

Runners! Put a (mattress) spring in your step

July 1 2013

Researchers have designed a new type of running shoe which incorporates springs into the sole for the first time. Prototypes of the trainer, developed to reduce injury risk, will be on show at this year's Royal Society Summer Science Exhibition, which opens to the public tomorrow (2 July).

"Over a given year, injury affects over 70% of [recreational runners](#)," explains Professor Jim Richards, research lead at the Allied Health research unit, University of Central Lancashire (UCLan). "This is still a huge problem; even with all the latest advances of [running shoes](#), we are still getting a high injury rate."

Since the 1980s, running shoes have featured shock-absorption cushioning which acts as a damper to help prevent injury caused by the impact felt as the foot strikes the hard ground. It is the intensity of the [shock waves](#) generated at this point of contact that is linked to the development of running-related injuries such as [knee pain](#), shin splints and stress fractures.

To improve on current technology, Professor Richards has teamed up with Leeds based mattress manufacturer Harrison Spinks to put a miniaturised version of one of their high-end pocket springs into the sole of a trainer. Using these lightweight microsprings mean that the sole of the shoe can absorb a significantly higher proportion of the shock pressure and provide an increased uplift as you push back off the ground.

"If you had a car suspension with just a damper and no spring in it then you'd have a very [bumpy ride](#). Therefore having a shoe that incorporates both provides a much improved shock-absorbing system compared with existing technology," says Professor Richards.

"By fine tuning the springs and the damper arrangement within the shoe we can optimise its shock absorbing properties. We will also be able to tweak the arrangement for each individual runner, which is particularly important because everyone has a different running style and physiology that impacts on their risk of different types of injury."

Professor Richards' research has so far resulted in a prototype version of the trainers. It is hoped that the successful prototyping will mean the shoes will be widely available for people to buy later this year.

Visitors will be able to try the prototype trainers at the Royal Society Summer Science exhibition, where Professor Richards and his colleagues will be on hand to explain the science behind the design. They will also be asking willing volunteers to get involved in an experiment where they try jumping wearing the sprung trainers versus ordinary trainers. The scientists will use accelerometers to test your deceleration at impact in the two different pairs of shoes to see how they compare.

Professor Richards' research will form part of a Royal Society Summer Science exhibit developed by UCLan which will showcase a number of their most exciting sports science research projects. UCLan scientists help engineer future sporting champions in ways that span a wide range of scientific disciplines including biomechanics, physiotherapy and psychology.

The bicycle that Sir Chris Hoy rode to win two gold medals at the 2012 Olympics, will be on display on the UCLan exhibition stand. Olympic runner, Helen Clitheroe, will be available at the press preview on July 1st

to speak to journalists about the various ways that UCLan science helped her achieve sporting success.

The [exhibition](#) opens to the public on Tuesday 2 July 2013.

More information: The Royal Society Summer Science Exhibition showcases cutting edge research in science and engineering from across the UK. It is held annually at the Royal Society, the UK's national academy of science. Follow the Summer Science Exhibition on Twitter at www.twitter.com/summerscience using the hashtag #SSE2013 and Facebook at www.facebook.com/summerscience

Provided by The Royal Society

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