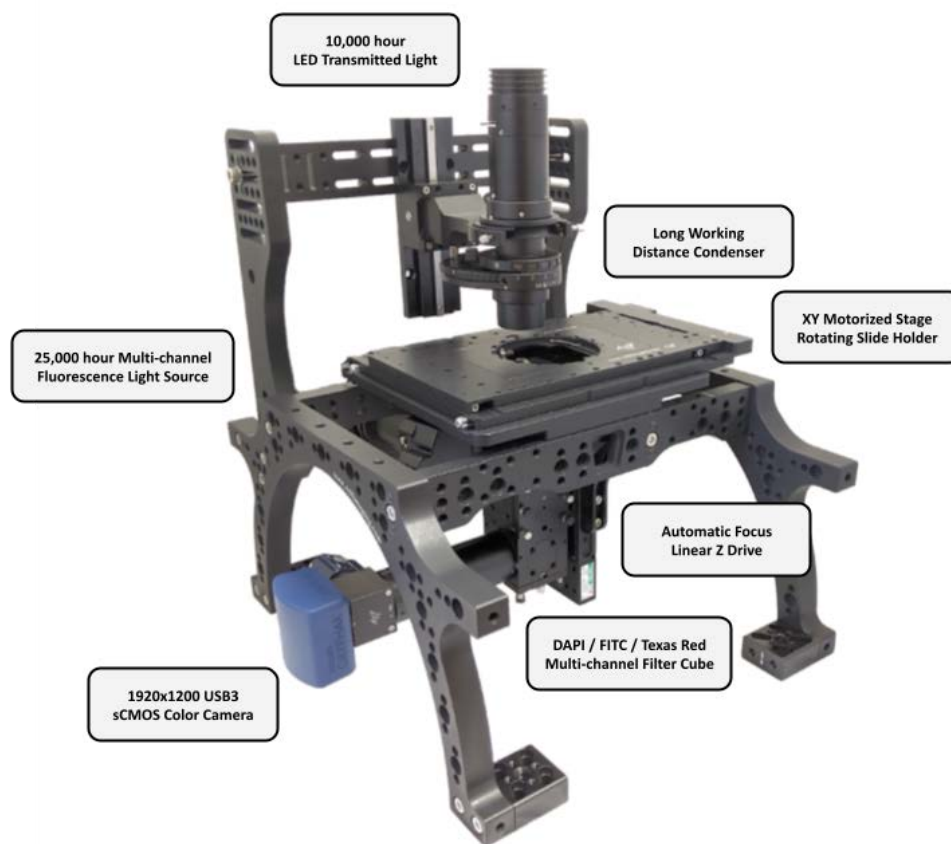




# OSTEOIMAGER



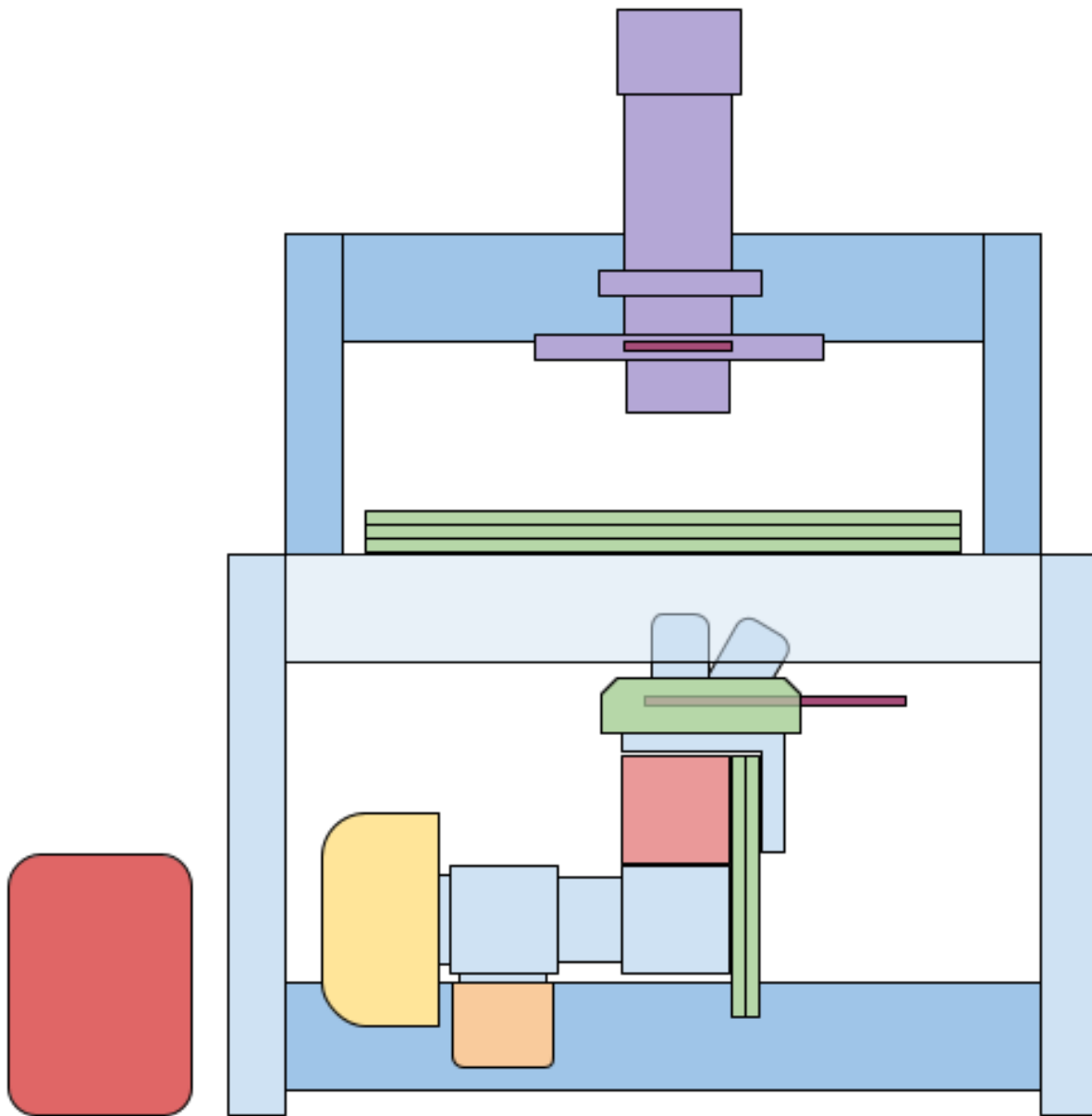
## BIOQUANT OSTEOIMAGER

The OSTEOIMAGER is an inverted automated scanning microscope. It scans both histology sections and cell cultures. A motorized nosepiece allows it to scan with 4X, 10X, 20X, or 40X objectives. It scans in brightfield, multi-channel fluorescence, polarized light, or darkfield.

## BIOQUANT SCAN

BIOQUANT SCAN is the control software for the OSTEOIMAGER. BIOQUANT SCAN is an extension to the BIOQUANT OSTEO analysis software. BIOQUANT SCAN is used to specify objectives, control illumination sources, adjust focus, define scan areas, and export images.

