

Dr. Artemio Soto-Breceda | Curriculum Vitae

email: artemio.soto-breceda@univ-grenoble-alpes.fr



[linkedin.com/in/artemiosb](https://www.linkedin.com/in/artemiosb)



[Google Scholar profile](#)

PROFILE:

Postdoctoral Research Fellow in Neural Modeling. PhD in Biomedical Engineering (Neuroscience), MSc in Bioelectronics Engineering. Retinal prostheses researcher and experienced electrophysiologist. Neural data analyst.

LANGUAGES:

Spanish (mother tongue), English (fluent, IELTS score: 8 overall, CEFR: C1)

ACADEMIC BACKGROUND:

The University of Melbourne, Melbourne, Australia

PhD in Biomedical Engineering - Neuroscience

2014 - 2018

Granted in
2019

Research focused on improving and optimizing retinal prostheses by studying different stimulation parameters.

Centro de Investigación y Estudios Avanzados (CINVESTAV), Mexico City, Mexico

Master's in science in Electrical Engineering - Bioelectronics

2011 - 2013

Design and manufacture of a training and assessing device for minimal invasion surgery. Data collection and statistical analysis of performance improvement after training.

Universidad Autónoma de Aguascalientes (UAA), Aguascalientes, Mexico

Electrical Engineering, Major in Automatic Control

2005- 2010

Victoria University, Peace Scholarship Recipient, Melbourne, Australia

One year exchange student, sponsored by SEP Mexico, IDP Australia and Victoria University

2008- 2009

PROFESSIONAL EXPERIENCE:

Grenoble Institut des Neurosciences INSERM

**March 2024 -
current**

Postdoctoral Research. Neural Modelling
Computational modelling of biological neural networks.

- Development of computational models of the neural correlates of consciousness.
- Study of perceptual consciousness.
- Research on possible neural mechanisms for Leaky Evidence Accumulation Processes (LEAP).

The University of Melbourne

**July 2020 - Dec
2023**

Postdoctoral Research Fellow in Neural Modelling
Multi-scale modelling of cortical neural circuits.

- Development of a framework to link the micro-scale neural dynamics (through a network of Leaky Integrate and Fire neurons) and the meso-scale dynamics (through a Neural Mass Model).
- Parameter estimation using Kalman Filters.
- Exploring current based models and conductance-based models.
- Framework based modelling using MATLAB and Brian2 on Python.
- Data analysis with MATLAB.
- In-vitro calcium imaging recordings, seizure-like activity induced in neural cultures, selective stimulation of inhibitory interneurons with optogenetics.
- Formal supervision of 1 PhD research project.
- Informal supervision of 1 PhD research project (at Monash University, Australia).

The University of Melbourne

**May 2019 - Dec
2019**

Postdoctoral Research Fellow (6 months fixed term position)

Management of the in vitro laboratory- Development of a novel computational tool for signal treatment and spike sorting of neuronal recordings.

- Development and testing of the software (MATLAB GUI).
- Releasing the project to the public (as a compiled standalone GUI and a MATLAB App).
- Development of a spiking recording simulation suite.
- Contribution in the writing and publication of a Methods paper outlining the technique.
- Formal supervision of 2 research projects (Master).

National Vision Research Institute (NVRI), Melbourne, Australia

2018 - 2019

Research assistant

- Experimental Neuroscience: Electrophysiology of retinal ganglion cells (rat, mouse, cat, wallaby).
- Electrode fabrication and testing. Platinum microelectrode array fabrication, certified in P2 clean room nanofabrication.
- Testing of different stimulation devices, e.g., wireless-powered electrodes, carbon nanocrystals, diamond/carbon fiber electrodes.
- Management of the in vitro laboratory.
- Continuous monitoring of cats during days-long in vivo electrophysiological recordings.
- Printed Circuit Boards (PCB) fabrication.

The University of Melbourne

2016 - 2019

Academic teaching and research

- Casual research assistant.
- Automatic control application of Neural Plasticity in auditory neurons (started September 2018) - Development of a computational model of neural plasticity.

