# Imaging Cells In Flow Cytometer Using Spatial-Temporal Transformation

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## BACKGROUND

Flow cytometry analyzes multiple physical characteristics of a large population of single cells as cells flow in a fluid stream through an excitation light beam. Flow cytometers measure fluorescence and light scattering from which information about the biological and physical properties of individual cells are obtained. Although flow cytometers have massive statistical power due to their single cell resolution and high throughput, they produce no information about cell morphology or spatial resolution offered by microscopy, which is a much wanted feature missing in almost all flow cytometers.

## TECHNOLOGY DESCRIPTION

Disclosed are methods, devices and systems pertaining to imaging flow cytometry. The method of the invention uses mathematical algorithms and a specially designed spatial filter as the only hardware needed to give flow cytometers imaging capabilities. Instead of CCDs or any megapixel cameras found in many imaging systems, in the invention high quality images of fast moving cells in a flow cytometer are obtained using photomultiplier tube (PMT) detectors, thus obtaining high throughput in manners fully compatible with existing cytometers. Proof of concept has been achieved with demonstration of imaging for cells travelling at a velocity of 0.2 m/s in a microfluidic channel, corresponding to a throughput of approximately 1,000 cells per second.

## APPLICATIONS

The approach can be applied to retrofit traditional flow cytometers to become imaging flow cytometers at a minimum cost.

## ADVANTAGES

This method provides a traditional flow cytometer with the added benefit of cell imaging capabilities.

## STATE OF DEVELOPMENT

Proof of concept has been achieved with demonstration of imaging for cells travelling at a velocity of 0.2 m/s in a microfluidic channel, corresponding to a throughput of approximately 1,000 cells per second.

## INTELLECTUAL PROPERTY INFO

This technology has a patent pending and is available for licensing.

## RELATED MATERIALS

- Yuanyuan Han and Yu-Hwa Lo. Imaging Cells in Flow Cytometer Using Spatial-Temporal Transformation. Scientific Reports 5, Article number: 13267 (2015) - 08/18/2015

## PATENT STATUS

| Country | Type | Number | Dated | Case |
|---|---|---|---|---|
| United States Of America | Issued Patent | 10,267,736 | 04/23/2019 | 2015-055 |
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## OTHER INFORMATION

### KEYWORDS

Imaging flow cytometry, fluorescence imaging, cellular analysis

### CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Imaging**
  - Other
- **Research Tools**
  - Other

### RELATED CASES

2015-055-0

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