# OSTEOIMAGER SCHEMATIC DIAGRAM - FRONT



## A Modular Solution on a Robust Platform

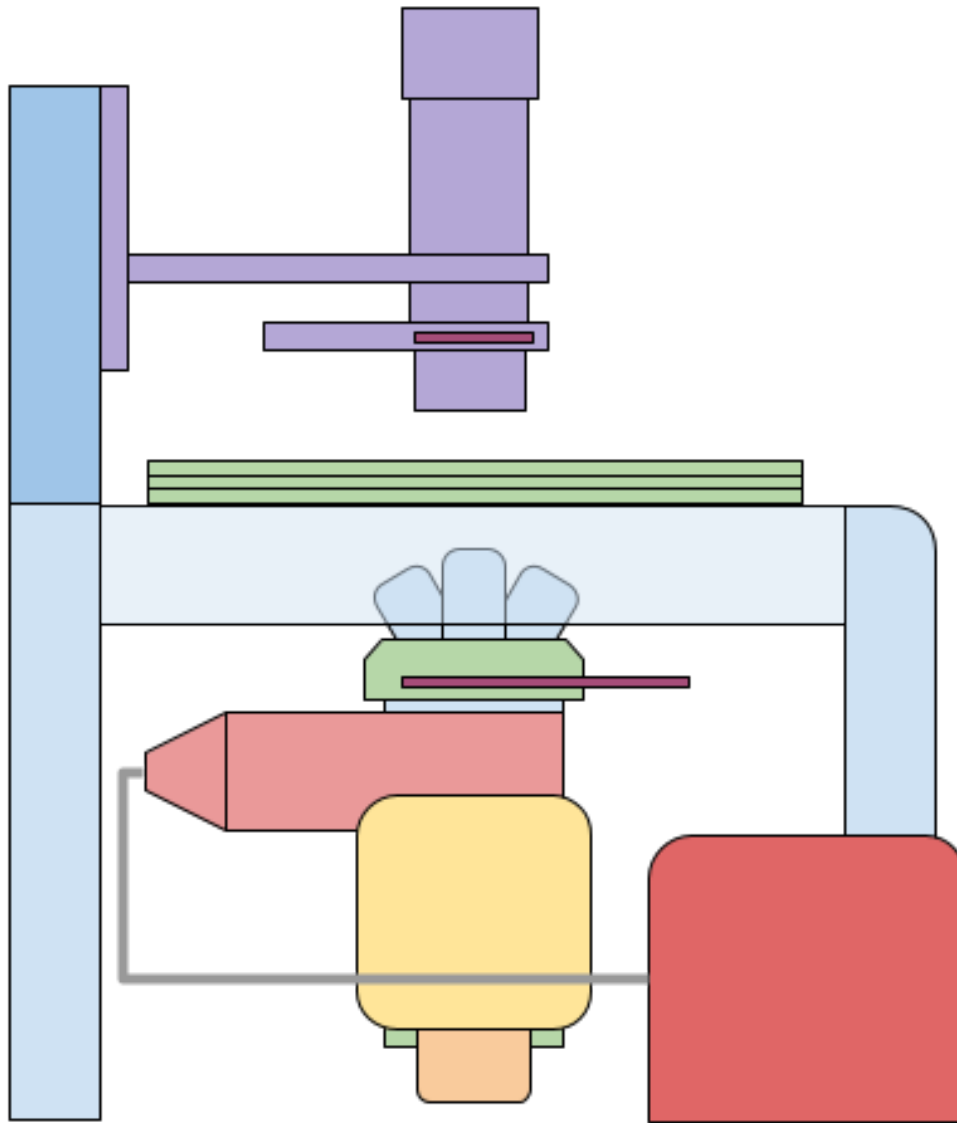
The BIOQUANT OSTEOIMAGER is a custom implementation of the RAMM/MIM platform developed by Applied Scientific Instrumentation. Motorization components are backed by a 5 year warranty.

Olympus optical components including objectives and condenser are backed by a 5 year warranty from Olympus.

## Key to Components

- ASI MS2000 FT XY Motorized Stage
- ASI LS50 Z Motorized Focus
- Olympus Motorized Nosepiece & Objectives
- Olympus Long Working Distance Condenser
- Olympus Linear Polarizer / Analyzer
- Chroma 69401 Epi-fluorescence Filter Cube
- CoolLED pE-300 White Fluorescence Light
- Jenoptik Prokyon Imaging Camera
- Watec Focus Camera
- ASI Modular Microscope Frame

## OSTEOIMAGER SCHEMATIC DIAGRAM - SIDE



### Unified Transmitted / Reflected Light Path

The BIOQUANT OSTEOIMAGER is designed around a uniform light path that eliminates the need to adjust the microscope when switching between brightfield and fluorescence imaging. Simply turn off one light and turn on the other.

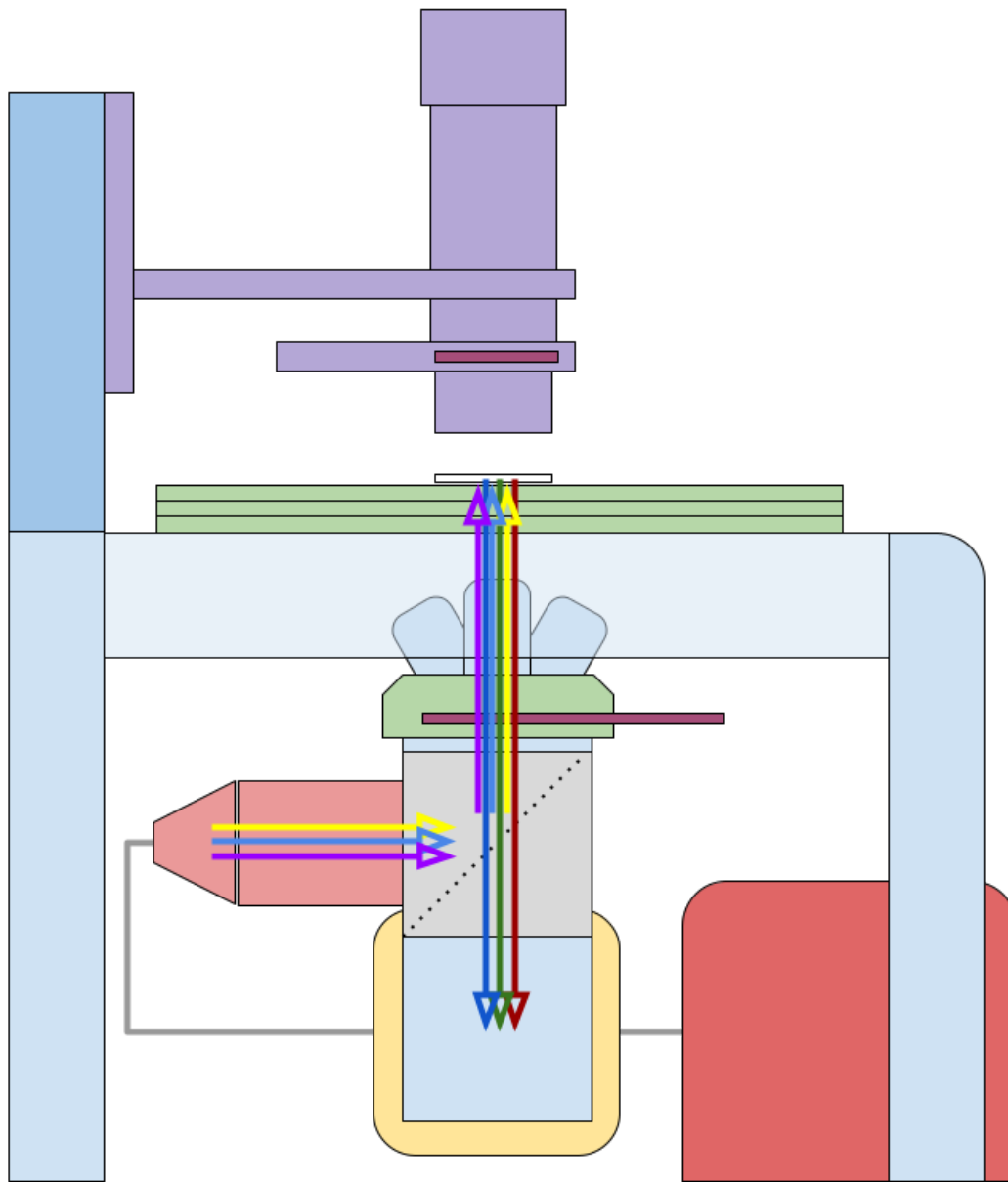
### Multi-modal Condenser Wheel

To switch from brightfield to polarized light to darkfield simply rotate the condenser wheel to insert or remove the appropriate filter.

