In the classical tradition, music is written as a score that performers read when playing their respective instruments. Playing music from a score translates into a sequence of physical motions required to play it on a given musical instrument. These motions incur dissimilar levels of difficulty on performers. The complexity of a music score represents the sum of the levels of difficulty of all motions in which a performer must engage when playing the score.

The ability to accurately assess a music score's complexity is required in a number of contexts, such as curricular recommendations, competition specifications, etc. Unfortunately, this non-trivial cognitive task depends solely on individual opinions, a process influenced by personal biases and lacking common criteria. As such, musicians often disagree about the relative complexity of music scores. Additionally, people buying sheet music face great uncertainty when determining whether unfamiliar music matches their playing ability.

This project is the first attempt to create a systematic and objective approach to assessing the complexity of a music score. The approach leverages computing technologies to be able to automatically and accurately calculate the complexity of playing a music score on a given instrument. As a proof-of-concept of the approach, we have been developing an automated, web-based application for music educators and performers. This interdisciplinary research employs novel computing paradigms to systematically expose the deep insights of Music Pedagogy to a broad music audience. Although the end product of this research will largely benefit musicians, the created novel computing concepts and paradigms will enhance the state of the art in computing, being applicable to solving important problems in other domains.

At the technical level, this interdisciplinary research exploits a fundamental musical tenet that—for a given instrument—different notes, intervals, and key signatures represent dissimilar levels of difficulty, which vary depending on the performer's proficiency. Tempo, dynamics, and articulation also affect the overall difficulty. We have realized our approach as a two-phase process. First, music experts rank the relative difficulty of musical components for different playing proficiencies and instruments. Second, an automated algorithm applies this ranking to music scores and calculates their respective complexity. Once music experts agree upon the complexity ranking for a given level of proficiency, our approach automatically calculates a music score's relative difficulty. The results of this interdisciplinary research project will empower musicians to expeditiously assess a music score's suitability for the abilities of intended performers.