Living musical instruments

Musical instruments historically have used all available materials – from bone and wood over metal and electronics to diamond and neural interfaces. One particular possibility is living instruments.

The earliest living instruments were merely biological interfaces that took signals from living beings – plants, human users or cultured neurons – and turned them into sounds. Beyond the novelty and transgressiveness (which faded already in the early 21st centiury) they soon evolved into neural interface control of musical instruments. Modern musicians commonly use interfaces to control even traditional instruments, like extra pedals or settings, and many popular instruments such as neurosynths, mindflutes, IAOs, and goldblocks are entirely mentally controlled.

The main remnant from the early era is **neural composers**: cultured neural tissue that produces signals that control music, often with feedback from the environment and some degree of learning. A typical composer is a small module containing a simple nanotech life support system and protective shell around a cubic centimeter or more of tissue culture, linking to a sound suite through the mesh. Neural composers develop their own styles and adapt to their environment. Unlike the ubiqitious AI composers used to make personal soundtracks or environmental music the neural composers are unique, hard or impossible to copy. This makes certain composers unique and valuable; "The Sparkle" was recently bought by Planetary Express Media for more than ten million credits from a private collector, and it is believed that Mauve SynDown is the most highly insured item in the Media Museum of Mars. The fact that they composers can get tired, degenerate and even die also adds to the mystique and value.

Lungpipes are living, singing bagpipes. Usually covered with a patterned fur, they consist of a muscular bag surrounding a "lung" that emits sound through one or more throats with laynxes. Usually they are controlled using neural interfaces, with the musician singing through the main voice and other signals controlling the accompanying voices. On Titan "free" lungpipes with more extensive nervous systems are used that have a number of preprogrammed behaviors that can be controlled through touch.

Gourdles are musical fruits, based on engineered gourds that grow into various acoustic instruments. Popular as disposable party instruments among spacers, they are rarely used for serious music (the Circovic 080 Belt Orchestra is perhaps best known to perform semi-seriously using gourdles). Various species and designs exist, ranging from vuvuzela-like trumpets to fairly sophisticated flutes. Some scum have inserted psychotropic sequences into the genome, making the instruments intoxicating to play.

Bird choirs are modified birds, changed so that they sing music rather than normal birdsong. The simplest form simply replay complete or partial pieces, such as the jinglesparrows that infested most pre-Fall Earth cities or the amadeusgales that improvise upon Mozart music. Parrots were often modified so that they could replay songs or monologues, and sometimes even engage in dialogue (the practice of playing absurdist dramas using small groups of parrots was once the height of fashion). While such birds are still common as pets, they are no longer regarded as serious culture and tend to insult uplifts (which is a reason some people still keep them; it is *de rigueur* among anti-uplift activists on Luna to have warblers that sing satiric melodies). At present the main cultural interest is in bird choirs, where modified birds

form choirs that interact and coordinate their musical efforts. Usually they have had their social, song and emotional systems subtly modified to fit transhuman aesthetics, so that they sing in harmony and form musical structures that are appealing. Cruder models make use of coordinating AI in a mesh network, while the true art lies in making birds that spontaneously produce good music. The very best designs from the Nova York flock designers are regarded as creative innovstors in their own right; mercurials are often heavily divided on whether this is insulting slavery or a positive addition to transhuman culture.

Direct neural control of birds is rarely used as a musical instrument, but the Venusian John St. Davids is famous for his music performed using neurally controlled nightingales.

Cicadas are living instruments based on a heavily re-engineered insect physiology supported by a nanotech life support system. Looking like an oboe made of chitin, they were designed by the originator Ki Chao to have a symbiotic relationship with the musician. As both learn to play together they form a bond: the cicada becomes dependent on the saliva of the musician, and various elements on the instrument self-organise to signal its internal state to the human or receive commands using an emergent code, unique for each pair. The tone is somewhere between an oboe and mirliton.

Living drumskins are one of the more sick applications of biotechnology. Invented by rogue biodesigner Gloria Eveninglight, they are cultured skin that can be stretched to use as ordinary drumskin. By tweaking the growth procedure it can be adapted to everything from small bongo drums to Japanese ōdaiko drums, and the skin requires very small mounts of nutrients to stay alive. It is also equipped with an exquisitely sensitive sense of touch, linked to a nervous system around the rim. With the right interfaces it can be used to produce XP or – this is the intentional use – linked to an ego running a special software morph so that the drums become their sensorium. The ego will experience playing of the drums as a symphony of pain. While the effect could be achieved using normal smart drumskins and sensory mapping software, Miss Eveninglight deliberately choose to base it on skin cloned from an unfaithful lover (according to the story, originally cultured on and then flayed directly from him). In the "proper" setup described in her HOWTO file, she suggests linking some of the motor output from the ego to the limited muscle fibers in the drum, making them change tension as a response to the suffering victim, "Making him a creative co-player in his own suffering". According to rumor, the original drum set (and lover) still exist, a horrible collector's item. However, other rumors claim the set and lover were eventually destroyed at the climax of a deliberately violent concert by Miss Eveninglight and her band; fans have been despreately searching for recordings or XP of the event. Some later experience artists have adapted the drumskins to map to other sensory modalities, such as normal touch, pleasure or color.

A special case of living instruments are **specialized morphs**. These morphs are intended to produce pleasant music, usually by altered voiceboxes (both enhancing the normal human range, or adding features such as ultrasound, infrasonic barytones or stereo voice by having two separate windpipes and laynxes). Skinthetic has also developed more unusual hybrids, such as stringed bodies or morphs with drum sounds in their chest, stomach and limbs (and rattle and scrape sounds produced by horn extensions of the skin). The most lavish morphs are the ones used by the Elysium Opera, often one-of-a-kind models designed for particular roles and performances.