

**Part A. PERSONAL INFORMATION**

**CV date**

05/09/2019

First and Family name	Manuel González-Burgos		
Social Security, Passport, ID number	30201970A	Age	53
Researcher numbers	Researcher ID	H-9443-2015	
	Orcid code	0000-0002-3012-4296	

**A.1. Current position**

Name of University/Institution	University of Seville		
Department	Department of Differential Equations and Numerical Analysis		
Address and Country	Facultad de Matemáticas, C/ Tarfia S/N, 41012 Sevilla, Spain.		
Phone number	+34954557999	E-mail	<a href="mailto:manoloburgos@us.es">manoloburgos@us.es</a>
Current position	Catedrático de Universidad (Full Professor)	From	21/12/2017
Espec. cód. UNESCO	1202.20,1207.02		
Palabras clave	Partial Differential Equations, Control, Controllability		

**A.2. Education**

PhD	University	Year
Doctor en Matemáticas	University of Sevilla	1993

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

**a) JCR articles** 33 **b)** 600 citations (Scopus) **c)** Average 2014-2018: 61,4 citations **d)** 17 papers in Q1 **e)** 4 papers in D1 **f)** H index: 14 (Scopus) **g)** Research sexenials: 4 (until 2016) **h) thesis supervised** 4

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

I studied mathematics (Bs. Degree) at the University of Sevilla (Spain). I was hired in this University in 1988 as Profesor Asociado. In September 1993, I defended a PhD Thesis at the University of Sevilla under the supervision of Prof. Enrique Fernández-Cara: "Dos problemas relacionados con E.D.P. de evolución no lineales". In 1995 I was appointed as Profesor Titular de Universidad at the Department "Differential Equations and Numerical Analysis" of the same university.

My fields of specialization cover Partial Differential Equations (PDE's) and Control Theory. In particular, they cover the controllability properties of scalar and non-scalar parabolic problems with controls exerted in a part of the domain or on a part of the boundary. My scientific career began in the early 90s with the first results on boundary controllability of the Navier- Stokes system.

At the beginning of the XXlth century, I started to study controllability properties of some nonlinear versions of scalar parabolic problems posed in bounded or unbounded domains. In these kind of works we considered some different linear and nonlinear boundary conditions (SIAM J. Control Optim. 2002, ESAIM:COCV 2006). At the same time, I was also interested in the existence of insensitizing controls for scalar parabolic problems obtaining some global results (Comm. PDE 2004, ...).

Since 2006 I am interested in the study of controllability properties of non-scalar parabolic problems when on the system one exerts less boundary or distributed controls than equations. To be precise, I have focused on the generalization of the algebraic Kalman condition for ode's to PDE's. In this framework we have obtained very interesting (and even counter-intuitive) results: minimal time of controllability, geometrical dependence in the parabolic case, .... (J Evol Eq 2009; J. Funct. Anal. 2010, 2014; J. Math. Pures Appl. 2011; SIAM J. Control Optim. 2014; J. Math. Anal. Appl. 444 (2016)).

My mid-to-long term objectives are centered around controllability of non-scalar problems. In this framework we have obtained some new phenomena that should be analyzed in detail. On the other hand, most of the results in this setting have been established in the one-

dimensional case. A generalization to the N-dimensional case is then necessary. In this sense new methods should be developed.

