Vr Software, Superresolution Microscopy Take Scientists inside Human Cells

2020-10-22
A joint development between University of Cambridge scientists and 3D image analysis software company Lume VR Ltd. is enabling the visualization of superresolution microscopy data — data that can be analyzed in 3D using VR. By applying the VR software, known as vLume, to study individual proteins and cells, end users of the software are able to observe molecular processes as they happen.

Biology and biological processes happen in 3D, meaning reliance on a 2D computer screen can omit valuable information and prevent scientists from making intuitive and immersive assessments. VR bypasses that barrier, essentially bringing human into the nanoscale, said Alexandre Kitching, CEO of Lume. The software first delivers visualizations and, given its VR platform, allows users to physically interact with 3D data through a VR headset and workspace.

Superresolution microscopy, in its ability to overcome the diffraction limit, allows the image capture of subcellular organization. The technology was celebrated in 2014 when Eric Betzig, Stefan Hell, and W.E. Moerner were awarded the Nobel Prize in chemistry for "the development of super-resolved fluorescence microscopy," which brings "optical microscopy into the nanodimension."

DBScan analysis being performed on a mature neuron in a typical vLUME workspace.

In one instance, a student in the research group of [Cambridge University](#)'s Steven Lee used the software to image an immune cell from her own blood. Using vLume, the student was then able to "physically" stand inside the cell.

Such a perspective can be applied to understand fundamental problems in biology and, eventually, to develop new treatments for diseases.

vLume can work with multiple data sets and millions of data points that can be loaded into the software. Using built-in clustering algorithms, the software finds and discerns patterns in data. The information can be shared with collaborators using image and video features that themselves are components of vLume.

As superresolution microscopy data is often complex and time consuming to analyze, vLume supports rapid testing and analysis, as well as expanded testing. Current tests examining how antigen cells trigger immune responses are underway, led by Steven Lee's group. Other distinct biological data sets the software is able to consider include neurons and cancer cells.

Read the [original article](#) on Photonics Media.