

FanFaire Foundation
presents

A San Diego Science Festival
SIGNATURE EVENT

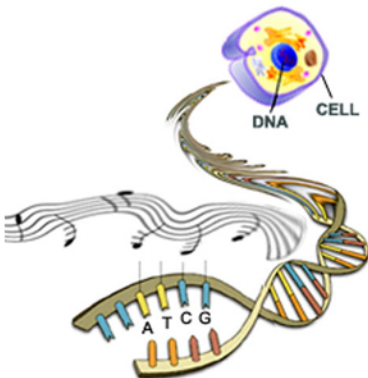
GENE MUSIC | MUSIC GENE

Is there music in our genes?
Do we have genes for music?

A CONCERT - LECTURE

SATURDAY, 10:30 AM
MARCH 20, 2010

POINT LOMA / HERVEY LIBRARY



FanFaire Foundation
where SCIENCE & MUSIC intersect
foundation@fanfairefoundation.org

MISSION STATEMENT

Promote the use of MUSIC as a TOOL for
TEACHING SCIENCE and enhancing public
understanding of science and technology

Develop programs that strengthen
SCIENCE and MUSIC EDUCATION

Promote MUSIC APPRECIATION among
the young and the general public

"Musical training is a more potent instrument than any other, because rhythm and harmony find their way into the inward places of the soul, on which they mightily fasten, imparting grace, and making the soul of him who is rightly educated graceful..." - Plato

"Life without playing music is inconceivable for me. I live my daydreams in music. I see my life in terms of music...I get most joy in life out of music..."

...The greatest scientists are always artists as well."
- Albert Einstein



FanFaire - the webzine that celebrates MUSIC!
www.fanfaire.com

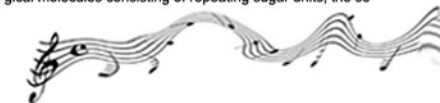
On Gene / Protein Music

It all began in the early 1980s when some origin-of-life scientists (biochemists, molecular biologists, geneticists) recognized that similarities between the sequencing of musical notes and the repetitive sequencing of bases in DNA could make the study of gene and other biomolecular structure infinitely more pleasurable.

A piece of music after all is nothing but a sequence of vibrating information called notes, which can be grouped into phrases, chunked into melodies, crafted into movements, and finally assembled into the beautiful complexity of a sonata, concerto, or symphony. For notes, substitute bases (as in adenine, guanine, cytosine and thymine). String millions of them together according to sequences prescribed by nature, and you end up with the DNA that makes up an organism's genes. Or else substitute amino acids (as in leucine, lysine, etc). Link thousands of them together in a chain of repeating sequences, and you get those other complex molecules of life called proteins. Each base, each amino acid, and the whole caboodle of genes and proteins, like the notes that make up music, vibrate at various frequencies. If we could listen to them, these scientists wondered, what would we hear? Curious, they went ahead and probed, and translated frequencies here and there, assigning bases and amino acids to notes or chords. Some collaborated with composers. The output has been prodigious. CDs have been produced and scores written for gene and protein music - in a wide variety of styles. From the lowly E.coli to human hemoglobin; from bird flu to Huntington's disease - there's music in all of them. So, yes! There's definitely music in our genes and our proteins. And it's possible that there's a gene for music in our DNA. In the meantime... *Rhapsody in Flu*, anyone?

Gloria Cajipe

A research chemist and educator in an earlier career, Gloria Cajipe is Technical Director and Editor of *FanFaire.com*, a webzine on classical music and opera, which are among her consuming passions. A co-founder of *FanFaire Foundation*, she is committed to developing programs for using music as a tool for teaching science. Holder of a PhD in Organic Chemistry from the University of California, Irvine, she has published widely on the chemistry and applications of algal polysaccharides, biological molecules consisting of repeating sugar units, the se-



quence of which could conceivably be—but to her knowledge has not been—translated to humanly audible music. Her other interests include architecture, sculpture, literature, film/video, computers, and vegetarian cuisine.

