

Part A. PERSONAL INFORMATION

CV date

17/09/2018

First and Family name	ZULUAGA MARIA CRUZ		
Social Security, Passport, ID number	30550647T	Age	57
Researcher numbers	Researcher ID	6602226415	
	Orcid code	0000-0003-1290-4093	

A.1. Current position

Name of University/Institution	University of the Basque Country (UPV/EHU)		
Department	Mineralogy and Petrology		
Address and Country	Campus de Bizkaia, Sarriena s/n, 48940 Leioa (Bizkaia), Spain		
Phone number	946012484	E-mail	mcruz.zuluaga@ehu.eus
Current position	Associate Professor	From	17/10/2008
Espec. UNESCO cod.	250611-250337-250602		
Key words	Geology, Archaeometry, bone remains, archaeological materials, palaeomobility		

A.2. Education

Degree/Master/PhD	University	Year
Degree in Geology	University of the Basque Country (UPV/EHU)	1985
Doctor of Geology	University of the Basque Country (UPV/EHU)	1995

A.3. Articles published in journals indexed in JCR / ISI

Six-year research: 2 Data: 2015
 Number of PhD theses directed in the last 10 years: 2
 Number of PhD theses in process: 2
 Total citations: 207 average during the last 5 years: 24,2
 Total publications in the first quartile (Q1): 11
 h-index: 9

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

My scientific career began with the study and evaluation of the diagenesis degree of clay minerals and their paleoenvironmental and palaeoclimatic implications in geological times. The methodology of analysis I had acquired was applied in materials of different geological ages resulting in the co-direction of three PhD theses. The investigations were funded by research projects and resulted in the publication of several articles in international journals. The methodology applied in the Earth Sciences Field is also valid for the study of archaeological pottery and it has been used to establish manufacturing processes, raw materials provenance and pottery commercial networks. These studies have allowed me to collaborate with researchers of archeology field in shared projects and as result of this multidisciplinary collaboration several scientific articles have been published in high impact journals (Q1). I have also used the mineralogical analysis in the study of archaeological mortars in order to analyze the constuctive material of historical building destined to conserve and restore these historical, architectural and archaeological heritages. Also the research of lime mortars have allow me to explore these materials as potential for radiocarbon dating of historical buildings.

Since the interest of society for the cutural heritage is increasing the collaboration with archaeologists is increasingly and more dynamic. In fact, not only pottery and mortars are under study, but more recently, the study of ancient ferric materials such as ironworks slag and grave goods has been started. Mortars and ferric materials research lines are being carried out through two ongoing doctoral thesis projects and developed by two predoctoral researchersa that I co-direct. Although these research lines are being developed first results

have already been published both in international journals and in the monographs of the different sites studied.

The study of the diagenesis degree has allowed me to evaluate the processes occurs in bone remains during the burial. To determine the absence of burial modifications is essential for the isotopic study of bone remains, either of macrovertebrates, micromammals or humans, in order to establish paleoenvironmental and palaeoclimatic conditions in historical epochs.

On the other hand, the knowledge of isotopes has allowed me to investigate palaeomigration and palaeoenvironmental conditions, in both fauna and human remains. In last years isotope studies have been reflected in various publications in international journals of Q1 and Q2 quartiles, and the co-direction of an international thesis.

For the next few years my scientific objectives are to continue with the research lines related to archaeological materials (ceramics, glazes, lime mortars, metals) as well as isotopes applied to paleontology or bone remains of both animals and humans.

Part C. RELEVANT MERITS

C.1. Publications (including books)

Gómez-Alday JJ, Zuluaga MC, Elorza J. (2008). $^{87}\text{Sr}/^{86}\text{Sr}$ ratios in inoceramids (Bivalvia) and carbonate matrix as indicators of differential diagenesis during burial. Early Maastrichtian Bay of Biscay sections (Spain and France). Potential use for Chemostratigraphy?. *Cretaceous Research*, 29, 563-576.

