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News

Nanoscale machines move liquid mountains

Controlled by light, transport the equivalent of world's tallest build

09.07.2005 @01:38 PM

Contributed by [Simon](#)

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For the first time, nanoscale machines have moved macroscale objects—droplets can even transport up a slope.

Researchers working on the project [say](#) that the feat is equivalent to a conventional machine using a millimeter displacement of pistons to lift an object twice the height of the tallest building.

The scientists, from Edinburgh, Groningen and Bolognam, covered a gold surface with molecular "shuttles."

Components of the shuttles move up and down by a millionth of a millimeter when hit by ultraviolet light. This occurs because a chemical reaction takes place in one part of the shuttle that causes it to repel another part.

The changes in position alter the surface tension of a droplet of liquid placed on top of the shuttle.

In this way, the researchers have used their shuttles to shift microliter drops of liquid both across a flat surface and up a one millimeter, 12-degree slope against the force of gravity.

While a tiny movement, it's considered a large leap forward for nanotechnology, as molecular machines largely haven't interacted with objects in the everyday world.

"Nature uses molecular machines in virtually every biological process and, when we learn to build and control such structures, we will surely find they have the potential to revolutionize molecular-based technologies, from health care to 'smart' materials," says principal investigator [David Leigh](#) of the University of Edinburgh. "Molecular machines could be used to create muscles, surfaces that change their properties in response to electricity or light or in the future—to move objects about a room using a laser pointer."

The research was announced at the [BA Festival of Science](#) in Dublin, and was reported in the journal [Nature Materials](#).

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