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Spring-powered shoes could help us run more than 50 per cent faster

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By [Donna Lu](#)



With a spring-powered exoskeleton, Usain Bolt could theoretically run 20.9 metres per second
PCN Photography / Alamy

High-tech shoes are making [running more efficient](#) – eventually, they could help us run more than 50 per cent faster.

David Braun and Amanda Sutrisno at Vanderbilt University in the US, modelled the energy used during running and the factors that can affect that – including air resistance, the

limited power of a human leg, and the losses that occur each time a foot hits the ground.



They found that the leg only supplies energy about 20 per cent of the time that a person's foot is on the ground. To improve upon that, they have conceptualised a spring-powered device that would increase the amount of power a person's legs generate while running.

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An [exoskeleton](#) connected to each foot that contains a programmable spring would allow the leg to supply energy 96 per cent of that time, according to their analysis.

The device would store energy created as the leg bends in the air, compressing the spring, and release it when the runner takes a step. It would also lessen collisional energy loss. "I would compare this to a catapult that is pulled up in the air and then released on the ground," says Bruan.

Read more: [Ski exoskeleton boosts leg power and reduces tiredness on the slopes](#)

The stiffness of the spring in the envisioned device would need to be changeable. "The faster the running motion is, the stiffer the leg should be," says Braun. The simplest way to do this would be to build in a way to change the active length of the spring, he says.

The researchers analysed the [running style](#) of 100-metre sprint world record holder Usain Bolt, who runs at a top speed of 12.3 metres per second. The device would in theory boost Bolt's top speed to 20.9 metres per second.

Even if the device increased the proportion of time the legs are generating power to only 60 rather than 96 per cent, it would still enable a theoretical speed of 18 metres per second, says Braun.

The researchers are currently building a prototype. Braun says the device could eventually be used by the military, but also for recreational purposes. "People love things that allow

them to move faster,” he says.

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