

# Álvaro Vega-Hidalgo

AI · HCI · ECOLOGY, EVOLUTION & BEHAVIOR

Ann Arbor, MI, USA

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## Education

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### University of Michigan

Ph.D. IN COMPUTER SCIENCE AND ENGINEERING

- Advisor: Dr. Rada Mihalcea (AI Lab – Language and Information Technologies).

Ann Arbor, USA

2024 – 2029 (expected)

### National University of Costa Rica

B.S. IN TROPICAL BIOLOGY

Heredia, Costa Rica

2018

## Work Experience

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### biometrio.earth

SENIOR SCIENTIST (REMOTE)

- Designed AI-driven data pipelines and software systems for ecosystem monitoring.
- Improved transparency for global carbon offset and biodiversity conservation initiatives.

Saarbrücken, Germany

Feb 2024 – Jun 2024

### University of Michigan

COMPUTATIONAL BIOACOUSTICS RESEARCHER (REMOTE)

- Developed transfer-learning approaches for individual identification of capuchin vocalizations in focal and passive acoustic recordings.

Ann Arbor, USA

Aug 2023 – Present

### Cornell Lab of Ornithology – Center for Avian Population Studies

DATA MANAGEMENT (HYBRID)

- Managed large soundscape datasets and HPC pipelines to evaluate sustainable coffee-farming impacts.
- Co-developed the *Biodiversity Progress Index* using Python, R, and AWS.

Ithaca, NY, USA

Dec 2019 – Present

### Cornell Lab of Ornithology – K. Lisa Yang Center for Conservation Bioacoustics

SOFTWARE DEVELOPMENT & DATA ANALYSIS (HYBRID)

- Built *Euphonia*, a mobile app for community-based conservation (Unity3D & Firebase).
- Conducted bioacoustic analyses in restoration ecology (Osa Peninsula, Costa Rica).

Ithaca, NY, USA

Nov 2018 – Present

### Smithsonian Tropical Research Institute; George Washington University

RESEARCH ASSISTANT

- Implemented DeepLabCut for automated behavioral tracking.
- Built GUIs and Raspberry Pi-based autonomous camera systems for field deployment.

Barro Colorado Island, Panama

Jun 2018 – Jun 2019

### Dept. of Neurobiology and Behavior, Cornell University

VISITING RESEARCHER

- Led 3D modeling and ligand docking to study the evolution of Hawaiian cricket song and speciation.

Ithaca, NY, USA

Nov 2018 – Dec 2018

### UC Davis & Smithsonian Tropical Research Institute

RESEARCH ASSISTANT

- Conducted primatology fieldwork, visual tracking, and big-data analysis of high-resolution GPS telemetry.

Barro Colorado Island, Panama

Oct 2017 – Oct 2018

### University of Costa Rica – Technology Academy

INSTRUCTOR

- Taught statistics and programming workshops for faculty and students.

San José, Costa Rica

Oct 2018 – Nov 2018

### MetricArts

INSTRUCTOR

- Designed and taught applied statistics & programming for business intelligence.

Panama City, Panama

May 2018 – Nov 2018

### Organization for Tropical Studies

TEACHING ASSISTANT

- Assisted Ph.D. course: *Tropical Biology: An Ecological Approach*.

Costa Rica

May 2017 – Jul 2017

### Brenesii

ENVIRONMENTAL EDUCATOR

- Taught environmental and social awareness to high-school students.

Costa Rica

May 2017 – Jun 2017

## Laboratory of Systematics, Phylogenetics and Evolution

RESEARCH ASSISTANT

- DNA extraction, sequencing, and phylogenetic analyses of velvet worms.

