Andrew Wiggins

Statement of Purpose

I want to pursue a Ph.D. in Electrical Engineering and subsequently a career in research. My research interests include music information retrieval (MIR), audio signal processing, and machine listening.

My interest in pursuing MIR research began as I was working on my senior thesis on algorithmic composition for my B.A. in Music & Technology. Under my advisors, Dr. Richard Graham and Dr. Brian Borowski, I was developing a computer program to compose music by slicing and rearranging audio clips into rhythmic textures. During that time, I was enrolled in a computer vision graduate course with Dr. Philippos Mordohai, and I was intrigued by the concepts and algorithms of machine vision that arose in the course. I immediately wanted to apply similar techniques of machine listening to my algorithmic composition work. In this process, I discovered the field of music information retrieval and was able to use the MIR concepts I had researched to improve the output of my composition system.

Overall, in my research, I aspire to create software for musicians and composers that utilizes MIR techniques to aid audio synthesis and music composition practices. This undergraduate thesis project sparked my interest in MIR, and since then I have sought every opportunity available to me at Stevens to engage in research experiences that have further contributed towards my preparation for research in the field.

During the summer of 2016, I was hired as a graduate student researcher at Stevens SCENE lab, under the direction of Dr. Seth Cluett. I developed a mobile application prototype to help amateur salsa dancers learn to count the music correctly. This involved researching feature extraction techniques for onset detection and real-time and offline algorithms for beat detection. My application prototype was successful and managed to outperform the alternate prototype from a team of graduate electrical engineering students. Having degrees in both Music Technology and Computer Science, I believe that my success on this project was largely due to my ability to understand the problem deeply, on both a technical and a musical level.

I am currently working on my Computer Science Master's thesis entitled "Classification of Guitar-Playing Techniques" under the direction of Dr. Philippos Mordohai. My research involves testing the use of Mel-frequency cepstral coefficients along with principal component analysis for feature extraction and training various classifiers, including a support vector machine, to identify different physical guitar-playing techniques. My end goal is to incorporate my real-time guitar technique classification system into innovative digital guitar effects. After completing my Master's program this spring, I would like to continue to expand my MIR research as an Electrical Engineering doctoral student in the MET-lab.

Given the strong encouragement for STEAM education at the MET-lab, I believe Drexel holds excellent opportunities for me to continue to engage in interdisciplinary research. Although I am open to a variety of engineering-related research, one professor at Drexel whose projects are especially appealing to me is Prof. Kim. Studying some of his papers and projects gives me a sense that Drexel's Ph.D. program in Electrical Engineering is a great match for my interests. I believe that my hands-on research experience and ability to articulate both the computational and musical components of MIR research qualify me as a strong candidate for the Ph.D. program at Drexel.