MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE (CVA)

Part A. PERSONAL INFORMATION

CV date	4-12-2023

First name	**Santiago**		
Family name	**Gutiérrez Martín**		
Gender (*)	**Male**	Birth date	**25/07/1965**
ID number	**09755086G**		
e-mail	**s.gutierrez@unileon.es**	http://grupos.unileon.es/ingenieria-y-agricultura-sostenible/	
Open Researcher and Contributor ID (ORCID) (*)		**0000-0001-6659-1390**	

(*) Mandatory

A.1. Current position

Position	**Professor of Microbiology**		
Initial date	**11/ July/ 2017**		
Institution	**University of León (Spain)**		
Department/Center	**Molecular Biology/ Escuela de Ingeniería Agraria y Forestal**		
Country	**Spain**	Teleph. number	**34 987442060**
Key words	***Trichoderma*, Mycotoxins, Trichothecenes, Terpenes, Biocontrol, Molecular plant-microbe interaction**		

A.2. Previous positions (research activity interruptions, art. 14.2.b)

Period	Position/Institution/Country/Interruption cause
2016 (3 months)	Postdoctoral Researcher/ United States Department of Agriculture (USDA)/ USA
1999-2017 (219 months)	Associate Professor of Microbiology - tenured position/ University of León/ Spain
1997-1999 (15 months)	Associate Professor of Microbiology/ University of León/ Spain
1992-1997 (60 months)	Assistant Professor of Microbiology/ University of León/ Spain
1995-1996 (1 year)	Visiting Associate in Biology/ California Institute of Technology (Caltech)/ USA
1992 (3 months)	EMBO fellowship/ TNO-Medical Biological Laboratory/ The Netherlands

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Graduate in Biology	University of León (Spain)	1988
Post-Graduate in Biology	University of León (Spain)	1988
Ph.D. in Biology	University of León (Spain)	1994

Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

Since the year 2012, my research career has been focused on the application of fungi belonging to the genus *Trichoderma* as biological control agents, specifically as a producer of primary or secondary metabolites with importance in the *Trichoderma*-plant-pathogen interactions. In this period our publications led to characterize the biosynthetic pathway of a group of fungal toxins of sesquiterpene nature known as trichothecenes, and it was possible to describe the importance of these compounds in the inhibition of phytopathogenic fungi growth, but also in the induction of the plant defense responses. However, one of the aspects reaching the highest impact in last years has been the description that the level of trichothecene production determines the levels of ergosterol-squalene in the fungal membranes, which also strongly affected to the interaction of these fungi with plants and to the responses induced in the latter. Very remarkable for the current proposal has been the study of the interaction of *Trichoderma*

with bean plants, and its effect on induction of bean defense-related genes, as well as in the plant metabolome.

Currently, I am a member or a multidisciplinary group of microbiologists and agronomists (crop production) that has been recognized as the Research Consolidated Unit number 264 by the Regional Government of "Castilla y Leon (Spain)"

In my career as a microbiologist, and as results of the research activities mentioned above, I have published in some of the most prestigious journals in our research field, for example: *PNAS*, *Journal of Biological Chemistry*, *BIO/TECNOLOGY*, *Environmental Microbiology, and PLoS Pathogens*, among others. I authored **23** book chapters, **1** book, **129** articles in SCI journals (average IF > **3.5)** (H-index: **44, source WOS), 11** patents [**7** International (4 PCT, 3 European) and **4** National]. I have supervised **11** Ph.D. Thesis and **3** Grade ("Tesinas") works. Author of **178** Congress communications (113 International y 65 national), and I reviewed **211** articles for 98 different SCI International Journals. I have participated in **30** research & development projects financed in public announcements (**13** as PI) and in **9** research & development contracts with companies (**4** as PI).

I have been positively evaluated for **five six-year Research Activity periods ("Sexenios de Investigación"), and for one six-year Research Transfer activity period ("Sexenio de Transferencia")**

Since 2021 I´m acting as a member of the B6 (Biomedical Sciences) Commission of the National Agency for Quality Evaluation and Accreditation (**ANECA**) for the access to the University teaching levels of Associated Professor (Tenured Position) and Professor.