### Key to Components

- ASI MS4400 XY Motorized Stage
- ASI LS50 Z Motorized Focus
- Olympus Motorized Nosepiece & Objectives
- Olympus Long Working Distance Condenser
- Olympus Linear Polarizer / Analyzer
- Chroma 69401 Epi-fluorescence Filter Cube
- CoolLED pE-300 White Fluorescence Light
- Jenoptik Prokyon Imaging Camera
- Watec Focus Camera
- ASI Modular Microscope Frame

# OSTEOIMAGER SCHEMATIC DIAGRAM - FLUORESCENCE PATHWAY



## Multi-channel Fluorescence Pathway

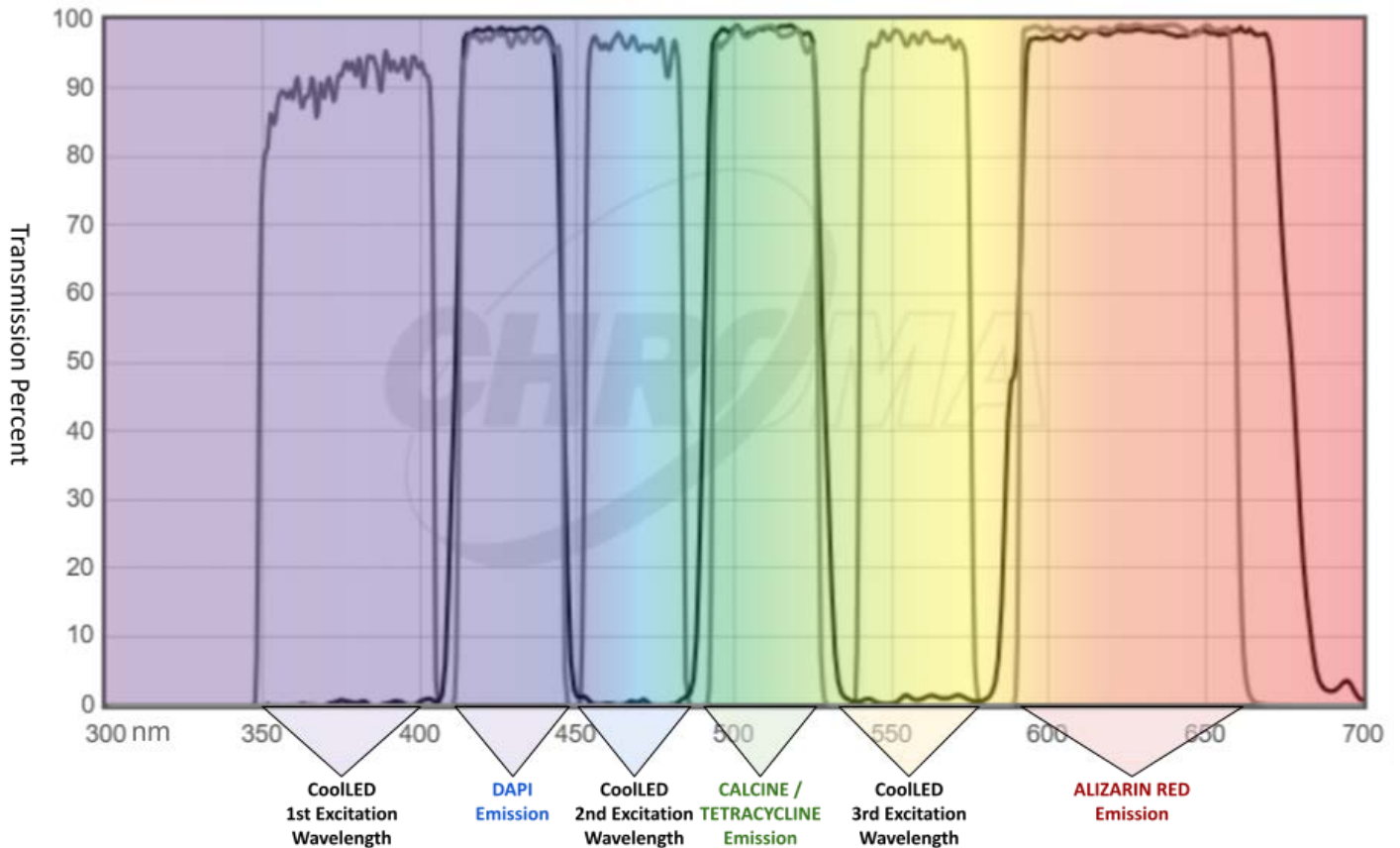
The CoolLED pE-300 excitation source provides three independent excitation lights at the 375nm, 475nm, and 575nm wavelengths.

This allows independent brightness control for blue (DAPI), green (Calcein, Tetracycline), and red (Alizarine) labels in bone tissue.

## Key to Components

- 375nm excitation light
- 475nm excitation light
- 575nm excitation light
- 425nm label emission light (DAPI)
- 525nm label emission light (Calcein, Tetracycline)
- 625nm label emission light (Alizarin)

## Standard Fluorescence Filter Cube Chroma 69401



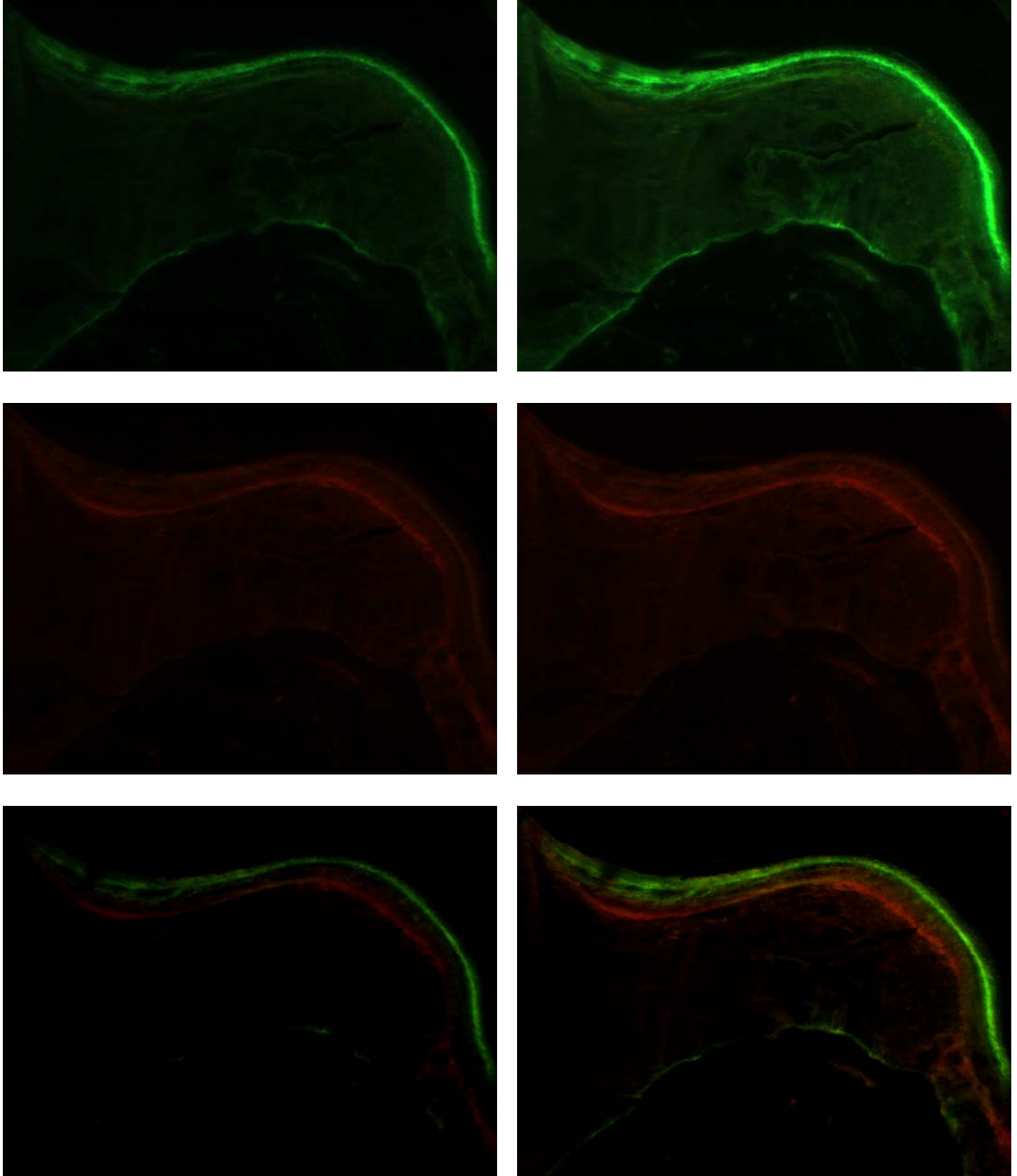
For simultaneous multi-channel fluorescence imaging, the OSTEOMAGER's default filter cube is the Chroma 69401. This cube is compatible with Labels can be excited individually or simultaneously. Compatible with DAPI | Calcein, Tetracycline | Alizarin Red.

