Zachary Laborde

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EDUCATION

Indiana University Bloomington Bloomington, IN
PhD, Cognitive Science & Neuroscience Expected June 2026
Research Focus: *Embodied AI & NeuroAI*

Xavier University of Louisiana New Orleans, LA
BS, Psychology & Computer Science (minor) May 2017

PUBLICATIONS

Laborde, Z., & Izquierdo, E. J. (2023, July). Spatial Embedding of Edges in a Synaptic Generative Model of C. elegans. In *ALIFE 2023: Ghost in the Machine: Proceedings of the 2023 Artificial Life Conference*. https://doi.org/10.1162/isal_a_00611

Severino, G. J., **Laborde, Z.**, & Barwich, A. S. (2023, July). The Degeneracy of Control Architectures in Cell Lineages: Implications for Tissue Homeostasis. In *ALIFE 2023: Ghost in the Machine: Proceedings of the 2023 Artificial Life Conference*. https://doi.org/10.1162/isal_a_00608

Laborde, Z., Toler, W., Velhal, K., Farag, T., & Chakra, A. (2019). Method and System for Implementing a Holistic Umbrella Drone. *IP.com.* https://priorart.ip.com/IPCOM/000257353

Laborde, Z., & Cohen, J. (2016). Nostalgia and the Perception of Time. *XULAnEXUS*, *14*(1). https://digitalcommons.xula.edu/xulanexus/vol14/iss1/1

CONFERENCE PRESENTATIONS

Laborde Z., Wood, S. M. W., & Wood, J. N. (2025, November). *Newborn Embodied Turing Tests: Comparing Development of Visual Intelligence in Animals & Machines*. [Poster presentation]. BioCrossroads, Bloomington, IN, USA.

Wood, S. M. W., Garimella, M., Desai, B., **Laborde Z.**, & Wood, J. N. (2024, March). *Comparing Newborn Animals and Newborn Machines: A Newborn Embodied Turing Test for the Development of Object Perception*. [Poster presentation]. Cognitive Development Society, Pasadena, CA, USA.

Laborde, Z., & Izquierdo, E. J. (2023, July). *Spatial Embedding of Edges in a Synaptic Generative Model of C. elegans*. [Powerpoint presentation]. ALIFE 2023: Ghost in the Machine, Sapporo, Japan.

Laborde, Z., & Izquierdo, E. J. (2022, November). *Spatial Embedding of Edges in Synaptic Generative Model of C. elegans* [Poster presentation]. Neuroscience, San Diego, CA, USA.

Laborde, Z. & Izquierdo, E. J. (2022, October). *Spatial Embedding of Edges in Synaptic Generative Model of C. elegans* [Poster presentation]. Annual Psychology Graduate Research Symposium & Reception, Bloomington, IN, USA.

Laborde, Z., Stephenson, D., Reiss, A., Beaton, E., & Cohen, J. (2017, March). *Anterior-Posterior Insular Cortex Bisection Plugin for Mango* [Poster presentation]. Cognitive Neuroscience Society, San Francisco, CA, USA.

Laborde, Z., Heatherton, T., & Lopez, R. (2016, August). *You've Got a Friend in Me: Effects of People-based Cues on Amygdala, Orbitofrontal Cortex, and Dorsomedial Prefrontal Cortex* [Poster presentation]. ASURE Poster Night, Hanover, NH, USA.

Laborde, Z., Heatherton, T., & Lopez, R. (2016, July). *Learning to Lose Focus: Relationships Between Reward-Learning, Multitasking, and Distractibility* [Powerpoint presentation]. Leadership Alliance National Symposium, Stamford, CT, USA.

Laborde, Z. & Cohen, J. (2014, November). *Nostalgia and Time Dilation* [Powerpoint presentation]. Charles A. Gramlich Psychology Research Symposium, New Orleans, LA, US

RESEARCH EXPERIENCE

Indiana University Bloomington Bloomington, IN
Graduate Researcher August 2021 – May 2026

- Created Python library & Gym environments to benchmark embodied AI agent learning to animals over 12 experiments, training 10 ANN architectures using 13 types of intrinsic reward, showing self-supervised learning & supervised zero-shot learning.

- Publication in progress - Presented at Cognitive Development Society (2024) - link to code.
- Evolved agent sensorimotor configs with genetic algorithm, finding neural networks 33% smaller & 30% more performant.
  - link to code.
- Discovered dynamic control system for multiple cell lineages capable of autonomously creating balance of cell types.
  - Published to International Society for Artificial Life (2023) - link to interactive web app.
- Modeled development of C elegans connectome with average connection lengths 60% more accurate than existing models.
  - Published to International Society for Artificial Life (2023) - Presented at Society for Neuroscience (2022) - link to code.
- Implemented level set algorithm for high-dimensional manifolds, reducing complexity & resource usage by 90%.

Dartmouth College Hanover, NH
Research Assistant June 2016 – August 2016
- Analyzed 30+ 4D fMRI tensors with Statistical Parametric Mapping to assess relationship between attention & brain activity.
  - Presented at Leadership Alliance National Symposium (2016).

