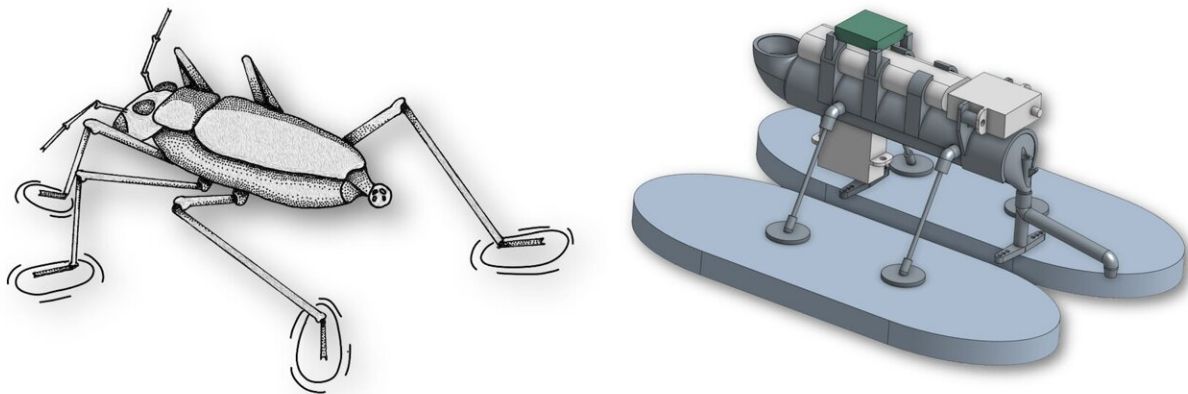


# Marangoni surfer robots look and move like water bugs

October 20 2021

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Hassan Masoud and his team, including doctoral student Mitchel Timm, built a robot that can manipulate surface tension to propel itself across the liquid surface with great speed and maneuverability. Credit: Mitchel Timm/Michigan Tech

From birds in the sky to fish in the sea, nature's creatures possess characteristics naturally perfected over millennia. Studying them leads engineers to create new technologies that are essential to our way of life today. Mechanical engineers from Michigan Technological University share how they built a tiny, self-powered robot inspired by water-skimming insects.

"Bio-inspired robotic technologies push the boundaries of what we think

is possible when it comes to traveling on land, in the air and underwater," said Hassan Masoud, an expert of biological and bio-inspired fluid mechanics at Michigan Tech. "Yet few robots focus on the [air-water interface](#). Many [biological organisms](#) such as insects, arachnids and even bacteria have the ability to stand upon this boundary by taking advantage of surface tension."

However, among these species, only a few can also manipulate surface tension to propel themselves across the liquid surface with great speed and maneuverability. Masoud and his team, including doctoral student Mitchel Timm, built a robot that can do this—and their work was recently published in *Bioinspiration and Biomimetics*.

They also [wrote a guest blog](#) for Michigan Tech's Unscripted research blog detailing how their robot uses Marangoni propulsion, a method of generating thrust by creating [surface tension](#) gradients.

**More information:** Mitchel Timm et al, A remotely controlled Marangoni surfer, *Bioinspiration & Biomimetics* (2021). [DOI: 10.1088/1748-3190/ac253c](#)

Provided by Michigan Technological University

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