



A New Project from MIT and Le Laboratoire

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Composer/inventor Tod Machover, with his The Opera of the Future group at the MIT Media Lab and graduate students Elena Jessop and Rebecca Kleinberger, is currently developing **Vocal Vibrations**, a voice and body experiment to examine the relationship between human physiology and resonant vibrations of the voice. In collaboration with Le Laboratoire in Paris, Alan Grodzinsky, director of MIT's Center of Biomedical Engineering, and Tenzin Priyadarshi, founder and director of the Dalai Lama Center at MIT, we are creating new types of vocal experiences that draw from and extend traditional contemplative practices. The goal is to explore the hypothesis that the singing voice - by focusing internal and externally applied vibrations within and throughout the body - can influence mental and physical health through observable physicochemical phenomena. Through this project, we seek to increase participants' awareness of the changes in body and mind while chanting and singing, as well as to develop new, voice-centric methods for building contemplative practice, concentration, and listening. To do this, we are developing a series of interactive experiences, including individual meditative spaces, a group "singing circle," specially-designed vocal exercises, and iPad applications, all effecting mood modulation, spiritual enhancement, and general wellbeing in an enveloping context of stunningly immersive, responsive, and beautiful music.

To accomplish this, we seek to expand the Opera of the Future group's work in technologies for sophisticated measurement and extension of the singing voice in performance to create new kinds of vocal experiences in which everybody can participate. The voice and body are instruments everyone possesses they are incredibly individual, infinitely expressive, and intimately linked to one's own physical form. However, many people are not comfortable "singing" or do not feel that they can use their voice to participate in a rich musical experience. To address this, we are developing techniques to engage the public in the regular practice of thoughtful singing and vocalizing, both as an individual experience and as part of a community.

This project also draws on currently researched relationships on the benefits of meditation, as well as research on the interactions between vibrations and cellular and body health. Several rigorous studies have shown that meditation training (especially mindfulness meditation) may be an effective component in treating various disorders such as stress, anxiety, and chronic pain. Additionally, medical imaging has proved that cerebral blood flow changes during meditation that incorporates chanting. Studies have also explored the ways in which vibratory forces can affect tissues and cartilage. We hope to expand knowledge about the benefits of chanting and vocalizing, with wide-ranging applications and implications.

In Fall 2013, we will open a vocal installation at Le Laboratoire in Paris, which will then travel internationally. In this installation, private "grotto" environments will allow individual visitors to meditate using vibrations generated by their own voice, accented within these grottos via visual, acoustic, physical and other stimuli. Four types of enclosed private stations allow participants to individually explore different varieties of vocal sounds, including breathing, buzzing, chanting, and singing. Visual and auditory cues, guided by physiological measurements and health observations derived from a range of kinetic phenomena, invite each person to produce these different kinds of quiet vocal sounds. As participants imitate target sounds or explore sounds in a particular sonic vocabulary, extra layers of voices will proliferate in support, creating powerful musical experiences. In each station, specially designed seats will measure auditory and physiological signals,

such as breathing characteristics, heart rate, galvanic skin response, and vibration within the body. As the extent of vocal vibration is increased, the position of the vibration and the participant's attention will be directed via technology that may include display/projection surfaces, vibration within the chair, sound and lighting, etc. to different locations within and around the body.

Visitors can also spend time in a space intended for a quiet, meditative experience, where voices surround and gently envelop them in sound. They can remain in this space for as long or short as they desire, choosing to join in or simply to listen. This space will also be used for collective voice experiments that explore the vibrational resonances between participants that may occur in group singing or chanting, as well as that give participants an accessible way to share a musical experience with others. We performed an early experiment along these lines with the vocal ensemble Blue Heron during the Dalai Lama's visit to MIT in October 2012. The celebrated vocal ensemble Blue Heron led the audience in a collaborative vocal experience, asking audience members to sustain a single pitch while listening to how that note played with and against the complex five-part counterpoint being performed by Blue Heron. By giving the audience members a relatively simple way to engage their own voices in the performance, each person could experience the difference between simply listening to a piece of choral music and being involved physically and mentally in the creation of that music.

In addition to the installation and performance experiences that are part of Vocal Vibrations, a series of iPad apps will allow for preparation at home for the onsite public experience, as well as provide a program of ongoing vocal meditations suitable for musical, physical, mental and spiritual enrichment. These vocal meditations will function similar to yoga routines or piano etudes, where each is a complete and satisfying experience in itself, yet designed to develop a particular technique and be applicable in a wide range of contexts through extended practice. We will also be forming a community and framework around the extended practice of these vocal "etudes" - such as the pedagogical and creative community we have developed around Hyperscore - to encourage participants to receive formal and informal mentorship while connecting with one another around their own vocal use and its influence on their health.

Selected Reference Material

More on the experiments during the Dalai Lama's visit to MIT: <http://operaofthefuture.com/2012/10/20/vocal-vibrations-video/>

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