Xavier University of Louisiana New Orleans, LA
Research Assistant August 2014 – July 2017
- Developed software to bisect brain region in MRI scans, automates 3-hour process down to seconds, >100x speed improvement.
  - Presented at Cognitive Neuroscience Society (2017) - link to code.
- Designed & administered 20 person study on nostalgia & time perception, using ANOVA on 1000s of bootstrapped samples.
  - Published in XULAneXUS (2016) - Presented at Charles Gramlich Research Symposium (2015).

PROFESSIONAL EXPERIENCE

IBM Research Triangle Park, NC
Software Engineer July 2017 – August 2021
Netcool Operations Insight - Artificial Intelligence Operations
- Trained & deployed ML models to optimize operations event analytics analysis & prediction, implemented with custom API.

IBM Cloud Event Management
- Developed two internationally used mobile apps for both Android & iOS used across 7 countries.

IBM Cloud App Management
- Created front-end visualizations of topological data and analytics.

IBM Hybrid Cloud
- Automated international team of SREs across 3 continents in 5 countries, saving IBM approximately $1,000,000/year.
- Responded to high severity alerts related to several IBM cloud applications.
- Invented autonomous umbrella drone design to autonomously keep users dry. Published to IP.com (2019).

TEACHING EXPERIENCE

Indiana University Bloomington Bloomington, IN
Assistant Instructor August 2021 – May 2026
Introduction to Programming in Cognitive Science
- Taught students Python in weekly lab sessions.

Neuroscience Colloquium Series
- Led monthly discussion sections with graduate students to discuss research colloquia.

Introduction to Cognitive Science
- Organized weekly discussion sections discussing cognitive science.

Xavier University of Louisiana New Orleans, LA
Supplemental Instruction Leader January 2016 – December 2016
Psychology Research Methods Spring 2016, Fall 2016

- Co-founded program with Professor Kate Eskine
- Arranged interactive sessions to help students learn research methods

SKILLS

Programming Languages: Python, C/C++, JavaScript (Node, React, Angular), R, Shell, SQL, C#, Mathematica, Java, MATLAB, Groovy, Ruby, Go
AI/ML Frameworks: PyTorch, TensorFlow, Lightning, Stable Baselines, RLLTE, Scikit-learn, Transformers, JAX, Ray RLlib
Simulation Software: Unity, Unity ML Agents, Gymnasium, Petting Zoo, MuJoCo, Nvidia Isaac Sim, Nvidia Omniverse, SuperSuit
Data Science & Ops: Hadoop, Spark, MongoDB, BigQuery, Cassandra, Git, Kubernetes, NumPy, SciPy, Matplotlib, Jupyter, HPC
Neuroscience Applications: Advanced Normalization Tools, SPM, FSL, ITK-SNAP, Multi-Image Analysis GUI

COURSEWORK

Computational Modeling of Evolutionary and Adaptive Systems, Neural Engineering, Computational Bioengineering, Theories of Learning and Memory, Machine Learning, Computer Architecture, Network Science, Dynamical Systems Theory, Linear Algebra, Discrete Mathematics

LEADERSHIP POSITIONS

Organizer, IU Lab BioCrossroads Research Conference, November 2025
Agile Workspace Super Champion, IBM, Dec 2018 – Present
Treasurer, IBM New Hire Network, Aug. 2017 – Aug. 2018
Organizer, Xavier University Psychology Supplemental Instructor Program, August 2015 – December 2015
President, Xavier University of Louisiana Speech & Debate Team, May 2016 – May 2017
Vice President, Xavier University of Louisiana Speech & Debate Team, May 2015 – May 2016
Treasurer, Xavier University of Louisiana Speech & Debate Team, May 2014 – May 2015
Treasurer, Louisiana State University Speech & Debate Team, Aug. 2012 – May 2013

HONORS & AWARDS

Member, Sigma Xi, 2025
Google PhD Fellowship Nominee, Google, 2024
Best Student Paper Award, International Society for Artificial Life, 2024
Rebec Fellow, Indiana University Bloomington, 2024
Rebec Fellow, Indiana University Bloomington, 2022
Security and Privacy by Design Foundations Badge, IBM, 2019
IBM Cloud Private - Continuous Integration/Continuous Delivery Badge, IBM, 2019
Jumpstart Scholar, IBM, 2019
Manager's Choice Award, IBM, Q1 2018, Q1 2019
People's Choice Award, IBM Developer SLAM, 2018
IBM Developer Jumpstart - Explorer Badge, IBM, 2018
IBM Developer Jumpstart - Practitioner Badge, IBM, 2018
Deep Learning Badge, IBM, 2018
Docker Essentials with Watson Conversation Badge, IBM, 2017
IBM Cloud Essentials Badge, IBM, 2017
Enterprise Design Thinking Practitioner Badge, IBM, 2017
Who's Who Among Students in American Universities and Colleges, 2017
1st Place, Xavier-Dillard Coding Competition, 2017
Dean's List, Xavier University of Louisiana, Fall 2015, Spring 2016, Spring 2017
National Semifinalist in Impromptu Speaking, Forensics Novice Nationals, 2013
National Semifinalist in Impromptu Sales, Forensics Novice Nationals, 2013
National Competitor in Extemporaneous Speaking, American Forensics Association's National Individual Event Tournament, 2013