



# LENS-FREE IMAGER FOR LIFE-SCIENCE APPLICATIONS

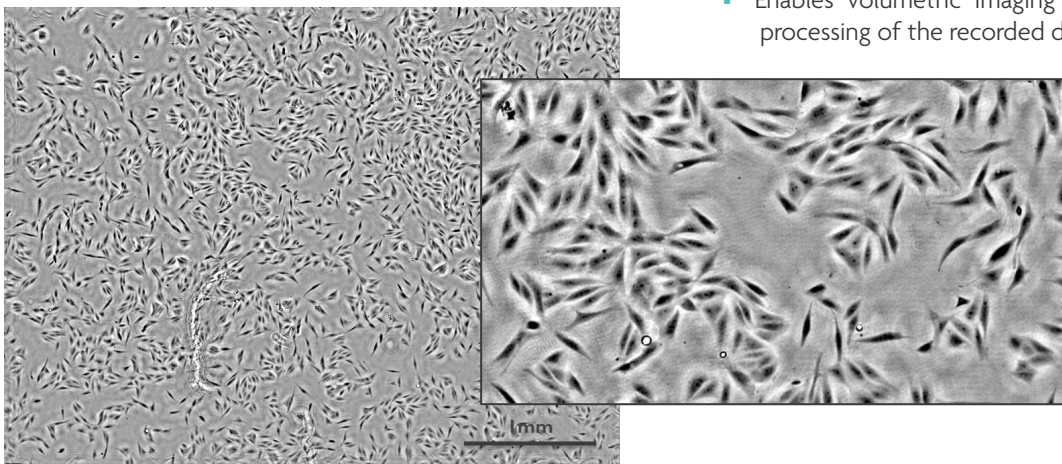
## COMPACT, SCALABLE MICROSCOPIC IMAGING

Imec's lens-free imaging microscopy solution leverages digital holographic imaging to automatically identify and classify cells, tissues and more.

The system is simple, easy to integrate, customizable and generates high-resolution images (up to 1  $\mu\text{m}$ ) with an extremely wide field-of-view.

## IMEC'S LENS-FREE IMAGER

- Minimal hardware (illumination source and a digital imager) assures low cost and ease of use
- Works in transmission and reflection mode (e.g to scan surfaces on microscale)
- Multiplexing possible thanks to small form factor
- 650nm lateral imaging resolution @20mm<sup>2</sup> FoV; 150nm detection limit
- Enables volumetric imaging with one image (via post-processing of the recorded data)



Label-free cell culture monitoring (here: osteoblasts) visualizes sub-cellular structures such as chromatin aggregates and nuclei.

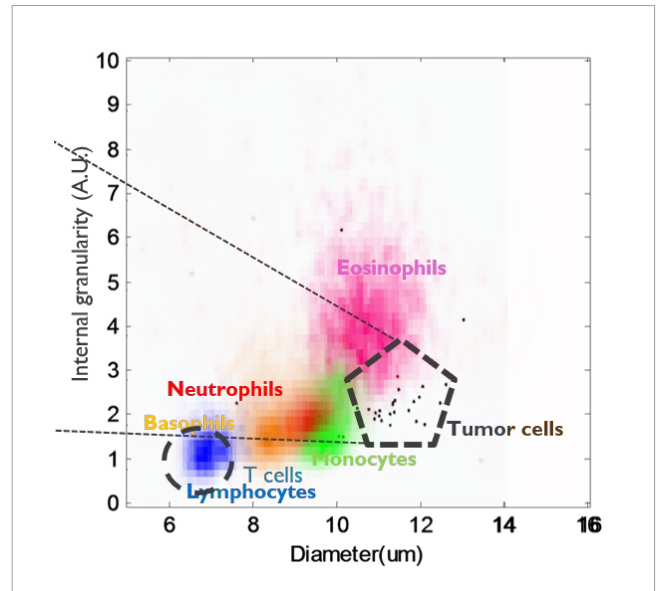
## DESIGN ON DEMAND

Imec offers full design on demand services, taking into account the context in which your applications will be running and creating synergies with other fields of expertise that might be needed downstream or upstream in the process (e.g. fluidics, cell sorting, in-line process monitoring...).

To demonstrate the strengths of our solution, imec created a plug-and-play evaluation system of the lens-free imager. Imec's lens-free imaging evaluation system offers simple, fast, and easy application set-up for your digital microscopy application. You can get instantly super wide field-of-view live images at micrometer resolution. The kit includes all required components, from imager to host pc, integrated lighting, software and can be easily rebuilt into different configurations.

## APPLICATION AREAS CURRENTLY UNDER INVESTIGATION

- Our automated cell culture monitoring systems enable large scale cell behaviour analysis and can be used for **high-throughput cell cultivation monitoring** for cell-based therapies.
- Our **on-chip flow cytometer** prototype aims to combine high-speed lens-free imaging with cell sorting, targeting oncology applications.
- **Haematology and diagnostics:** prototype systems that enable automated complete blood count analysis.
- **Industrial inspection systems:** air-borne particle contamination monitoring, material inspection and quality control for optical component production and industrial (pharma) processes.



Lens-free imaging based flow cytometry of white blood cells. Diameter, internal complexity and other extensive image feature analysis can be evaluated per cell and plotted to distinguish cell types. For example to detect circulating tumor cells.

Video:

[www.imec-int.com/lens-free-microscopy](http://www.imec-int.com/lens-free-microscopy)

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