## Additional Filter Cube Options



The OSTEOMAGER supports all filter sets that can mount in the standard Olympus BX2 filter cube holder (Chroma part 91018).

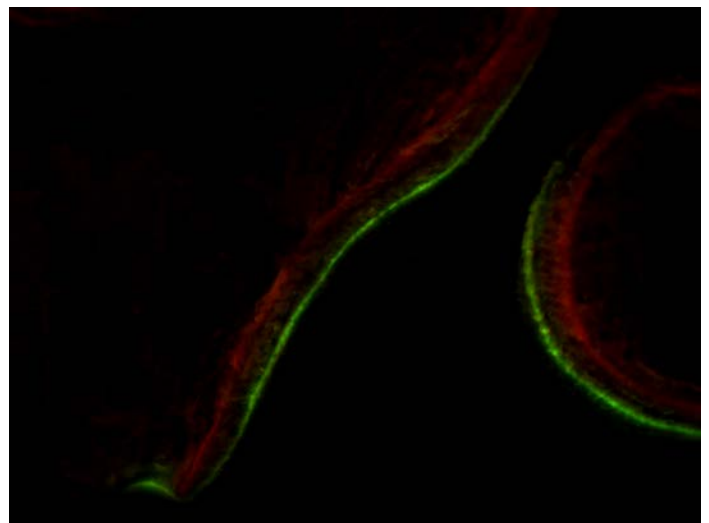
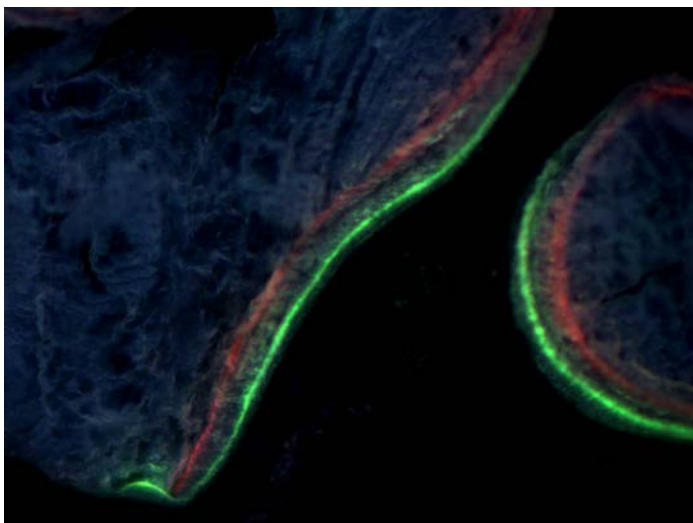
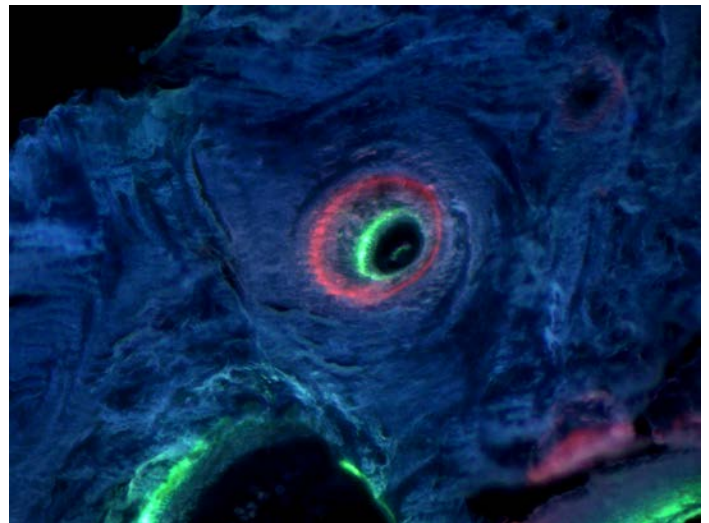
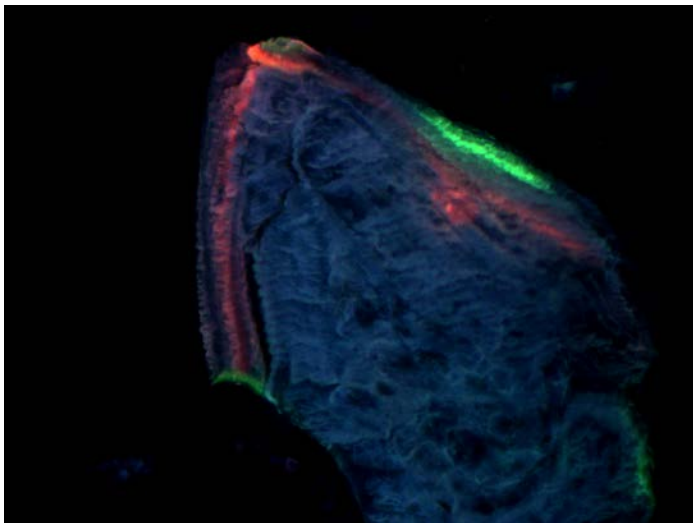
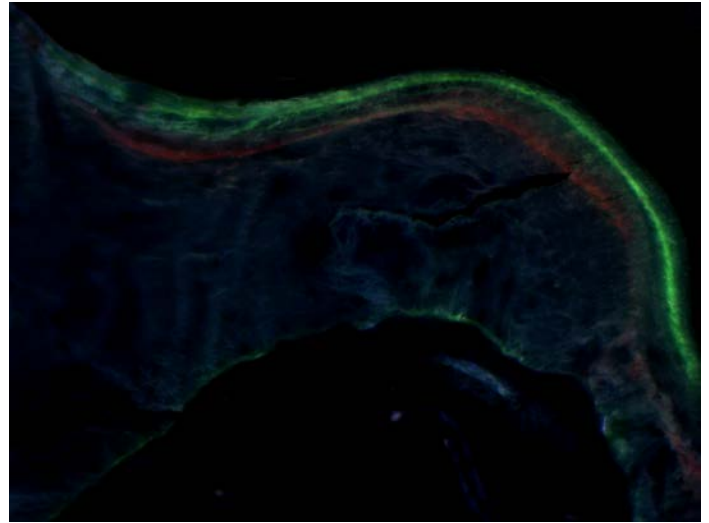
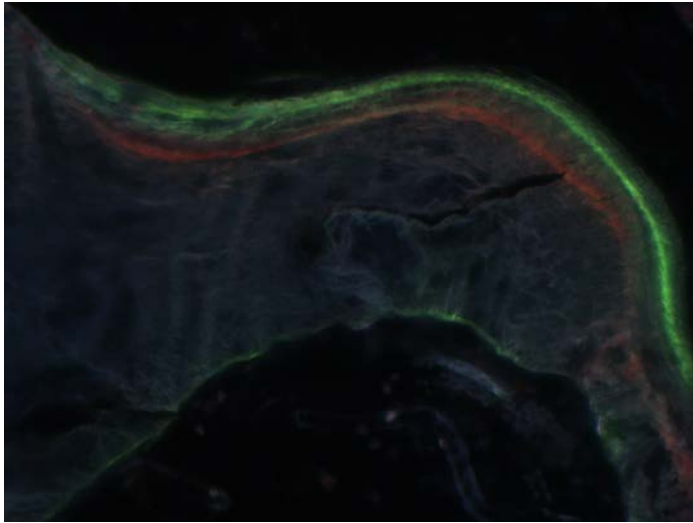
## IMAGE GALLERY - LIVE MULTICOLOR FLUORESCENCE MIXING



