

# Anthony Hong

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## Education

Carnegie Mellon University Pittsburgh, PA, USA  
Bachelor of Engineering and Arts, Electrical and Computer Engineering and Music Technology  
Additional Major: Artificial Intelligence

## Relevant Coursework

Advanced Digital Signal Processing (Graduate)	Machine Learning for Signal Processing (Graduate)
Introduction to Deep Learning	Introduction to Machine Learning
Introduction to Computer Systems	Introduction to Embedded Systems (Spring 2024)

## Skills

Technical: real-time audio processing, acoustics, data structures and algorithms, systems programming  
Musical: FL Studio, Logic Pro, Pro Tools, electronic music production, piano, audio engineering  
Tools: Matlab, Juce, C/C++, CMake, Python, PyTorch, Google Cloud, HTML/CSS, Java, Max/MSP/Jitter  
Languages: English (native), Chinese (native), Shanghainese (native)

## Experience / Projects

**Gerzz Interactive** May. 2023 - Sept. 2023  
Machine Learning and Signal Processing Intern Shanghai, China

- Modified the existing VITS model for training singing voice conversion, improved clarity of pronunciation and naturalness of unvoiced components
- Implemented real-time reverb and Transformers robot voice effect algorithms in C++
- Developed a real-time AI-based acoustic echo cancellation system

**Carnegie Mellon University** Aug. 2022 - May. 2023  
Teaching Assistant Pittsburgh, PA, USA

- “Signals and Systems”: covered system properties, convolution, Fourier/Laplace/Z Transform, sampling
- “Digital Signal Processing”: covered multirate DSP, filter design, Discrete/Fast Fourier Transform
- Hosted weekly office hours to help students understand important signal processing concepts
- Created homework assignments and exams that aid students’ understanding

**Course Projects** Jun. 2022 - May. 2023

- “Introduction to Deep Learning” Course Projects
  - Created Pytorch classes from scratch for loading and preprocessing speech and image data
  - Implemented various models for different tasks from scratch, using basic Pytorch functions
  - Reviewed multiple research papers describing different model architectures and their performances
  - Attention-based Automatic Speech Recognition
    - Reviewed the “Listen, Attend, and Spell” research paper
    - Implemented an attention mechanism, a pyramidal bi-directional long-short-term memory (pBLSTM)-based encoder (listener), and a LSTM-based decoder (speller)
    - Used the Librispeech dataset for training, validating, and testing
    - Achieved 8.9 Levenshtein distance during testing
  - Convolutional neural network for face classification
    - Reviewed research papers on Convnext and ResNet
    - Experimented with and built Convnext and ResNet from scratch, using pytorch functions
    - Used the VGGFace2 dataset for training, validating and testing
    - Achieved 90% test accuracy using the Convnext model
  - Deep neural network for frame-level speech recognition
    - Built a multi-layer perceptron (MLP) for mapping speech to phonemes

- Experimented with various MLP architectures and other hyperparameters, including but not limited to: dropout probability, learning rate, scheduler, batch size, and optimizer
  - Used the Librispeech dataset for training, validating, and testing
  - Achieved 88% test accuracy
- “Advanced Digital Signal Processing” Matlab Simulations
  - Noise canceller using adaptive filtering and the LMS update algorithm
  - Linear predictive coding-based vocoder
  - Phase vocoder that changes the time and pitch of music independently
- “Introduction to Computer Systems” Course Projects
  - Tiny interactive shell that supports background jobs, process interruptions, and zombie reaping
  - Dynamic memory allocator (1300+ lines of C code) achieving high throughput and utilization
  - Cache simulator adopting the LRU replacement policy
  - Fast matrix transposition implemented with blocking techniques

## **Carnegie Mellon University AB Tech**

Aug. 2021 - Dec. 2022

### **Sound Engineer**

Pittsburgh, PA, USA

- Set up sound and lighting equipments
- Assisted operating sound board during the performance to monitor sound quality and feedback
- Communicated with stage managers to ensure smooth transition between performances

### **Music Producer**

Dec. 2015 - Present

- Produced high-quality original music, solely responsible for all aspects of production: composition, sound design, sound recording, mixing and mastering
- Used signal processing methods to generate real-time audiovisual artwork accompanying original music
- Created a musician website from scratch using HTML/CSS, regularly updating content

## **References**

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Richard Stern: rs1e@andrew.cmu.edu

## **Awards / Honors**

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Dean's list, Fall 2022

International Electronic Music Competition Top 25%, Aug. 2019

Black Hole Recordings China Remix Competition Honorable Mention, Feb. 2019

United States Academic Decathlon China Music Section Gold Medalist, Feb. 2019