**Points of Audition**

**Jon Aveyard**

**JAveyard@uclan.ac.uk**

The Points of Audition project concerns improvised music by multiple, mobile performers some/all of whom are recording using in-ear microphones, and the subsequent editing of those recordings to present an unbroken improvisation cutting between different points-of-audition. The project’s outputs are an album of music and the below set of instructions that articulate the recording and editing process as well as tips and prompts to assist in best practice. The instructions, tips and prompts are the result of reflexion during my own participation as a performer, director and editor; observation of musicians taking part; reflection on the resulting pieces. This project built on my earlier composition work using similar techniques but also sought to articulate the practice in order that others could try it themselves.

This document begins by outlining how humans localize sounds (i.e. determine the spatial position of sound sources). The rest of the document then articulates the recording and editing process for Points of Audition pieces along with the tips and prompts suggested for best practice.

**Localization**

The way in which we localize sound sources includes matching sounds to corresponding sights and using our knowledge of the likely placement of sound sources (e.g. the sound of a distant aeroplane is likely to come from up in the sky, the sound of a distant train is likely to come from towards the horizon). However, other cues are found within the sounds themselves.

The interaural cues are those derived from the differences in the sound heard by the left and right ears. A sound coming from the left side will be louder in the left ear and will reach the left ear fractionally sooner that it reaches the more distant right ear. These interaural cues help us to localize a sound source in the left-right parameter.

The monoaural cues help us determine the elevation (the height and front-back position) of a sound source. Sounds arriving at a listener’s ears from different elevations are differently filtered by the listener’s shoulders, head and external ears, and recognition of the frequencies which are being emphasized and attenuated allows the listener to determine the elevation. The monoaural cues are weak, particularly given the need for an a priori sound on which to make comparisons with the filtered sound. Listeners will not always be able to discern between spectral changes caused at source and those caused by the filtering. As such, using sound alone we are poor at determining the elevation of sound sources resulting most notably in front-back confusion.

There are also a number of distance cues. Generally, the closer a particular sound source is to the ears, the louder the sound heard will be. Particularly close sounds have emphasized lower frequencies whilst distant sounds will lose their higher frequencies. Increased distance also typically means increased reverberation of the sounds as a greater proportion of what is heard has been reflected off other surfaces.

Localisation is typically easier when the sound source is moving relative to the listeners ears thus providing a stream of cues rather than a single set of cues.

Binaural recordings made using in-ear microphones then heard over headphones capture the sounds, including the interaural, monoaural and distance cues, at entry to the recordist’s inner ears and play them back at this position to the listener. This presents to the listener an externalized and immersive recreation of the soundscape as heard by the recordist.

**Recording**

In recording a Points of Audition piece, multiple musicians improvise whilst moving within a space, some/all of them wearing in-ear microphones attached to portable recording devices. This project has been successfully tested on groups of between three and ten musicians. The descriptions below assume that someone, either one of the musicians or someone from outside of the improvisations, is acting as a director.

Ideally, at least some of the musicians will be making use of sound sources that enable them to be mobile (e.g. acoustic guitar, violin) as opposed to static (e.g. piano). Amplified instruments on long leads offer obstacles in that the sound source (the amplifier) is more difficult to put into motion though they do not prevent the musician(/recordist) from having some mobility within the space. It may be useful for the ensemble to have available to them additional instruments and found sound objects.

1. The session begins with a brief introduction to localisation, binaural recording and in-ear microphones drawing from the text above.
2. The director informs the group how the durations of the improvisation will be determined. This might be by a displayed time limit, or by the director raising a hand indicating that musicians must find an ending, or by the ensemble finding an ending at a time of their choosing. Alternatively, the group may agree between them a different method of how the duration will be determined.
3. Phones are switched off. Clothing is adjusted so as to avoid unwanted incidental sounds that might arise from noisy straps, leather jackets, and so on. Depending on the floor surface, it may be best to remove shoes to limit the sound of footsteps.
4. If the attending musicians aren’t accustomed to improvising together, it may be worth beginning with an improvisation that is static and without the microphones. Instead/additionally, an unrecorded improvisation may be desired in which the musicians are mobile and everyone is paying close attention to exactly what they are hearing as they move through the space in different ways as well as identifying if anyone is making unwanted incidental sounds.
5. When the ensemble is ready to begin recording their improvisations, some of the musicians are selected to be the recordists. It is recommended to avoid selecting people who find the in-ear microphones uncomfortable or who struggle to get them to stay in place in their ears. In some cases it may be possible to have all the musicians wearing microphones.
6. The recording devices are checked to make sure their input levels match and that they all have sufficient battery life and available storage space. The selected musicians don the in-ear microphones. It is recommended that they feed the microphone leads inside their clothing to avoid them hanging loose, and that they keep the recording devices in their pockets.
7. When it is time to carry out a recorded improvisation, the devices are activated to begin recording, each recordist in turn states their name (optional), the director states the identity of the improvisation (e.g. ‘number one’ or ‘short, fast improv’) (optional), a mark (e.g. a clap) is made to better enable the recordings to be synched afterwards, and the improvisation begins.