Tutor, Department of Biomedical Engineering. Awarded **Best Tutor of 2019**

- BMEN30008 - Biosystems Design (July 2016 - December 2018)
- BMEN30006 - Circuits and Systems (February 2017 - June 2019)
- BMEN90002 - Neural Information Processing (July 2017 - December 2018)
- BMEN90033 - Bioinstrumentation (February 2018 - June 2019)

UCAD - University of Science and Management, Mexico

2012 - 2013

Assistant Lecturer in Bachelor of Psychology and Bachelor of Computer Science. The subjects I taught include Statistics, Introduction to IT, Algorithms (C++), Visual Programming (C#), Electrical Circuits, Assembler Language, Memories and Peripherals, and Microcontrollers.

Softtek / General Electrics Capital, Mexico

2009 - 2011

Software Development

- Web application development using following frameworks: Google GWT, Spring, iBatis
- Strong knowledge of software design and development in an international team environment.
- Technical support via telephone with customers worldwide (USA, India, Pakistan, China).

PUBLICATIONS:

Preferential modulation of individual retinal ganglion cells by electrical stimulation.

Authors: M Yunzab[^], **A Soto-Breceda**[^], M Maturana, S Kirkby, M Slattery, et al.
Journal of Neural Engineering, 2022
[^] Joint first authorship

Irregularly timed electrical pulses reduce adaptation of retinal ganglion cells.

Authors: **A Soto-Breceda**, T Kameneva, H Meffin, M Maturana and MR Ibbotson
Journal of Neural Engineering, 2018

Inhibitory stabilized network behaviour in a balanced neural mass model of a cortical column.

Authors: P Zarei Eskikand, **A Soto-Breceda**, MJ Cook, AN Burkitt and DB Grayden
Neural Networks, 2023

Brain model state space reconstruction using an LSTM neural network.

Authors: Y Liu, **A Soto-Breceda**, P Karoly, DB Grayden, Y Zhao, MJ Cook, et al.
Journal of Neural Engineering, 2023

Hybrid diamond/carbon fiber microelectrodes enable multimodal electrical/chemical neural interfacing.

Authors: MA Hejazi, W Tong, A Stacey, **A Soto-Breceda**, MR Ibbotson, M Yunzab, et al.
Biomaterials, 2020

A new algorithm for drift compensation in multi-unit recordings of action potentials in peripheral autonomic nerves over time.

Authors: CE Davey, **A Soto-Breceda**, A Shafton, RM McAllen, JB Furness, et al.
Journal of Neuroscience Methods, 2020

Wide dipole antennas for wireless powering of miniaturized bioelectronic devices.

Authors: A Aldaoud, S Lui, KS Keng, S Moshfegh, **A Soto-Breceda**, W Tong, et al.
Sensing and Bio-Sensing Research, 2020

Wireless multichannel optogenetic stimulators enabled by narrow bandwidth resonant tank circuits.

Authors: A Aldaoud, **A Soto-Breceda**, W Tong, G Conductier, MA Tonta, et al.
Sensors and Actuators A: Physical, 2018

SPARC: Noise Analysis and Signal Drift Correction in Long-Period Multi-Unit Recordings of Action Potentials in Autonomic Nerves.

Authors: MJ Stebbing, **A Soto-Breceda**, A Shafton, RM McAllen, JB Furness, et al.
Abstract published in The FASEB Journal, 2020

Investigating Preferential Activation of Rat Retinal Ganglion Cell Classes with Electrical Stimulation.

Authors: M Yunzab, **A Soto-Breceda**, M Maturana, H Meffin, T Kameneva, A Burkitt, et al.
Abstract published in Investigative Ophthalmology & Visual Science, 2019

CONFERENCES, SEMINARS AND LECTURES:

Computational Neuroscience Meeting (CNS), 2023

Attended OCNS annual conference in Leipzig, Germany, 2023. Presented my work on multi-scale neural modelling of cortical networks.

Guest lecture - Bionic Eyes: Electrical stimulation of the retina, Mexico, 18th May 2022.

Original name: Ojos biónicos: estimulación eléctrica de la retina.
Lecture at Universidad Autonoma de Aguascalientes (UAA), Mexico.

Maths in the Brain, Melbourne, Australia, 2022

Presented my post-doctoral project in a quick talk at the annual Maths in the Brain conference at Monash University in Melbourne. Talk: Multi-scale neural modelling framework.

Invited speaker - The Arduino as a scientific research tool, Ecuador, 26th April 2022.

