



TWO LIVE CONCERT PERFORMANCES

Jung Hee Choi
Tonecycle Base 30 Hz, 2:3:7 Vocal Version with 3:4 and 6:7

Saturdays, 13 and 20 September 2014, 9 pm

La Monte Young, voice
Marian Zazeela, voice
Jung Hee Choi, voice
77 Sine wave frequencies

MELA Foundation *Dream House*
275 Church Street, 3rd Floor, between Franklin & White Streets in Tribeca

Admission \$24. MELA Members, Seniors, Student ID, \$18.

Limited seating. Advance reservations recommended.

Info and reservations: mail@melafoundation.org (or 212-219-3019)

The installation will be open from 2 to 7 pm on Saturdays, September 13 and 20. Doors will reopen at 8:30 for concert seating.

In the transcendent setting of Jung Hee Choi's exhibition *Ahata Anahata, Manifest Unmanifest VIII*, MELA Foundation is presenting two live concert performances of her composition, *Tonecycle Base 30 Hz, 2:3:7 Vocal Version with 3:4 and 6:7*. La Monte Young, Marian Zazeela and Jung Hee Choi, voices, perform with 77 sine wave frequencies on Saturday evenings, September 13 and 20 at 9 pm in the MELA *Dream House*. The three vocalists improvise over the implied tonic that changes imperceptibly throughout the performance of the composition. The relationship of their improvisations to the drone continuously elaborates the musical meaning of the pitch, creating a compelling, harmonious construct that draws the listener into a profoundly contemplative world. Choi writes:

For the live performances this year, I added two frequencies to the lower tetrachord: the septimal minor third, 7:6, and the perfect fourth, 4:3, which yield the septimal second, 8:7

between the 7:6 and the 4:3 frequency ratios of the scale. These successive superparticular ratios, 7:6 and 8:7 make the lower tetrachord symmetrical to the upper tetrachord divided by a whole tone, 9:8, such that the tonic, the septimal minor third and the perfect fourth degrees of the lower tetrachord are symmetrical to the perfect fifth, the septimal minor seventh and the octave of the upper tetrachord. These musical proportions of the scale have a close relationship to the ascending form of *Raga Bhimpulasi* and America's own *Blues*.

Tonecycle Base 30 Hz, 2:3:7 Vocal Version consists of the linear superposition of 77 sine wave frequencies and 6 channels of voices based on the invariant harmonic ratios of 2, 3 and 7, all ascending imperceptibly to fixed frequencies and then descending to the starting frequencies. In this composition, there are eleven groups of sine wave frequency components set in ratios based on the harmonics 2, 3 and 7. Each of the eleven groups has seven sine wave frequency components that have the same starting point. Each of these seven sine wave frequency components gradually separates from each of the other components over time while ascending at slightly different rates of speed, and then descending toward the starting frequencies, infinitely revolving as in circles. These extremely close frequencies and their harmonics constantly produce beat cycles that traverse through a continuum of phase angles.

Since all tones are ascending or descending together, all in fixed ratios to create parallel motion, and since there is no reference tone (drone) or fixed tonic with which to compare, the sense of the pitch shift is practically imperceptible. Instead, the gradual development of distinctive melodic and rhythmic patterns emerges over time as the result of the acoustical phenomenon of phase interference. Nonetheless, each melodic pattern (recognizable sequence of pitches) is infinitesimally higher and faster or lower and slower than the preceding pattern, while the pitch relationships within the pattern remain the same.

In this linear superposition of 77 sine wave frequencies, there is no traditional musical pitch, where pitch is defined to be a specific fixed frequency of at least a minimum duration. Further, although there is no fixed drone in this composition, a tonic is implied because the frequency ratios based on the harmonics 2, 3 and 7 remain invariant while tones are in motion. However, this sense of tonic is very subtle because the sine waves never stand on the lowest points of origin or the highest points of ascent. A frequency with the starting value of 60 Hz ascends 0.0000463 Hz per second and therefore is not in one place long enough to satisfy the definition of a traditional musical pitch.

Originally, the frequencies were programmed to move for six hours from the starting point to the ending point at constant rates. For example, seven frequencies starting at 120 Hz ascended at specific rates to reach 122 Hz, 124 Hz, 126 Hz, 128 Hz, 130 Hz, 132 Hz, 134 Hz in six hours (21,600,000 ms). However, I decided not to use the entire six-hour progression but rather to program the frequencies to circle back to the original starting frequencies after a shorter period of time to avoid including fast repetitive rhythmic patterns, which are eventually generated as part of the phenomenon. For the current version of the *Tonecycle Base 30 Hz, 2:3:7*, each cycle takes 32 minutes before starting a new cycle. Therefore, in the final composition the seven frequencies at 120 Hz ascend at the same original rate (used in the six hour version) to the following seven frequencies in sixteen minutes:

Starting Frequencies (Hz)	@ 16 minutes (Hz)	@ 6 hours (Hz)
120.0	120.088890	122.0
120.0	120.177780	124.0
120.0	120.266670	126.0
120.0	120.355552	128.0

120.0	120.444442	130.0
120.0	120.533333	132.0
120.0	120.622222	134.0
60.0	60.044445	61.0
60.0	60.088890	62.0
60.0	60.133335	63.0
60.0	60.177776	64.0
60.0	60.222221	65.0
60.0	60.266666	66.0
60.0	60.311111	67.0

The seven frequencies that start at 60 Hz will arrive at 1/2 of the above frequencies at the sixteen-minute point, and the seven frequencies that start at 30 Hz will arrive at 1/4 of the above frequencies at the sixteen-minute point. This process has been the fundamental compositional technique and structural determinant of the *Tonecycle* series, which I originally composed in 2006-2007. I have since composed numerous pieces using this technique incorporating various harmonic ratios.

