Lic. Cecilia T. Herbert February 2021

Education

April 2016 to date – PhD student of Biology in the Doctoral Program of the Physiology and Molecular Biology Department (DFMBC) at Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires (FCEyN, UBA). I work at the Dynamical Systems Lab, Physics Department, FCEyN, UBA & IFIBA, CONICET, Argentina.

Doctoral Thesis: Study on the neural coding of song production in oscine birds

PhD Advisor: Ana Amador, PhD. (anita@df.uba.ar)

Scholarship for doctoral studies granted by CONICET (Argentine National Scientific and Technical Research Council).

Expected graduation date: mid 2021.

To put the lab's population neural model of birdsong production to the test, I recorded extracellularly from a cortical nucleus in freely behaving canaries while they sang, using tetrodes. I developed and taught the techniques for small animal surgery and microdrive and tetrode fabrication, which were not used in the lab prior. I performed spectrographic analysis on the audio signals, neural signal processing and spike sorting of the data using custom Matlab code. I am currently performing time series analyses to correlate LFP signals with behaviour.

Courses taken: **Frugal Science** BioE 271 (by Prof. Manu Prakash from Stanford University), **Electronics Laboratory** (by Prof. Miguel Larotonda from UBA), **Machine Learning** (by Prof. Agustín Gravano at UBA), **Neural Systems and Behavior** (directed by Hans Hofmann, André Fenton and Jade Zee at the Marine Biological Laboratory affiliated to the University of Chicago, in Woods Hole, MA, USA), **Seminar on Advanced tools in Statistical Analysis** (by Profs. Andrés Farall and Marina Valdora at UBA), **Data Science in R**: Fundamentals (by Profs. Mariela Sued and Ana Bianco at UBA) and **Systems Neuroscience** (by Prof. Rodrigo Quian Quiroga at UBA).

March 2009 to March 2016 – Undergraduate student of Biology at Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires (FCEyN, UBA), Argentina.

Licenciatura in Biology with specialization in Animal Physiology and graduation thesis (equivalent to Master's).

Thesis title (2015): An automatic method for the identification of significant motor instances in birdsong

Thesis advisor: Gabriel Mindlin, PhD. Grade point average: 9.26 out of 10. Thesis passed successfully in March 2016.

Publications

Peer reviewed journals

1. Lassa Ortiz, J. N., Herbert, C. T., Mindlin, G. B., & Amador, A. **"Significant instances in motor gestures of different songbird species"**. Frontiers in Physics, 7, 142. (2019). https://doi.org/10.3389/fphy.2019.00142

2. Herbert, C. T., Boari, S., Mindlin, G. B., & Amador, A. **"Dynamical model for the neural activity of singing *Serinus canaria*"**. Chaos 30, 053134. (2020). https://doi.org/10.1063/1.5145093

Poster sessions

October 2020 – Interactive talk in English "Grouped single-unit activity in a cortical avian nucleus supports a population model of birdsong production in *Serinus canaria*" (Cecilia T. Herbert, Santiago Boari, Gabriel B. Mindlin, Ana Amador) presented at the **Neuromatch Conference 3.0** held virtually.
https://www.youtube.com/watch?v=C1wGYC6LRWU&ab_channel=NeuromatchConference

October 2020 – Poster presenter "Grouped single-unit activity in a cortical avian nucleus supports a population model of birdsong production in *Serinus canaria*" (Cecilia T. Herbert, Santiago Boari, Gabriel B. Mindlin, Ana Amador) presented at the **XXXV annual congress of the Argentine Neuroscience Research Society** (SAN) held virtually. Abstract to be published in the open access journal ASN Neuro.

October 2019 – Poster presenter "Local field potential in cortical avian nucleus supports a circular model for birdsong production" (Cecilia T. Herbert, Santiago Boari, Gabriel B. Mindlin, Ana Amador) presented at the **XXXIV annual congress of the Argentine Neuroscience Research Society** (SAN) in Villa Carlos Paz, Córdoba, Argentina. Abstract to be published in the open access journal ASN Neuro.

September 2017 – Poster presenter "HVC neural activity supports a circular model for birdsong production" (Cecilia T. Herbert, Santiago Boari, Mariano Belluscio, Gabriel B. Mindlin, Ana Amador) presented at the **XXXII annual congress of the Argentine Neuroscience Research Society** (SAN) in Mar del Plata, Buenos Aires, Argentina.

Teaching background

Master thesis supervision

March 2020 - March 2021 – Assistant supervisor to Fiamma Liz Leites for her licenciatura thesis (master thesis equivalent). Fiamma is a Biology student at FCEyN, UBA. Thesis topic: Study of auditory neural activity in a sensorimotor cortical nucleus in canaries. Main supervisor: Ana Amador.

