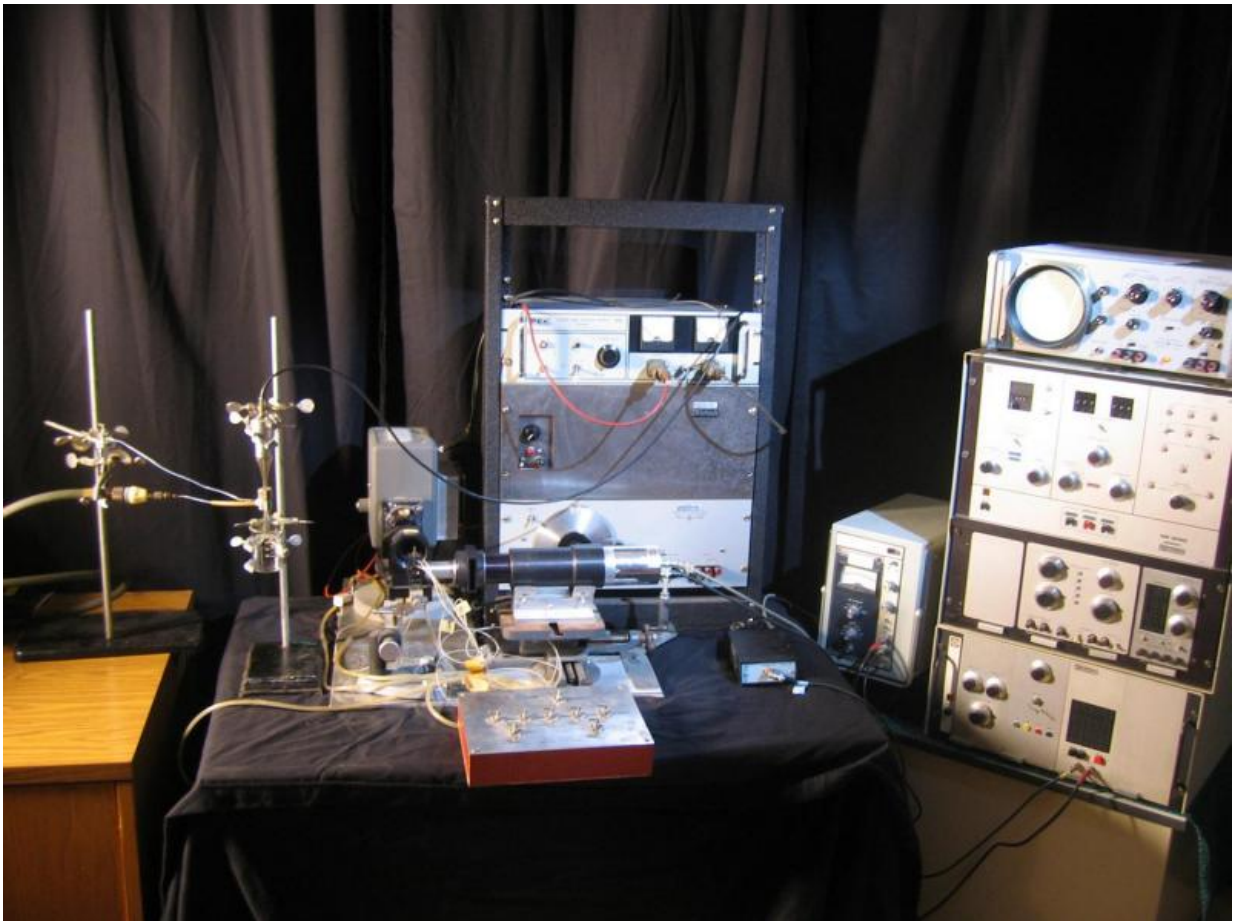


Expert discusses field of flow cytometry 50 years after its invention

November 13 2015, by Elizabeth K. Gardner



A cell sorter built by Mack Fulwyler has been preserved by Purdue Professor J. Paul Robinson. Fulwyler is credited with creating the first cell sorter in 1965, which started the field of flow cytometry. This instrument, which Fulwyler built in 1967, is a copy of the 1965 instrument and was given to Robinson by Boris Rotman of Brown University. Credit: Purdue University photo/courtesy of the Purdue University Cytometry Laboratories

A pioneer in the field reflects on the history and future of flow cytometry on its 50th anniversary in an article in the journal *Science*.

J. Paul Robinson, The SVM Professor of Cytomics in Purdue's College of Veterinary Medicine and professor in Purdue's Weldon School of Biomedical Engineering, co-authored with National Institutes of Health senior scientist Mario Roederer the article "Flow Cytometry Strikes Gold" for the "History of Science" section in the journal. The feature appears on the 50th anniversary of the original publication in *Science* of the invention of the cell sorter, the start of [flow](#) cytometry.

Flow cytometry, which allows for measurement of multiple parameters and rapid analysis of individual cells within a liquid sample, has become a staple for biological research as well as clinical diagnostics, Robinson said.

"The invention of flow cytometry made possible many advances in immunology and cell biology and it is arguably a technology that has had one of the greatest impact on the biomedical field," said Robinson, who leads the Purdue University Cytometry Laboratories. It has rapidly advanced and expanded over the past 50 years. The number of simultaneous measurements that can be done on each cell has grown to more than 30, leading to a wealth of scientific data. Flow cytometry is now an industry worth more than \$3 billion and its use has expanded into environmental sciences and the livestock industry."

For three decades Robinson's research has focused on the applications of flow cytometry and improvement to the technology.

"Several key technologies now well embedded within most clinical and research instruments were developed at Purdue, including the unique

barcoded embedded file structure for profile management used for clinical analysis and high throughput screening using flow cytometry," he said. "Most recently we created a spectral detection and display technology that is currently licensed to Sony Corp. The spectral detection allows for differentiation of fluorescent molecules with nearly identical spectra that could not be measured on a regular flow cytometer, which opens new opportunities in [cell biology](#)."

Purdue's Cytometry Laboratories also published the first methods manual for [flow cytometry](#) in 1989 and created Current Protocols in Cytometry in 1996, which includes more than 5,000 pages updated quarterly of all the known applications in the field, he said.

Mack Fulwyler is credited with creating the first flow cytometer in 1965 by combining inkjet technology invented by Richard Sweet in 1964 with an impedance-based blood cell counter invented by Wallace Coulter in 1953. The new technology allowed the physical separation of single cells and became known as cell sorting, Robinson said.

Coulter Corp. selected Purdue's Cytometry Laboratories in 1989 to be its primary alpha and beta testing laboratory. The corporation also helped Robinson receive the only remaining instrument built by Fulwyler.

The instrument, which Fulwyler built in 1967 and is a copy of the 1965 instrument, was given to Robinson by Boris Rotman of Brown University. Long after it had been installed in Rotman's lab in 1967 and Rotman had retired, Robinson reached out to him. Rotman, with the approval of the university's board of trustees, donated the instrument to Robinson's laboratory for safekeeping. Beckman Coulter, which had acquired the Coulter Corp., packed and shipped it safely to its destination, he said.

"I hope one day to donate it to a museum so that everyone can enjoy this

piece of history," Robinson said.

More information: History of Cytometry DVD:
www.cyto.purdue.edu/cdroms/cyto10a/

J. P. Robinson et al. Flow cytometry strikes gold, *Science* (2015). [DOI: 10.1126/science.aad6770](https://doi.org/10.1126/science.aad6770)

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