

# Music 222: Sound in Space — Project Proposal

**Title:** *Music in Motion*

**Project Members:** Tyler Sadlier

**Description:** Music in Motion is an interactive sound-art installation that uses the motion of balloons through a performance space to modulate synthesized sounds in realtime. MiM utilizes two webcams and a computer vision python script to determine the XYZ coordinates, speed, and color of balloons thrown by participants. This raw CV data is fed into a Max host patch where it is trimmed, filtered, and sent to multiple plugins within a DAW. The motion data will be used to artificially pan synthesizers using first-order (at least) ambisonics plugins as well as modulate synth pitches, filter sweeps, and other sound effects in realtime. Different balloon colors will be tied to different timbres and “instruments,” as well. MiM should be tuned such that participants are clearly aware of *how* the motion of their balloons changes the sound in the space. Ideally, I hope for the motion tracking & ambisonics panning to be robust enough that a participant could throw a balloon and hear the perceived sound source of their balloon’s “instrument” move away from them, directly in motion with the balloon.

**Reflection:** Music in Motion will be set up at Frost Arts Festival on May 20th, so I should have most of the project done before this class’s final deadlines. For equipment, I need at least four loudspeakers and two webcams. I’m hoping to use the CCRMA stage for this class’s installation so that I can use its already installed loudspeakers—the only unique equipment I’d need to set up in the space for testing sessions & the final presentation would be the webcams. I just ordered both webcams on Amazon and will be able to start testing with them as early as next week. As far as the computer vision aspect of the project goes, I already have a working python script that can track the motion of individual objects as well as recognize their primary color. My Frost project partner (and previously my Music 250A partner), Max Farr, has been doing most of the lifting with getting the CV side of Music in Motion working—my primary responsibility is getting that data to adequately modulate sounds and their spatialization with low latency.

I need to decide if I’m going to be hosting the synthesizers and ambisonics plugins within Ardour or Ableton. In the Music 250A version of Music in Motion, we used a Jitter CV library to interpret webcam motion within a Max patch, and we sent this data via midicc to Max4Live patches within Ableton... these M4L patches would in turn modulate synth and effect parameters using the motion data. I currently don’t have much experience working with ambisonics plugins within Ableton, and I have no experience with Ardour, so I need to spend some time experimenting with both DAWs to determine which one I will use to host the spatialization + synth plugins.

## References:

<https://ccrma.stanford.edu/moodle/mod/resource/view.php?id=310>

[http://econtact.ca/11\\_3/nettingsmeier\\_ambisonics.html](http://econtact.ca/11_3/nettingsmeier_ambisonics.html)

<https://ccrma.stanford.edu/moodle/file.php/6/>

[spatial\\_composition\\_techniques\\_and\\_sound\\_spatialisation\\_technologies.pdf](#)