Left column: reduced excitation. Right column: increased excitation. First two rows: individual label viewing. Last row: live dual label viewing. 20X objective. Calcein and alizarin red labels.



## IMAGE GALLERY - LIVE MULTICOLOR FLUORESCENCE EXAMPLES



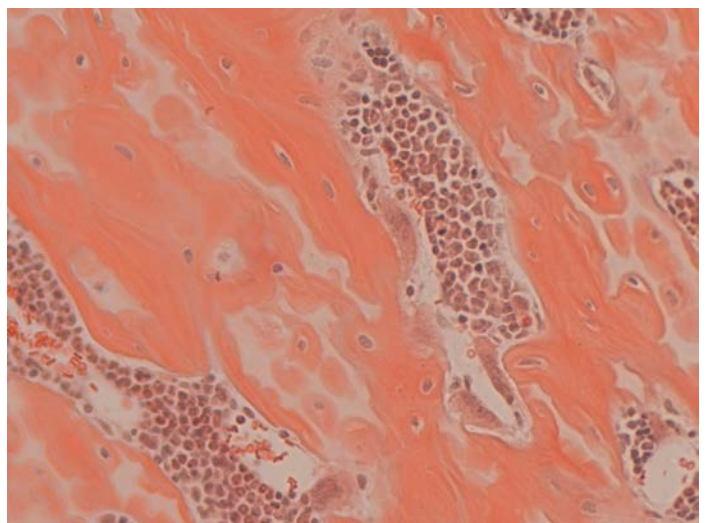
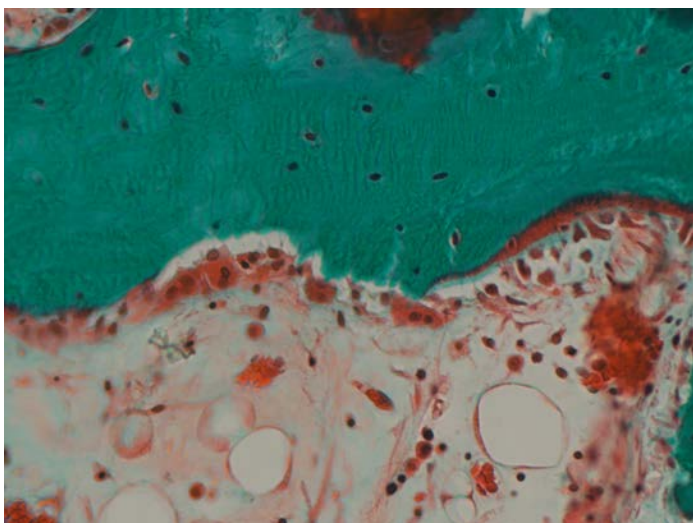
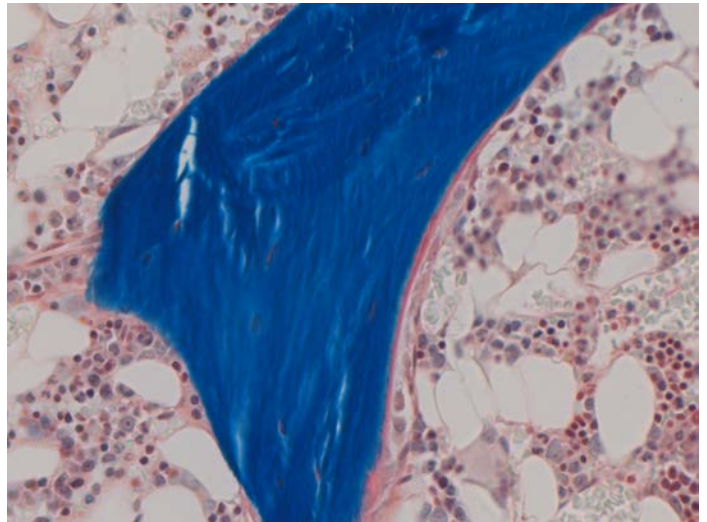
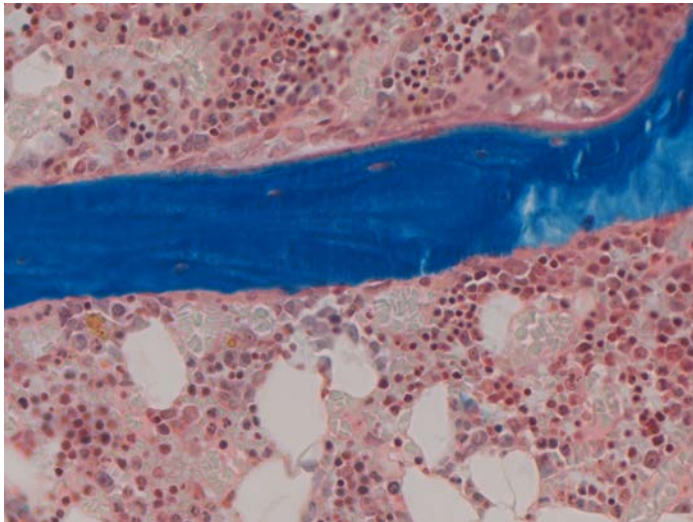
20X objective. 0.4 microns per pixel. Trabecular bone. Calcein and alizarin red labels. Blue autofluorescence in mineralized bone. Hardware brightness adjustment and simultaneous viewing. Live black background correction is also applied in hardware. No software post processing required.

## IMAGE GALLERY - BRIGHTFIELD IMAGING

Uncorrected Brightfield Background



Live Background Correction Applied

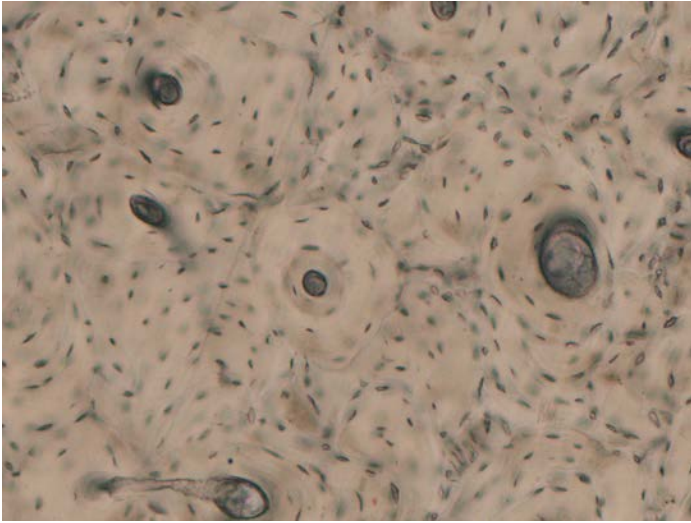


Examples of non-demineralized histology. Osteoclasts, osteoblasts, adipocytes, osteocytes, osteoid.