Program Notes:

Alexander Porfir'yevich Borodin

Surely you can hum the melody of "Stranger in Paradise" or "This is My Beloved" from the musical *Kismet*? If you can, then you've known Borodin's music perhaps without knowing he wrote it. Among the great composers, his is perhaps the slimmest body of works. Which is as much as can be reasonably expected of someone who throughout his life, served two masters, SCIENCE and MUSIC, with equal passion and with great success. The bastard son of a Georgian prince and an unconventional Russian woman who by some accounts was a doctor's wife, he declared his parallel passions even as a boy. He played the flute, piano and cello, composing a flute and piano concerto at 13, and tinkered with test tubes in his mother's kitchen, at times creating accidental fireworks! Holder of an MD and a PhD in Chemistry, he became a distinguished Professor of Organic Chemistry, renowned for his work on aldehydes, for championing women's rights to medical education, and arguably for being among the first to link cholesterol to heart disease. All these while at the same time a member of Russia's "Mighty Five" composers, writing music (without benefit of a formal music education) that includes: three symphonies, an orchestral tone-poem, two string quartets, some piano pieces, a dozen songs, and one major opera (Prince Igor) that are part of the standard repertoire. A genius? Some say "Not!" Chemists ask (and musicians the converse): Had he not been a composer, would Borodin have been a greater scientist? Pointless speculation, this; better to be doubly grateful that in Borodin, science and music converged, and as a result, chemistry advanced as it did in his time and we have some of the most beautiful melodies to hum forever. **Kismet?** Perhaps, though it's very tempting to say surely!

Petite Suite

Composed over a period of five years, *Petite Suite* is the largest of Borodin's works for piano. It consists of seven charming and romantic short movements, each with a brief but pictorial description, to wit: "The Church's vows foster thoughts only of God"; "Dreaming of Society Life"; "Thinking only of dancing"; "Thinking both of the dance and the dancer"; "Thinking only of the dance"; "Dreaming of love"; and "Lulled by the happiness of being in love." Dedicated to the Countess Louise de Merc d'Argenteau, the score was inscribed thusly: "*Little poems on the love of a young girl*", clearly showing, along with the subtitles, Borodin's infatigably dreamy state of mind at the time of its writing, two years before he died - at age 53 of a sudden, apparently painless heart attack after a jolly social evening of dancing.

PROGRAM

Gloria Cajipe, *lecturer*
Tatiana Roitman, *piano*

Welcome remarks

Alexander Borodin (1833-1887)

(Composer, cellist, and Professor of Chemistry
in whom music and science truly converged)

Excerpts from "*Petite Suite*" ca. 1885

GENE MUSIC | MUSIC GENE

If we could listen to the molecules of the body,
what would we hear?

Wolfgang Amadeus Mozart (1756-1791)

(Physicist and violinist Albert Einstein's
favorite composer)

"Mozart's music is so pure. It seems to have
been ever present in the universe."

Variations on "*Ah vous dirais-je, Maman*"

(Twinkle, Twinkle Little Star), K.265" ca. 1781-82)

Book and CD Raffle

Wolfgang Amadeus Mozart

In this post-"Amadeus" age, he is the most familiar of classical composers. Born on 27 January 1756 in Salzburg, he was the ultimate *wunderkind*. An early master of the keyboard and violin, for years he was showcased all over Europe by his father Leopold. He composed music from age 5 on, in ever increasing abundance and with an artistic maturity that belied his youth, until his untimely and mysterious death at 35. [A 2009 report suggests that Mozart may have died from kidney failure resulting from a strep throat infection.] His known works, 800 altogether, many of them indisputable masterpieces, cover all the musical genres. More than 200 years after his death, Mozart's influence has not ebbed. His music remains a staple of concert and operatic repertoires all over the world, and excerpts of his works still filter through the soundtracks of modern films *en route*, one would hope, to at least the public subconscious.

Variations on "*Ah vous dirais-je, Maman*"

Known by every child and its mother, this most popular variation in all of classical music was composed by Mozart probably in Vienna when he was around 25 years old. Translated as "Ah! I shall tell you, Mama" and known to English-speakers as "Twinkle, Twinkle, Little Star", it was based on a 1761 French folk tune. Consisting of twelve variations, this work demonstrates Mozart's ability to create a substantial piece of music from simple or even childish materials.

Tatiana Roitman

Pianist Tatiana Roitman has appeared as a soloist and recitalist across North America and Europe. The BBC hailed her performance of Gershwin's *Rhapsody in Blue* with the Oxford Pops Orchestra as "formidable...both accurate and with rarely seen joy." She has premiered contemporary works and as the recipient of the Peggy Rockefeller Memorial Fellowship at Tanglewood, she worked with James Levine, Dawn Upshaw, Yo-Yo Ma, Charles Rosen, and Claude Frank. A lecturer at the University of San Diego, she holds a BMus. from Arizona State University, graduate degrees from Manhattan School of Music, the Royal Academy of Music in London, UK, and a DMA from the University of Minnesota.

