

London's Materials Library, presided over by interdisciplinary artist Zoe Laughlin, is a laboratory for investigating the acoustic properties of the stuff that surrounds us. Joanne Lee

Zoe Laughlin occupies a relatively unusual position, even in today's interdisciplinary landscape, given that she works as an artist *and* a scientific researcher. She is interested in the art and science of how materials sound, attending to the particularity of acoustic properties within the discipline of materials science, whilst also being concerned to explore the cultural and psychological possibilities of sound that shape our experience and understanding of the world.

Laughlin is currently the curator of the Materials Library. The Library, based in the Division of Engineering at Kings College, London, was developed through Dr Mark Miodownik's 2003 NESTA (National Endowment for Science, Technology and the Arts) fellowship, which sought to develop a space for the interaction and collaboration of 'materials scientists' with artists, designers and architects. Laughlin and Miodownik work alongside Martin Conreen, who has a background in design and material culture, to form the Library's core team.

The Library brings together a range of extraordinary materials, including for instance, the tin stick, a metal that 'cries' as one bends it. "These materials are gathered together not only for scientific interest, but for their ability to fire the imagination and advance conceptualisation. Our hypothesis is that not only do technical details enhance aesthetic experience but that in generating physical encounters with matter, one provides an often forgotten way into this technical knowledge."

As part of this endeavour, the Library has frequently collaborated with the Tate, to explore the artworks on display there via their physical, material properties. They have developed a series of events that have focused upon the acoustic qualities of works as, for instance, in *The Sound Of Materials* (2007) and *What Can The Matter Be?* (2008). In one experiment, Laughlin and Conreen entered the enclosed curving space of *Ishi's Light*, a sculpture by Anish Kapoor, which takes the form of a large fibreglass 'egg' with a highly polished interior, in order to test out the visual and acoustic shifts as first one person and then the other step inside. "It was," remarks Laughlin, "like being *inside* a trumpet."

Laughlin is also interested in the psychological effects of sound. "In another experiment, I accompanied the viewing of a Jean Dubuffet painting, (*Vie Exemplaire Du Sol*, through which he intended to give the impression of "teeming matter, alive and sparkling") with a range of audio inputs. These included the actual sound of the painting as it is cleaned by conservators, fizzing water and a drumstick hitting actual soil – in order to determine if one's perception of the work is changed."

Her work is sometimes a little mischievous. Much is made of the alleged emotional or psychological effect of Mark Rothko's paintings, and Laughlin decided to play upon this with a piece for the Tate's Rothko room. "I was interested in the way that church organs are known to produce frequencies that can be felt rather than heard, and which are thus said to contribute to creating feelings of awe amongst the religiously inclined," Laughlin explains, "So I worked with a friend who is a drum 'n' bass producer, to conceal speakers within the gallery benches such that they produced frequencies gradually building from 0–40 Hz. At the point that the sound becomes audible, and begins to alert the gallerygoer's conscious attention to the physical effects they have been feeling, it disappears." The effects might be summed up in *The Sound of Rothko's* subtitle, 'Brain Thickening', which derives from the notes Laughlin made as she experienced the piece herself.

However, for Laughlin and the Materials Library, exploring the very physical impact of sound isn't simply a way of engaging gallery audiences (though of course it does), but it is also at the heart of their research. Aesthetics, in the original and broader definition of 'sense perception', is increasingly mobilised as a powerful method to investigate and understand the world. Acoustic properties can tell us a great deal about a material or location, and this information can be used to shape a host of daily experiences: a good architect, for example, will pay as much attention to the auditory signatures of a building as to any other aspect.

At times, Laughlin goes back to basics. "For example," she says, "I made a set of tuning forks all the same size, but from different materials so that one can test out their various acoustic properties." Laughlin demonstrates a traditional steel tuning fork, and tells me, "This produces sound at a frequency of 440 Hz – and thus the note of A." She brings out others: there's one made of glass, which unsurprisingly has had to be replaced after being broken in use. There are many more, in balsawood and in spruce, in copper and brass. The results aren't always quite what one might have suspected: the spruce is surprisingly resonant and, while brass can clearly sustain a note, copper can only manage a quick, low tone.

"These acoustic properties indicate something of the material properties: the stiffer the material, the higher it will sound, and the denser, the lower it will be," she explains, adding, "The design and making of musical instruments is an especially close conjunction of science and art." In order to get the precise tone and pitch required in an instrument, the materials from which it is to be made must be engineered to control density, hardness and modulus (this latter affects the speed of the sound produced.) So, the brass of a brass trumpet might in fact use a very hard nickel silver, or perhaps a softer red and yellow brass instead, whilst an extremely soft ambronze (copper, tin, zinc) alloy would produce a much warmer but duller sound.

Laughlin has created a selection of rather unusual instruments for the Materials Library. She has, for instance, a bell and a bugle both made from lead, which allow one to explore in practice how materials really sound. The bugle can actually be played, though there's something acutely melancholy not only about the sound, but also because of the knowledge that, were one to develop one's playing skill by repeated practice, the cumulative effects of lead poisoning would result. There's a poetic sensibility at the heart of Laughlin's work. She explains, "The Materials Library is a serious scientific and cultural proposition, but one which also seeks to recognise that wonder and strangeness are at the heart of our engagement with the world."

Laughlin says, "The Materials Library wants to make science accessible, and the ethos of discovery through doing and trying lies at the heart of our project." The physical encounter with materials can conjure a childlike excitement for exploration. "In fact," Laughlin remarks, "such a playful engagement with the material world and the eradication of boundaries between art and science is precisely what the Library is seeking to promote. We try to bring together the study of sensual, aesthetic and cultural properties, which typically have been the domain of the arts, with that of physical properties, as explored by materials scientists, because we want to rekindle a spirit of common purpose and curiosity."

One of the most familiar but striking experiments that Laughlin performs, explores the use of sound to shatter a wine glass. In the display cases of the Materials Library at Kings College, there is a wonderfully sculptural collection of such glasses, all broken in Laughlin's various presentations. Some are reduced to the stumps of their stems, the glass bowl now completely gone, whilst others seem as if a small and very precise bite has been taken out of them. "The way that they shatter comes down to the level of impurities within the glass," she says, "and all the glasses require different and particular acoustic frequencies before they'll succumb." There is a curious tension in watching such experiments: at times the glass shatters almost immediately, but often it takes a while to discover the correct frequency. Laughlin is interested in the performativity of matter: "Materials perform. Stuff is constantly getting up to things. Matter is *doing* all the time."

Laughlin's work is hard to define. In part, there is something of the Royal Institution Christmas Lectures about what she does: she is akin to a public proselytizer for the value and excitement of science, but, with her background in performance, there is a critical alertness to the very nature of the events themselves, along with a concern for the 'aesthetic' qualities of materials and phenomena: "At the Materials Library we pay attention to how things feel, as we consider this to be an important form of knowledge." She concludes: "We are interested in how best to communicate complex datasets, and have even hypothesised that we could use song to hand down knowledge between generations of materials scientists." Zoe Laughlin website: www.asifitwerereal.org. Materials Library website: www.materialslibrary.org.uk