Zuluaga MC, Alonso-Olazabal A, Murelaga J, Ortega L.A. (2011). A comparison of scanning electron microscopy energy dispersive X-ray (SEM/EDX) and inductively coupled plasma optical emission spectrometry (ICP-OES) for provenance inferences of grog-tempered Bronze Age pottery. *Microchemical Journal*, 99, 443-44.

Zuluaga MC, Alonso-Olazabal A, Olivares M, Ortega LA, Murelaga X, Bienes JJ, Sarmiento A, Etxebarria N. (2012). Classification of glazed potteries in the Christian and Islamic border at Late Medieval Ages (IX-XIII centuries) by micro-Raman spectroscopy. *Journal of Raman Spectroscopy*, 43, 1811-186.

Ortega LA, Zuluaga MC, Alonso-Olazabal A, Murelaga X, Insausti M, Ibañez-Etxeberri, A. (2012). Historic lime-mortar ^{14}C dating of Santa María la real (Zarautz, northern Spain): Extraction of suitable grain size for reliable ^{14}C dating. *Radiocarbon*, 54, 23–36.

Ortega LA, Guede IL, Zuluaga MC, Alonso-Olazabal A, Murelaga X, Niso J, Loza M Quiros J.A. (2014). Strontium isotopes of human remains from Dulantzi graveyard (Alegría-Dulantzi, Alava) to infer population mobility in Early Medieval Age. *Quaternary International*, 339-340, 54-63.

Rofes J, Garcia-Ibaibarriaga N, Aguirre M, Martínez-García B, Ortega L.A, Zuluaga M.C, Bailon S, Alonso-Olazabal A, Castaños J, Murelaga X. (2015). Combining Small-Vertebrate, Marine and Stable-Isotope Data to Reconstruct Past Environments. *Scientific Reports*, 5(14219),1-12.

Guede IL, Ortega LA, Zuluaga MC, Alonso-Olazabal A, Murelaga X, Pina M, Gutierrez FJ Iacumin P. (2017). Isotope Analyses to Explore Diet and Mobility in a Medieval Muslim Population at Tauste (NE Spain). *PLOS ONE*, 12(5), 1-27.

Guede IL, Zuluaga MC, Ortega LA, Alonso-Olazabal A, Murelaga X, Pina M, Gutierrez FJ. (2017). Analyses of human dentine and tooth enamel by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) to study the diet of medieval Muslim individuals from Tauste (Spain). *Microchemical Journal*, 130, 287–294.

Guede IL, Ortega LA, Zuluaga MC, Alonso-Olazabal A, Solaun JL, Azcárate A, Sánchez I. (2017). Isotopic evidences for reconstruction of diet and mobility during village genesis

during Medieval Ages in northern Spain: Las Gobas site (Burgos, north Spain). Archaeological and Anthropological Sciences. 409(14), 3597-3610.

Portillo H, Zuluaga MC, Ortega LA, Alonso-Olazabal A, Murelaga X, Martinez-Salcedo, A. (2018). XRD, SEM/EDX and micro-Raman spectroscopy for mineralogical and chemical characterization of iron slags from the Roman archaeological site of Forua (Biscay, North Spain). Microchemical Journal, 138, 246-254.

C.2. Research projects and grants

Title: Paleoclimatología y Paleodiversidad en el Pleistoceno superior en la zona de Urdaibai.
Ref.: UNESCO07/01

Financial entity: Universidad del País Vasco (UPV/EHU)

Duration, from: 2007 to: 2009 Grant quantity: 28.500

Principal researcher: Xabier Murelaga

Title: Paleoceanografía y paleoclimatología del Cuaternario en el sur del Golfo de Vizcaya.
Microfauna y geoquímica.

