |        |                                                    |
| Phone number        | 34 924289532                                                                             | E-mail | <a href="mailto:mlglez@unex.es">mlglez@unex.es</a> |
| Current position    | Full Professor                                                                           | From   | 03-11-2010                                         |
| Espec. cód. UNESCO  | 22 10 32                                                                                 |        |                                                    |
| Key words           | Characterization of surfaces. Characterization of interfaces.<br>Bioadhesion. Adsorption |        |                                                    |

### A.2. Education

|                            |                           |      |
|----------------------------|---------------------------|------|
| PhD                        | University                | Year |
| Doctor en Ciencias Físicas | University of Extremadura | 1989 |

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

- Sexennia of research: 5; Last granted: Period 2013-2018
- Sexennia of transference: 1; Last granted Period -2018
- Doctoral theses supervised: 9

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

My main line of research is aimed at characterizing the properties of surfaces and interfaces, and the processes that occur on them. I have focused my work on adsorption and adhesion systems, on pulverulent and extensive solids, of dissolved molecules and microorganisms in suspension, respectively.

I am specialized in the characterization of solid surfaces and interfaces by evaluating surface and interfacial free energies, wettability, topography, electrical properties and surface composition. These evaluations require the use of methodologies that include calorimetry, liquid imbibition, contact angle goniometry, electrokinetic techniques, atomic force microscopy (AFM), ellipsometry, electron spectroscopy of X-ray bombardment (XPS) and time of flight secondary ion mass spectroscopy (ToF-SIMS). In addition, the process-specific ones, such as batch isotherms or static and dynamic bacterial adhesion procedures. I have achieved this specialization starting with my Doctoral Thesis and postdoctoral studies, at the University of Dundee (UK), by thermodynamic analysis, mainly by calorimetry, of liquid phase adsorption on powdered solids, and continuing with short stays at the University Maria Curie-Skłodowska (Lublin, Poland), one of the international references in the study by contact angle goniometry. In 2000, in collaboration with the Microbiology Department of the UEx Medical Faculty, research began on the process of adhesion of microorganisms to the surface of biomaterials. This process is at the origin of the problem of infections associated with the use of biomaterials. Until now this research has become the main line of investigation of our group. We are interested in the consequences on the bacterial adhesion of the modifications by physical and even chemical processes of the surface of degradable and non-degradable metals and metal-polymer compounds.

I am currently IP of the UEx Biosurfaces and Interfacial Phenomena (BIP) group, IP of the CIBER-BBN Microbial Adhesion group, and responsible for the Surface Characterization and Calorimetry Unit of the Tissues, Biomaterials and Surfaces Platform of the NANBIOSIS Singular Scientific-Technical Facility.

## Part C. RELEVANT MERITS

### C.1. Publications (including books)

- V. Luque-Agudo, M. Hierro-Oliva, A.M. Gallardo-Moreno, M.L. González-Martín  
"Effect of plasma treatment on the surface properties of polylactic acid films"  
Polymer Testing 96, 107097 (2021) (First quartile)  
Detailed surface characterization of modified polylactic acid films by plasma treatment.
  
- V. Luque-Agudo, M.C. Fernández-Calderón, M.A. Pacha-Olivenza, C. Pérez-Giraldo, A.M. Gallardo-Moreno, M.L. González-Martín  
"The role of magnesium in biomaterials related infections"  
Colloids and Surfaces B: Biointerfaces 191, 110996 (2020) (First quartile)  
In-depth update on the consequences against bacteria of the presence of magnesium in biomaterials.
  
- A.M. Gallardo-Moreno, D. Romero-Guzmán, M.L. González-Martín  
"Quantification of electronic activity inside photo-activated TiO<sub>2</sub> layers through a new electrical model supported by electrokinetic data"  
Journal of the Electrochemical Society, 166 (16), H871-H876 (2019) (First quartile)  
Proposal of an analytical model based on streaming potential/current data suitable for the electrokinetic characterization to any metal and any excited semiconductor.
  
