

# Zachary Burkett

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## EDUCATION

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### Universitat Pompeu Fabra

Masters of Sound and Music Computing

2025 - Expected 2026

### University of Central Florida | Burnett Honors College

Bachelor of Science in Computer Science, Music Minor

2022 - 2025

GPA: 3.85

Honors: Summa Cum Laude, Dean's List (F' 22, S' 23, F' 23, S'23, F'24), National Merit Scholar

## SKILLS / CERTIFICATIONS

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**Audio/ML Skills:** Python | DSP | PyTorch | TensorFlow | Jupyter | Audio Analysis | Max/MSP | PureData

**Programming Skills:** C/++/# | Java | JavaScript | HTML/CSS | Git | JUCE

**Software Skills:** Ableton | Reaper | Logic Pro | Max for Live | Audacity | Adobe Suite | MacOS | Linux

**Microsoft Certifications:** Software Development | Java | Python | JavaScript | HTML/CSS

## EXPERIENCE

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### APPLESEED Lab at UCF | *Undergraduate Research Assistant on C macro translation project*

2024 - 2025

Orlando, FL

- Co-authored paper titled "Translation Tag Team: Formal Rules and LLMs Translate More Macros Together than Apart," researching semantic translation of C macros and LLM code translation performance, under submission to OOPSLA software engineering conference
- Developed automated testing suite in Python for evaluating AI translation quality and performance across benchmark dataset
- Created benchmark dataset of 398 statistically sampled macro examples from 100,711 real-world definitions across 25 popular Linux software, leading organization and LLM performance evaluation, focusing on realistic developer prompting strategies
- Analyzed and visualized C macro usage patterns in the Linux kernel using Python and Clang
- Collaborated remotely using Zoom, Slack, and Github for distributed team development

## RELEVANT COURSEWORK

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**Digital Signal Processing for Sound and Music** - Implemented DSP algorithms, DFT, sinusoidal/residual/harmonic stochastic models, sound transformations, sound/music description algorithms

**Music Perception and Cognition** - Psychoacoustics, audio research methods, auditory neuroscience

**ML for Sound and Music** - Implemented genre classifiers, audio autoencoders for generation, CNNs, MLPs, transformers for audio tasks using PyTorch and Tensorflow

**Generative Algorithms for Sound and Music** - Genetic algorithms with human feedback, contrastive language-audio models (CLAP)

**Music Information Retrieval** - Audio feature extraction, music classification, content-based analysis

## PERSONAL PROJECTS (SEE ZACHBURKETT.WEBSITE FOR MORE)

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### PlayStation 1 Reverb Recreation | *DSP implementation in JUCE*

- Reverse-engineered and implemented PlayStation 1's characteristic reverb algorithm in C++
- Applied digital signal processing techniques to authentically recreate vintage hardware audio effects
- Developed as VST plugin for use in any digital audio workstation

### CrushDrive | *Ableton Live audio effects plugin created in Max for Live and JUCE*

- Created demo audio, website and application using Max, Bootstrap CSS, Photoshop, and Github
- Developed as an investigation into the capabilities of Max for Live and Ableton, as well as plugin design
- Audio processing techniques: filtering, bit reduction, overdrive, mixing, modulation, and visualization
- Using JUCE framework to make a VST plugin that can be used with any digital audio workstation

### Chordle | *Daily chord guessing game inspired by Wordle*

- Interactive chord guessing game made in HTML, CSS, JS and Tone.JS
- Solved music theory/software design challenges, ex. chord note names need to be relative to the chord generated, prevented audio distortion due to lag

### Cross Platform Colorimetric Sensing Application | *React.js and computer vision application*

- Worked in a team to create a React application for all mobile platforms to detect ammonia concentration
- Worked with UCF Nanotechnology lab to increase accessibility to medical analysis using OpenCV