

## Juan José Silva Fernández, Ph.D

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(IMBB-FORTH)

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### Professional Profile

My principal focus and skills are to do research and teach on insect physiology, molecular biology, toxicology, bioinformatics and evolution. I earned my Ph.D. in the Department of Entomology at Cornell University. Before joining Cornell University, my laboratory experience was from two different research centers in Biochemistry and Microbiological Laboratories at Universidad de Los Andes.

### Education

Doctor of Philosophy, Entomology – November 2022

Thesis title: *The insect voltage-gated sodium channel: structure conservation, role in pyrethroid resistance and fitness costs in the yellow fever mosquito, Aedes aegypti*

Advisor: Jeffrey G. Scott, Ph.D., Cornell University, United States

Master in Biological Sciences, Microbiology area – February 2017

Thesis title: *Synergism and antagonism of Lysinibacillus sphaericus consortia against reference and field-collected strains of Aedes aegypti larvae.*

Advisor: Jenny Dussan, Ph.D., Universidad de Los Andes, Colombia

Microbiologist, Universidad de Los Andes. Bogotá, Colombia – October 2015

Thesis title: *Larvicidal activity of Lysinibacillus sphaericus against Aedes aegypti. Preliminary screening of the midgut receptor to binary toxin*

Advisor: Jenny Dussan, Ph.D., Universidad de Los Andes, Colombia

Biologist, Universidad de Los Andes. Bogotá, Colombia – October 2015

Thesis title: *Standardization of leukocitary Hexosaminidase A activity: Range values from Colombian population*

Advisor: Alfredo Uribe, Ph.D., Universidad de Los Andes, Bogotá, Colombia

### Professional skills

Rearing mosquito colonies, microinjection of mosquito embryos, DNA and RNA extraction protocols, Polymerase Chain Reaction, mosquito brain dissections, bacterial cloning, conducting bioassays, use RStudio and Unix-based softwares for analysis of transcriptomics data.

## Publications

5. Fisher, C.R., Dressel, A.E., Silva, J.J., Scott, J.G., A Globally Distributed Insecticide Resistance Allele Confers a Fitness Cost in the Absence of Insecticide in *Aedes aegypti* (Diptera: Culicidae), the Yellow Fever Mosquito, *Journal of Medical Entomology*, 2023;, tjad015, doi:[10.1093/jme/tjad015](https://doi.org/10.1093/jme/tjad015).
4. Silva, J.J., Kouam, C.N. and Scott, J.G. (2021) Levels of cross-resistance to pyrethroids conferred by the *knockdown resistance* allele V410L + V1016I + F1534C in *Aedes aegypti*. *PLOS Negl Trop Dis*. doi:[10.1371/journal.pntd.0009549](https://doi.org/10.1371/journal.pntd.0009549).
3. Freeman, J.C., Smith, L.B., Silva, J.J., Fan, Y., Sun, H. and Scott, J.G. (2021), Fitness studies of insecticide resistant strains: lessons learned and future directions. *Pest Manag Sci*. doi:[10.1002/ps.6306](https://doi.org/10.1002/ps.6306).
2. Smith, L.B., Silva, J.J., Chen, C., Harrington, L.C., Scott, J.G. (2021), Fitness costs of individual and combined pyrethroid resistance mechanisms, *kdr* and CYP-mediated detoxification, in *Aedes aegypti*. *PLoS Negl Trop Dis* 15(3): e0009271. doi:[10.1371/journal.pntd.0009271](https://doi.org/10.1371/journal.pntd.0009271).
1. Silva, J.J. and Scott, J.G. (2020), Conservation of the voltage-sensitive sodium channel protein within the Insecta. *Insect Mol Biol*, 29: 9-18. doi:[10.1111/imb.12605](https://doi.org/10.1111/imb.12605).

## Teaching Experience

### Cornell University

*Teaching Assistant of Honey Bee Biology – ENTO2030 (two sections: 25 and 26 students)*

Fall semester 2022

Responsibilities: Assist activities during lectures, design questions for exams, proctor exams, lead discussion sections, grade exams and other assignments and hold office hours.

*Guest lecture on April 1, 2022 for the class Integrated Pest Management – ENTOM 4440 (25 students) Spring 2022*

*Teaching Assistant of Plagues and People – ENTO2100 (three sections: 18, 19 and 20 students)*

Fall semester 2019

Responsibilities: Assist activities during lectures, design questions for exams, proctor exams, lead discussion sections, grade exams and other assignments and hold office hours.

*Teaching Assistant of Investigative Biology – BioG1500 (36 students per semester)*

Responsibilities: Assist activities during lectures, design questions for exams, proctor exams, lead discussion section, grade exams and other assignments. Fall 2018 and Spring 2019

*Teaching Assistant of Alien Empire: Bizarre Bio Bugs – ENTO2010 (22 students)*

Responsibilities: Assist activities during lectures, design questions for exams, proctor exams, lead discussion section, grade exams and other assignments.

Spring semester 2018

*Teaching Assistant of Plagues and People – ENTO2100 (three sections: 18, 11 and 13 students)*  
Fall semester 2017

Responsibilities: Assist activities during lectures, proctor exams, lead discussion sections, grade exams and other assignments and hold office hours.

Mentoring of undergraduate students

Cedric Kouam (Fall 2018 and Spring 2019 at Cornell University)

Anastacia Dressel (Fall 2021 and Spring 2022 at Cornell University)

#### University of Los Andes

*Undergraduate Teaching Assistant of General Biochemistry Laboratory - MBIO2101*

Fall semester 2011

Spring and Fall semester 2012 and 2014

Spring semester 2013

Responsibilities: Prepare reagents and equipment for laboratory sections, grade quizzes, proctor lecture and discussion exams, hold office hours, grade exams.