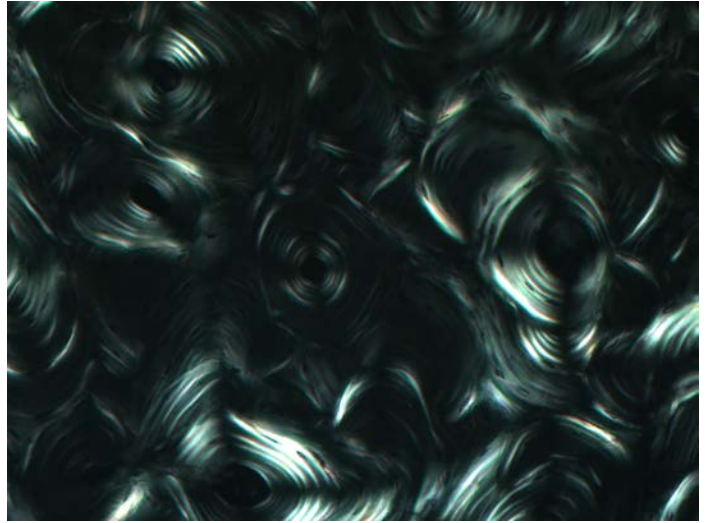


## IMAGE GALLERY - POLARIZATION AND DARKFIELD

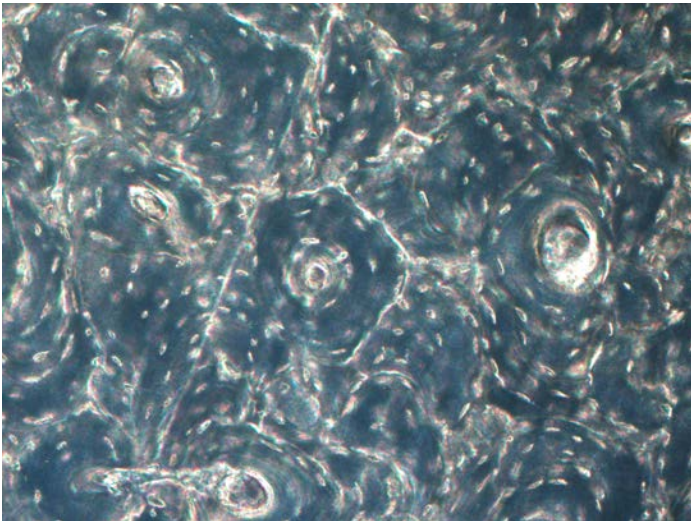
Ground Cortical Bone Cross-Section



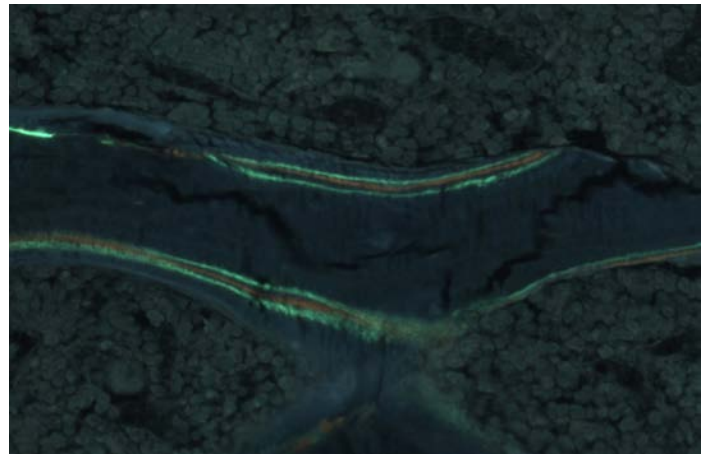
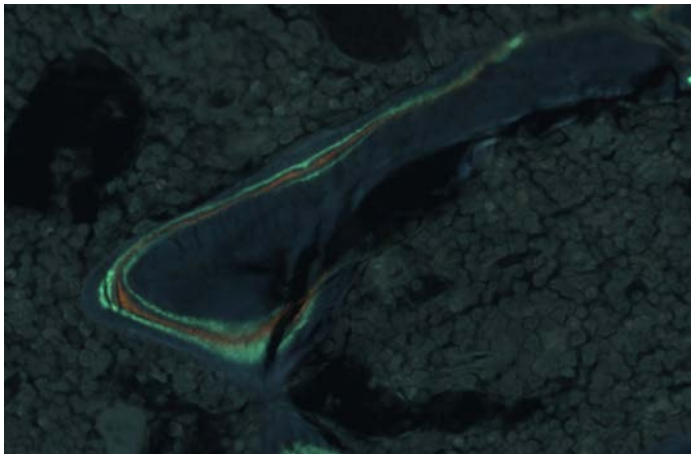
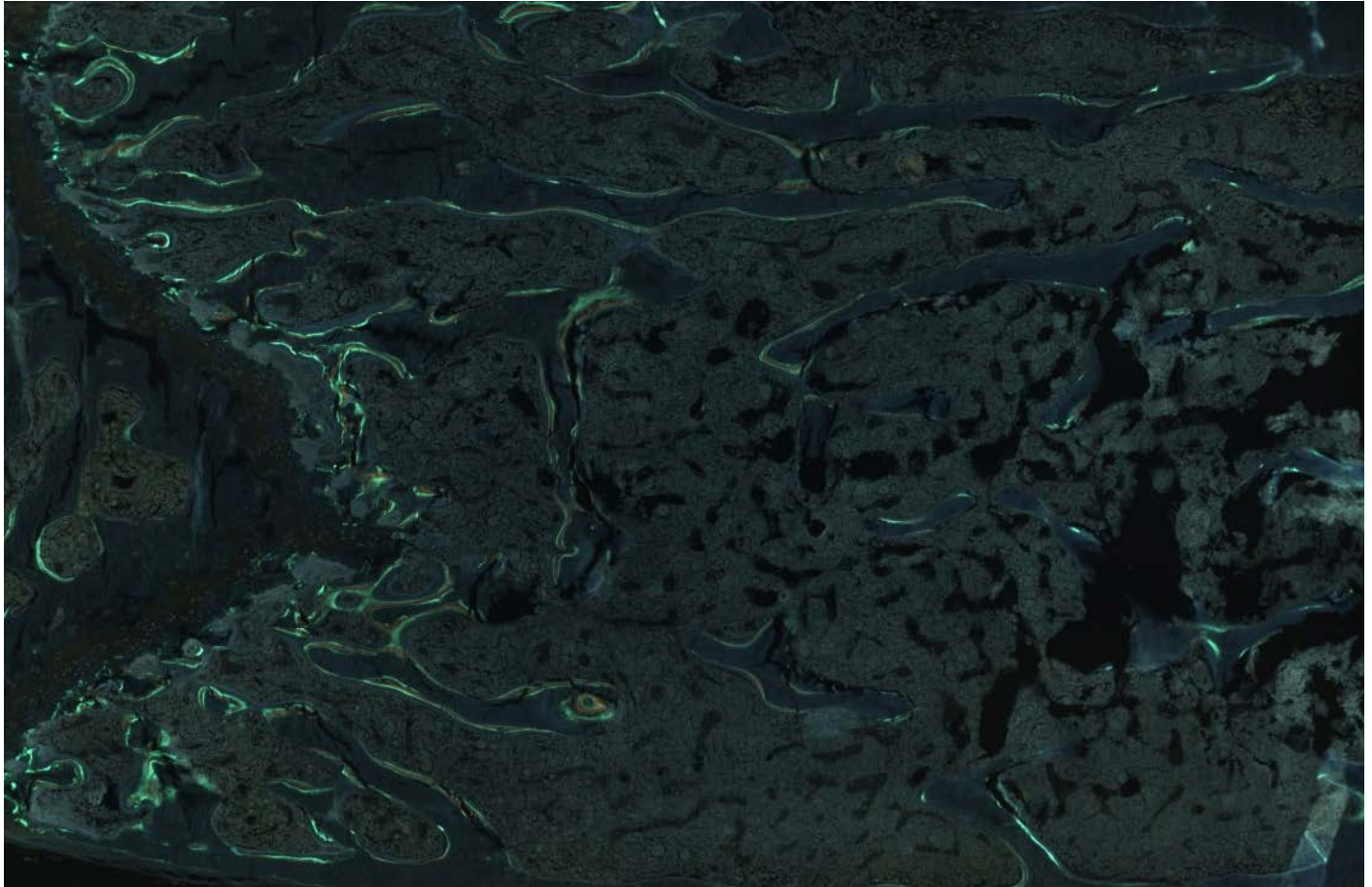
Same Field - Linear Polarized Illumination