SUMMARY OF THE MOST RELEVANT MERITS (Between 2013-2023)

- **58** SCI articles.
- Author of **9** book chapters, **1** book, and **7** non-SCI journal articles
- **46** Communications to Scientific Congress (**23** International and **14** National)
- **Co-inventor** of **1** National/EU and Non-EU International Patent (year 2019) (P201830817)
- **Principal Researcher** of **6** National and **1** Regional projects
- Member of the Consolidated Research Unit (UIC) number 264 (2018-today) of the "Junta de Castilla y León" (Spain)

2013 – today: Director of **5** Ph.D. Thesis in this period in the University of León.

Dr. Mónica Gómez Malmierca (2010-2013). "Biosynthesis of harzianum A and its role in physiology and biocontrol activity of *Trichoderma arundinaceum*". End date: April, 2013. Number of JCR Publications resulting from her Ph.D. work: 10. Current Position: Postdoctoral Fellow at the University of Oviedo (Spain).

Dr. Sara Mayo Prieto (2013-2017). "Selection and evaluation of *Trichoderma* spp. in the ecological control of fungi in the PGI-bean of La Bañeza-León-". End date: July, 2017. Number of JCR Publications resulting from her Ph.D. work: 5. Current position: Assistant Professor at the University of León.

Dr. Laura Lindo Yugueros (2016-2019). "Characterization of the effect of terpenes produced by *Trichoderma* in the interaction with plants and with phytopathogenic fungi". End date: November, 2019. Number of JCR Publications resulting from her Ph.D. work: 7. Current Position: Formulation Development Scientist at Chemo España SL. León (Spain)

Dr. Samuel Álvarez García (2018-2021). "New *in vitro* approaches and technologies to evaluate the biological activity of microbial secondary metabolites in plants, plant pathogens and pests". July, 2021. Number of JCR Publications resulting for his Ph.D. work: 3. Current Position: Starting a postdoctoral period in Italy. Doctorate Extraordinary Award.

Dr. Guzmán Carro Huerga (2019-2022). "Control biológico de Phaeoacremonium minimum mediante el uso de *Trichoderma* spp.". End date: February 2022. Number of JCR publications resulting for his Ph.D. **4**. Current Position: Postdoctoral Researcher at Bragança Polytechnic Institute (Portugal).

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. Publications (*= corresponding author) **(**Q1= first quartile; D1= first decile)

1. Cardoza, R.E., McCormick, S.P., Izquierdo-Bueno, I., Martínez-Reyes, N., Lindo, L., Brown, D.W., Collado, I.G., Proctor, R.H., **Gutiérrez, S.*** (2022). Identification of polyketide genes required for aspinolide biosynthesis in *Trichoderma arundinaceum*. Applied Microbiology and Biotechnology **166**: 7153-7171. Impact Factor (IF): 5.0. Q1- Biotechnology & Applied

Microbiology.

