

Colton Arnold

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Multimedia Artist · Researcher · Creative Technologist

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PROFILE

Multimedia artist, researcher, and software engineer working at the intersection of machine learning, mechatronics, and audiovisual performance. Builds real-time systems in which machines, sound, and image respond to each other — spanning peer-reviewed research, robotic instrument design, live performance technology, and professional audio capture.

EDUCATION

M.F.A., Music Technology — California Institute of the Arts

Expected 2027

Valencia, CA

Thesis: comparative evaluation of state-of-the-art music generation architectures — diffusion transformers (DiTs), Mamba/state-space models, and masked non-autoregressive transformers — benchmarked on local consumer hardware.

B.M., Computer Music — Peabody Institute, Johns Hopkins University

Spring 2024

Baltimore, MD

Principal teachers: Lyn Goeringer, Sam Pluta, Margaret Schedel, Geoffrey Wright.

PUBLICATIONS

Arnold, C., Cheng, Z., Kapur, A. “Modernizing the Machine Lab with Mechatronic Immersive Design and Artificial Intelligence.” New Interfaces for Musical Expression (NIME), London, 2026. Oral paper.

zenodo.org/records/20784111

Arnold, C., Cheng, Z., Kapur, A. “AI Framework for Dynamic Robotic Instrument Calibration.” International Computer Music Conference (ICMC), Hamburg, 2026. Oral paper.

mtiitd.calarts.edu/wp-content/uploads/2026/05/paper_265.pdf

AWARDS & HONORS

Harold Randolph Prize in Performance

Peabody Institute, May 2024

Jory Prum Scholarship for Sounds That Redefine Normal

CalArts, 2025 – 2026

Georgie Award — Outstanding Student Organization

Peabody Institute, 2023

Awarded to VVAVeS

Georgie Award — Emerging Student Organization of the Year

Peabody Institute, 2022

Awarded to VVAVeS

TEACHING

Instructor — Synth Design in Max with Machine Learning

Winter 2026

California Institute of the Arts

Designed and taught an eight-session course introducing machine learning to musicians through synthesis in Max, open to students with no prior Max experience.

- Built the full curriculum from scratch: supervised and unsupervised methods including MLPs, K-nearest neighbors, K-dimensional trees, PCA, UMAP, and hidden Markov models, taught through the FluCoMa library.
- Developed worked derivations and audio-domain examples for each algorithm — covering loss metrics, dimensionality reduction, and classification — to make the mathematics legible to students without a technical background.
- Assessed by final project: an original Max patch presented and performed live, with students accounting for their design decisions and the tools chosen.

Teaching Assistant — California Institute of the Arts

Aug 2025 – Present

Coding Fundamentals and Introduction to Max (Fall 2025); Machine Orchestra and Intermediate Max (Spring 2026). Held office hours, graded coursework, and scheduled additional one-on-one sessions with students outside the appointment. Departmental tutor across the Music Technology curriculum.

Teaching Assistant — Laptop Ensemble

Aug 2022 – May 2024

Peabody Institute, Johns Hopkins University

Assisted faculty in running rehearsals and interpreting scores, and helped students build the materials required to perform repertoire.

EXPERIENCE

Machine Lab Maintainer & Systems Developer

Aug. 2025 - Present

California Institute of the Arts

Maintain and rebuild the Machine Lab, CalArts' collection of robotic and mechatronic musical instruments and hub of the Creative Computing department.

- Designed an AI-driven calibration framework using Chuck's ChAI library, combining a k-nearest neighbors model and a multi-layer perceptron in a distance-weighted ensemble; produces stable, repeatable calibration for pitched and non-pitched robotic instruments, outperforming standalone models across sparse and dense sampling conditions.
- Installed and integrated an 8x8 ceiling-mounted array of Modulets, creating a distributed acoustic environment with spatialized sound across 64 discrete locations.
- Rebuilt the Chuck control server to take advantage of new language features; reintegrated Open Sound Control (OSC) and built a wireless networking layer allowing multiple performers to connect without ethernet.

Technical Assistant — WaveCave Gallery

Aug. 2025 - Present

California Institute of the Arts

Provide year-round technical support for the gallery's rotating installation program, assisting visiting and student artists with load-in, setup, strike, and troubleshooting across the run of each show.

Sound Designer, Audio Engineer & Photographer — MAXIMILLIAN

Oct 2023 – Sep 2024

Vehicle audio capture and sound design for Underground Street Racing, an unreleased racing title, working with the studio's London branch.