## Part C. RELEVANT MERITS

### C.1. Publications 2012-2018 (including books)

- [1] F. Ammar-Khodja, A. Benabdallah, M. González-Burgos, M. Morancey, *Quantitative Fattorini-Hautus test and minimal null control time for parabolic problems*, J. Math. Pures Appl. **122** (2019), 198–234. **Impact Factor**: 1.802; 16/311 MATH.; Q1.
- [2] F. Ammar-Khodja, A. Benabdallah, M. González-Burgos, L. de Teresa, *New phenomena for the null controllability of parabolic systems: Minimal time and geometrical dependence*, J. Math. Anal. Appl. **444** (2016), no. 2, 1071–1113. **Impact Factor**: 1.014; 56/312 MATH.; Q1.
- [3] E. Fernández-Cara, M. González-Burgos, L. de Teresa, *Controllability of linear and semilinear non-diagonalizable parabolic systems*, ESAIM Control Optim. Calc. Var. **21** (2015), no. 4, 1178–1204. **Impact Factor**: 1.112; 76/254 MATH. APPL.; Q2.
- [4] F. Ammar-Khodja, A. Benabdallah, M. González-Burgos, L. de Teresa, *Minimal time of controllability of two parabolic equations with disjoint control and coupling domains*, C. R. Math. Acad. Sci. Paris, Ser. I **352** (2014), no. 5, 391–396. **Impact Factor**: 0.469; 210/312 MATH.; Q3.
- [5] F. Ammar-Khodja, A. Benabdallah, M. González-Burgos, L. de Teresa (2014), *Minimal time for the null controllability of parabolic systems: the effect of the condensation index of complex sequences*, J. Funct. Anal. **267** (2014), no. 7, 2077–2151. **Impact Factor**: 1.322; 27/312 MATH.; Q1, D1.
- [6] A. Benabdallah, F. Boyer, M. González-Burgos, G. Olive (2014), *Sharp estimates of the one-dimensional boundary control cost for parabolic systems and application to the  $N$ -dimensional boundary null controllability in cylindrical domains*, SIAM J. Control Optim. **52** (2014), no. 5, 2970–3001. **Impact Factor**: 1.463; 42/257 MATH. APPL.; Q1.
- [7] F. Ammar-Khodja, A. Benabdallah, M. González-Burgos, L. de Teresa, *A new relation between the condensation index of complex sequences and the null controllability of parabolic systems*, C. R. Math. Acad. Sci. Paris **351** (2013), no. 19–20, 743–746.. **Impact Factor**: 0.425; 221/302 MATH.; Q3.
- [8] J.L. Boldrini, A. Doubova, E. Fernández-Cara, M. González-Burgos (2012), *Some controllability results for linear viscoelastic fluids*, SIAM J. Control Optim. **50** (2012), no. 2, 900–924. **Impact Factor**: 1.38; 41/247 MATH. APPL.; Q1.

### C.2. Research projects and grants 2012-2017

- 1. Title:** Análisis y control de EDPs no lineales con origen en Física y otras Ciencias.  
**Reference:** MTM2016-76990-P. Ministerio de Economía y Competitividad.  
**Principal Investigators:** Dr. Enrique Fernández Cara and Manuel González Burgos, Universidad de Sevilla. **Funding:** 47900€. **Duration:** 01/01/2017 to 31/12/2020.
- 2. Title:** Análisis y control de EDPs no lineales con origen en Física y otras Ciencias.  
**Reference:** MTM2013-41286-P. Ministerio de Economía y Competitividad.  
**Principal Investigators:** Dr. Enrique Fernández Cara and Manuel González Burgos, Universidad de Sevilla. **Funding:** 26312€. **Duration:** 01/01/2014 to 31/12/2016.
- 3. Title:** Análisis y control de EDPs con origen en Física y otras Ciencias.  
**Reference:** MTM2010-15592. Secretaría de Estado de Investigación, Ministerio de Ciencia e Innovación.  
**Principal Investigator:** Dr. Enrique Fernández Cara, Universidad de Sevilla. **Funding:** 87300€. **Duration:** 01/01/2011 to 31/12/2013. Researcher.

### C.3. Contracts

### C.4. Patents

### C.5, C.6, C.7... (e. g., Institutional responsibilities, memberships of scientific societies...)

**Member of the Executive Board of SEMA** (Spanish Society of Applied Mathematics). 09/1999 - 09/2002.

**Secretary of the Department** "Ecuaciones Diferenciales y Análisis Numérico", Universidad de Sevilla. 01/05/2009 - 30/09/2012 and 12/03/2013 - 15/05/2013.

**Director of the Department** "Ecuaciones Diferenciales y Análisis Numérico", Universidad de Sevilla. 01/10/2012 - 11/03/2013 and from 16/05/2013 until 06/06/2017.

