

# SALVADOR GOMEZ-CARRETERO

salvagc@gmail.com  
www.salvadorgc.com  
+65 85983465



## ABOUT ME

I am interested in the application of synthetic biology to engineer systems useful in clinical applications. Another interest is the development of technologies for the automation of the design and manufacturing of such systems, which would allow the creation of any synthetic biological construct in a rational and optimal way. I am enthusiastic, hardworking and I have leadership skills. I can work independently and also as part of a team. I also enjoy learning about history, playing videogames, hiking and cooking.

## EDUCATION

### PHD DEGREE

2017

KAROLINSKA INSTITUTET (SWEDEN)

Prof. Agneta Richter-Dahlfors' group at the Swedish Medical Nanoscience Center. Thesis title:

"Prevention of bacterial colonization in hospital-acquired infections using electrically conducting polymers". Topics:

1. Electrically conducting polymers to modulate biofilm formation.
2. Bacterial sensors based on electrically conducting polymers.

### ENGINEERING DEGREE

2011

UNIVERSITY OF SEVILLA (SPAIN)

Five academic years degree. Main areas of study: electronics and robotics. End of degree project focused on:

1. Theoretical modeling of the role of quorum sensing in biofilm formation by *Staphylococcus*.
2. Theoretical modeling of a bacterial sensor based on electrochemical impedance spectroscopy.

## PROFESSIONAL EXPERIENCE

### NUS (SINGAPORE)

2018-2020

One year and seven months. Research Fellow at NUS (National University of Singapore). Research on bacterial optogenetics and synthetic biology automation. Additional tasks included mentoring of the iGEM 2019 NUS Singapore team and assisting in the teaching of the theoretical modelling of biological systems.

### KAROLINSKA INSTITUTET (SWEDEN)

2011

Three months. Research engineer at Prof. Agneta Richter-Dahlfors' group at the Swedish Medical Nanoscience Center.

### CIBER-BBN (SPAIN)

2010-2011

One year studentship at CIBER-BBN (Biomedical Research Networking Center in Bioengineering, Biomaterials and Nanomedicine), Sevilla (Spain). Projects focused on:

1. Theoretical models of biofilm formation processes.
2. Theoretical models of electrokinetic phenomena to control biofilm formation.
3. Theoretical models of the spread of infectious diseases.

### CERN (SWITZERLAND)

2005

Summer internship of 13 weeks at the LHCb detector of the LHC particle accelerator. Projects involved circuit design and implementation on an FPGA using the VHDL language and design and implementation of an SCADA software.

## SKILLS

### ELECTRICALLY CONDUCTING POLYMERS

Chemical and electrochemical synthesis. Characterization.

### ELECTROCHEMISTRY

Voltammetry. Amperometry. Coulometry. Electrochemical Impedance Spectroscopy. Electrodeposition.

### MATERIALS CHARACTERIZATION TECHNIQUES

Contact angle. Dynamic light scattering (DLS). Surface plasmon resonance (SPR). Fourier-transform infrared spectroscopy (FTIR). Four-point probe electrical measurements.

### DEVICE FABRICATION

Mask design. Lithography. MEMS design and simulation. PDMS microfluidics. Surface functionalization.

### ELECTRONICS AND ROBOTICS

Circuit design for low and high frequency. Microcontroller and VHDL system design. Automatic control. Robot design and programming. Artificial vision.

### PROGRAMMING

LABVIEW. MATLAB. Octave. The ImageJ macro language. The R statistical language. Python. C/C++. HTML and CSS. Shell scripting.

### MICROBIOLOGY AND CELL BIOLOGY

General lab work with Gram+/Gram- bacteria and biofilms. Eukaryotic cell work.

### SYNTHETIC BIOLOGY

RNA and DNA work. PCR. Gel electrophoresis. Western blot. Gibson assembly. Bioinformatics.

### IMAGING

Immunohistochemistry. Microscopy. Development of custom imaging processing software.

### THEORETICAL MODELING

Multiphysics modeling with COMSOL. Systems biology. Epidemic models. Multiscale modeling. Statistics.

### SCIENTIFIC COMMUNICATION

Experience in scientific writing, oral and poster presentations. LaTeX. Graphic design in 2D (Inkscape) and 3D (Blender). Proficient in English and Spanish.

## REFERENCES

References available upon request.

## PRESENTATIONS

Gomez-Carretero, S., Persson, K., Kjäll, P., Berggren, M. & Richter-Dahlfors, A. Modulation of biofilm formation processes using conducting polymers. 5th International Symposium on Flexible Organic Electronics (ISFOE12), Thessaloniki, Greece (2012). Oral presentation.

Gomez-Carretero, S., Persson, K., Kjäll, P., Berggren, M. & Richter-Dahlfors, A. Modulation of *Salmonella enterica* serovar Typhimurium biofilm formation using conductive polymer surfaces. E-MRS 2012 Spring Meeting, Strasbourg, France (2012). Oral presentation.

## PUBLICATIONS

Yeoh, J.W. et al. Genetic Circuit Design Principles, in *Handbook of Cell Biosensors* (editor Thouand, G.). Springer, Cham (2020).

Gomez-Carretero, S. et al. Redox-active conducting polymers modulate *Salmonella* biofilm formation by controlling availability of electron acceptors. *npj Biofilms and Microbiomes*, **3**, 19 (2017).

Gomez-Carretero, S. et al. Electroenhanced Antimicrobial Coating Based on Conjugated Polymers with Covalently Coupled Silver Nanoparticles Prevents *Staphylococcus aureus* Biofilm Formation. *Advanced Healthcare Materials*, **6**, 1700435 (2017).

Gomez-Carretero, S. & Kjäll, P. Medical Applications of Organic Bioelectronics, in *Organic Electronics: Emerging Concepts and Technologies* (editors Cicoira, F. & Santato, C.). Wiley-VCH Verlag GmbH & Co. KGaA (2013).