

Scientist drums up way of using bodhrán in surgical procedures

Groundbreaking research could help surgeons treat everything from cuts to cancer

Expand



Mathematics professor Michel Destrade and his wife Joyce with a bodhrán made by Michael Vignoles in Galway City. Photograph: Joe O'Shaughnessy.

Brian Hutton

Thu Nov 24 2022 - 05:00

🔊 📘 🐦 🗨️ ⋮

A French scientist living in Ireland has helped develop a groundbreaking method of measuring stress on human skin and organs by studying the bodhrán in an advance that could help surgeons treat everything from cuts to cancer.

Professor Michel Destrade, chair of applied mathematics at University of Galway, had been working with cling film in his experiments when his Dublin-born wife Joyce suggested he examine the quintessentially Irish drum.

“She came up with the idea of the bodhrán,” he told *The Irish Times*. “I was trying to explain my experiment to her, that I wanted to find a way of measuring forces and stretches in a membrane. She said what about the bodhrán, and told me how musicians wet it to suit the humidity of venues, changing its pitch, tension and stretch.

“I thought ‘that’s a great idea.’”

READ MORE

Are Black Friday and Cyber Monday sales too good to be true?

I’m a Celebrity final: Matt Hancock maintains his dignity as molluscs make ...

Maureen Dowd: My brother Kevin and I are finally agreed on Trump – but no...

Should we drink red wine with red meat, or is it down to personal preference?

Working with scientists at Harvard University, as well as the University of Sheffield, Prof Destrade immediately told his Boston counterpart Dr Guo-Yang Li to go out and buy a bodhrán and record the sound waves it creates.

Using an advanced technique called optical coherence tomography, Dr Li was able to capture ultra-fast digital movies of the waves and then amplify them to show the motion.

Prof Destrade then developed a mathematical formula to directly measure the forces and stresses on the bodhrán skin.

“When I looked at the literature, no one had thought of this before,” the 53-year-old said.

“Before this, it was a really convoluted way of measuring the force and pressure: you needed to know the properties of the material or membrane, and if you didn’t then you were stuck.

“So now we can apply this to materials we don’t know much about like membranes in the human body; for example, skin, the bladder, the diaphragm, the eardrum.. there are so many membranes in the body we don’t really know what they are made of.

“And for one person the properties of the membrane could be very different from another: they could be older, younger, sicker, pregnant – everybody has different properties for different parts of the body.”

Prof Destrade believes the method could find its way into hospitals in the coming years.

“This is invaluable to surgeons for instance, so they know how much skin is being stretched, under what force, before they make an incision or a graph or something like that.

“It has so many applications. It is still in the laboratory right now, but maybe next year or in the next decade it will be in the hospitals. It is really exciting.”

A paper on the measurement has just been published in the *Nature* journal *Communications Physics* and the team of scientists are already working on a revised version for the prestigious *Science Advances* journal.

“The technique will allow us to measure stretches and forces in membranes inside the body or on the surface of the body, like skin or even arteries,” Prof Destrade continued.

“It could be used looking at aneurysm, to see if it has stretched a lot or not or whether a wound will open up under tension, which could be interesting for a surgeon.

“Dermatologists looking to find an area of skin that has a pathology you can’t see with the naked eye, like cancer without any change in colour, could use it, or a surgeon grafting skin who wants to know how much stress and force can be used.

“Also, the eardrum is a very tiny, thin membrane that vibrates inside our ear, it could potentially help us know what is going on in the eardrum.”

One of its first applications could be in eye care as a more accurate way of determining force and pressure on the cornea, the team believes.

Prof Destrade says the scientists remain at the “proof of concept” stage and are moving on to other materials to prove what they have found by measuring the pressure on the bodhrán.

From Bordeaux, and living in Ireland for 20 years, he was not a complete stranger to the traditional Irish drum, having enjoyed the occasional music session around the country.

“But I look at it very differently now,” he said.

Brian Hutton

Brian Hutton is a freelance journalist and Irish Times contributor

✉️ 🐦 in