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## 4.7 Spectral decomposition of an instrumental sound object

**ilinx** (09:12)

*ilinx* is a multichannel fixed media work for 8 channels, (8.0). The piece has also been realised in 5.1 and stereo formats.<sup>193</sup>

### Programme Note

*ilinx* – a category of play.<sup>194</sup>

"the pursuit of vertigo", disorientation, dizziness, to momentarily shift or disrupt perception through disorientating changes in the direction of movement.

### Overview of Work

The disorientation and dizziness alluded to in the title of the work reflects the dynamic gestural and structural shifts heard within the piece. Changing trajectories and detailed sonic interplay are key characteristics, with periods of relative stability and calm contrasting with the more dizzying features heard within the work's structure. This contrast attempts to enhance and intensify the impact of the colliding sonic structures that contribute to the overall suggestion, or impression of instability and disorientation.

Varied sonic materials are created using a traditional musical instrument, using non-conventional instrument playing techniques. These materials are transformed to create new sound morphologies, inviting the listener to interpret and decipher the causal sources and imaginary physical gestures initiating the sounds heard in the piece.<sup>195</sup> A variety of instrument excitation techniques are playfully explored during the process of recording the performed source materials for composition. Throughout this process the instrument is

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<sup>193</sup> A studio reduction and binaural version are included in the portfolio.

<sup>194</sup> *Les Jeux et Les Hommes (Man, Play and Games)*. Caillois (1958).

<sup>195</sup> Smalley (1997), pp. 110 refers to the term bonding play in relation to source bondings.

considered as a sound object,<sup>196</sup> and the composer's performance of the instrument considered as morphological event and gestural shape acquisition.<sup>197</sup>

A view of musical sounds as complex morphological events and not simply 'notes' of specific pitch centre and duration is an innovative musical observation, particularly associated with the application of electroacoustic tools to music, and one that can be actively exploited in electroacoustic composition.<sup>198</sup>

### **Approach, Form and Aesthetics**

Whilst the work could be in part analysed and described with reference to harmonic language, this is not the method in which the piece was composed. The materials are considered more in terms of musical and gestural shapes. Physically improbable gestures feature, and these may contribute to perceptual experiences of the work.

Dennis Smalley refers to gesture perception within a spectromorphological context as a bidirectional process, which can be described as:

**cause - source - spectromorphology**

or

**spectromorphology - source - cause**<sup>199</sup>

Smalley acknowledges that an imagined human gesture can be interpreted from the spectromorphological attributes of sound.<sup>200</sup> As the primary sound materials in *ilinx* are derived or descended from a conventional musical instrument, this assertion has particular significance here.

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<sup>196</sup> Or "objet sonore" as defined by Pierre Schaeffer.

<sup>197</sup> As opposed to specific melodic or harmonic progressions with a regular rhythmic metric structure.

<sup>198</sup> Young (2004), pp. 9.

<sup>199</sup> Smalley (1997), pp. 111.

<sup>200</sup> "When we hear spectromorphologies we detect the humanity behind them by deducing gestural activity, referring back through gesture to proprioceptive and psychological experience in general. Everyone uses this spectromorphological referral process when listening to recordings of instrumental music. Not only do we listen to the music, but we also decode the human activity behind the spectromorphologies through which we automatically gain a wealth of psycho-physical information." Smalley (1997), pp. 111.

The sole instrumental source for all sound materials in the work is a dulcimer. The implements used for instrument excitation include a violin bow, a metal ruler, all fingers of both hands to simultaneously excite as many strings as possible, and the traditional dulcimer hammers. The hammers were used in a conventional fashion, and also with varying amounts of tissue paper wrapped around and secured to the end of each hammer, to achieve differing degrees of muted percussive timbres. The instrumental source materials are subjected to a range of transformation processes. *ilinx* therefore presents an imaginary stringed instrument to the listener. The source instrument is alluded to, but is rarely explicitly represented. It thus becomes a form of imaginary meta-stringed instrument that exhibits improbable morphological behaviours. A playful and exploratory approach is adopted throughout the sound transformation and structuring processes, with the composer's personal aural responses to the materials steering the process.

Reduced listening as a perceptual mode is vital to the composer of electroacoustic music – it is what steers the composer in the direction the material wants to go!<sup>201</sup>

The piece delivers an intentionally coloured and often abstract representation of the source instrument. The materials are frequently deliberately subjected to quite drastic treatments, creating a hybrid sound world, which to some degree represents the inherent nuances of the source instrument, whilst frequently moving towards a more ambiguous, colourfully distorted and synthetic electronic sound world. The processing often destabilises and even shatters the instrument's intrinsic morphologies. Indeed, the nature and effects of the transformation processes themselves contribute to the morphological design of the imaginary instrument.