2. Lindo, L., Cardoza, R.E., Lorenzana, A., Casquero, P.A., **Gutiérrez, S.*** (2020). Identification of plant genes putatively involved in the perception of fungal ergosterol-squalene. Journal of Integrative Plant Biology. **62**(7): 927-947. Impact Factor (IF) 7.061. Q1-D1- Plant Sciences
3. Carro-Huerga, G., Compant, S., Gorfer, M., Cardoza, R.E., Schmoll, M., **Gutiérrez, S.,** Casquero, P.A.* (2020). Colonization of *Vitis vinifera* L. by the endophyte *Trichoderma* sp. strain T154: biocontrol activity against *Phaeoacremonium minimum*. Frontiers in Plant Science **11**: 1170. IF: 5.753. Q1-D1- Plant Sciences.
4. Lindo, L., McCormick, S.P., Cardoza, R.E., Busman, M., Alexander, N.J., Proctor, R.H.*, **Gutiérrez, S.*** (2019)**.** Requirement of two acyltransferases for 4-*O*-acylation during biosynthesis of Harzianum A, an antifungal trichothecene produced by *Trichoderma arundinaceum*. *Journal of Agricultural and Food Chemistry*. **67**(2): 723-734. IF: 4.192. Q1-D1- Agriculture, Multidisciplinary.
5. Proctor, R.H.*, McCormick, S.P., Kim, H.-S., Cardoza, R.E., Stanley, A.M., Lindo, L., Kelly, A., Brown, D.W., Lee, T., Vaughan, M.M., Alexander, N.J., Busman, M., **Gutiérrez, S.*** (2018). Evolution of structural diversity of trichothecenes, a family of toxins produced by plant pathogenic and entomopathogenic fungi. *PLoS Pathogens*. **14**(4): e1006946. IF: 6.158. Q1-D1- Parasitology.
6. Malmierca, M.G., McCormick, S.P., Cardoza, R.E., Monte, E., Alexander, N.J., **Gutiérrez, S.*** (2015). Trichodiene production in a *Trichoderma harzianum erg1*-silenced strain provides evidence of the importance of the sterol biosynthetic pathway in inducing plant defense-related gene expression. *Molecular Plant-Microbe Interactions* **28**: 1181-1197. IF: 4.145. Q1-D1- Plant Sciences.
7. Mayo, S., **Gutiérrez, S.**, Malmierca, M.G., Lorenzana, A., Campelo, M.P., Hermosa, R., Casquero, P.A.* (2015). Influence of *Rhizoctonia solani* and *Trichoderma* spp. in growth of bean (*Phaseolus vulgaris*, L.) and in the induction of plant defence-related genes. *Frontiers in Plant Science*. **6**: 685. IF: 4.495. Q1-D1- Plant Sciences.
8. Cardoza, R.E., McCormick, S.P., Malmierca, M.G., Olivera, E.R., Alexander, N.J., Monte, E., **Gutiérrez, S.*** (2015). Effects of trichothecene production on plant defense response and on fungal physiology: overexpression of *Trichoderma arundinaceum tri4* gene in *T. harzianum*. *Applied and Environmental Microbiology* **81** (18):6355-6366. IF: 3.823. Q1- Microbiology.
9. Malmierca, M.G., McCormick, S.P., Cardoza, R.E., Alexander, N.J., Monte, E., **Gutiérrez, S.*** (2015). Production of trichodiene by *Trichoderma harzianum* alters the perception of this biocontrol strain by plants and antagonized fungi. *Environmental Microbiology*. **17**(8): 2628-2646. IF: 5.932. Q1-Microbiology
10. Malmierca, M.G., Barua, J., McCormick, S.P., Izquierdo-Bueno, I., Cardoza, R.E., Alexander, N.J., Hermosa, R., Collado, I.G., Monte, E., **Gutiérrez, S.*** (2015). Novel aspinolide production by *Trichoderma arundinaceum* with a potential role in *Botrytis cinerea* antagonistic activity and plant defense priming. *Environmental Microbiology* **17**(4): 1103-1118. IF: 5.932. Q1-Microbiology

C.2. Congress. Organization of scientific meetings

2018 Chairman of the session "Environmental Biotechnology" in the National Congress of Industrial Microbiology and Microbial Biotechnology organized by the Spanish Society of Microbiology (SEM- Spain), which was held in Cádiz (Spain) in June 2018.

2016 Member of the organizing of the Organizing Committee of the VI National Congress of Industrial Microbiology and Microbial Biotechnology organized by the Spanish Society of Microbiology (SEM- Spain), which was held in Leon (Spain) in September 2016.

C.3. Research projects

1. PID2021-123874OB-I00. "Isolation of bacterial strains able to de-epoxidate trichothecenes from bean and hop crops colonized by trichothecene-producer *Trichoderma* strains". Funding Institution MCINN (Spain). Principal Researchers (PR): **Santiago Gutiérrez** and Pedro A. Casquero. University of León. 2022-2025, 121.000 €.
2. RTI2018-099600-B-I00. "Isolation of *Trichoderma*-trichothecene-producer strains from bean crops and assessment of their effect in the plant defense against fungal diseases". **Funding Institution**: MCINN (Spain). Principal Researcher (PR): **Santiago Gutiérrez**. Universidad de León. 2019-2021, 84.000 €.
3. AGL2015-70671-C2-2-R "Importance of membrane sterols of *Trichoderma* in the nitrogen use

efficiency (NUE) of plants. Cloning of genes encoding for ergosterol and squalene receptors in tomato plants". **Funding Institution**: MINECO (Spain). PR: **Santiago Gutiérrez**. Universidad de León. 2016-2018, 40.000 €.

