Santiago Caño-Muñiz

Life Science Data Scientist

ABOUT ME

I am a young and ambitious data scientist. Competitive and determined spirit. I trained as a biologist, but curiosity drove me toward the computational sciences. During my PhD, I taught myself coding, making R and Python my most potent tools. I truly enjoy developing insightful data graphics because they reveal the truth hidden in the numbers. Outside work, I like building DYI projects with my Raspberry Pi 3 or enjoying family time with my wife, Erjona.

PROFESSIONAL EXPERIENCE

PhD/Research Associate

Laboratory of Molecular Biology (Floto Lab) 2017-Present

I met Prof. Floto at the Cambridge Infectious Diseases conference. There we discussed my interest in bacterial membrane potential. That conversation started my PhD project on the membrane potential paradox.

- Experiment Design and data analysis. Data analysis with R. Monthly data presentations. Report and thesis writing.
- Image analysis, image segmentation and development of single-cell tracking algorithms with Python and ImageJ.
- Microfluidics chips design and preparation. Cell trapping and laser microscopy single-cell tracking.
- Plasmid design. Routine molecular biology and cloning of genetic material.

Research Assistant

Department of Genetics (Summers Lab) 2016-2017

As an intern with Dr Summers, I studied the mechanism of action of indole signalling in E. coli. I performed a systematic study of the link between the carbon source metabolism and indole production to show that an indole pulse occurs at the transition from glycolytic to gluconeogenic metabolism. For that purpose, I deployed advanced models of Flux-Balance-Analysis based on stochastic flow variation (Monte Carlo Simulation). The modelling was done within the R programming environment.

- Microbiology culture and physiological assays.
- Flow cytometry and fluorescent dye staining.
- Experiment Design and data analysis. Data analysis with R. Monthly data presentations. Report and thesis writing.
- Plasmid design. Routine molecular biology and cloning of genetic material.

Student project

University of Groningen (Kuipers Lab) 2016/06-2016/09

As part of my master, I volunteer to participate in a summer program within the Kuipers lab. There I participated in the study of the osmotic stress on Bacillus subtillis resistance to antibiotics. My role was to prepare agar pads and perform single-cell microscopy on the samples with cells. There, I measured the activation time of a fluorescent labelled gene. For the imaging analysis, I developed my first scripts in the ImageJ macro language.

- Data analysis with R. Monthly data presentations.
- Routine microbiology. Live laser microscopy based on agar pads.

CONTACT

Santiago.e.canomuniz@gmail.com

+44 7435 742811

phisanti.github.io

linkedin.com/in/santiagocanomuniz

SKILL

Problem Solving.
R.
Python.
Microfluidics.
Microbiology.
Image Analysis.
Critical Thinking.
Handling Pressure.
Leadership.
Collaboration.

AWARDS

- **Sandpit Pump priming (Cambridge Centre for Infectious Diseases)**

2022, For leading the most innovative project for the development of new drug delivery methods, we were awarded £10.000.

- **NIHR Fellowship (NIHR)**

2017, PhD fellowship for the study of antibiotic permeability in bacteria.

- **Leaders of Tomorrow (St. Gallen University)**

2016, Invited to the St Gallen conference.

- **Honours Degree (St. Gallen University)**

2017, Each year, the most prominent (10 % quantile) master students are invited to participate in the Honours Master.

- **Marco Polo Scholarship (University of Groningen)**

2017, A 1200€ Award for excellent research abroad.

EDUCATION

Advanced Statistics for Data Science

Universidad Johns Hopkins (USA, remote) 2022/Nov-2023/Jan

Mathematical Biostatistics Boot Camp 1
Mathematical Biostatistics Boot Camp 2
Advanced Linear Models for Data Science 1: Least Squares
Advanced Linear Models for Data Science 2: Statistical Linear Models

Design and Interpretation of Clinical Trials

Universidad Johns Hopkins (USA, remote) 2022-Nov

PhD in Medical Science

University of Cambridge, Gonville and Caius (UK) 2017-2021

Thesis: "The ionic control of porin permeability in Escherichia coli".
Teaching experience: Supervised two master's project students; twice practical demonstrator for Cells & Developmental Biology undergraduate course. Invited to give a course in Statistics with R at the Instituto Potosino de Investigación Científica y Tecnológica (México). Organised the online Floto Lab Bioinformatics R course during the pandemic. I contributed to the publication of multiple peer-reviewed journal articles and wrote one myself. Invited to the Leaders of Tomorrow conference (St. Gallen).

Master of Science

University of Groningen (NL) 2014-2016

Thesis (I): The Bacterial Cell Cycle, Graduated with Honors.
Thesis (II): New approaches and therapeutic options for *Mycobacterium tuberculosis* in a dormant state.
Remarks: Focus on Advanced statistics and Microbiology. Publication of one article in a peer-reviewed journal.

Degree in Genetics and Biology

Autonomous University of Madrid (ES) 2008-2014

Thesis: Application of Schwanniomyces occidentalis for inulin production.
Activities: Twice president of the "Asociación Huerto y Vivero" (Student Association greenhouse and orchard). With them I organized the reforestation of a burnt natural area in Candeleda, (Ávila, Spain) and a trip to the former mining area of Laciana.
Majors: Thesis.....8.5/10.
Data analysis.....8.5/10.
Bioethics.....Honours.

PUBLICATIONS

- Caño-Muñiz S, Hagting A, Evans I, Alsulami A, Summers DK, Blundell T, et al. Ionic control of porin permeability in bacteria. bioRxiv. 2022.
- Goode O, Smith A, Zarkan A, Cama J, Invergo BM, Belgami D, Caño-Muñiz S, et al. Persister Escherichia coli cells have a lower intracellular pH than susceptible cells but maintain their pH in response to antibiotic treatment. MBio. 2021;12(4):e00909-21.
- Zarkan A, Caño-Muñiz S, Zhu J, Al Nahas K, Cama J, Keyser UF, et al. Indole Pulse Signalling Regulates the Cytoplasmic pH of E. coli in a Memory-Like Manner. Scientific Reports. 2019 Mar 7;9(1):3868.
- Caño-Muñiz S, Anthony R, Niemann S, Alffenaar JWC. New approaches and therapeutic options for *Mycobacterium tuberculosis* in a dormant state. Clinical microbiology reviews. 2018;31(1):e00060-17.
- De Leon-Rodriguez A, Caño-Muñiz S, Liu J, Summers DK. Indole modifies the central carbon flux in the anaerobic metabolism of Escherichia coli: application to the production of hydrogen and other metabolites. New biotechnology. 2016;33(6):868–73.
- Caño-Muñiz S. Bacterial cell cycle: Regulatory strategies to increase survival [Thesis]. Faculty of Science and Engineering; 2016.

REFERENCE

Andres R Floto
Principal Investigator
(Molecular Immunity Unit)
University of Cambridge
Arf27@cam.ac.uk

David K. Summers
Principal Investigator
(Department of Genetics)
University of Cambridge
dks11@cam.ac.uk

Oscar Kuipers
Principal Investigator
(Department of Molecular Biology)
University of Groningen
dks11@cam.ac.uk