Reference is also made to the fact that morphological identity can spring from the inherent shape characteristics of naturally occurring sound objects, as well as the morphological artifacts of signal processing routines.<sup>202</sup>

The nature of the transformations of the instrumental source dynamically shift the materials of the piece between representations of first-order surrogacy,<sup>203</sup> where the materials retain

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<sup>201</sup> A Schaefferian theory discussed by Rudy (2007), pp. 11.

<sup>202</sup> Young (2004), pp. 8.

<sup>203</sup> Described by Dennis Smalley as "*first order surrogacy*, the traditional business of instrumental music. If that instrumental source is electroacoustically transformed but retains enough of its original identity it remains a first order surrogate." Smalley (1986), pp. 82.

some semblance of their original identity, through to second-order surrogacy,<sup>204</sup> where increased levels of ambiguity are introduced, and the instrumental source becomes unclear. The structure of the piece not only plays with modulating levels of source-cause ambiguity, but also makes specific use of what Smalley describes as *gesture-carried*, and *texture-carried* structures.<sup>205</sup> Percussive, unrestrained and dynamic gestures are the gesture-carried structures, where the focus centres predominantly on gestural features. These are contrasted with the more sedate passages that encourage examination of the shifting spectral landscapes.

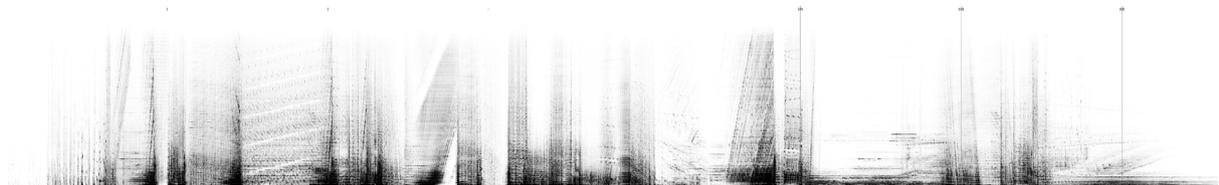


Figure 44. Sonogram I *ilinx*

The sonogram of the piece highlights the use of spectral glissandi and the dominant structurally significant percussive impact points that initiate shifts in spectral and textural materials. Dynamic contrast is notably reduced in the final third of the piece, and this is considered to be a less ‘dizzying’ section of the work.

## Techniques

FFT (Fast Fourier Transform) based processes and techniques are explored for sound transformations, with the filtering, distorting and skewing of the spectral content achieved through *Jitter* matrix based operations, using a patch developed as an extension of the *Jitter Phase Vocoder*.<sup>206</sup> Magnitude data is treated using varied matrix transformations, many of which are combined to significantly abstract the materials from their source.

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<sup>204</sup> Described by Dennis Smalley as “Through sound synthesis and more drastic signal processing, electroacoustic music has created the possibility of a new, *second order surrogacy* where gesture is surmised from the energetic profile but an actual instrumental cause cannot be known and does not exist.” Smalley (1986), pp. 82.

<sup>205</sup> “In a *gesture-carried* context gesture dominates. If the gesture is strongly directed and swift moving, the ear is more likely to ride on the momentum generated rather than dwell on any textural niceties at the gesture’s interior. With a less impetuous gesture we can imagine the possibility of enticement by internal textural detail which would create a certain equilibrium between gesture and texture. The ear recognizes that a gesture is in progress: the sense of directed motion remains, and can be temporarily taken for granted while the ear shifts focus to delve into textural motion, perhaps to merge again once a more urgent sense of directed motion is detected.” Smalley (1986), pp. 83-84.

<sup>206</sup> Developed by Luke R Dubois.

Spectral synthesis techniques, as described and utilised in the *Spira/Set* project, are also employed to generate further materials that are increasingly identifiable as being of an electronic origin, yet still retain a level of spectral coherence with the source instrument.

### **Spatial Approaches**

The spatial approach adopted in the realisation of the 8 channel work is similar to that applied in the first two movements of *Hydrophilic Pulses*, and is discussed in more detail in 4.5. The piece is primarily spatialized using stereo pairs distributed in the performance space, with stereo left/right relationships mostly retained.<sup>207</sup> Dynamic modulation of spatial position is featured at key structural points, such as the ascending spectral sweep which can be heard moving from the front of the space to the rear.<sup>208</sup> Each component part within the work is allocated a spatial position within the performance space. The interplays between these individually spatially located component parts results in dynamic spatial interactions and spatial counterpoint.

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<sup>207</sup> This technique is similar to diffusion practice for stereo works, but each independent part is individually spatialized, providing opportunities for spatial counterpoint. It could be argued that this spatial approach is best described as studio based diffusion.

<sup>208</sup> Heard at around 03:08.