

Hypothetical spring-loaded human exoskeleton could double running speed

26 March 2020, by Bob Yirka



A shoe that could allow runners to use their legs in the air could considerably increase running speed. Credit: Amanda Sutrisno and David J. Braun / Vanderbilt University

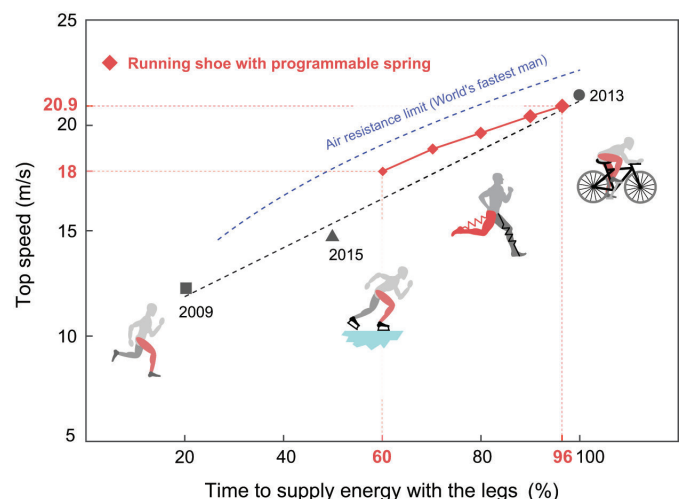
A pair of researchers at Vanderbilt University has proposed a method to create a device that would allow human beings to run nearly twice as fast as is possible naturally. In their paper published in the journal *Science Advances*, Amanda Sutrisno and David Braun describe their idea for such a device and what is required to make it a reality.

Prior research has shown that the average person can run approximately 24 kilometers per hour; world record holder Usain Bolt has been clocked at 12.3 meters per second. But such speeds are not very impressive when compared to other animals—of course, most of them run on four legs. Humans have found a way to improve their speed, however, using only human power—using bicycles. But there might be another way. In this new effort, Sutrisno and Braun have shown that it might be possible that a human being could run as fast as a person riding a bicycle by wearing a device that takes advantage of air time. When a person runs, their feet take turns hovering in the air for brief moments—a time when the foot is not doing anything to advance [running](#).

The idea presented by Sutrisno and Braun is to

build a device that attaches to the body to serve as an assist. The device would have springs, one for each leg. The springs would be pulled by leg action during air time. The knee joint serves as a hinge that extends the leg—it is during that extension that the spring would pull, storing energy that could be expended once the foot comes back to the ground. That energy would then be combined with normal muscle energy, allowing the foot to push back harder than normal against the ground, propelling the person forward faster than they would normally be able to achieve on their own. When the researchers ran simulations with such a device, they found that it could help people run nearly twice as fast as normal.

Unfortunately, there is a hitch with the idea: Materials such as carbon fiber lack the energy-holding capacity that would be needed to realize the device the team has envisioned. Something new will have to be developed before they are able to test their idea in the real world.



Top speeds of human-powered locomotion. Credit: Amanda Sutrisno and David J. Braun / Vanderbilt University

More information: Amanda Sutrisno et al. How to run 50% faster without external energy, *Science Advances* (2020). [DOI: 10.1126/sciadv.aay1950](https://doi.org/10.1126/sciadv.aay1950)

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