Gave a lecture and technical demonstration at Universidad San Francisco de Quito, Ecuador (USFQ). The talk covered gyroscope, accelerometer and various other sensors, as well as DAQ using Arduino, Bluetooth communication and data visualization.

Guest lecture - Biosensors and Biopotentials, Australia, 2021

Gave this lecture as part of the subject Circuits and Systems at The University of Melbourne as a guest lecturer.

NeuroEng, 2018

Attended the conference NeuroEng in Sydney, Australia, 2018. Presented my work on selective stimulation of retinal ganglion cells.

SCiNDU, 2015

Attended the conference SCiNDU in Brisbane, Australia, 2015. Presented my work on random inter-pulse interval stimulation to reduce adaptation of retinal ganglion cells,

PAHCE, 2013

Attended the IEEE conference Panamerican Health Care Exchange in Medellin, Colombia, 2013. Presented my work on the development of a device for training and assessment of minimally invasive surgery.

AWARDS:

Outstanding UAA alumnus - Universidad Autónoma de Aguascalientes (2023)

Recognized as one of 50 outstanding alumni of Universidad Autonoma de Aguascalientes for its 50th anniversary.

Outstanding Reviewer 2022 - Journal of Neural Engineering

Issued by IOP Publishing Group in March 2023

Outstanding Reviewers are selected by IOP Publishing's editors based on the quality, quantity and timeliness of their reviews. ([link](#))

Best Tutor in the Department of Biomedical Engineering

The University of Melbourne

I was selected best tutor in semester 1, 2019 among all tutors and demonstrators in the department of biomedical engineering.

Recipient of CONACyT Scholarship - 2014

Issued by CONACyT, Mexico. PhD Scholarship stipend to study abroad for 4 years

Recipient of NICTA Scholarship - 2014

Issued by NICTA, Australia (now part of CSIRO). PhD Scholarship stipend to study in the field of Biomedical Engineering.

Recipient of CONACyT Scholarship - 2011

Issued by CONACyT, Mexico. Master's Scholarship to study in a recognized program for 2.5 years

Recipient of IDP Peace Scholarship - 2008

Issued by IDP, Australia and SEP, Mexico.

The Peace Scholarship Program is committed to providing opportunities for eligible students in selected countries worldwide to study abroad in Australia at undergraduate or postgraduate level.

RESEARCH GRANTS:

CBE Accelerate Grant 2023

Internal Grant - The University of Melbourne, School of Chemical and Biomedical Engineering.

Amount: AUD\$10,000

Funds used to hire a Graduate Research Assistant to update, debug and maintain the public repository.

PROFESSIONAL DEVELOPMENT:

- Current Member of the Australasian Neuroscience Society (ANS)
- Current Member of the Organization for Computational Neurosciences
- Current Member of the BioMelbourne Network

PEER REVIEW:

Regular reviewer for IOP's *Journal of Neural Engineering* in the field of retinal implants.

Was granted Trusted Reviewer status in 2022 by IOP, following the submission of a top-quality review report (not through the regular application process). It indicates a high level of peer review competence and the ability to constructively critique scientific literature to an exceptional standard.

Peer reviewer for *IEEE Transactions on Neural Systems and Rehabilitation Engineering*

SERVICE TO THE DEPARTMENT AND THE UNIVERSITY:

Faculty of Engineering and IT professional mentoring program 2023.

Currently mentoring two bachelor students in the field of neuroscience. Mentoring consists on providing career support and advice through regular meetings.

Welcome to Melbourne mentoring program, 2022.

Participated in the Welcome to Melbourne program, which ensures that incoming Australia Awards Scholarship students receive a truly welcoming experience at The University of Melbourne.

Member of the Early Career Academic Network (ECAN) at The University of Melbourne since 2022.

Have been a member of the ECAN committee since 2022. As part of the committee, I organize conferences for Early Career Researchers in the Faculty of Engineering and IT at The University of Melbourne. I have organized three conferences this year, including:

- How to recruit PhD Students. Interviewing, assessing their profiles and successful supervision.
- Licensing Intellectual Property.
- Data Science at The University of Melbourne. Information session for Early Career Researchers at The University of Melbourne about the Data Science and Data Analysis available for them.

Volunteer organizer of the CBE Research Fellow Professional Development Workshops 2021.

The program consisted of a series of talks and discussions throughout the year. My contribution included organizing a networking event and recruiting 3 speakers for the industry engagement session.