Costa Rica

Aug 2014 – Jun 2016

## Publications & Media

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- **Vega-Hidalgo, Á.**, Abzaliev, A., Bergman, T., & Mihalcea, R. (2025, July). Acoustic Individual Identification of White-Faced Capuchin Monkeys Using Joint Multi-Species Embeddings. *Proceedings of the 63rd Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*, 645–659.
- Molina-Mora, I., Ruiz-Gutiérrez, V., **Vega-Hidalgo, Á.**, & Sandoval, L. (2024). *The utility of passive acoustic monitoring for using birds as indicators of sustainable agricultural management practices*. *Frontiers in Bird Science*, 3, 1386759.
- **Vega-Hidalgo, Á.**, Kahl, S., Symes, L., Ruiz-Gutiérrez, V., et al. (2023). A collection of fully-annotated soundscape recordings from neotropical coffee farms. *Zenodo Dataset*.
- **Vega-Hidalgo, Á.** et al. (2021). Acoustic assessment of experimental reforestation in a Costa Rican rainforest. *Ecological Indicators*, 133, 108413.
- **Vega-Hidalgo, Á.** et al. (2020). Decline of native bees in a tropical forest of Panama. *Apidologie*.
- Krichilsky, E., **Vega-Hidalgo, Á.** et al. (2020). First gynandromorph of *Megalopta amoena*. *Journal of Hymenoptera Research*, 75, 97.
- González, J. P. B., **Vega-Hidalgo, Á.**, Monge-Nájera, J. (2019). Feeding behavior of Costa Rican velvet worms. *UNED Research Journal*, 11(2), 85–88.
- **Media:** Featured in *World Economic Forum*, *Smithsonian Magazine*, and *La Nación (Costa Rica)*.

## Technical Reports

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### Nespresso AAA Sustainable Quality Program

THE BIODIVERSITY PROGRESS INDEX

2022

- Tool for measuring and communicating the impact of regenerative practices on biodiversity.

## Computer Science Skills

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**Research** NLP, Computational bioacoustics, HCI

**Tools** AWS SageMaker, Google Cloud, HPC, signal processing, ML/DL, bioacoustics, bioinformatics, Unity3D, GIS, Unix

**Python** Pandas, NumPy, Matplotlib, Librosa PyTorch, TensorFlow, Keras

**R** tidyverse, sf, seewave, shiny

**C#** Unity3D for scientific visualization and app development

**App Dev** Firebase, Dart/Flutter, JavaScript

## Languages

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**English** Fluent

**Spanish** Native

## Awards & Research Funds

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2021	<b>AI for Natural Environments (co-lead), \$100k</b> , Microsoft + National Geographic	International
2019	<b>Quantifying Bee Behavior with AI, \$4k</b> , George Washington University	USA
2018	<b>1st Place, Hardwarethon</b> , IoT Innovation — Costa Rica	Costa Rica
2018	<b>Vector Prize</b> , Linux Foundation — Heredia R User Group	Costa Rica
2017	<b>2nd Place, SynBioThon</b> , Synthetic Biology	Costa Rica
2015	<b>Full Honor Scholarship</b> , University of Costa Rica	Costa Rica
2013	<b>Bronze Medal</b> , Ibero-American Biology Olympiad	Argentina
2012	<b>Best Experimental Exam</b> , National Chemistry Olympiad	Costa Rica

## Presentations (Selected)

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### 2nd International Symposium on Computational Intelligence Applied to Animal Behavior Analysis

Puebla, México

PLINARY TALK

Aug 2025

“Cross-Species AI Models for Decoding Animal Communication.”

## **Harvard University — Bridging brains and bioacoustics seminar**

INVITED TALK

"AI and Animal Communication in dogs and capuchin monkeys."

Cambridge, USA

Sep 2025

## **BirdNET+ Workshop**

INVITED TALK

"Open Source Computational Bioacoustics for Community-Based Conservation."

Chemnitz, Germany

2024

## **UMichigan — Evolution & Human Adaptation Seminar**

INVITED TALK

"Acoustic identification of white-faced capuchins using deep learning."

Ann Arbor, USA

2023

## **Animal Behavior Society**

INVITED TALK

"Mobile Audio Annotation Tool in Agroforestry Landscapes."

San José, Costa Rica

2022

## **Cornell Day of Data**

PANEL DISCUSSION

"Challenges for Bioacoustics Training Data."

Ithaca, New York

2021

## **The Association for the Study of Animal Behaviour (ASAB)**

POSTER PRESENTATION

"Behavioral tracking gets real in the wild".

Konstanz, Germany

2019

## **National Center for High Technology**

INVITED TALK

"Bioinformatics applied to animal behavior and movement ecology".

San José, Costa Rica

2018

## **STRI — Capybara Seminar**

INVITED TALK

"Revisiting multiple central place foraging in spider monkeys".

Barro Colorado Island, Panamá

2018

## **XI Latin American Congress of Herpetology**

POSTER PRESENTATION

"Personality of *Oophaga pumilio*".

Quito, Ecuador

2017

## **Advanced Materials & Nanotechnology**

SYMPOSIUM

"Topography and electronic characterization by STM of thin film semiconductors for applications in photovoltaic solar cells".

San José, Costa Rica

2017

## **Volunteer Work**

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### **SIFAIS**

GUITAR INSTRUCTOR FOR CHILDREN IN SOCIAL RISK

Costa Rica

2016 (10 months)