MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

**CURRICULUM VITAE (CVA)**

***IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.***

| **CV date** | 05/11/2025 |
|---|---|

## Part A. PERSONAL INFORMATION

| | | | |
|---|---|---|---|
| **First name** | Pedro | | |
| **Family name** | San-Segundo Nieto | | |
| **Gender** (*) | Male | **Birth date** | 11/09/1965 |
| **ID number** | 07861396L | | |
| **e-mail** | pedross@usal.es | **URL Web:** | https://ibfg.usal-csic.es/pedro-san-segundo-en.html |
| **Open Researcher and Contributor ID (ORCID)** (*): | 0000-0002-5616-574X | | |

*(*) Mandatory*

### A.1. Current position

| | | | |
|---|---|---|---|
| **Position** | CSIC Research Scientist | | |
| **Initial date** | 15/06/2005 (Científico Titular) | | |
| **Institution** | Consejo Superior de Investigaciones Científicas (CSIC) | | |
| **Department/Center** | Instituto de Biología Funcional y Genómica (IBFG) | | |
| **Country** | Spain | Teleph. number | 923294902 |
| **Keywords** | Meiosis / Checkpoints/ Chromosome segregation / Recombination / Cell cycle / DNA damage / Histone modifications | | |

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

| **Period** | **Position/Institution/Country/Interruption cause** |
|---|---|
| 1986-1988 | Intern Student / Dpt. Microbiología y Genética. Univ. Salamanca / Spain |
| 1988-1992 | MEC Predoctoral Fellow / IMB-CSIC / Spain |
| 1991 (3months) | Short-term MEC Fellow / NIH / USA |
| 1993 | Contract Project BIOT-CT90-165 / Univ. Salamanca / Spain |
| 1994 | Faculty Assistant / Biology School-Univ. Salamanca / Spain |
| 1995-1996 | MEC Postdoctoral Fellow / Dpt. Biology-Yale University / USA |
| 1997-2000 | Research Associate / HHMI-Yale University / USA |
| 2000-2001 | MEC Reincorporation Contract / IMB-IBMCC-CSIC-Univ. Salamanca / Spain |
| 2002-2005 | Ramón y Cajal Investigator / CIC-IBMCC-Univ. Salamanca / Spain |

### A.3. Education

| **PhD, Licensed, Graduate** | **University/Country** | **Year** |
|---|---|---|
| Biology Degree ("Licenciado") | Universidad de Salamanca / Spain | 1988 |
| PhD Biology | Universidad de Salamanca / Spain | 1994 |

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

During the **PhD period** as an FPU fellow in the IMB (CSIC-USAL) (1989-1994) I addressed the biochemical, genetic and functional study of remodeling enzymes involved in cell wall dynamics during **sporulation** in *S. cerevisiae*. In addition, I obtained a fellowship for a short-stay in NIH (USA) acquiring experience in mRNA translational control.

Soon in my doctoral thesis I was introduced to the field of sporulation and gametogenesis, and I was interested in expanding this knowledge working in a model system, such as budding yeast, but in an evolutionarily conserved aspect of gametogenesis such as meiosis itself. For that, I carried out my **postdoctoral period** at Yale University (1995-2000) working on the group of Dr. Shirleen Roeder, a leading laboratory in the meiosis field. The specific topic that I initiated during my postdoc, and I am still currently involved in, is the study of **meiotic cell cycle checkpoints**. Very little was known in this field when I started working on that, and we were **pioneer in those studies**. We identified meiotic checkpoint genes already known from its involvement in the DNA damage response in mitotic cells,

linking this process to meiotic DSB control, as well as novel meiosis-specific genes. In addition, we discovered a novel connection between the meiotic recombination checkpoint and certain chromatin modifications. One of the published articles in Cell, with more than 200 citations, described the first characterization of the yeast **Pch2** meiotic checkpoint protein and set up the grounds for the work of many groups around the world studying the multiple facets of this enigmatic protein until these days.

Ending my postdoctoral stay, I came back to Spain and I established as a Group Leader first as a **"Ramón y Cajal"** researcher in CIC (CSIC-USAL) (2002-2005) and, since June 2005, as a **Tenured CSIC Scientist ("Científico Titular")** in the former IMB now IBFG (CSIC-USAL). In November 2024, I gain the promotion to Research Scientist ("Investigador Científico", pending BOE nomination). During all this period, I have had **uninterrupted funding** from National Grants (AEI), Autonomic Grants (JCyL) and also from a private Foundation (Ramón Areces). In my group, we have continued the study of various aspects of **meiosis**, our main research topic, but we have also addressed some aspects of the mitotic **DNA damage response**, such as DNA damage tolerance.