- E. Anitua, R. Tejero, M.A. Pacha-Olivenza, M.C. Fernández-Calderón, M. Delgado-Rastrollo, M. Zalduendo, M. Troya, C. Pérez-Giraldo, M.L. González-Martín  
"Balancing microbial and mammalian cell functions on calcium ion-modified implant surfaces"  
Journal of Biomedical Materials Research Part B: Applied Biomaterials 106(1), 421-432 (2018) (First quartile)  
Cellular and microbiological characterization of a new implant surface.
  
- J. Rodríguez-Sánchez, A.M. Gallardo-Moreno, J.M. Bruque, M.L. González-Martín  
"Adsorption of human fibrinogen and albumin onto hydrophobic and hydrophilic Ti6Al4V powder"  
Applied Surface Science, 376, 269-275 (2016) (First quartile)  
The adsorption of two proteins on particles with different hydrophobicity but identical chemical composition is studied and quantified.
  
- J.A. Sánchez-Pérez, A.M. Gallardo-Moreno, M.L. González-Martín, V. Vadillo-Rodríguez  
"BSA adsorption onto nanospheres: Influence of surface curvature as probed by electrophoretic light scattering and UV/vis spectroscopy"  
Applied Surface Science, 353, 1095-1102 (2015) (First quartile)  
The effect of the curvature of the adsorbent on the adsorption of BSA and its conformation on the surface is evaluated. This effect is suggested to be more relevant in the case of adsorption occurring far from the IEP of the protein and with small nanospheres.
  
- I. Braceras, M.A. Pacha-Olivenza, A. Calzado-Martín, M. Multigner, C. Vera, L. Labajos-Broncano, A.M. Gallardo-Moreno, J.L. González-Carrasco, N. Vilaboa, M.L. González-Martín.  
"Decrease of Staphylococcal adhesion on surgical stainless steel after Si ion implantation"  
Applied Surface Science, 310, 36-41 (2014) (First quartile)  
Analysis of the effect of silicon implantation in surgical steel. The mechanical and topographical modifications induced by implantation, their effect on the biocompatibility and on the adhesion of common bacteria in infections associated with prosthesis are studied.
  
- A. Rodríguez-Cano, M.A. Pacha-Olivenza, R. Babiano, P. Cintas, M.L. González-Martín,

"Non-covalent derivatization of aminosilanized titanium alloy implants. Silver-enhanced coating of antibacterial organics"

Surface and Coatings Technology, 245, 66-73 (2014) (First quartile)

From a very dense aminosilanization, silver ions in the coating has been combined with other antibacterials producing a complementary response against bacterial colonization. An exhaustive chemical characterization of the coating and its stability was carried out.

- V. Vadillo-Rodríguez, J.M. Bruque, A.M. Gallardo-Moreno, M.L. González-Martín

"Surface-dependent mechanical stability of adsorbed human plasma fibronectin on Ti6Al4V: domain unfolding and stepwise unraveling of single compact molecules"

Langmuir, 29, 8554-8560 (2013) (First quartile)

By means of atomic force microscopy, the effect on human fibronectin adsorbed in the Ti6Al4V alloy of the modifications caused when the material was irradiated with UV before adsorption was analyzed. This work also includes experiments in which the deployment of the molecule is observed, without the previous stretching of its domains.

- A.M. Gallardo-Moreno, V. Vadillo-Rodríguez, J. Perera-Núñez, J.M. Bruque, M.L. González-Martín

"The zeta potential of extended dielectrics and conductors in terms of streaming potential and streaming current measurements"

Physical Chemistry Chemical Physics 14, 9758-9767 (2012) (First quartile)

Methodological contribution on the analysis of the electrical properties of large surfaces, especially relevant in the case of metallic surfaces, to solve the unresolved problem of obtaining unique zeta potential values, regardless of the electrokinetic technique used.

