

# LOUIS LARSEN

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## EDUCATION

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### Princeton University

Class of 2024

- Bachelor of Arts in Computer Science, Minor in Music Composition, GPA: 3.222
- Relevant Courses: Machine Learning, Algorithms and Data Structures, Programming Systems

## SKILLS

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- **Programming Languages:** Python, Java, C, ARM Assembly Language, JavaScript, SQL, Go, Git
- **Artificial Intelligence/Machine Learning:** Computer Vision, Transformers, CNNs, PyTorch
- **Software Development:** Algorithm Optimization, Parallel Computing, GUI Development
- **Web Development:** Full-Stack Programming, Webserver Setup & Deployment, HTML, CSS, Flask
- **Music:** Drum Set, Keyboards, Composition, Songwriting, Engineering/Production

## ACADEMIC PROJECTS

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### The Development of a Drum Identification and Transcription Tool

September 2023 – May 2024

*Senior Thesis*

*Advisor: Dr. Adam Finklestein*

- Developed a novel approach to Automatic Drum Transcription (ADT) using a combination of CNNs and a 2-layer Hierarchical Encoder-Decoder Transformer
- Analyzed drum audio along the frequency and time axes, improving transcription accuracy and achieving state-of-the-art results, scoring 35% better than previous ADT models

### The Great Princeton Raccoon Invasion

September 2023 – December 2023

*Computer Graphics Final Project*

*Professor: Dr. Adam Finklestein*

- Created a 3D single-player game with a team of 3 implementing a complete physics engine featuring collisions, gravity, and spatial sound, providing a realistic and immersive gaming experience

### The Development of a CNN for the Classification of Drum Sounds

February 2023 – May 2023

*Junior Independent Work*

*Advisor: Dr. Brian Kernighan*

- Designed and implemented a CNN to classify sub-instruments of a drum set, including kick drums, snare drums, tom drums, and cymbals, achieving a testing accuracy of 94%

### Academic Work Time Estimator

February 2023 – May 2023

*Advanced Programming Techniques Final Project*

*Professor: Dr. Robert Dondero*

- Collaborated with a team of 4 to design a website that helped Princeton students estimate weekly coursework hours for informed course selection

## PROFESSIONAL EXPERIENCE

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### Research Assistant

June 2024 – August 2024

*Olin College of Engineering*

*Boston, MA*

- Expanded the existing AI-based music generation program developed with Dr. Diana Dabby by creating a GUI to improve usability and accessibility for non-technical users
- Built and deployed a server for efficient communication between the GUI and AI algorithm.
- Improved the efficiency of the underlying code, reducing processing time by 90%

### AI Programming Intern

June 2023 – August 2023

*Olin College of Engineering*

*Boston, MA*

- Collaborated with Dr. Diana Dabby to develop a program which incorporated chaos theory and AI algorithms to generate diverse variations of popular songs, optimizing both musicality and randomness

## CAMPUS ACTIVITIES

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### Stage Manager

*Princeton University Rock Ensemble*

### Percussion Section Leader

*Princeton University Orchestra*

### Pit Orchestra Percussionist

*Princeton Triangle Club, Princeton University Players*

### Employer Engagement Student Assistant

*Princeton Center for Career Development*