

The Union College Distinguished Science and Engineering Lecture Series presents:

CREATING MUSICAL VARIATION

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- **Wednesday, March 10th, Union College**
- **4:45-5:45 PM, Olin Center Auditorium**
- Sponsors: Skidmore-Union ADVANCE Network Project, Union College Department of Music, Union College Department of Electrical and Computer Engineering

Abstract: During the 18th and 19th centuries, composers often dressed a melody in new attire by weaving additional notes around its thematic tones in order to create a variation. Such ornamentation could enliven and elaborate one or more musical entities. Yet myriad variation techniques existed besides ornamentation, including permutation and combination, as advocated by a number of 18th-century treatises. More recently, fields such as chaos theory have allowed composers to create new kinds of variations, some of which are reminiscent of earlier combinatorial techniques. One such technique uses a chaotic mapping to make musical variations of an entire work. This technique harnesses a natural mechanism for variability found in the science of chaos—that is, the sensitivity of chaotic trajectories to initial conditions. Two chaotic trajectories map the pitch sequence of a musical score into a variation where the same set (or subset) of pitches appear, but in modified order.

The chaotic mapping can create variations on pieces which employ multiple instruments, as well as infuse a piece with musical attributes, e.g., pitches, outside its own musical event space. Virtually infinite in number, the variations can be close to the original, diverge from it substantially, or achieve degrees of variability between these two extremes. Schenkerian analysis can offer a kind of ‘musical proof’ as to why some of these variations continue to engage listeners. In sum, the technique offers a post-compositional process in which a composer can go on a journey to someplace new or unimagined with an already completed piece.

Biographical Information: Diana Dabby has taught at MIT, Tufts and Juilliard, and holds degrees in music and electrical engineering from Vassar, Mills, C.C.N.Y., and MIT. In her doctoral research at MIT, she combined music and engineering by devising a chaotic mapping for musical variation, as heard on NPR member station WBUR-FM (2004), NPR’s *Weekend Edition* (2007), and in *Science* (April 4, 2008). Awarded a U.S. Patent in 1997, this work has since been the topic of a number of invited concert/lectures sponsored by the National Association of Schools of Music, MIT, Princeton, Cornell, Dartmouth, IEEE, FIRST Place of New Hampshire, New Horizons in Science, the 2007 International Conference on Complex Systems, and Harvard. As a concert pianist, Dabby has performed in Weill (Carnegie) Recital Hall, Merkin Concert Hall, Jordan Hall, Symphony Hall Boston, Tanglewood, and abroad. Her recent works include *A Fire’s Tale* (2008), *Aerial Silk* (2006), and *September Quartet* (2005), a 5-movement work scored for voices, winds, brass, percussion, violin and piano, commissioned to commemorate the 150th anniversary of Tufts University. She is a founding faculty member and Associate Professor of Electrical Engineering and Music at the Franklin W. Olin College of Engineering, where she teaches orchestration, composition, and electrical engineering, as well as interdisciplinary courses combining art and science. She is also the founder and developer of the Music Program at Olin (2002-present).