- A.M. Gallardo-Moreno, M.L. Navarro-Pérez, V. Vadillo-Rodríguez, J.M. Bruque, M.L. González-Martín

"Insights into bacterial contact angles. Difficulties in defining hydrophobicity and surface Gibbs energy"

Colloids and Surfaces B: Biointerfaces 88, 373-380 (2011) (First quartile)

Methodological contribution on the procedure of characterization of hydrophobicity and free surface energy of microorganisms by means of contact angles. The fundamentally comparative nature of the information obtained is analyzed and highlighted.

## C.2. Research projects and grants

"Response of the adhesive properties of pathogens to the controlled released of natural active compounds" (RTI2018-096862-B-100)

Funding entity: Ministry of Science, Innovation and Universities

Principal Investigator: Amparo María Gallardo Moreno

"Implants signal to bone for bone growth and attachment" (PCIN-2016-146)

Funding entity: M-ERA-NET 2015 Ministry of Economy and Competitiveness

Principal Investigator: María Luisa González Martín (International Coordinator K. A. Gross)

"Surface characterization and microbial adhesion of biodegradable and bioresorbable magnesium-based materials for bone repair" (MAT2015-63974-C04-03)

Funding entity: Ministry of Economy and Competitiveness.

Principal Investigator: María Luisa González Martín

"Surface characterization and response to microbial adhesion of a new bioreabsorbable material for PLLA osteosynthesis with high Vol. fraction Mg (MAT2012-37736-C05-03)

Funding entity: Ministry of Economy and Competitiveness.

Principal Investigator: María Luisa González Martín.

"Development of phytate-coated biomaterials to stimulate bone regeneration. PHYTECH" (IPT-2012-1345-300000)

Funding entity: Ministry of Economy and Competitiveness.

Principal Investigator: Joana María Ramis Morey.

"New surface modifications of conventional metal alloys. Surface Characterization and Microbial Adhesion" (MAT2009-14695-C04-01)

Funding entity: Ministry of Science and Innovation.

Principal Investigator: María Luisa González Martín.

"Living functional bio-interfaces" (MAT2010-10407-E)

Funding entity: Ministry of Science and Innovation.

Principal Investigator: Manuel Salmerón Sánchez

"Influence of surface enrichment in silicon of 316 LVM steel on biocompatibility, bioactivity and bacterial adhesion in vitro" (MAT2006-12948-C04-03)

Funding entity: DGI-FEDER.

Principal Investigator: María Luisa González Martín.

### C.3. Contracts

- Contract with the company Technoform Bautech Holding GmbH for the development of the project "Evaluation of surfaces against S. epidermidis and E.coli" 2021-cont.
- Contract with the company Mozo-Grau S.A. for the development of the project "Procedure for the obtention of implants with personalized surface" 2018-cont.
- Contract with the company Biotechnology Institute I+D SL for the development of the project "ActiBa: Titanium Activation for Bioadapted Implants". 2013-2014.
- Contract with the company AVINENT for the development of a study of adhesion and bacterial viability. 2011.

### C.4. Patents: "Procedure for molding surfaces of curable materials."

L. Labajos- Broncano, J.M. Perera Núñez, M.L. González-Martín, A. Méndez Vilas; UEx and CIBER-BBN. Spanish Patent Application number P201030795, May 26, 2010. International Application number PCT/ES2011/070363, May 20, 2011.

**C.5.** Principal Investigator of the Microbial Adhesion Group of the Networking Research Center on Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN) of the Instituto de Salud Carlos III.

**C.6.** Evaluator in the ANEP and Aid Calls for the financing of Biomedical Research and Health Sciences in Andalusia, (Junta de Andalucía). Start 2011-continues.

**C.7.** Member of the editorial board of the Journal of Adhesion Science and Technology (Ed. Taylor and Francis). Start 2013-continues.

**C.8.** Responsible for the Surface Characterization and Calorimetry Unit of the Tissue, Biomaterials and Surface Characterization Platform of the Singular Scientific-Technical Facility NANBIOSIS. Start January 2009-continues.

**C.9.** Member of the A2 Accreditation Commission (Physics) of the ANECA 2016-2021.