Same Field - Darkfield Illumination



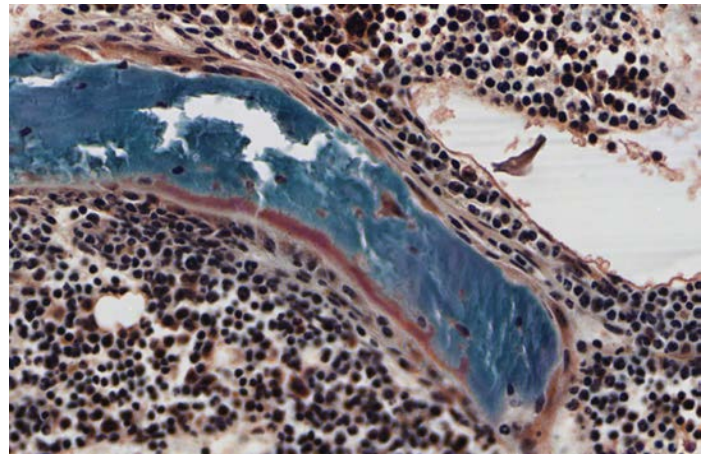
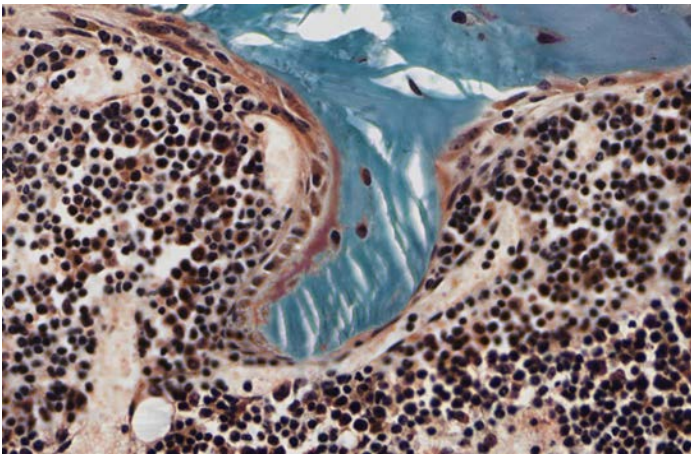
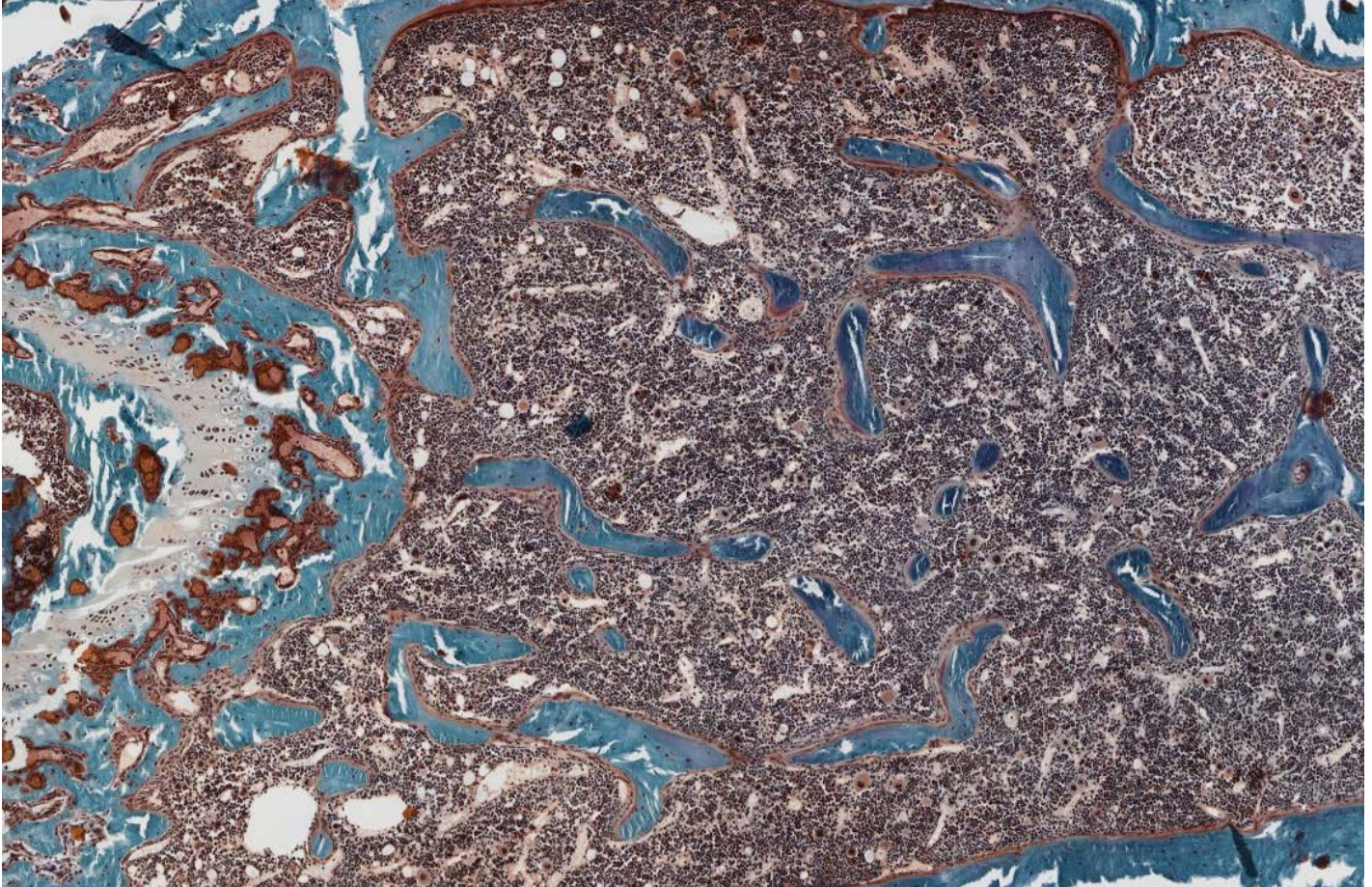
## IMAGE GALLERY - SCAN - FLUORESCENCE



Representative multi-channel fluorescence scan of distal mouse femur at 0.3 micron per pixel resolution. Simultaneous viewing of calcein and alizarin red labels for bone formation rate. No software image merging step required. Both labels are imaged simultaneously.



