

## Lensfree Tomographic Imaging

Tech ID: 29202 / UC Case 2011-373-0

### SUMMARY

UCLA researchers in the Department of Electrical Engineering have developed a system for lens-free tomographic imaging.

### BACKGROUND

Traditional light microscopy is a critical tool in medical imaging, diagnostics, and in research, however much of the technology remains fundamentally unchanged since their development (i.e. use of lenses and eyepiece/detector). In efforts to visualize increasingly smaller features and gain high resolution and contrast has resulted in significantly larger and more complex microscopes. With the advent of microfluidic (lab-on-a-chip) technology we have begun to be able to handle biological samples within miniaturized systems. However, we still rely on traditional light microscopes, which are several orders of magnitude larger, and have limited fields of view to image microfluidic devices. As a result there is a current clear need for miniaturized imaging platforms for microfluidic technologies.

### INNOVATION

UCLA researchers led by Prof. Aydogan Ozcan have developed a new system for lens-free tomographic imaging. They have demonstrated for the first time in high resolution and large field of view a tomographic image utilizing a lens-free system on a microfluidic chip. This technology also allows for pixel super resolution techniques to be applied to optical tomographic imaging.

### APPLICATIONS

This technology could be used to generate tomography images of organelles, cells, cellular components, or small particles in static or flow based environments.

### ADVANTAGES

- ▶ Technology can be incorporated into microfluidics
- ▶ Much smaller form factor than traditional imaging techniques
- ▶ Lens-less technology

### STATE OF DEVELOPMENT

This technology has been used to visualize several biological and synthetic samples.

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,605,941	03/28/2017	2011-373

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### INVENTORS

- ▶ Ozcan, Aydogan

### OTHER INFORMATION

#### KEYWORDS

lab-on-chip, microfluidics, microscopy, tomographic imaging, lens-free tomographic imaging, lab-on-chip imaging, and super resolution optical imaging

#### CATEGORIZED AS

- ▶ **Optics and Photonics**
  - ▶ All Optics and Photonics
- ▶ **Biotechnology**
  - ▶ Health
- ▶ **Imaging**
  - ▶ Medical
  - ▶ Molecular
  - ▶ Other
- ▶ **Medical**
  - ▶ Devices
  - ▶ Diagnostics
  - ▶ Imaging
  - ▶ Other
  - ▶ Screening
- ▶ **Nanotechnology**
  - ▶ NanoBio
- ▶ **Sensors & Instrumentation**
  - ▶ Biosensors
  - ▶ Medical

#### RELATED CASES

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Automated Semen Analysis Using Holographic Imaging
- ▶ Low-Cost And Portable Uv Holographic Microscope For High-Contrast Protein Crystal Imaging
- ▶ Extended Depth-Of-Field In Holographic Image Reconstruction Using Deep Learning-Based Auto-Focusing And Phase-Recovery
- ▶ Detection and Spatial Mapping of Mercury Contamination in Water Samples Using a Smart-Phone
- ▶ Computational Cytometer Based On Magnetically-Modulated Coherent Imaging And Deep Learning
- ▶ Single Molecule Imaging and Sizing of DNA on a Cell Phone
- ▶ Cross-Modality Deep Learning Brings Bright-Field Microscopy Contrast To Holography
- ▶ Microscopic Color Imaging And Calibration
- ▶ Quantification Of Plant Chlorophyll Content Using Google Glass
- ▶ Rapid, Portable And Cost-Effective Yeast Cell Viability And Concentration Analysis Using Lensfree On-Chip Microscopy And Machine Learning
- ▶ Holographic Opto-Fluidic Microscopy
- ▶ Design Of Task-Specific Optical Systems Using Broadband Diffractive Neural Networks
- ▶ Ultra-Large Field-of-View Fluorescent Imaging Using a Flatbed Scanner
- ▶ Revolutionizing Micro-Array Technologies: A Microscopy Method and System Incorporating Nanofeatures
- ▶ Tunable Vapor-Condensed Nano-Lenses

## Gateway to Innovation, Research and Entrepreneurship

### UCLA Technology Development Group

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