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Inside Science blog

Changing the way water cleans

Posted by [Charlotte Marling](#) on February 25, 2012

The revolutionary potential of an ultrasonic cleaning nozzle – essentially an attachment for taps which massively enhances the ability of water to clean – has been recognised by the Royal Society's 2011 [Brian Mercer Award for Innovation](#). The prototype, developed by [Professor Tim Leighton](#) and [Dr Peter Birkin](#) at the University of [Southampton](#), has attracted commercial interest from companies keen to use the technology.



Professor Leighton explains the 'bigger picture' for its [application](#): "Because it works with cold water the user (be they householder or industrialist) saves the energy that would have been used to heat the water. In the wider perspective, water will be seen as an increasingly valuable resource in this century, the 'new oil' if you like. By using less of it, and by contaminating the amount that is used to a lesser extent, water is conserved, and the run-off is not only easier to treat but also less likely to contaminate other water sources. The application is therefore to conserve water and energy wherever cleaning occurs, which is in every household and every business in the world. "

The device can be attached to a tap or hose and generates bubbles and ultrasound which travel down the stream of water to the dirty surface. The ultrasound presses the bubbles against the surface and causes them to migrate, seeking out cracks and crevices. It also induces ripples on the surface of the bubbles, turning them into microscopic 'scrubbing brushes' dramatically increasing the cleaning power of the stream of water. The device has both a high and low powered setting

allowing it to be used on both hard materials and soft materials such as hands and foodstuffs.

Professor Leighton and Dr Birkin have been collaborating for over a decade on the [science](#) of activating gas bubbles in liquids using acoustic waves. Despite the strong basis for the technology, they struggled to find funding to progress the device towards commercial exploitation. The Brian Mercer award (which provides £250,000 funding for researchers to develop a proven concept or prototype to a product that can be commercially exploitable) was timely. Professor Leighton explains: “Our applications for funding were rejected by a range of organisations which had not really taken on board what the technology did (for example, telling us that ‘the ultrasonic cleaning bath has already been invented’; or ‘acoustic techniques will not work in industry because factories tend to be very noisy places’). Two years of such rejections were disheartening. We are very grateful to the Royal Society Brian Mercer Award assessment team and their experts for taking the time to understand the device for what it was. Such expert assessment is recognised in the wider community, and has opened door to other parties because the credibility it gave us.”

Dr Birkin said, “This award will enable the project to advance and hopefully transfer from the lab to a commercially exploitable system. The publicity alone has been extremely encouraging as many new and exciting [opportunities](#) have arisen.”

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