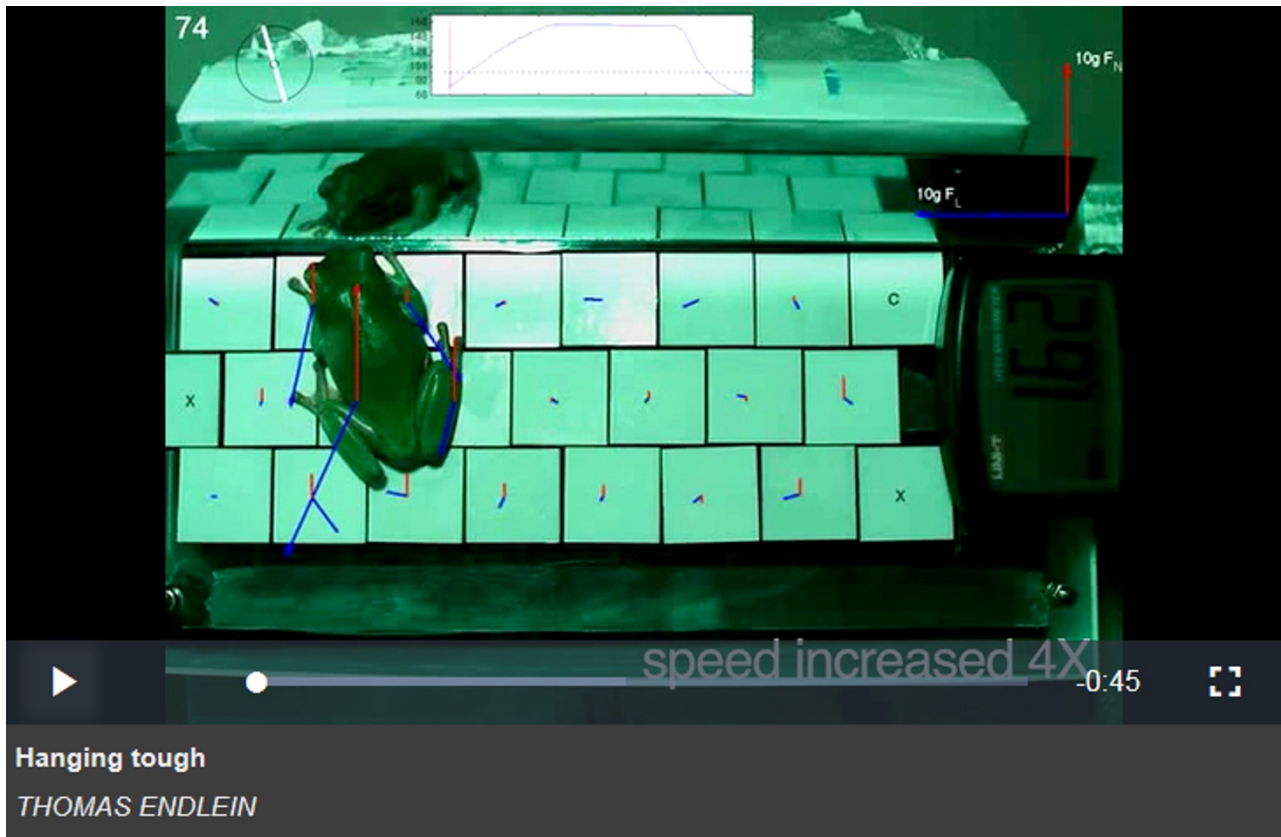


Frogs cling and peel just like adhesive tape

The amphibians angle their limbs to get more traction on overhanging surfaces.

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Australian tree frogs hang from tilted surfaces using the same physics as adhesive tape, experiments have found.

White's tree frog (*Litoria caerulea*) secrete mucus from their toe pads to hold on to steep surfaces through capillary forces, similar to the way a wet piece of tissue sticks to a window. In this video, the researchers place a frog on a platform and begin to tilt the platform up to a vertical position (90° in the counter at top left) and then continue rotating until the frog is hanging upside down and eventually falls off (typically at around 150°).

The frog starts out in a crouching position with its legs tucked under its body. As the challenge increases, however, the amphibian engages in a sprawling dance.

The researchers found that this sprawling behaviour is rooted in the same physical principle that applies to adhesive tape. The easiest way to peel tape away from a surface is by pulling one corner away at the largest possible angle from the sticking surface; pulling the tape at a shallow angle makes it virtually impossible to get unstuck. Australian tree frogs mimic this effect by stretching their limbs to maintain a shallower angle with respect to the platform as it rotates, the researchers write in *Journal of the Royal Society Interface*¹.

"This experiment shows the maximum adhesive force a frog can take," says Thomas Endlein, a biologist at the University of Glasgow, UK, who led the study. "But usually frogs would avoid overhanging surfaces to avoid such difficult sprawling positions."

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References

1. Endlein, T. *et al. J. R. Soc. Interface* 20120838 (2013).