*Undergraduate Teaching Assistant of Phytopathology Theory - MBIO3600 (30 students)*

First semester 2015

Responsibilities: Grade quizzes and other assignments, proctor lecture and discussion exams.

*Undergraduate Teaching Assistant of Molecular & Cell Biology of Prokaryotes –MBIO3100 (15 students)*

Spring semester 2015

Responsibilities: Prepare reagents and equipment for laboratory sections, grade quizzes, proctor lecture and discussion exams.

*Graduate Teaching Assistant of General Biochemistry Laboratory*

*(Undergraduate course) - MBIO2101 (30 students)*

Fall semester 2015

Responsibilities: Prepare reagents and equipment for laboratory sections, grade quizzes, design exams for laboratory sections, proctor lecture and laboratory exams, grade exams and hold office hours.

#### **Presentations**

10. *In vivo* characterization of three knockdown resistance alleles in pyrethroid resistant-congenic strains of *Aedes aegypti*. American Mosquito Control Association annual meeting – Jacksonville, FL - March 2022.

9. Different mutations in the voltage-sensitive sodium channel ( $V_{ssc}$ ) in *Aedes aegypti* confer variable levels of resistance to pyrethroids. Entomological Society of America virtual annual meeting in November 2020.

8. Contribution of the Voltage-sensitive sodium channel to cyhalothrin resistance in *Aedes aegypti*. Research Lightning Talks for the Diversity Preview Weekend held on March 9<sup>th</sup> in Ithaca, NY.

7. Codon constraints of knockdown resistance mutations in the voltage-sensitive sodium channel of *Aedes aegypti*. 85<sup>th</sup> Annual Meeting of the American Mosquito Control Association - Orlando, FL - February 2019.

6. *Exon evolution of the voltage-sensitive sodium channel ( $V_{ssc}$ ) in hexapods*. 8<sup>th</sup> Annual Cornell Entomology Symposium - Ithaca, NY - January 2019.
5. *Contribution of the voltage-sensitive sodium channel ( $V_{ssc}$ ) to cyhalothrin resistance in the *Aedes aegypti* LM-R strain*. Winter Entomology Symposium – Cornell University – Geneva, NY - January 2018.
4. *Characterization of the mechanisms of resistance to pyrethroids in a Colombian strain of *Aedes aegypti**. Winter Entomology Symposium – Cornell University – Ithaca, NY - February 2017
3. *Standardization of leukocitary Hexosaminidase A activity: Range values from Colombian population XIII*  
Colombian Conference of Human Genetics - ICESI University - Cali, Colombia – September 2014
2. *Enzymatic determination of acid  $\beta$ -glucosidase on dried blood spot from Gaucher's disease patients in Colombia: Preliminary results of a modified protocol*  
I Colombian conference of Biochemistry and Molecular Biology - National University of Colombia, Bogotá, Colombia – June 2014
1. *Larvicidal activity of *Lysinibacillus sphaericus* against *Aedes aegypti*. Preliminary screening of the midgut receptor to binary toxin*  
Entomology Laboratory - Colombian National Institute of Health – Bogota, Colombia – November 2014

### **Honors and Awards**

- Paper presentation won second place in the Latin American Student Competition at AMCA 2022.
- Co-leader and Chair of the Applications committee for Diversity Preview Weekend (DPW) 2020.
- Co-leader of DPW: 2019-present.
- Griswold fellowship committee reviewer in the Department of Entomology: October 2018-present.
- President of the Cornell University Colombian Student Association (CUCSA), November 2016 – 2021.
- Fellowship to take a summer research program CienciAmerica at Cornell University – 2015.
- Student's representative of the Department of Life Sciences at the Student Council at Universidad de Los Andes – Academic years 2012 and 2013.

### **Conferences attended**

12. *88<sup>th</sup> Annual Meeting of the American Mosquito Control Association 2019* Jacksonville, FL - February 2022.
11. *Entomological Society of America Eastern Branch meeting*.  
Virtual meeting - March 2021.
10. *Entomological Society of America virtual annual meeting*.  
Virtual meeting - November 2020.

9. *85<sup>th</sup> Annual Meeting of the American Mosquito Control Association 2019*  
Orlando, FL - February 2019

8. *American Society for Microbiology - Microbe 2016*  
Boston, MA – June 2016

7. *II International & Interdisciplinary Workshop on Mathematical Modeling, Ecology, Evolution and Dynamics of Dengue and Other Related Diseases.*  
Villa de Leyva, Colombia – August 2015

6. *XIII Colombian Conference of Human Genetics*  
ICESI University - Cali, Colombia – September 2014

5. *I Colombian Conference of Biochemistry and Molecular Biology*  
National University of Colombia - Bogotá, Colombia – June 2014

4. *III Meeting of Inborn Errors of Metabolism*  
Universidad de Los Andes - Bogotá, Colombia - March 2013

3. *II Meeting of Inborn Errors of Metabolism*  
Universidad de Los Andes - Bogotá, Colombia – March 2012

2. *I International Conference for Arginines and Pyrimidines (ICAP)*  
Universidad de Los Andes - Bogotá, Colombia- June 212

1. *III Symposium of the Colombian Network for Evolutionary Biology*  
Explora Park - Medellin, Colombia – July 2012

### **Citizenship**

Colombian

### **Languages**

Fluent in Spanish & English.

### **References**

To be provided upon request.