

# Aaron Pilapil

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## EDUCATION

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### University of California, Davis

B.S. Cognitive Science (Computational Emphasis), minor in Computer Science  
*Coursework:* Logic, Probability & AI; Probability & Statistical Modeling for CS

Graduating Fall 2026

## TECHNICAL SKILLS

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**Languages:** Python, C++, C, R, MATLAB, SQL, Java

**Tools:** PyTorch, TensorFlow, scikit-learn, Pandas, NumPy, MNE, Git, GitHub

## PROFESSIONAL EXPERIENCE

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### Undergraduate Researcher, Speech Neuroengineering and Cybernetics Lab

Mar 2025 – Present

UC Davis

- First-author research project analyzing four years of pediatric EEG data across hundreds of sessions (cochlear implant vs. non-implant), applying ICA in MNE-Python to isolate CI-specific artifact sources.
- Constructed thousands of paired clean–noisy EEG epochs and trained learning-based denoising models (CNNs and transformers), benchmarking performance against classical signal-processing methods for manuscript submission.

### Undergraduate Researcher, Logic, Language, and Learning Lab

Sep 2024 – Present

UC Davis

- First-author research project investigating whether explicit syntactic supervision improves language model generalization, training a 160M-parameter Pythia model with POS-tag pretraining versus post-training objectives (next-utterance and next-sentence prediction).
- Evaluated model grammar competence using BLiMP, negative log-likelihood (NLL), and a targeted subject–aux inversion task, identifying conditions where syntactic signals improve grammatical generalization.
- Second author on a BUCLD-submitted manuscript analyzing CHILDES child–parent dialogue data in Python and R; engineered linguistic feature pipelines and ran regression models to identify predictors of age-of-production for function words.

## PROJECTS

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### Project Manager, Neurotech

Sep 2025 – Present

- Developing a multimodal brain–computer interface (BCI) for intent and eye based navigation, integrating EEG, eye tracking, LiDAR, and vision–language models (VLMs) for assistive mobility in diverse settings.
- Building an end-to-end EEG decoding pipeline in Python, including preprocessing, frequency-domain analysis, artifact handling, and real-time inference with minimal latency.
- Training and testing several types of machine learning architectures to decode movement intent and semantic action initiation from 3 types of neural signals.
- Integrating decoded intent with SLAM-based path planning and motor control to enable hands-free, interpretable device navigation.

### Developer, NewsDash

Jun 2025 – Sep 2025

- Designed and deployed a retrieval-augmented generation (RAG) system using PostgreSQL and Sentence-BERT embeddings for scalable semantic retrieval grounded with dozens of articles per response.
- Integrated Google’s Gemini LLM with retrieval grounding to reduce hallucinations and improve factual reliability in news-related query answering.

### Developer, Mentorship Matcher

Jun 2025 – July 2025

- Built and launched a Streamlit-based matching system using cosine similarity over Google Forms responses, supporting customization weighting schemes.
- Adopted by 3 student organizations (100+ users), matching 300+ participants and reducing manual matching time by up to 50%.

### Project Manager, Neurotech

Sep 2024 – June 2025

- Led a team developing a BCI for real-time semantic activation detection from orthographic stimuli across 5 languages.
- Systematically evaluated 1,000+ EEG preprocessing configurations on OpenBCI (8-channel) data, benchmarking SVM, kNN, LDA, Random Forest, and neural models.
- Achieved >80% classification accuracy and integrated the optimized model in a real-time BrainFlow pipeline for live experiments.