SFU innovation revolutionizes the microscope, allows R&D to accelerate discovery

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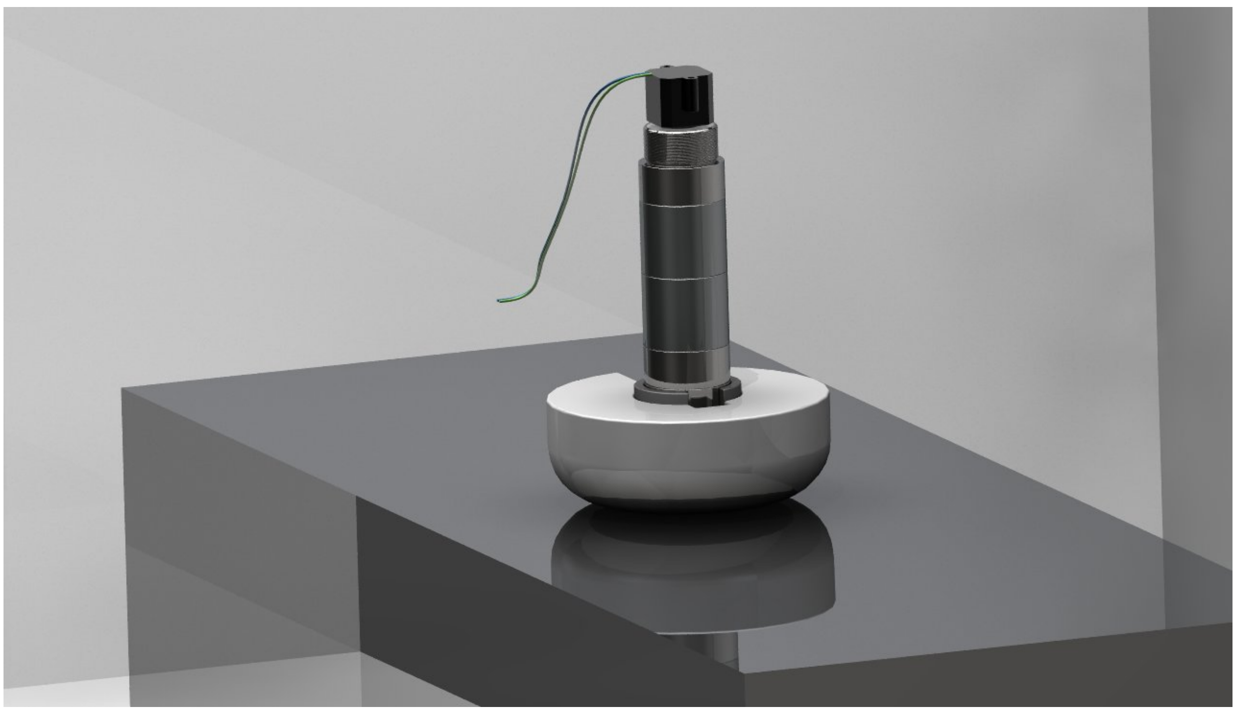

Spinning microscope rendering. Credit: SFU

A new microscope developed by SFU researchers Mike Kirkness and Nancy Forde spins thousands of times faster than a fairground swing ride, and subjects its contents to forces hundreds of times higher than in a NASCAR race or rocket liftoff.

The invention holds promise for industries that conduct research and development (R&D) on consumer products like pharmaceuticals and adhesives. These products often require the understanding of the molecular basis for what holds things together.

Scientists are currently researching this question in academic labs with single-molecule tests using instruments such as an atomic force microscope or optical tweezers. SFU's new wireless and highly portable spinning microscope, called the mini-radio centrifuge force microscope (MR.CFM), costs only $500 to produce. This is a fraction of the $150,000 cost of competing commercial technologies.

None of these approaches currently on the market are wireless and portable. The SFU researchers' device offers both, by its compact size (just slightly larger than an adult hand) and by utilizing wireless technology, which allows users to read the data remotely.

In addition, their device is compatible with most commercial centrifuge buckets, a staple in many industry labs.

Kirkness says their device may help open new doors for research in this area by lowering the barriers to entry and allowing companies to conduct R&D more cheaply and efficiently.

Their innovation is already turning heads in the science community. A study using the MR.CFM led by Kirkness and Forde has revealed that collagen is destabilized under stress. These findings, published in the *Biophysical Journal*, address a contentious issue; it was previously thought that stress would cause collagen to tighten and stabilize under load.

While this study provides preliminary insight into factors controlling collagen stability, their findings and approach may help pharmaceutical companies develop better treatments to prevent collagen degradation. More than 25 per cent of the protein in the human body is made up of collagen. It is the main protein building block for our connective tissues like cartilage, tendons and bones.

More information: Michael W.H. Kirkness et al, Single-Molecule Assay for Proteolytic Susceptibility: Force-Induced Collagen Destabilization, *Biophysical Journal* (2018). DOI: 10.1016/j.bpj.2017.12.006

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