

## **"Navigating Cycles" --Peace and Healing through Sound & Motion**

Ancient Buddhist culture believed in Kalachakra, or the idea that time, life, and the universe are all cyclical. This is found in the rhythm and energy of the orbits of the heavenly bodies, the changing of the seasons, and the in and out of human breath. As we live our lives, we navigate these cycles, a wheel of time between birth and death, as we already have for millions of years, without beginning or end.

We strive to create a rich, intriguing work that translates this aspect of ancient philosophy to a day-to-day spiritual experience through artistic practice through the interactive aspect of multimedia arts and music composition. Inspired by the traditional Tibetan Prayer Wheel and Tibetan Singing bowl, we propose a novel physical motion sensing controller and sound processing software that both processes the recorded voice of the operator based on the performer's body motion in real time and creates a dynamic art installation. This system is designed for a layperson to be able to easily use their voice to improvise and assemble their own unique piece, becoming part of the installation themselves through their multi-sensory experience.

Tibetan prayer wheels are metal cylinders that contain multitudes of prayers on a long roll of paper, spun with a simple, gentle, repetitive motion, inducing relaxation and a meditative state. Tibetan singing bowls are musical instruments made by bronze or crystal, played by gently rubbing a leather-covered mallet in a steady, slow circular motion around the outer rim, emanating a harmony of deep, resonant tones.

This project will create both a set of two hand-held electronic, musical Tibetan prayer wheels, and a large, fixed Tibetan prayer wheel sound art installation, all of which will be three-dimensional human-computer interfaces to control various interactive electronic voice filtering and sound synthesis techniques. The hand-held prayer wheels will contain miniaturized electronics, sensors and a wireless transmitter. The sensors will measure speed at which the performer spins the wheel, the rising or falling gesture, and several carefully hidden buttons, that allow for a "strike" sound when kissed, and allow the performer to seamlessly transition between sound design layers as desired during the performance.

The large, floor-mounted prayer wheel will be a glowing, humming presence, requiring about a 10'x10' area, with the wheel holding a solid presence in the middle. Small speakers within and around the wheel will create a meditative atmosphere. People will be encouraged to navigate around the wheel and spin it, and embedded microphones and sensors will feed back their processed voices in response to touch and spinning of the wheel, while the lights will change color and luminosity.

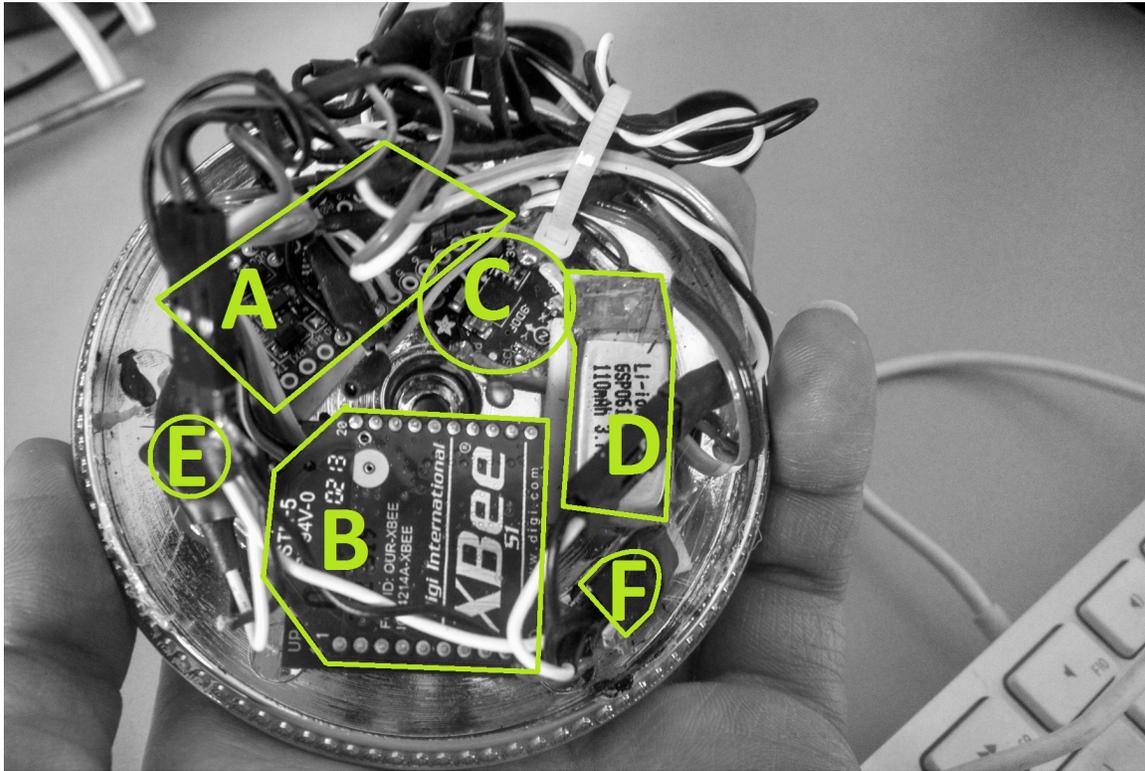
We currently implement three sound design layers in software. The main layer will be modulating aspects of a Faust-STK physical model of a Tibetan singing bowl, based on the Essl and Cook banded waveguide technique proposed. The two supplementary layers will be voice-based layers, with one filtering the singer's voice through a modal synthesis model constructed from recordings of an actual Tibetan singing bowl, and the other adding reverberation and feedback.

The hand-held prayer wheels and their software are already done and were implemented at a network concert at Stanford University on November 21, 2014. Currently we receive a funding to work on the bigger wheel installation from Stanford Arts Institute. The whole installation will be done by April 2015.

The link of the current working hand-held prayer wheel demonstration:

<https://www.youtube.com/watch?v=B2CWJbLgPiY>

(Please review the video from 39:30. The first 39 minutes are technically non-relevant with the work.)



For the picture of the inside of hand-held prayer wheel, the labels are:

- (A) Arduino Pro Mini 328, 3.3V, 8MHz
- (B) Xbee 1mW Trace Antenna Series 1 2.4GHz RF Module
- (C) Flora 9DOF Accelerometer/Gyroscope/Magnetometer - LSM9DS0
- (D) Li-Ion 3.7V 110mAh or 400mAh battery pack
- (E) Charging port
- (F) On-Off switch

Our challenges on the hand-held wheels were in designing the hardware system to be unobtrusive yet tightly integrated into the hand-held prayer wheels, as well as in integrating a variety of gestures and interactions. We also will be designing different physical interactions, haptic feedback and visual interaction between multiple prayer wheels.



We would need a 10'x10' area for the installation. We will bring all of the parts of the installation except load speakers. The parts we would bring include designed hardware, laptop, mics, audio interface and cables. We'd like the conference organizers to provide two load speakers for the sound propagation.