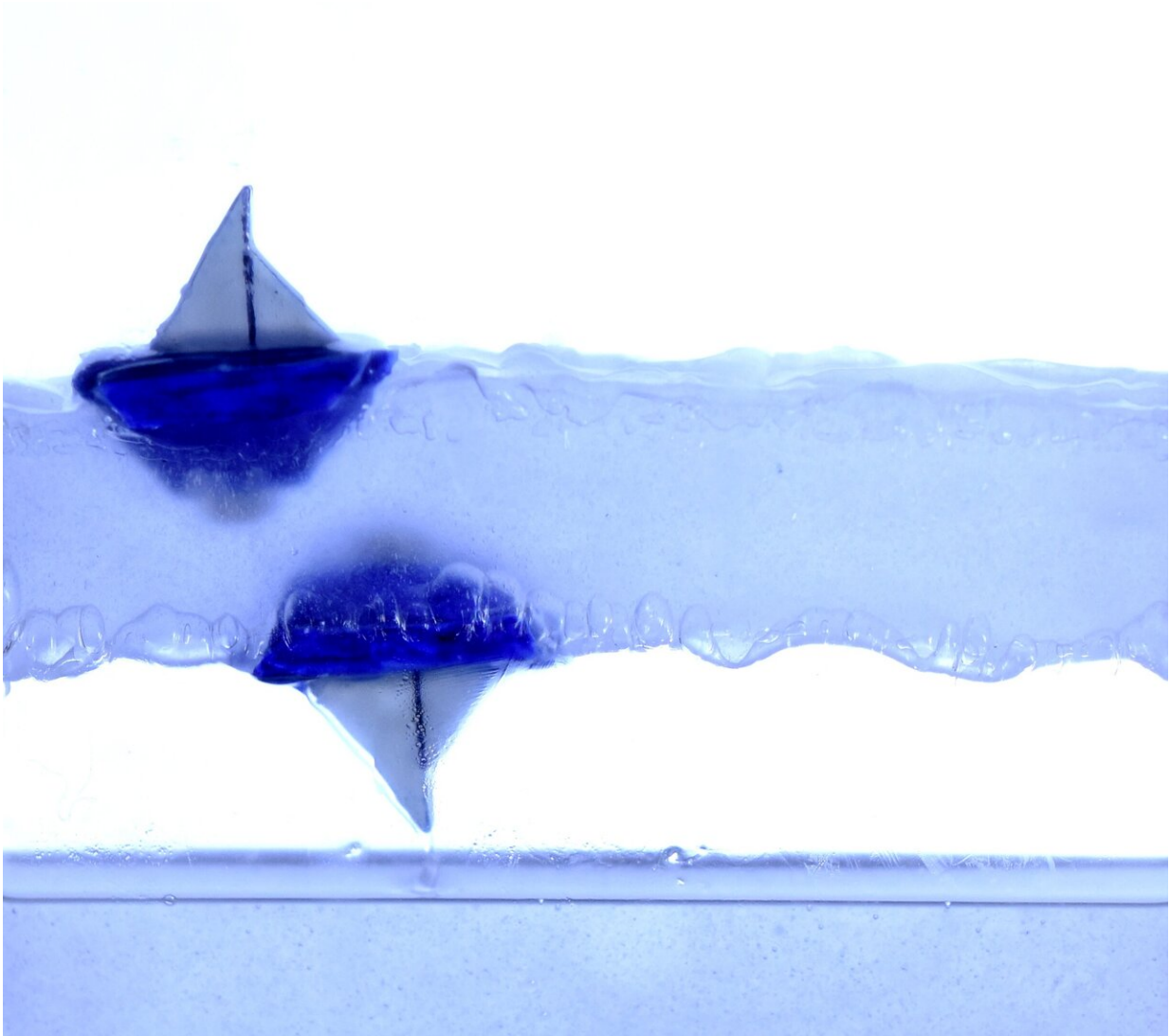


# Floating a boat on the underside of a liquid

September 3 2020, by Bob Yirka

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Plastic boats floating above and below a levitating liquid layer. Credit: Benjamin Apffel et al., Nature.

A team of researchers from Institut Langevin and Sorbonne Université has shown that it is possible to float boats on both the top and underside of a suspended fluid. In their paper published in the journal *Nature*, the group describes experiments they conducted with levitating fluids and what they learned from them. Vladislav Sorokin and Iliya Blekhman with the Russian Academy of Science have published a [News & Views piece](#) in the same journal issue outlining the work by the team in France.

Prior research has shown that if you put a liquid into a tub, it will fill in the bottom of the tub—but if you pick up the tub and shake it vigorously up and down, the [fluid](#) will rise from the bottom of the tub and hover near the top. This is due to vibrations that compress the air below the fluid, preventing it from falling to the bottom. In this new effort, the researchers have found that there is something else that can be done using the same setup—float a boat on the underside of the [levitating](#) fluid.

To learn more about what happens when a fluid is levitated by shaking, the researchers partially filled small tubs with either glycerol or silicone oil and then used a shaking device to shake the tub. As expected, the fluids soon rose from the bottom of the tub to hover near the top. But then they pushed a small toy boat through the fluid, turned it upside down, and let it go. To their surprise, the boat moved to a partially submerged position on the underside of the levitating fluid—floating upside down. For added effect, the researchers then placed another [boat](#) on top of the fluid, allowing it to float on top. They then filmed the action with a camera that was fixed to the shaking mechanism, allowing for the creation of a video that appeared to show the two boats floating without the up and down movement of the tub—imagery that defies the senses.

The researchers plan to continue their research—they will next try levitating two types of fluids in the same container and also explore what

happens when the amount of fluid and the size of the floating objects are varied.

**More information:** Benjamin Apffel et al. Floating under a levitating liquid, *Nature* (2020). [DOI: 10.1038/s41586-020-2643-8](https://doi.org/10.1038/s41586-020-2643-8)

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