4. LE228014 "Effect of terpenes and physiologically related compounds produced by *Trichoderma parareesei* in the development of common bean (*Phaseolus vulgaris*, L.) and in the defense responses in bean plants". **Funding Institution**: "Junta de Castilla y León". PI: Pedro. A. Casquero. Universidad de León. 2015-2017, 29.000 €. **Role**: Team member.
5. AGL2012-40041-C02-02 "farnesol as an auto-regulated molecule: signaling of tyrosol and farnesol in the interaction *Trichoderma*-bean". **Funding Institution**: MINECO (Spain). PR: **Santiago Gutiérrez**, Universidad de León, 2013-2015, 76.500 €.
6. LE125A12-2 "Role of trichothecenes and pyrones in the interaction *Trichoderma*-plant using as a model for the study *Trichoderma harzianum*- tomato". **Funding Institution**: "Junta de Castilla y León". PR: **Santiago Gutiérrez**. Universidad de León, 2012-2014, 29.800 €.

C.3.b. Participation in Evaluation of scientific articles and grant proposals

- 2012 - today. Evaluation of **20** National (Spanish) proposals for the "Agencia Nacional de Evaluación y Prospectiva" (Spain), and **21** International Grant Proposals for Foreign Funding Institutions in Austria, United States-Israel, Poland, Czech Republique, France, Canada, Mexico, Norway, and Argentina.
- 2012 - today. Reviewer of **204** manuscripts for 96 different International Scientific Journals

C.4. Participation in transfer of technology/knowledge and exploitation of the results

Contracts

1. IDI-20210391 "Application of *Trichoderma* strains in sustainable vine production: effects on pH regulation and improvement of wine quality "as part of the CDTI-CIEN project "Study of new factors related to the soil, the plant and the oenological microbiota that influence the acidity balance of wines and their guarantee of quality and stability in hot climates (LOWpH-WINE 2020)". **Funding Institutions**: Center for the Industrial-technological development (CDTI-Spain). **Funding Companies**: Pago De Carraovejas S.L.; Bodegas Roda; Bodegas Barbadillo; Bodega de Hoyada de Lobos; Vitis Navarra; Fertinagro Biotech; Atens; Agrovin; PR: Pedro A. Casquero**,** University of León. **2020 - 2024**. 166.980 €. **Role**: Team Member.
2. IDI-20160750 "Effect of *Xylotrechus arvicola* in the transmission of vine-wood diseases: use of *Trichoderma* in biological control of the insect and the disease" as part of the CDTI-CIEN project "Global approach to improve wine production against the climate change based on robotics, IR technology and on biotechnological and wine-yard handling strategies. (GLOBALVITI)". **Funding Institutions**: Center for the Industrial-technological development (CDTI-Spain). **Funding Companies**: Pago De Carraovejas S.L.; Miguel Torres, S.A.; Grupo Hispatec Informatica Empresarial S.A.; Juve Y Camps, S.A.; Bodegas Martin Codax S.A.U.; Pellenc Iberica S.L.; Bodegas Ramon Bilbao S.A.; Viveros Villanueva Vides S.L. PR: Pedro. A. Casquero**.** University of León. **2016-2020**. 197.593 €. **Role**: Team Member.

Awards of Research Transfer

1. 2016. First "Accesit" to the Research award of the Economic and Social Conseil of "Castilla y León" and the Public Universities of Burgos, León and Valladolid, which integrate the "Triangular E^3" Campus of International Excellence, 2016 edition, with the project entitled "**Biological control of diseases of vine wood: a challenge for the sustainability of the wine sector in Castilla y León**"

Registered industrial properties.

1. **Registered industrial property title:** "Culture chamber for competition microbiological tests by volatile compounds". **Type of industrial property:** Invention patent. **Copyright:** Yes. **Inventors:** Álvarez-García, S.; **Gutiérrez, S.**; Mayo- Prieto, S.; González-López, O.; Carro-Huerga, G.; Suárez-Villanueva, V.; Rodríguez-González, A.; Casquero, P.A. **Rights-holding entity:** Universidad de León. **Code reference/registration:** 2018/129115**. Application number:** P201830817. **Country of registration:** Spain, Castilla y León. **Registration date:** 08/10/2018. **Grant Date:** 04/11/2019. **Patent number:** P201830817. **Spanish patent:** Yes. **EU patent:** Yes. **Non-EU international patent:** Yes. **PCT patent:** Yes. **Company:** JD Catalan.