Shedding Light on Samples: Optical Microscopes

While electron, scanning probe, and ion beam microscopes garner headlines for their ability to detect to nanoscale levels, optical microscopes maintain their vital role as the workhorses of research laboratories. Many applications in the life science, biology, medical, and measuring industries, as well as educational institutions, rely on these forms of microscopes.

New features are extending the capabilities of these tools to produce better images at higher magnifications. Automated stages, cameras, computer interfaces, fine focus, image analysis processing software, and oil immersion objectives, can be added to these microscopes to better improve magnification, resolution, and ease-of-use.

Optical microscopes use visible light and a system of lenses to magnify images of small samples. While the basic optical microscope is simple in design, manufacturers aim to meet the demands of researchers by improving the resolution and sample contrast with each product introduced to the market.

Two main types of optical microscopes dominate the market—the compound microscope and digital microscope. Some digital microscopes capture images directly to a camera and display them on a monitor, eliminating the need for the eyepiece associated with traditional optical microscopes.

– Lindsay Hock

Company/Product Name	Microscope Type and Features	Observation Methods	Eyepiece Styles/ Magnification	Objective Magnification	Magnification Range	Field of View
Carl Zeiss MicroImaging Inc. Axio Observer Z1 	Compound microscope featuring automated stage, camera, computer interface, fine focus, image analysis processing software, mechanical stage, and oil immersion objective.	• Brightfield • Darkfield • Fluorescence • Phase contrast • Polarizing • DIC	Binocular or trinocular 10X magnification	1.5X to 150X	10.5X to 1500X	N/A
CRAIC Technologies UVM-1 Ultraviolet Microscope 	Compound microscope featuring automated stage, camera, computer interface, digital display, fine focus, image analysis processing software, mechanical stage, and UV-Vis-NIR microspectroscopy.	• Brightfield • Fluorescence • Polarizing	Trinocular 10X in magnification	10X, 15X, 36X, 40X, 74X	N/A	600 x 450 µ with UV camera
KEYENCE Corporation VHX-1000 Digital Microscope 	Digital microscope featuring camera, computer interface, digital display, fine focus, image analysis processing software, and mechanical stage.	• Brightfield • Darkfield • Polarizing • DIC • Transmitted	N/A	N/A	0.1X to 5000X	4000 to 76 mm (diagonal) Varies depending of magnification
Nikon Metrology, Inc. Multizoom Microscope AZ100/100M 	Multizoon microscope featuring camera, computer interface, digital display, fine focus, image analysis processing software, and mechanical stage.	• Brightfield • Confocal • Fluorescence • Polarizing	Binocular, trinocular, or digital camera head 10X in magnification	0.5X, 1X, 2X, 4X, 5X	5X to 500X	44 mm
Olympus America LEXT OLS-4000 	Laser confocal microscope featuring automated stage, computer interface, digital display, fine focus, and image analysis processing software.	• Brightfield • Confocal	N/A monitor only Monitor magnification 21.6	100X	10.8X to 17.280X	2560 x 2560 to 16 x 16 µ
Leica Microsystems DVM5000 	Digital microscope featuring camera, computer interface, digital display, fine focus, image analysis processing software, and mechanical stage.	• Brightfield • Darkfield • Polarizing • Oblique • Waxial	N/A	1X to 700X	0X to 7000X	59 to 0.61 mm