Once again proving that science fiction isn't just fiction, researchers at Penn State University have taken a major step towards creating a real-life version of Star Trek's nifty tricorder, which scans and automatically detects diseases.

Published recently in *Lab on a Chip*, the work done by Professor Tony Jun Huang and his team at Penn State demonstrates that a flow of leukemia cells can be diverted and sorted into more than five channels by standing acoustic waves. Other methods can manage two channels at most and the equipment can be desktop-sized; this chip could fit in your palm.

The chip uses frequencies between 9.5 MHz and 14.5 MHz, nearer to the ultrasound region than human hearing, which allows the cells to emerge from the device unscathed. Some other methods of sorting cells use magnets and lasers, but they tend to damage the cells, says Dr. Huang. He likens this chip to the ultrasound technique used for obstetric purposes, explaining, "You'd always use ultrasound to check pregnant women -- not magnets!"

Two digital transducers on the chip emit surface acoustic waves, which produce pressure nodes (regions of low pressure), and anti-nodes (regions of high pressure). The cells being sorted are diverted into the pressure nodes; changing the frequencies of the transducer waves means that the distribution of the pressure nodes can be modified, too. This is how Dr. Huang's team was able to produce different "channels" of leukemia cells.

A major advantage of this method, according to Dr. Huang, is that the cells are placed very precisely. The chip could potentially sort different kinds of white and red blood cells for further analysis, or tumor cells circulating in the bloodstream.

Disease detection, however, is still a little way into the future: while the acoustic cell sorter can divert cells into various channels, it isn't fitted with a detection system. Calling it a Star Trek-like tricorder is therefore a little optimistic, but Dr. Huang says his team is working on this very problem.

In the meantime, companies have already come knocking. Dr. Huang mentions he's spoken to a few since his research was published, but acknowledges the difficulties of commercializing something that's still very experimental. "I'm thinking of starting a company myself," he says, only half-jokingly.

A venture that creates a hand-held scanner and detector straight out of sci-fi? Sounds like a fantastic business plan.