- Designed microphone placement for vehicle capture, specifying positions for four DPA 4062 lavaliers in the engine bay and two exhaust rigs to yield synchronized, phase-coherent perspectives for layered engine and exhaust design.
- Rigged and operated six-channel capture on hub-dynamometer sessions, recording to a Zoom F8N Pro.
- Recorded 11 performance vehicles across steady-RPM holds, ramps, and acceleration runs to redline, plus mechanical foley including gear shifts, doors, and indicators.
- Conducted field recording sessions to build original libraries rather than working from stock assets; designed and edited sound in Ableton Live.
- Shot photo and video documentation across recording sessions.

Recording Engineer & Studio Assistant

Mar 2021 – May 2024

Peabody Institute, Johns Hopkins University

- Set up, tracked, and struck recording sessions across genres in the institute's studios (Recording Engineer, Mar 2021 – May 2024).
- Maintained studio facilities — minor repairs, organization, and instructing students on hardware — and tutored students on coursework (Studio Assistant, Aug 2022 – May 2024).

SELECTED PERFORMANCES & INSTALLATIONS

Bee Boy — Guillermo E. Brown

REDCAT, Los Angeles, 2026

Creative Developer & Technologist

Operatic triptych presented with The Industry company members. Built the performance technology for The Instrument, a sensor-based controller fusing drumming, singing, electronics, and custom sensors, developed with Erika Earl.

- Created and projection-mapped all show visuals in TouchDesigner and GLSL, including a 30-inch gong-like surface functioning as both drum and screen.
- Architected the sensor network: OSC for sensor data into Max and TouchDesigner, WebSocket for a wireless webcam feed driving image processing.
- Built the primary Max synthesis patch, using the FluCoMa machine learning library to let the performer search and glide through a career archive of recordings.

Tracking Session

WaveCave, CalArts, May 2026

Solo project

Week-long installation in which four local large language models played the roles of musicians collaborating on an album, culminating in a listening party.

- Built on a self-authored multi-agent conversation engine to coordinate four models locally on a single machine.
- Integrated ACE-Step v1.5 to render the tracks specified by the models' daily negotiations.
- Networked to a Mac Studio running TouchDesigner, streaming the live conversation over OSC for visitors to read.
- Ran entirely on local hardware as a deliberate ethical constraint, aligned with ongoing thesis research.

Babel

CalArts, May 2026

Creative Technologist

Multi-agent audiovisual installation staging a day-long conversation between four language models, each speaking a different native language and rendered as its own text visualization — a literal staging of “Babel” as mutually unintelligible voices sharing one room.

- Authored an open-source LLM conversation engine supporting an arbitrary number of networked agents, with a moderator process selecting which agent responds to each utterance.
- Deployed each character to a dedicated Raspberry Pi with its own speaker, distributing the conversation across physical space rather than mixing to a single output.
- Designed four language-specific visualizations driven by each agent's live speech; characters named for the Olympic mascots of their respective nations.

github.com/carnol16/LLM_Conversation

Illuminations 2023: The Many Faces of Home

Heckscher Museum of Art, October 2023

Co-Composer & Co-Visual Designer — light show and multimedia installation

Journey — for Solo Violin and Electronics

SPLICE Institute, 2023

Composer — Western Michigan University, Kalamazoo, MI

To Be in Concert

Johns Hopkins University, April 2022

Co-Composer & Creative Technologist

LEADERSHIP

Founder — VVAVEs

2021 – 2024 (series ongoing)

Peabody Institute, Johns Hopkins University

Founded a student-run electronic concert series in sophomore year; the series continues today under new leadership.

Programmed monthly concerts spanning ambient, hyperpop, and noise; grew the series into a standing student collective and expanded performance opportunities across the department. Recipient of consecutive Georgie Awards for Emerging (2022) and Outstanding (2023) Student Organization.

SKILLS

Languages — Python, Chuck, GLSL, C/C++ (Arduino)

Environments — Max/MSP, TouchDesigner, Ableton Live, Arduino IDE

Machine Learning — PyTorch, Librosa, FluCoMa, ChAI; MLPs, KNN, KD-trees, PCA, UMAP, HMMs, diffusion transformers, state-space models

Audio Engineering — Multi-microphone capture and array design, field recording, hub-dynamometer sessions, Zoom F8N Pro, DPA and Sennheiser microphones

Systems & Protocols — OSC, WebSocket, MIDI, wireless instrument networking, Raspberry Pi deployment

Hardware — Mechatronic and robotic instrument design, sensor integration, Eurorack modular synthesis

Visual — Projection mapping, real-time generative visuals, shader programming

ADDITIONAL WORK

Cowboy Cadavers — Mini Jam 206: Western, CalArts Gamemakers. Music, sound design, art.

Knock On Wood — GMTK Game Jam, 2024. Level design.

Original music released via Bandcamp, SoundCloud, and YouTube.