**Transcript**

***Katherine Legge – Optimising musical instruments***

My area of interest is musical instruments. I’m a physicist by nature and I apply the science and the maths of vibration to try and understand the sound that a musical instrument makes.

Look, most instruments have been designed by instrument makers over hundreds of years and they use empirical methods. They often produce an instrument by using a template of some sort for the shape, so they either mould or they carve the resonating body so that they get a particular shape and then they fine tune it by adding or subtracting material at particular locations. What we’ve been doing is seeing whether we can predict or design the shapes of these vibrating bodies for the instruments using numerical or mathematical methods to design the best shape that will give us the harmonic content, the quality of sound that we might want from those particular instruments.

We’ve applied our techniques to instruments like xylophones and church bells, large bells. I work with a structural engineer who’s here on the Bendigo campus with me and what we’re applying are techniques that can be used for any vibrating structure so the techniques that we’ve used successfully on musical instruments can also be applied to an engineering structure such as a bridge or a plate where you might want a particular harmonic either enhanced or suppressed.