

**A Teacher's Guide to  
The Binghamton Philharmonic's Time Warner Young People's  
Concert:  
*Music and the Magical Brain!***

*Music and the Magical Brain!* is an entirely new, original presentation by the Binghamton Philharmonic for its annual Time Warner Young People's Concert. It has been created by Music Director John Covelli and his wife, filmmaker and writer Ruth Covelli, in order to demonstrate for young audiences the value and effect of music on our brains. The program will explain how the brain works and how music and the arts can encourage the expansion of our intelligence and creative capacities. During the concert, children will experience music by a live symphony orchestra as well as a multimedia presentation illustrating the scientific and musical concepts which are at the heart of the program.

**The Music**

Richard Strauss	Also Sprach Zarathustra (opening)
Aaron Copland	Fanfare for the Common Man
Gustav Holst	"Mars" from The Planets
Richard Rodgers	"You Have to be Carefully Taught" from South Pacific
Leonard Bernstein	Candide Overture
Aaron Copland	Shaker Hymn ("Simple Gifts")
W. A. Mozart	Eine Kleine Nachtmusik
Benjamin Britten	Fugue from Young Person's Guide to the Orchestra
Giacomo Puccini	"Humming Chorus" from Madama Butterfly
John Williams	"Call to the Champions"

## The Brain

Starting in at least the mid-1970s, the human brain was understood by both scientists and laymen to function much like a computer. That is to say, that it was structured hierarchically with bits of information travelling from lower order to higher order neurons, which would integrate the bits of information into more complex concepts. For example, single neurons would detect certain features in the environment, such as lines and edges, which when combined in the brain would be recognized as concepts such as “grandmother’s face.” In this model, the brain’s neurons operate similarly to transistors in a computer.

More recently, researchers such as E. Roy John of New York University, W.R. Freeman of the University of California at San Diego and Rafael Yuste of Columbia University, have posited a view of the brain that is quite different from a computer. They argue that information is stored and processed in the brain through the synchronized firings at various frequencies of millions of neurons. Rather than a hierarchical model (i.e., the computer) these biologists contend that the brain actually functions more like an orchestra, with information travelling among neurons as a musical theme travels from instrument to instrument. (See Eric Lerner, “Music of the Brain,” *21<sup>st</sup> C*, Issue 4.2, available at [www.columbia.edu/cu/21stC/issue-4.2](http://www.columbia.edu/cu/21stC/issue-4.2)).

Researcher Rodolfo Llinas of New York University has extended the brain as orchestra metaphor by trying to locate the brain’s equivalent of the conductor. Llinas believes that intralaminar nuclei found deep within the thalamus are responsible for synchronizing the massive electrical activity within the brain. His research has even uncovered that the brain while sleeping emits an electrical hum at a regular beat. (John J. Ratey, *A User’s Guide to the Brain*, 2001)

***Music and the Magical Brain!*** will demonstrate these exciting concepts and more using an actual symphony orchestra giving students a tangible understanding of how the human brain works.