

## USUY DAVID LEON TOLOSA

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Researcher and educator with 2 years of experience, passionate microscopist, and a dreamer for diversity, open science, and open software. Focused on understanding the biological mechanisms underlying pattern formation and regeneration of three-dimensional tissues and structures. Driven by promising advances in genetics, electrophysiology, and microscopy, I believe there has never been a better time to explore these fundamental biological questions.

### EDUCATION

**National University of Colombia** | Bogota, DC. Colombia

Jan 2016 - Dec 2022

*Bachelor in biology* | **Honors:** 2023 Best bachelor thesis of the year award, 2023 Top undergraduate performance in university-level Saber Pro National Exam. | *Top 10 percent of the class*

### RESEARCH EXPERIENCE

**University of Maryland** *Faculty Assistant* | College Park, MD. United States

May 2023 – Jan 2025

*Juan Anguerya's laboratory*. Supervised by Dr Juan Anguerya MD, PhD

- Characterization of the effects of thrb modulation on photoreceptors subtypes of *Astatotilapia Burtoni* (Acquired all the preliminary data for grant application NSF 25-504)
- Inducing CRISPR mutagenesis on Foxq2 transcription factor, and sparse neuron labeling to evaluate the synaptic connectivity of different horizontal cell subtypes in *Danio rerio*.
- Assembly and construction of a custom electrophysiology rig and multi-wavelength stimulator for ERG recordings.
- Recording of electroretinograms and optokinetic responses to explore the onset of vision of *Astatotilapia Burtoni* during first stages of development.
- Exploring horizontal cell subtypes diversity across multiple species using sparse neuron labeling (DII staining) and confocal microscopy on Snakes (*Pantherophis obsoletus*), Geckos (*Tokay gecko*), Cichlids (*Metriacrima zebra*, *Astatotilapia Burtoni*), Mongolian Gerbil (*Meriones unguiculatus*), and Zebrafish (*Danio rerio*).
- Proficient in retina micro-dissections on multiple species adults and larvae.
- Responsible for zebrafish aquaculture and maintenance

**National University of Colombia**, *Research Assistant* | Bogota, DC. Colombia

May 2021 - July 2023

*Neurophysiology Research Group*. Supervised by María Del Pilar Gómez, MD, PhD and Enrico Nasi, PhD

- Establishing a protocol to isolate functional photoreceptors on planaria (*Schmidtea mediterranea*) to explore the phototransduction pathway via patch clamp and calcium imaging.
- Labeling different elements of the phototransduction cascade using immunohistochemistry on planaria ocelli.
- Proficient in dissection and dissociation of planarian ocelli tissue.
- Responsible for maintenance of planarian culture.

**University of Pennsylvania**, *Research Trainee* | Philadelphia, PA. United States

Summer 2020

*Summer Undergraduate Internship Program (SUIP)*. Supervised by Minghong Ma, PhD

- Analysis of video and images using machine learning, specifically the neural network "DeepLabCut" to understand the behavioral changes upon optogenetic manipulation of the islands of Calleja neurons in the ventral striatum.
- Co-author of a review article on the network connections between olfactory and non- olfactory areas such as the medial prefrontal cortex.

**National University of Colombia**, *Research Trainee* | Bogota, DC. Colombia

Jan 2019 - Dec 2020

*Neurophysiology Research Group*. Supervised by María Del Pilar Gómez, MD, PhD and Enrico Nasi, PhD

- Trained in basics of cellular electrophysiological recording and immunocytochemistry.
- Trained in dissection of chicken eye and protein assays such as Electrophoresis and Western Blot.
- Learned cell culture using Neuroblastoma cell line.

**National University of Colombia**, *Research Trainee* | Bogota, DC. Colombia

Feb 2018 - Dec 2018

*Protein Research Group*. Supervised by Edgar Reyes, PhD

- Worked on the purification of a lectin protein from *Salvia bogotensis*, using affinity and size exclusion chromatography to explore the insecticidal activity of this protein in lepidoptera *Tecia solanivora*.

## TEACHING EXPERIENCE

**Neurophysiology laboratory 405 Teaching Assistant** | College Park, MD. United States

Jan 2024 - May 2024

Supervised by Dr Hillary Bierman PhD

During the semester, I was assigned a group of 20 students for whom I supervised alone for a weekly 4-hour laboratory session focused on extracellular and intracellular electrophysiological recordings using various models, including Crayfish, Crickets, and Worms. Under my supervision, the students progressed to designing and conducting their own experiments. Ultimately, they presented their findings through posters, showcasing results obtained from both intracellular and extracellular recordings on pharmacology and sensorial information.

**High School voluntary teacher** | Bogota, DC, Colombia

Feb 2017 - Dec 2018

*No supervision*

As part of a team of undergraduate students, we helped high-school students to prepare for the admission test of the National University of Colombia (the top-ranked university in Colombia, with an average admission rate of 7%). The students we mentored were from a low resource community.

## PUBLICATIONS

Bhattarai, J.P., Etyemez, S., Jaaro-Peled H., Janke, E., **Leon Tolosa, U.D.**, Kamiya, A., Gottfried, J.A., Sawa, A., and Ma, M. (2021). Olfactory modulation of the medial prefrontal cortex circuitry: implications for social cognition. *Seminars in Cell and Developmental Biology*. <https://doi.org/10.1016/j.semcdb.2021.03.022>.

## PRESENTATIONS AND POSTERS

Leon, U, Angueyra, J. (2024). **Waiting for godot? Unveiling the rules for synaptic connectivity of horizontal cells.** Mid Atlantic zebrafish meeting (MARZ). Rutgers University. New Jersey. (Principal presenter).

Leon, U, Ma, M. (2020). **Contribution of the olfactory system to social cognition in mice.** Undergraduate Internship Program (SUIP). University of Pennsylvania. Philadelphia PA. (Principal presenter).

Puerto, P; Leon, U; Zuluaga,M; Gomez, P. (2023). **Planaria eye as a study model of phototransduction.** XIII Seminario Nacional de Neurociencia (COLNE). Colegio Colombiano de Neurociencia. Cali. Valle del Cauca. (Principal presenter).

## SKILLS AND OTHERS

**Staining** Lipid tracing (DII), Immunocytochemistry, Golgi staining.

**Electrophysiology:** whole-cell patch clamp, Electroretinograms (ERG), Calcium imaging (Gcamp6, Fluo4AM). **Microscopy:** Confocal microscopy, Light sheet microscopy, Confocal live microscopy, Expansion microscopy. **Molecular Biology:** PCR, cell transfection, western blot.

**Software:** Python (*napari*), FIJI-ImageJ, µManager, Linux, OpenSCAD, Inkscape, Elements (Nikon), Zen (Zeiss).

**Hardware:** Soldering of simple circuits, Arduino basics, Raspberry pi.

**Relevant Coursework:** Cellular Biophysics; Molecular Biology; Genetics; Cell Biology; Animal Physiology I and II; Electricity and Magnetism; Biochemistry I and II.

**Graduate Coursework (special admission):** Neurobiology of Sensory Transduction; Membrane Biophysics; Fundamentals of Light Microscopy.

**Language:** Spanish (Fluent), English (Fluent), German (Beginner).

## REFERENCES

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