**Tips and prompts for the improvisations**

The director may find that the musicians benefit from additional guidance. Beyond any general directorial guidance offered as to any improvising ensemble, it may be useful to introduce some of the following tips to an ensemble taking part in a Points of Audition recording:

* This process raises the importance of spatialisation as a musical parameter. The relative position and motion of musicians to one another and to the microphones is something of which they should aim to be continually aware.
* It is much easier to localize sound sources that are moving relative to the microphones.
* Avoiding front-back confusion is much easier when the sound source moves between the two relative to the microphones.
* Common mistakes include making unwanted incidental sounds such as footsteps and sniffing, and bluster as people move too quickly or wave objects too vigorously near the microphones. However, musicians can also be reassured that there are always multiple microphones recording at once so shouldn’t worry too much if, for example, the microphones fall from their ears and need to be replaced.
* As they move around the space and try out different approaches to capturing interesting sounds for the recordings, it doesn’t matter what the performers look like however strange, awkward or undignified that might be; what matters is what the microphones are capturing.
* Everyone is performing even if silent - they may also use this silence to acquire new sound sources and to reposition themselves. A recording musician is always performing not just through a decision regarding what to play but also through their decisions regarding staying still and moving around.
* Playfulness is a real advantage in being able to exploit the Points of Audition process. Many of the best Points of Auditions pieces have been the result of musicians exploring the particularities of the process rather than simply improvising as they usually would.
* Sections will not be removed from within the improvisations at the editing stage but topping and tailing may occur (see the editing section later) so it is acceptable for the improvisation to take a little while to get going or to have an uncertain ending.

In addition to appropriately offering relevant tips from above (and being aware not to overburden your ensemble with information), you may wish to add a prompt to an improvisation to enable the musicians to engage more fully with the Points of Audition process. The prompts I have found most useful are:

* Be aware of whether you are producing a static sound or a mobile sound and whether the recordists are static or mobile;
* Consider global and local sounds – those sounds that fill the space and those that can only be heard by nearby ears;
* Be aware of whose microphones you are performing to whether it is your own (if you are wearing any) or someone else’s;
* Consider the use of circling and rotation as compositional tools;
* Consider the unusual acoustic effects that can be captured by having microphones near the walls, in the corners, inside instruments, wrapped in found sound objects;
* As you move through the space, consider whether you are performing individually, as part of a sub-group, or as part of the whole ensemble.

On previous occasions, when there has confidence that earlier improvisations have been up to standard, the session has ended with an improvisation focused on boldness and experimentation, one in which ideas that might have been shied away from earlier in the session are tried.

**The editing**

In the editing stage, the recordings from an improvisation are synched. The editor generates logs identifying the stretches that are Good, Adequate or Inadequate. Inadequate stretches are those that cannot be included in the final recording, typically as a result of unwanted sounds or a focus on poor performance. Good stretches are those that the editor believes deserve to be included (unless something better is heard from another recordist) because of the quality of the performance, the sound sources heard or a particular acoustic effect. Adequate stretches are those that aren’t as compelling as the Good stretches but would adequately serve as a bridge between them. Comparing these logs sometimes presents clear indications of which point of audition to use at a given point. Elsewhere, the recordings may need to be auditioned again to reach a decision.

The goal here is to identify unbroken stretches of improvisation worth keeping, to identify which point of audition to use at any time to avoid unwanted sounds and highlight strong recorded moments, and to choose the edit points so as to create or strengthen an engaging narrative through the improvisation. The edit can then take place using cross-fades and cuts to move between the points of audition. According to the Points of Audition process, the improvisations never have sections removed from within but they can be topped and tailed and longer improvisations may be turned into more than one piece.

If it is known which musician made each recording either through them stating their names before the improvisation or by other means, this better allows later evaluation of the ability of each recordist. It has been found that some people are particularly reliable at capturing Adequate recordings, others may capture recordings that are less reliably Adequate but more likely to contain Good moments, whilst others are less reliably either Adequate or Good. This knowledge can be used to guide the allocation of the microphones and recording devices in any subsequent recording sessions with the same musicians or to provide guidance for improvement.