Ref.: CGL2007-64428

Financial entity: Ministerio de Educación y Ciencia

Duration, from: 2007 to: 2010 Grant quantity: 36.300

Principal researcher: Julio Rodríguez Lázaro

Title: Variaciones Climáticas y de la Paleobiodiversidad de vertebrados a lo largo del Pleistoceno y Holoceno en el entorno de Urdaibai.

Ref.: UNESCO09/01

Financial entity: Universidad del País Vasco (UPV/EHU)

Duration, from: 2010 to: 2011 Grant quantity: 30.000

Principal researcher: Xabier Murelaga

Title: Arqueología Medieval y Postmedieval

Ref.: IT315-10

Financial entity: Gobierno Vasco

Duration, from: 2010 to: 2015 Grant quantity: 450.000

Principal researcher: Juan Antonio Quirós

Title: Evaluación de los morteros de Cal en edificios históricos como registro del cambio climático.

Ref.: S-PE13UN146

Financial entity: Gobierno Vasco

Duration, from: 2013 to: 2014 Grant quantity: 8.383,98

Principal researcher: Luis Ángel Ortega Cuesta

Title: La ruta occidental del poblamiento de la Península Ibérica, durante el paleolítico medio y superior.

Ref.: HAR2014-53536-P

Financial entity: Ministerio de Economía y Competitividad

Duration, from: 2015 to: 2017 Grant quantity: 65.000

Principal researcher: Alvaro Arrizabalaga

Title: Arqueología Medieval y Postmedieval

Ref.: PPG17/68

Financial entity: Universidad del País Vasco (UPV/EHU)

Duration, from: 2017 to: 2018 Grant quantity: 22.100

Principal researcher: Juan Antonio Quirós

C.3. Contracts, technological merits or transference

1. Contract/project title: Actividades de divulgación de la Geología del Geoparque de la Costa Vasca 2011

Company/Financial administration: Asociación para la Gestión del Geoparque de la Costa Vasca (GEOGARAPEN)

Duration: from: 03/05/2011 to: 31/12/2011

Responsible researcher: Baceta Caballero, Juan Ignacio

Total price of the project: 12.000,00

2. Contract/project title: Estudio multidisciplinar de materiales arqueológicos del yacimiento romano de Forua

Company/Financial administration: ANA MARTÍNEZ SALCEDO

Duration: from: 01/02/2010 to: 30/01/2011

Responsible researcher: Zuluaga Ibargallartu, Maria Cruz

Total price of the project: 2.105,88

3. Contract/project title: Geoparque 2012

Company/Financial administration: Asociación para la Gestión del Geoparque de la Costa Vasca (GEOGARAPEN)

Duration: from: 01/04/2012 to: 31/12/2012

Responsible researcher: Murelaga Bereicua, Javier

Total price of the project: 6.000,00

4. Contract/project title: Preparación de material Geológico de Salinas de Añana

Company/Financial administration: Fundación Valle Salado de Añana

Duration: from: 03/11/2010 to: 31/12/2012

Responsible researcher: Murelaga Bereicua, Javier

Total price of the project: 13.764,71

5. Contract/project title: Estudio de paleodietas de la necrópolis musulmana de Tauste

Company/Financial administration: Asociación Cultural El Patiaz

Duration: from: 30/11/2014 to: 30/05/2015

Responsible researcher: Ortega Cuesta, Luis Angel

Total price of the project: 1.800

6. Contract/project title: Divulgación y estudios de la Geología de las Bardenas para el 2017

Company/Financial administration: Comunidad de Bardenas Reales de Navarra

Duration: from: 30/09/2017 to: 31/12/2017

Responsible researcher: Murelaga Bereicua, Javier

Total price of the project: 23.353,00

7. Contract/project title: Estudio de la movilidad de población neotítica del yacimiento de Valdescusa

Company/Financial administration: CRONOS S.C.

Duration: from: 01/05/2017 to: 30/11/2017

Responsible researcher: Ortega Cuesta, Luis Angel

Total price of the project: 2.370,00