Using ***S. cerevisiae*** as a powerful model organism for meiotic studies, our work has provided a number of contributions to elucidate the **meiotic recombination checkpoint pathway** at several levels: detection of meiotic errors, generation of an emergency signal in the context of meiotic chromosomes, and transmission of this signal to the cell cycle machinery to impose the meiotic arrest to prevent chromosome missegregation and aneuploidies. In addition, we have identified novel factors involved in promoting **meiotic chromosome movement** driven by telomere tethering to the nuclear envelope, describing the unexpected chromatin-independent contribution of a histone variant. We have also participated in studies reporting other aspects of meiotic DSB repair and chromosomal distribution. During all this time, our contribution to the field has been reinforced by the establishment of **collaborations** with a number of prestigious national and international groups, allowing us to expand our studies to **other model systems** besides budding yeast, such as fission yeast, nematodes and mice. We have also developed an arsenal of useful **meiotic analysis tools and reagents** (antibodies, strains, plasmids…) that we have shared and distributed worldwide.

My whole career has been devoted to the study of **genomic integrity** and, specially, the meiotic control mechanisms that reinforce proper distribution of chromosomes to the gametes. Errors in these processes lead to aneuploidy, which is the leading cause of reproductive disorders and genetic diseases. Thus, our **Basic Research** contributes to the **Generation of Knowledge** which is crucial for understanding the molecular basis of this important societal challenge. We have also contributed to bring **Science to the Society** by the regular participation in **outreach activities**, such as laboratory tours, short research projects for high-school students, Science Exhibitions, etc.

My scientific career includes additional contributions: I have directed **6 Doctoral Thesis** (**3** with **Extraordinary Doctorate Awards**) with an average of 3-4 publications from them. I have trained **3 Technicians**, **12 undergraduate students**, directed **8 TFGs** and **5 TFMs**. I am a regular **reviewer** for articles in various journals, and member of one **Editorial Board**. I have been **Guest Editor** for an Special Issue and I have participated as **reviewer and expert** in several **Grant Evaluation Panels** at the Regional, National and International level throughout the years. I have **organized 2 National** and **3 International Meetings** on Meiosis and Genome Integrity. I have collaborated in several Master programs and I am a **professor** in charge of the "**Genome Dynamics and Stability**" course of the Molecular and Cellular Biology **Master** of USAL, and in the **Doctoral Program** of Functional Biology and Genomics of USAL.

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

### C.1. Publications

*A selection of relevant publications from the last 10 years is presented. Please, see ORCID (0000-0002-5616-574X) or Scopus (6603091347) for full publication record. (OA): Open Access.*

Benavente R, Pradillo M, **San-Segundo PA** (2024)
Editorial: Molecular architecture and dynamics of meiotic chromosomes
*Frontiers in Cell and Developmental Biology* 12:1386038. (OA)(Q1).DOI: 10.3389/fcell.2024.1386038

Herruzo E, Sánchez-Díaz E, González-Arranz S, Santos B, Carballo JA, **San-Segundo PA** (2023)
Exportin-mediated nucleocytoplasmic transport maintains Pch2 homeostasis during meiosis.
*PLOS Genetics* 19(11): e1011026. (OA) (Q1). DOI: 10.1371/journal.pgen.1011026

Ravindranathan, R., Raveendran, K., Papanikos, F., **San-Segundo, P.A**., Tóth, A. (2022)
Chromosomal synapsis defects can trigger oocyte apoptosis without elevating numbers of persistent DNA breaks above wild-type levels.
*Nucleic Acids Research* 50: 5617-5634 (OA) (Q1, D1). DOI: https://doi.org/10.1093/nar/gkac355

Herruzo E, Lago-Maciel A, Baztán S, Santos B, Carballo JA, **San-Segundo P.A.** (2021)
Pch2 orchestrates the meiotic recombination checkpoint from the cytoplasm.
*PLOS Genetics* 17(7): e1009560. (OA) (Q1). DOI: 10.1371/journal.pgen.1009560

González-Arranz S, Acosta I, Carballo JA, Santos B, **San-Segundo P.A**. (2021)
The N-Terminal Region of the Polo Kinase Cdc5 Is Required for Downregulation of the Meiotic Recombination Checkpoint.
*Cells* 10(10):2561. (OA) (Q2). DOI: 10.3390/cells10102561

González-Arranz S, Gardner JM, Yu Z, Patel NJ, Heldrich J, Santos B, Carballo JA, Jaspersen SL, Hochwagen A, **San-Segundo PA**. (2020)
SWR1-independent association of H2A.Z to the LINC complex promotes meiotic chromosome motion.
*Frontiers in Cell and Developmental Biology* 8: 594092. (OA) (Q1). DOI: 10.3389/fcell.2020.594092

Lascarez-Lagunas L.I., Herruzo, E., Grishok, A., **San-Segundo P.A**., and Colaiácovo M.P. (2020)
DOT-1.1-dependent H3K79 methylation promotes normal meiotic progression and meiotic checkpoint function in C. elegans.
*PLoS Genetics* 16: e1009171. (OA) (Q1). DOI: 10.1371/journal.pgen.1009171

