The Allegheny College Mathematics Department
Presents Guest Speaker

Thomas Fiore

University of Michigan-Dearborn

# Morphisms in Musical Analysis

Henderson Auditorium, Quigley Hall
Allegheny College
Thursday, September 25, 2014 at 4pm

   Music theorists draw upon mathematics to analyze works of music, to reconstruct musical notions, and to compose music. In this talk I will discuss just one of these three aspects: the analysis of music. We will study Schoenberg's String Quartet in D minor from a transformational point of view.

   A transformational analysis, in the sense of Lewin, asks: which transformations are idiomatic for a work of music? In other words, how do musical materials such as pitch, melody, chord, and rhythm change in a piece over time, which changes do they undergo, and how do these changes "make the piece work"? These changes are transformations, i.e. *functions* in the sense of mathematics.

   Over the centuries, mathematicians have learned a great deal about functions. For instance, functions can have different roles. On the one hand, a function can be applied to an input, e.g. if $f(x)=x^2$ then $f(3)=9$. On the other hand, functions can be composed to form a structure themselves, e.g. the symmetries of a triangle form a *group*. Yet, there is a third role: functions can map one structure to another, e.g. the exponential map e^x takes addition to multiplication. This third role of a function is called a *morphism*. In Schoenberg's String Quartet in D minor, we will meet a musical morphism: a function which maps one musical structure into another.

   This is joint work with Thomas Noll and Ramon Satyendra.
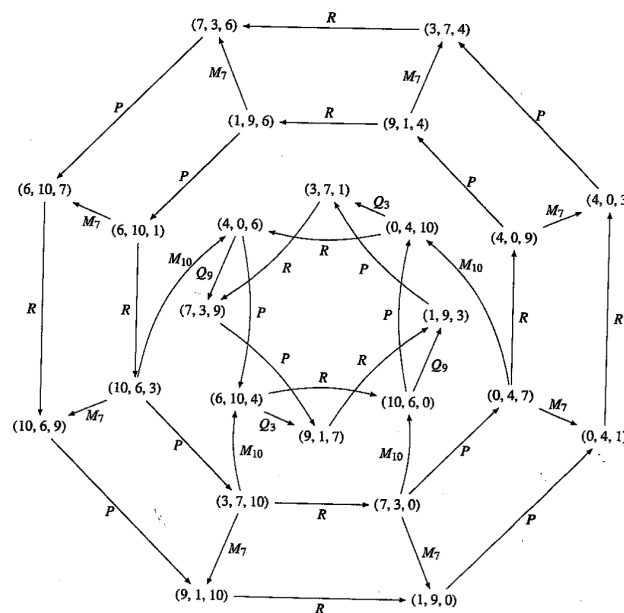
Refreshments will be available after the talk.

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For more information, contact Harald Ellers at hellers@allegheny.edu.