Alex Alvarez

U.S. Citizen

caalvarez@mgh.harvard.edu | +1 (832) 941-2978
alexrez.com | linkedin.com/in/calexalvarez

Education

Texas A&M University — College Station, TX
B.S. in Computer Science, Minor in Psychology — August 2019 – December 2025

Professional Experience

Research Intern — May 2025 – Present
Harvard Medical School — Boston, MA

- Advisors: **Alex Russell** and **Samuel Acuff**
- Leading an on-going blinded qualitative study comparing AI-generated versus human therapist responses by MI-trained clinicians.
- Fine-tuning HIPPA-compliant LLMs with real patient/therapist transcripts and synthetic data. Developed a new evolutionary technique to generate synthetic data for fine-tuning.
- Creating the first AI-based online screening, brief intervention, and referral to treatment (SBIRT) tool for substance use disorder.

Undergraduate Researcher — May 2024 – Present
Texas A&M University — College Station, TX

- **Brain Networks Lab** — Advisor: **Yoonsuck Choe**
  - Co-authored "Saliency Thresholds in Neural Code and its Relation to the Power-Law, Gaussian, and Lambert W Function", accepted to the NeurIPS 2025 Workshop on Symmetry and Geometry in Neural Representations, introducing a computational framework linking Lambert W, power-law response distributions, and saliency thresholds in neural code.
  - Authored a commentary (invited by Behavioral and Brain Sciences) on Anil Seth's model of consciousness, focusing on self-modeling, embodiment, and the neural correlates of awareness.
  - Developed neuroevolutionary simulations using NEAT to model the emergence of homing vectors and allocentric navigation, inspired by Gaby Maimon's Drosophila spatial navigation studies.
- **Cognitive Science Lab** — Advisor: **Takashi Yamauchi**
  - Leading a study to identify and causally manipulate "steering vectors" in transformer models corresponding to personality traits and cognitive dispositions.
  - Ran human decision-making studies in the lab and contributed to data collection, trial design, and analysis of reasoning under uncertainty.
  - Conducted layerwise analyses exploring how large language models (LLMs) represent and differentiate modal reasoning categories such as inconceivable, impossible, and improbable concepts.

- **Bolaños Lab** Advisor: **Carlos Bolaños**
  - Conducting comprehensive pharmacological-behavioral studies in rodent models, including intraperitoneal drug administration, behavioral phenotyping, terminal tissue collection with rapid brain extraction and flash freezing, cryosectioning, and region-specific micropunch dissection.
  - Performing molecular analyses from tissue to data, including full PCR workflows (RNA/DNA isolation, quantification, amplification), fluorescence microscopy of brain sections, and developed a custom ImageJ macro for automated quantification of c-Fos expression.

Founder December 2019 – December 2023
Volk Houston, TX

- Built, bought, and sold E-commerce brands.
- Multiple six and seven-figure exits and acquisitions. Over 100M+ total impressions and millions of organic followers across brands.
- My friends and I pioneered "organic social media marketing" during the wild wild west era of social media ads. It's now a widely used and formalized marketing strategy. It was a lot of fun but I'm no longer interested in it.

Founder August 2022 – December 2023
Molly & The Mop Houston, TX

- Online company that connected commercial and residential service providers with clients.
- 15+ employees, 85k+ followers on social media.
- Sold to a private local cleaning company.

Software Engineer Intern June 2022 – August 2022
TD Ameritrade/Charles Schwab Chicago, IL

- Implemented a CI/CD automation pipeline for TD Ameritrade software releases using a wide tech stack including Bamboo and Puppet.
- Created a server monitoring interface for Schwab and TDA live servers still being used internally today to monitor all of Schwab's servers.

Publications

Accepted/In Press

1. **Alex Alvarez**, Jin Hyun Park, & Yoonsuck Choe (2025). Saliency Thresholds in Neural Code and its Relation to the Power-Law, Gaussian, and Lambert W Function. *NeurReps 2025 (Accepted).*

In Preparation

2. **Alex Alvarez**, Samhita Bollepally, & Takashi Yamauchi. (in preparation). The You-Axis: Invoking Personal Voice through a Single Direction in Latent Space.

3. **Alex Alvarez**, Samuel F. Acuff, & Alex M. Russell. (in preparation). Comparative Evaluation of AI-Generated vs. Human Therapist Motivational Interviewing Responses: A Blinded Expert Rating Study

Notable Projects

Demographic IQ October 2024
Voter Decision-Support Application

- Visualized how the user's income would change depending on their demographic information and which presidential candidate was elected.
- Used non-partisan data sources for each candidate's official policy proposals.
- TIDAL hackathon winner and featured in KBTX News. [Press Link] [Web App Link].

TIC-Bot Summer 2024
Intelligent Tutoring System and Education Tool

- LLM-based intelligent tutoring system fine-tuned on instructor transcripts. [Link to PDF.]
- Later merged with PhD student Rujun Gao's thesis and is currently being used for a chemical engineering course at TAMU.
- Rujun is now Co-founder & CEO of Encando.AI, an AI for Education spin-off.

Zyntora 2021
Virtual Real Estate/Social Media Startup

- Allowed users to buy and sell "LU" (a fixed share of a creator's advertising space) and thereby gain exposure in that creator's feed.
- The idea was that as a creator got more popular, the value of their LU would increase, acting as a kind of speculative asset tied to a creator's future success.
- 1000+ peak monthly users. [Website Link]

Awards & Honors

Brandon Rogers Endowed Memorial Scholarship 2025

Michael W Powell Computer Science Scholarship 2025

Sara & Andrew Fikes Scholarship 2024-2025

NSF REU Award 2024

TAMU Undergraduate Engineering Grant x2 2022-2023, 2024-2025

TAMU IAP Scholarship 2021

Skills

Technical: Python, PyTorch, NumPy, SciPy, Pandas, scikit-learn, Matplotlib, NEAT-Python, OpenAI Gym, TensorFlow, HuggingFace Transformers, Jupyter Notebook, OpenCV, PyTorch Geometric, Swift, LaTeX, Git, Docker, and Linux.

Languages: English & Spanish