**Member of the Scientific Commission** of the Institute of Mathematics of the University of Seville (IMUS) from 21/11/2016 until now.

**Assistant Director of the Institute of Mathematics of the University of Seville** (IMUS) from 05/10/2018 until now.

### C.6. Organization of scientific programs and conferences

- Co-organizer (together with David Arcoya, Anna Doubova, Francisco Ortégón Gallego, Carlos Parés y Antonio Suárez) of the Doc-Course "**Partial Differential Equations: Analysis, Numerics and Control**" (from April 2nd to June 5th, 2018), a post-graduate intensive school organized by the [Instituto de Matemáticas de la Universidad de Granada \(IEMath-GR\)](#), the [Instituto de Matemáticas de la Universidad de Sevilla \(IMUS\)](#), the [University of Málaga](#) and the [University of Cádiz](#).
- Co-organizer (together with Anna Doubova, Francisco Guillén González and Mercedes Marín Beltrán) of the Workshop on "**Recent Advances in PDEs: Analysis, Numerics and Control**", in honor of **Enrique Fernández Cara** for his **60th birthday**. January 25th – 27th, 2017, Instituto de Matemáticas de la Universidad de Sevilla and Departamento de Ecuaciones Diferenciales y Análisis Numérico, Universidad de Sevilla. Sevilla, SPAIN.
- Co-organizer (together with Nicolas André, Dominique Barbolosi, Assia Benabdallah and Florence Hubert) of the Workshop "Present challenges of mathematics in oncology and biology of cancer", 07-11th December 2015, Marseille, FRANCE.
- September 2014. Co-organizer (with Fernando Verduzco) of the Special Session "Control and Optimization", III Meeting Real Sociedad Matemática Española y Sociedad Matemática Mexicana (Zacatecas, México).
- **First Joint International Meeting RSME-SCM-SEMA-SIMAI-UMI**. June 30 July 4, 2014, Bilbao, Spain. Special Session "*PDE Methods and Challenges in Control and Inverse Problems*". Organizers: Francesca Bucci (University of Florence, Italy); Enrique Fernández-Cara (University of Sevilla, Spain); Manuel González Burgos (University of Sevilla, Spain).
- Co-organizer (together with Assia Benabdallah, Sébastien Benzekry, Guillemette Chapuisat, Yves Dermenjian and Florence Hubert) of the Thematic School "Present Challenges of Mathematics in Oncology and Biology of Cancer: Modeling and Mathematical Analysis", 19-23th March 2012, Marseille, FRANCE.
- January 2012. Co-organizer (with Maxim I. Todorov) of the Special Session "Control and Optimization", II Meeting Real Sociedad Matemática Española y Sociedad Matemática Mexicana (Málaga, Spain).
- Fall 2010. Co-organization of a thematic day on "Controllability of coupled systems" during the special trimester on "Control of partial differential equations" at Institut Henri Poincaré, Paris.
- June 2010. Co-organizer (with Prof. M.G. Naso) of the Minisymposium MSP10 "Control and stabilization of nonlinear evolutionary systems", part of the Conference SIMAI 2010 "Joint SIMAI/SEMA Conference on Applied and Industrial Mathematics" (Cagliari, Italy).
- Sept. 2009. Co-organizer of the « Workshop on Control and Inverse Problems of Systems Governed by PDEs » (Sevilla, Spain).

### C.7. International Mobility

2010: Invited Professor at Institut Henri Poincaré (University of Paris VI): One moth (November 2010).

2013: Invited Professor at Aix-Marseille Université: One moth (March 2013).

2014: Invited Professor at Aix-Marseille Université: three moths (March-May 2014).

2015: Invited Professor at Université de Franche-Comté: three moths (March-May 2015).



### **C.8. Scientific Direction**

**Supervisor of 4 Ph. Theses:** Anna Doubova Krasotchenko (2000), Rosario Pérez García (2004), Sergio Guerrero Rodríguez (2005) y Gilcenio Rodrigues de Sousa Neto (2016).