

transient flows intonation

for 2 performers with sustaining instruments

transient flows intonation (2022/23, for two instrumentalists) explores our ability to listen and respond to our environment in a tuning process which translates environmental sound into harmonic pitches to which performers respond. The environment, here, is the water system/gallery space as heard through two microphones placed inside the hydro-clarinet system. The piece uses a gradually shrinking time window (how much time elapses before a live microphone generates new pitches) to reveal thresholds between where our actions can amplify environmental harmonies and where they overwhelm them.

Setup:

- two large loudspeakers, output from laptop, with separation
- two Raspberry Pi and sensor-controlled speakers (custom build) running ChuckK and Python scripts
- two cell phones running TouchOSC layout
- laptop computer running SuperCollider and Python
- wireless router with all devices connected (laptop, Raspberry Pis, cell phones)
- two or more microphones routed into laptop, placed within the environment

Each performer should be comfortably situated in their own space (not too close together) with their sensor-controlled speaker at their feet and able to view their cell phone with the TouchOSC layout. Before beginning, each performer selects for themselves a single prime number (2, 3, 5, or 7). This number is used to determine their harmonic interval in relation a variable reference pitch. When given the pitch, they construct a ratio of their selected prime number plus or minus one (so 5 could be paired with 6 or 4, thus creating the ratio $6/5$ or $5/4$). In this ratio, the reference pitch may be either number. The player then plays (in accordance with the cycle outlined below) the other pitch as determined by the ratio (if treating the reference pitch a 4 in a $5/4$ ratio, the performer would play a pure major third higher). The performer can choose to displace their harmonic pitch by octaves at any time but should remain in that octave for the entire portion of that cycle (so a $8/7$ ratio could become $7/4$ or $7/2$, for instance).

To begin the piece, someone initiates the Raspberry Pi programs by remote login and the main SuperCollider script, after which the following cycle is enacted:

1. Two short audio samples are recorded through the two respective microphones.
2. Each sample is analyzed and the loudest frequencies are returned.
3. These frequencies are sent to the two digital synthesizers and are immediately played back in an amplitude envelope which begins loudly and slowly fades.
4. The program selects one of the frequencies from each analyzed sample and sends each one, respectively, to the performers' cell phones and sensor-controlled speakers.

5. The cell phone displays the frequency using scientific pitch notation to indicate the musical pitch and octave along with cents deviation. The cell phone also displays a stopwatch and when the next cycle will begin.
6. By placing their foot in front of the sensor on each speaker, they can sound the reference pitch and adjust the volume by moving their foot closer or further away from the sensor.
7. After listening to their reference pitch, each performer plays and sustains a harmonic pitch according to the process outlined above using their selecting prime number. It is expected that pitches will often sit in between the locations of tempered notes and that the performers will make adjustments in order to tune. This process should play out in an unhurried, relaxed manner, allowing dissonances to sound equally as they search for the desired intonation. The performer should not sound their reference pitch (using the sensor) when not playing (though sounding it for a moment before or after their sustained tone can be allowed).
8. The performers' pitches should be sustained for at least a full breath or bowing wherever possible. When the electronic part fades to silence before a new cycle begins, the performers may "hang over" and sustain their pitches into the relative silence for a short period independently. When the electronic part switches to a new cycle abruptly (explained below), the performers immediately can begin their new pitch.
9. This cycle repeats, but at irregular durations. Initially, the time window is large with the electronic synthesized tones fading to silence partway through. Each new cycle is shorter than the last, with the fadeout eventually disappearing and the electronic part sustaining, but with updated pitches at every new time value. These time values where new cycle begins are displayed on the cell phones of each performer. When the piece ends (the cell phone will stop updating the clock), the electronic part will fade and the performers should sustain their pitches independently beyond the electronic fadeout. The piece ends when both performers have stopped.