## IMAGE GALLERY - SCAN - BRIGHTFIELD

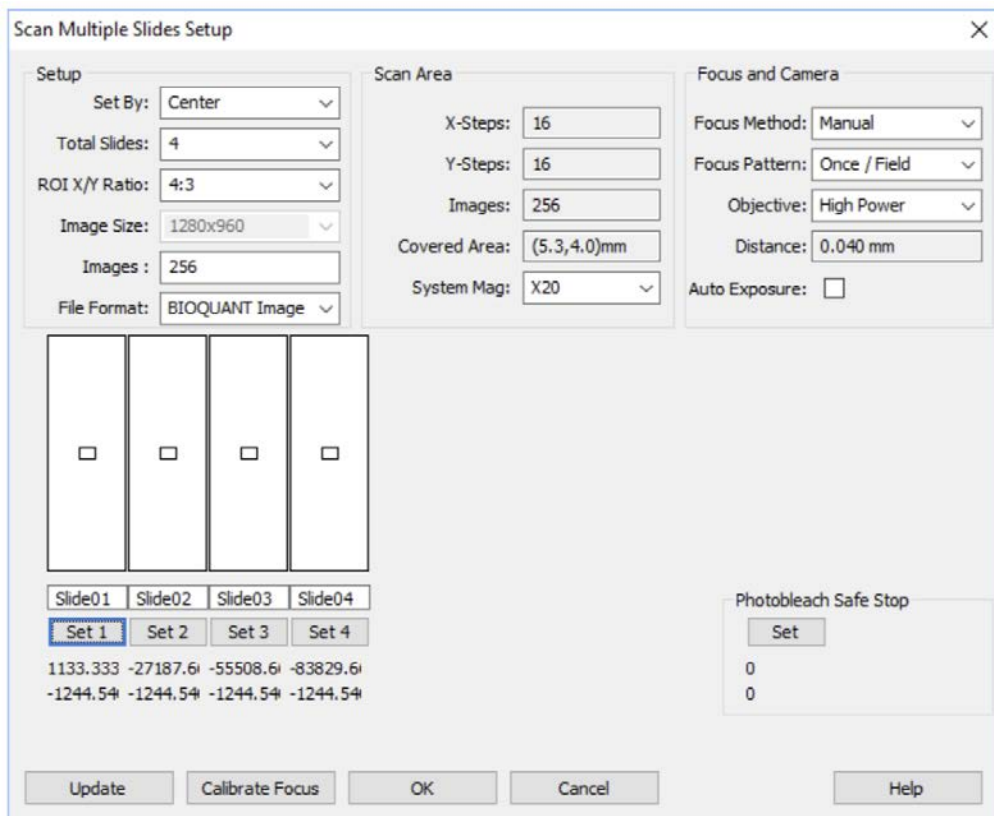


Representative trichrome scan of distal mouse femur at 0.3 micron per pixel resolution.

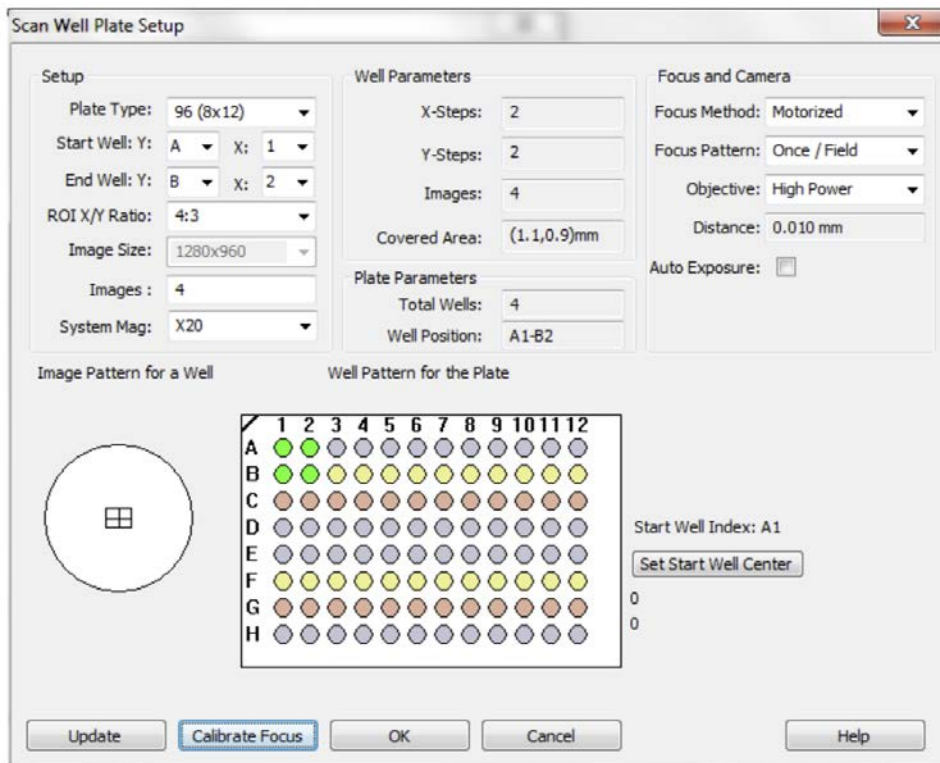


# BIOQUANT SCAN CONTROLS

## Multi-slide Scanning: Up to 8 Regions over 4 Slides Automatically



## Multiwell Plate Scanning: Up to 96 Well Plates



## Technical Specifications

Optical Specifications	
<b>Olympus UIS2 Fluorite Objectives</b>	4X 0.13NA, 10X 0.25NA, 20X 0.5NA, 40X 0.75NA
<b>Olympus IX2-LWUCD Condenser</b>	25mm Working Distance, 0.55NA
Illumination Specifications	
<b>Transmitted Light</b>	10,000 Hour ASI White LED
<b>Epi-fluorescent Light</b>	25,000 Hour CoolLED pE-300 White 3 Channel LED Source
<b>Fluorescent Filter Set</b>	Chroma 69401 DAPI   Calcein, Tetracycline   Alizarin Red
<b>Polarized Light</b>	Linear Polarization, All Objectives
Sample Handling Specifications	
<b>XY Motorized Stage</b>	Applied Scientific Instrumentation Model MS4400-FT
<b>Z Motorized Focus</b>	Applied Scientific Instrumentation Model LS50
<b>Multi-slide Holder</b>	Fixed Vertical Orientation, 4 Slides, 25mm x 75mm
<b>Single-slide Holder</b>	360° Rotation, 1 Slide, 25 x 75mm or 50 x 75mm
<b>Well Plate Holder</b>	1 plate, Standard 84mm x 127mm
Imaging Specifications	
<b>Imaging Camera</b>	Jenoptik Prokyon - 2.3 / 20 Megapixel, Color, 60fps
<b>Focus Camera</b>	Watec 902H3 - 0.3 Megapixel, Monochrome, 30fps
<b>Maximum Scan File Size</b>	4GB Uncompressed
<b>Scan File Formats</b>	Calibrated BIF, Uncalibrated TIF
<b>Scan Area at 4X</b>	over 2500 mm <sup>2</sup> (1.4 microns per pixel)
<b>Scan Area at 10X</b>	over 400 mm <sup>2</sup> (0.56 microns per pixel)
<b>Scan Area at 20X</b>	over 100 mm <sup>2</sup> (0.28 microns per pixel)
<b>Scan Area at 40X</b>	over 25 mm <sup>2</sup> (0.14 microns per pixel)
<b>Maximum / Auto Focus Scan Rate</b>	1.5s per field / 5s per field