

# Stephen Karukas

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## Education

<b>Indiana University</b> , Bloomington, IN	May 2022
<i>Master of Science in Computer Science</i>	Cumulative GPA: 4.00/4.00
<b>Indiana University</b>	December 2019
<i>Bachelor of Music in Composition &amp; Bachelor of Music in Percussion</i>	Cumulative GPA: 3.99/4.00
• Minors in Computer Music & Computer Science	CS GPA: 4.00/4.00
• Indiana University Founder's Scholar	2016, 2017, 2018, 2019

## Recent Employment

<b>Indiana University</b>	January 2021 – present
<i>Associate Instructor [Graduate Teaching Assistant], Computer Science</i>	
• Co-instructing a lab section, creating programming assignments, and writing programs for automatic testing and grading for two graduate computer science courses, B505 Applied Algorithms (Spring 2021) and B551 Elements of Artificial Intelligence (Fall 2021).	
<b>Amazon.com</b> , Bellevue, WA	May 2021 – August 2021
<i>Software Development Engineer Intern</i>	
• Developed an object-oriented library in Java and used AWS technologies such as DynamoDB, CloudFormation, and EC2, to improve a latency-sensitive service. Solved a crucial throttling problem, allowing the service to handle millions of retail transactions per day while introducing minimal latency.	

## Research Experience

<b>Spatial-Conditioned U-Net for Musical Source Separation</b>	May 2021
<i>Final group research project for CSCI-B657 Computer Vision</i>	
• Developed a neural network architecture for isolating an audio signal from a stereo mixture.	
• Designed a “condition generator” convolutional network for injecting learned priors (over source stereo location within a given genre) into a U-Net architecture in an attempt to improve separation accuracy.	
<b>Neural Timbre Synthesis</b>	May 2021
<i>Final paper for CSCI-B555 Machine Learning</i>	
• Surveyed research in latent audio spaces and generative audio models, with a focus on applications to musical timbre synthesis. Traced historical to contemporary lines of research, relating earlier studies in timbre perception and latent timbre spaces to recent frame- and sample-based deep generative models (WaveNet, GANSynth, and variational autoencoders).	

## Software Development Projects ([github/skarukas](https://github.com/skarukas))

<b>xen/springs/tune</b>	December 2019 – Present
<i>Web apps and programming tools for microtonal music theory</i>	
• Developing a web app ( <a href="#">springs</a> ) for intuitive microtonal chord creation as well as a TypeScript library ( <a href="#">tune.js</a> ) and high-level programming language ( <a href="#">xen</a> ) for symbolic manipulation of microtonal chords.	

## Skills

**Technologies:** Python, Keras, PyTorch, Java, MATLAB, JavaScript, TypeScript, AWS (DynamoDB, DynamoDB Accelerator, CloudFormation, CloudWatch, EC2)

**Academic Courses:** Machine Learning, Computer Vision, ML for Signal Processing, Elements of AI, Audio Signal Processing, Data Analysis & Mining, Applied Algorithms, Object-Oriented Design Patterns, Deep Learning, High-Dimensional Data Analysis, Computer Networking

**Work Style:** Self-motivated and independent, with a focus on efficiency, detail, and completeness.

**Other interests:** music, experimental art, plant-based cooking, and pretzels