Cano-Linares M.I., Yáñez-Vilches A., García-Rodríguez N., Barrientos-Moreno M., González-Prieto R., **San-Segundo P.A**., Ulrich H.D. and Prado F. (2020)
Non-recombinogenic roles for Rad52 in translesion synthesis during DNA damage tolerance.
*EMBO Reports* 22(1):e50410. (OA) (Q1). DOI: 10.15252/embr.202050410

Herruzo E, Santos, B, Freire, R. Carballo, J. and **San-Segundo P.A.** (2019).
Characterization of Pch2 localization determinants reveals a nucleolar-independent role in the meiotic recombination checkpoint.
*Chromosoma* 128: 297-316. (Q2). DOI: 10.1007/s00412-019-00696-7

Subramanian V, Zhu X, Markowitz TE, Vale-Silva LA, **San-Segundo P.A.**, Hollingsworth NM, Keeney S and Hochwagen A. (2019)
Persistent DNA-break potential near telomeres increases initiation of meiotic recombination on short chromosomes.
*Nature Communications* 10: 970. (OA) (Q1, D1). DOI: 10.1038/s41467-019-08875-x

González-Arranz S, Cavero S, Morillo-Huesca M, Andujar E, Pérez-Alegre M, Prado F, and **San-Segundo P.A.** (2018).
Functional impact of the H2A.Z histone variant during meiosis in *Saccharomyces cere*visiae.
*Genetics* 209: 997-1015. (OA) (Q2). DOI: 10.1534/genetics.118.301110

## C.2. Congresses *(last 10 years)*

**26** presentations in National Meetings (24 oral), **25** presentations in International Meetings (13 oral), **3** Invited Conferences. *A few selected presentations are listed below:*

Exportin-mediated nucleocytoplasmic transport maintains Pch2 homeostasis during meiosis
EMBO Workshop Meiosis
Pamhagen, Austria, June 18-23, 2023 (Selected talk)

A cytoplasmic population of Pch2$^{TRIP13}$ supports the meiotic recombination checkpoint response
The students and postdocs Meiosis workshop v3.0
Montpellier, France. April 6-8th, 2021. (Talk)

Budding yeast as a powerful model to decipher meiotic quality controls preventing reproductive disorders
International Symposium: Yeasts: at the cross-roads of Systems biology and Biomedicine.
Fundación Ramón Areces. Madrid. January 23-24th, 2020. (Invited Talk)

Pch2 localization during the meiotic checkpoint response: is there life outside the nucleus?
EMBO Meiosis Conference
La Rochelle, France. August 25-29th, 2019. (Poster)

## C.3. Research projects *(selection from last 10 years)*

Meiotic quality control mechanism: checkpoints
MICIU. PID2021-125830NB-I00
Period: 01/09/2025 to 31/08/2028 Amount: 212.500 €
Principal Investigator**: Pedro A. San Segundo.**

Multifactorial control of meiotic chromosome dynamics, recombination and checkpoints during gametogenesis.
MICINN. PID2021-125830NB-I00
Period: 01/09/2022 to 31/12/2025 Amount: 187.550 €
Principal Investigator 1**: Pedro A. San Segundo.** IP 2: Jesús A. Carballo

Control traduccional de la entrada en quiescencia por la ruta TOR
Junta de Castilla y León. CSI010P23. (UIC028)
Period: 31/10/2023 a 30/04/2027 Amount: 180.000 €
Principal Investigator UIC028: Sergio Moreno. Guarantor Investigator: **Pedro A. San Segundo**

Spatiotemporal regulation of chromosome dynamics during gametogenesis.
MICIU. RTI2018-099055-B-I00
Period: 01/01/2019 to 30/09/2022 Amount: 157.300 €
Principal Investigator 1**: Pedro A. San Segundo.** IP2: Jesús A. Carballo

Regulation of meiotic program by CDK/Cyclin canonical and non-canonical complexes
Junta de Castilla y León. CSI259P20 (UIC028)
Period: 01/01/2020 to 31/12/2023 Amount: 246.000 €
Principal Investigator UIC028: Sergio Moreno. Guarantor Investigator: **Pedro A. San Segundo**

Control of meiotic chromosome dynamics during gametogenesis.
MINECO. BFU2015-65417-R
Period: 01/01/2016 to 31/12/2018 (extended to 30/09/2019) Amount: 157.300 €
Principal Investigator**: Pedro A. San Segundo**

Coordination between cell cycle and meiotic chromosome dynamics: implications in fertility
Junta de Castilla y León. CSI084U16 (UIC028)
Period: 01/01/2016 to 31/12/2018 Amount: 40.000 €
Principal Investigator UIC028: Sergio Moreno. Guarantor Investigator: **Pedro A. San Segundo**

The meiotic recombination checkpoint; epigenetic regulation.
MINECO. BFU2012-35748
Period: 01/01/2013 to 31/12/2015 Amount: 126.360 €
Principal Investigator**: Pedro A. San Segundo**