Researchers at the University of South Florida and Rochester Institute of Technology, have invented microtube-based 3D printed pump with integrated electronics and wireless control.

Peristaltic micropumps generate fluid flow through the triggering of actuators in a desired fashion and controlled direction. Traditionally, peristaltic pumps use tubing pressed against rollers that are mounted on a larger wheel which creates the rhythmic, directional compression of the tubing that leads to fluid pumping within the tube.

The Inventors have developed peristaltic micropumps that are fabricated with direct write printing technologies. The micropumps are fabricated such that they are scalable to a broad range of pump rates. These novel fabrication methods achieve significant reductions in fabrication complexity, cost, and micropump size. The methods not only provide a controlled fluid flow path that minimizes the number of materials and sources of potential failure of conformal coatings, the techniques also enable integration of the micropumps directly on traditional printed circuit board assemblies for low-cost, ultra-miniaturized integration of commercial off the shelf control electronics without complicated interconnects and associated failure modes.

These peristaltic micropumps, due to their ability to be sterilized, can be used in chemical, pharmaceutical, and food industries; medical applications like vascular or neural drug delivery; and drug administration for protective and restorative biotherapies for noise induced-, sensorineural-, and age-related hearing loss, deafness, and vestibular disorders.

**ADVANTAGES:**
- Inexpensive
- Highly reliable
- Scalable pump rate
- Reduced fabrication complexity

**Scalable Micropump with Integrated Electronics and Wireless Control**

**Superior and inferior view of the fully integrated device**

**Pump performance deduced by volume-time graph**

*It shows volume of delivered drug measured in 10 minutes*

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