For this vocal version I used the sound generated by the 77 sine wave frequencies and their gradual development of distinctive melodic and rhythmic patterns as the underlying *cantus firmus*-like drone and added six channels of the overlaid voices of three performers, La Monte Young, Marian Zazeela and Jung Hee Choi improvising over the implied tonic in harmonic ratios based on 2, 3 and 7. The performers were asked to sing intuitively responding to the imperceptible movement of the tones and to each other. This combination of pitch material generated a remarkable array of harmonics. The relationships of the improvisations to the tones were constantly evolving since all tones are in motion and each melodic pattern is infinitesimally higher and faster or lower and slower than the preceding pattern, while the pitch relationships of the improvisations to the tones remain the same.

Music is a relationship of sounds. In Indian music and all modal music, each pitch of a modal scale is determined in relation to the tonic. In Indian classical music, a pitch is not always a fixed frequency but its relationship to the drone determines the musical meaning of the pitch. This openness and wide range of possibilities allows improvising performers to have some control over the scale and to express subtle microtonal articulations of the pitches of the mode in which the raga is set.

The harmonic series extends beyond the limits of our perception and each set of harmonically related pitches produces a particular set of combination tones that together create a unique musical essence. Amidst the infinite shift of tones in *Tonecycle Base 30 Hz*, 2:3:7, both the fundamental and its relative pitches in invariant ratios, can be considered isomorphic to the infinite possibilities of a unique essence. (From Exhibition Catalogue, copyright © Jung Hee Choi 2014)

However, even though all 77 sine waves are continuously moving, and even though the 2nd, 3rd, 7th harmonics and their octave multiples from time to time demonstrate rhythmic and melodic permutations and recombinations in gradually changing tempi, there is absolutely no sense of pitch shift at all but instead there is a powerful auditory illusion to all listeners that the drone frequencies based on the harmonic relationships 2, 3 and 7 are absolutely stable. Both the listeners in the audience and the performers hear the illusion of a very stable drone chord with only occasional acoustical beats in the form of long, very slow phase shifts.

In the accompanying exhibition catalog, Young and Zazeela observed that through this example of auditory illusion, Choi has demonstrated that the *Maya* of illusion is continuously perpetuated as a result of the body's self-limiting and locked-in modes of perception, analysis and cerebral

cognition, outside of which perhaps we can never escape.

In his LA Times Blog, critic Mark Swed wrote of the Ensemble's 2009 performance of the Maha Mrityunjaya Mantra in *Raga Sindh Bhairavi*:

"Frankly, what made me drop everything and fly to New York at the last minute for the [Merce Cunningham] memorial was the announcement of the music lineup, which was a once-in-a-life-time gathering. La Monte Young, the otherworldly inventor of Minimalism, began the program singing a welcoming raga with Marian Zazeela and Jung Hee Choi, which was pure vibratory magic."

About Jung Hee Choi

Jung Hee Choi has created a series of *Environmental Compositions* with video, evolving light point patterns, drawing, incense, performance and sound involving the concept of *Manifest Unmanifest*. Choi's work has been presented in the U.S., Europe and Asia, including Frac Franche-Comté, France; Berliner Festspiele, Germany; Guggenheim Museum and MELA Foundation Dream Houses, NYC; FRESH Festival, Bangkok; Korea Experimental Arts Festival, Korea. Commissioned by MELA Foundation, Choi's video sound performance and installation, *RICE*, set in Zazeela's *Imagic Light* environment was chosen as one of The 10 Best of 2003 in the December Artforum.

In 1999, Choi became a disciple of La Monte Young and Marian Zazeela in the study of music and art, with the classical Kirana tradition *gandha bandh* red-thread ceremony in 2003. In 2002, with Young and Zazeela she became a founding member of The Just Alap Raga Ensemble and has performed as vocalist in every concert, including the MELA *Dream House*, 2009 Yoko Ono Courage Award Ceremony, Merce Cunningham Memorial, and MaerzMusik Festival.

Choi graduated BA, summa cum laude and received her MA in art and sound from NYU. Choi's in-depth interview is featured in the online Asian Contemporary Art Week presentations organized by Asia Society, NY. Since 2008 Choi has been teaching Raga as instructor at the Kirana Center for Indian Classical Music. Choi appeared as guest artist and lecturer at the School of Visual Art, NYC and École supérieure d'art de Mulhouse, France. Choi's essay, *SOUND: A Basis for Universal Structure in Ancient and Modern Cosmology*, was published in a festschrift for *Antonio T. de Nicolas: Poet of Eternal Return*. Her work is in the collection of Frac Franche-Comté, France.

Concert admission is \$24 / \$18 MELA members; seniors; students with ID. **Limited seating. Advance reservations recommended.** For further information and reservations, 212-219-3019 or mail@melafoundation.org.