Experience

March to December 2016 – Undergraduate Teaching Assistant position in the Physiology and Molecular Biology Department, FCEyN, UBA. *I assisted in laboratory practicals and seminars of the courses Neural System Physiology and Introduction to Molecular Physiology.*

Internships, collaborations, scholarships and awards

Postgraduate

September 2019 – Received a travel grant from the Physics Department, FCEyN, UBA to attend the XXXIV annual congress of the Argentine Neuroscience Research Society (SAN) in Villa Carlos Paz, Córdoba, Argentina.

June to July 2018 – Received a travel grant from Boehringer Ingelheim Fonds and **Financial aid scholarship sponsored by IBRO International Brain Research Organization, NIH Grant for NS&B and Lola Ellis Robertson Endowed Scholarship to attend the course "Neural Systems and Behavior"** in Woods Hole, MA, USA.

April to July 2016 – Collaborated with Mariano Belluscio on tetrode and microdrive construction at the Systems Biology Group in the Bernardo Houssay Institute of Physiology and Biophysics, Buenos Aires, Argentina.

April 2016 to April 2021 – Received a doctoral grant from CONICET at the Dynamical Systems Laboratory, Physics Department, FCEN, UBA & IFIBA, CONICET.

Undergraduate

July to August 2014 – Received financial aid scholarship to participate in the Undergraduate Summer Research Program 2014 of the School of Life Sciences of École Polytechnique Fédérale de Lausanne (EPFL) in the Biorobotics Laboratory led by Prof. Auke Ijspeert in Lausanne, Switzerland. *I performed a biophysical analysis of the movement of domestic animals using tracking software on videos to aid design of biologically inspired quadruped robots. The program included seminars/workshops and a student symposium.*

December 2013 – Received the 2013 Academic Merit Award, Santander Río Universidades for having one of the three hundred highest GPAs amongst participating students in a group of argentine universities.

August 2012 to October 2013 – Intern under the supervision of Dr. Roberto G. Pozner in the Biological Chemistry Department, FCEyN, UBA. Project "The Use of ICT in University Education in the Natural and Exact Sciences" of the UBATIC program. *I adapted code in netlogo to develop a virtual laboratory practical about enzyme kinetics for the Biological Chemistry course at the FCEyN. I continue to update the code as it remains a valuable tool, especially during distance learning in the 2020 academic year.*

Professional networks

2020 to date – Co-founder of Talleres Open Source, speaker and organizer. *Our goal is to bring together our experiences, guided by the needs of the neuroscience research community in a series of workshops about open source tools to establish a collective construction of knowledge. I gave a workshop on Digital Fabrication (CAD Design for FDM Printing) using FreeCAD*. GitHub: https://github.com/talleresopensource

2020 to date – Contributor to Open Neuroscience, the user-driven database of Open Science projects related to Neuroscience (https://open-neuroscience.com/)

2020 to date – Participant in the red latinoamericana de tecnologías libres (reGOSH) and the Buenos Aires node of GOSH (Global Open Science Hardware)

2019 to date – Member of the Red de Estudiantes de Neurociencias (Neuroscience student network)

2016 to date – Member of the Sociedad Argentina de Investigación en Neurociencias (SAN, Argentine Society for Neuroscience Research)

Outreach

August, October and November 2020 – "How sounds look" , live virtual talk for school students and the general public at St.Hilda's College (Music and Biology classes), La Matanza Science Plaza and FCEyN, UBA Virtual Biology Week.

August 2019 – "Tuning into the melodies of the nervous system", exhibit creator, co-ordinator and presenter at Biology Week for FCEyN, UBA.

August 2015 & August 2016 – "A world of sensations", exhibitor at Biology Week for FCEyN, UBA.

November 2013, October 2015 & October 2016 – "Learning like animals", exhibitor at Museum Night for the general public.

June 2016 – "A path in science" , talk for high school students at St.Hilda's College.

Languages

Spanish mother tongue and bilingual **English** (AICE with distinction). Conversational **French** (A2).

Programming

Matlab, Python, C, R, NetLogo – Proficient by working on specific projects during courses and internships.

Non-scientific background

March 2009 to date – **Principal oboe with the Hurlingham Municipal Symphonic Orchestra** and soloist performances.

December 2018 to date – **Principal oboe with the San Isidro Municipal Symphonic Orchestra.**

January 2009 to March 2016 – Head of Quality Department and Internal Auditor at Linguistic Services SA, a company specialized in English to Spanish translation. *Our department led the company to successfully update and renew its ISO 9001:2008 and EN 15038:2006 certified Quality Management System every year. I trained as an auditor in TÜV Rheinland Argentina.*