

## 4D BLOOD CELL IMAGING

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Phase contrast lens-free 3D imaging of living blood cells is presented by an inline holographic microscopy set-up. 3D imaging means imaging of living cells in a 3D volume by only one exposure and generating of image stacks by subsequent numerical focusing of z-positions inside the micro-fluidic channel from 0 to 50  $\mu\text{m}$ . 3D also means imaging from different viewing directions of rotating cells. Videos containing optical information of living cells in four dimensions are shown.

Therefore a compact set-up is established which uses a simple laser-diode for illumination with partially coherent light. Functions like a long working distance, correcting different refractive indices caused by glass sample carriers (micro-fluidic chambers, glass slides), and an auto calibration for holographic imaging are performed numerically.

Phase contrast videos of living red and white blood cells like lymphocytes, neutrophils and monocytes are presented. The technique as well as special samples for medical diagnostics are discussed and compared to the classical optical microscopy.

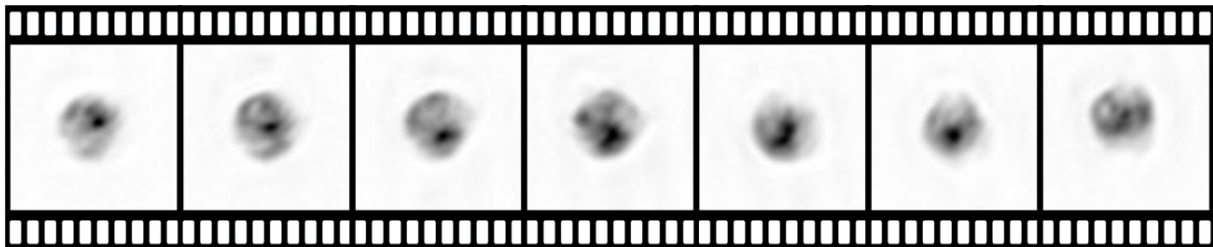


Figure 1: Part of a video of a living rotating white blood cell. Corresponding to different viewing directions the position of the nucleus changes, too.

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