



# BioPipeline **SLIDE**

Microscope Automated Slide  
Imaging System



# Experiment Pipeline

**Sample Que**  
Samples for high resolution imaging and archiving can stack up quickly



**Instrument Time**  
Attending to the imaging system to insert samples, obtain images, check results, then move to the next sample takes significant time.



Multiple slide cassettes automatically load and unload samples from the microscope.



**Imaging**  
Experiments are run and images acquired in an automated fashion.



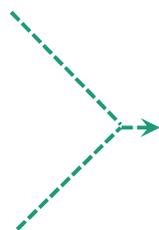
**Getting Samples to and from the Instrument**  
Reliably moving samples on and off of the instrument requires a stable and robust platform.



Robotics transfer slides to and from the microscope



**Processing and Analysis**  
During and post-acquisition, processing and analysis functions are performed to generate statistics for further interpretation.



An optional dedicated server can manage offline processing, analysis, and storage.



**Data Archival**  
Storage of experimental data, especially large data, can be difficult if it has to be transferred off of the acquisition workstation.

 **Potential Bottleneck**

# Key Features

## The Perfect Platform for High Content Slide Imaging

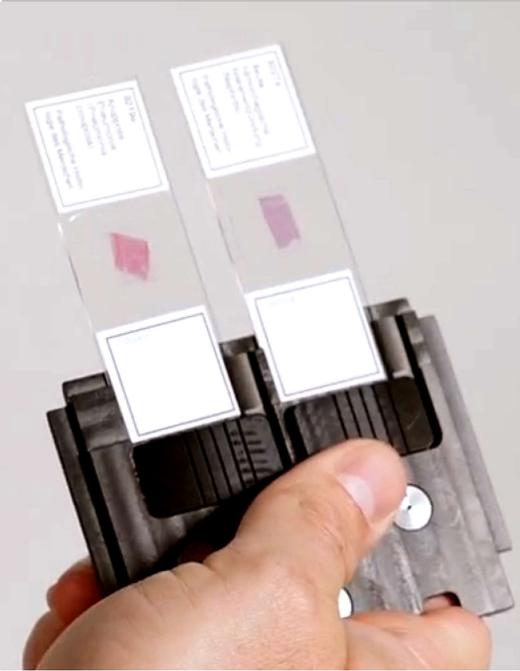
An Ni-E motorized upright microscope platform with several choices for high performance optics and a wide range of available detectors means the highest quality results.

Using the Marzhauser Slide Express 2 automated slide loader, stability and repeatability is maintained by a solid platform with precision connection to the microscope body, resulting in flawless loading and unloading of samples.

With a unified software package across all microscope platforms, data can be easily shared and visualized as well as learning time reduced.



# STABLE AND RELIABLE



Slides are inserted into the cassette using two-slide holders, which insure the slides are flat and oriented properly for imaging.

Cassettes are loaded into a motorized enclosure with space for up to 3 cassettes, or a total of 120 slides.

To place slides on the imaging area, the two slide holders are extracted from the cassettes by magnetic attachment. Because the stage is integrated and attached to the loading mechanism, a stable and reliable transfer of slides results.



# NIS-Elements Software



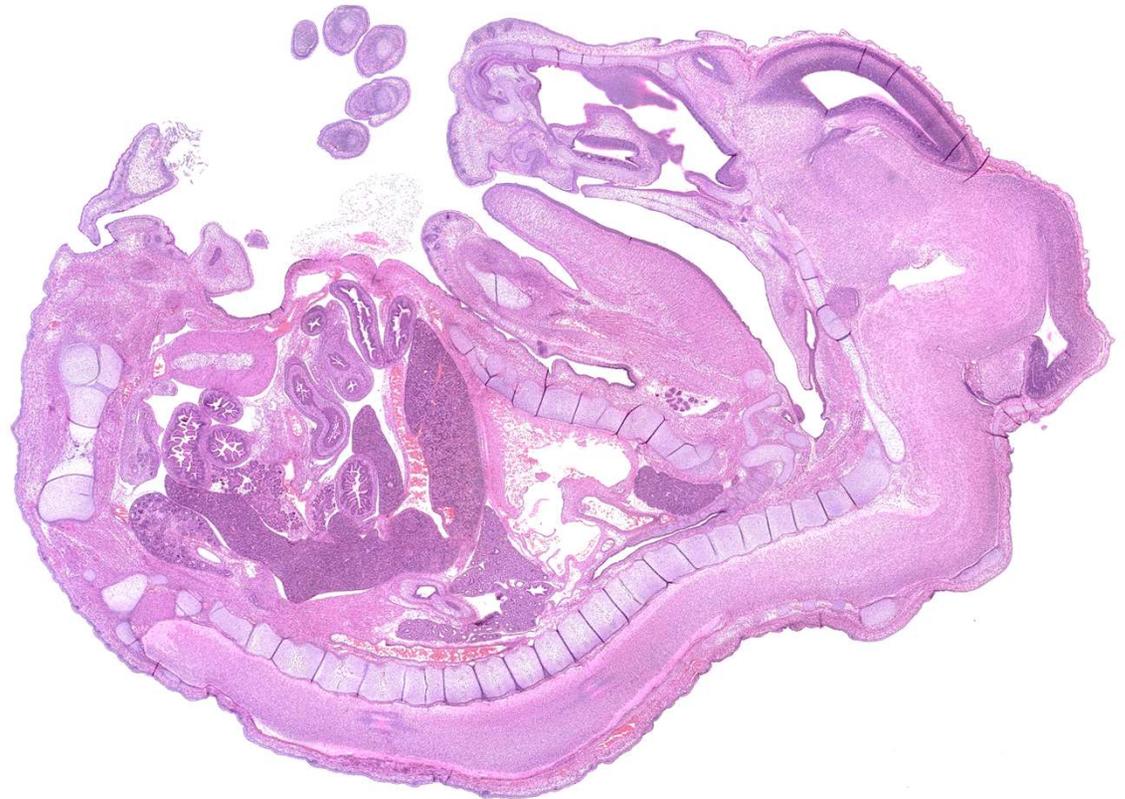
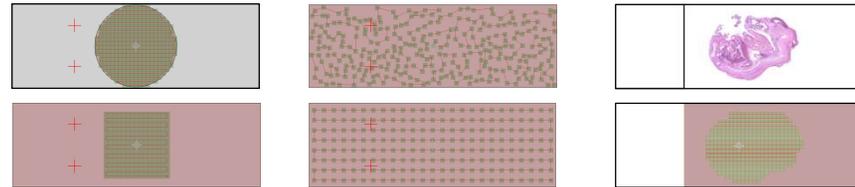
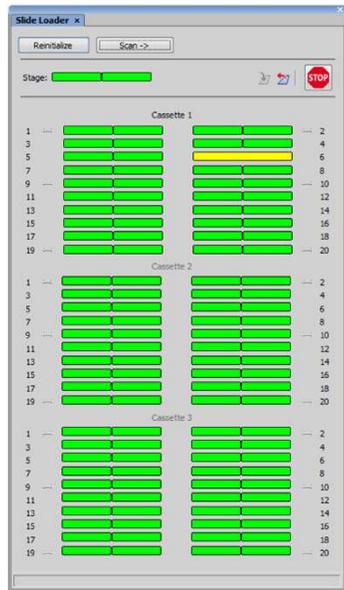
NIS-Elements reads and catalogs the cassettes, and automates the delivery of specimens to the microscope. An indicator shows which cassette location is currently loaded onto the microscope stage.

Slide scanning can be in a defined area and/or pattern, or specimen boundaries can be detected and the area within used as a tiling, fixed, or random pattern.

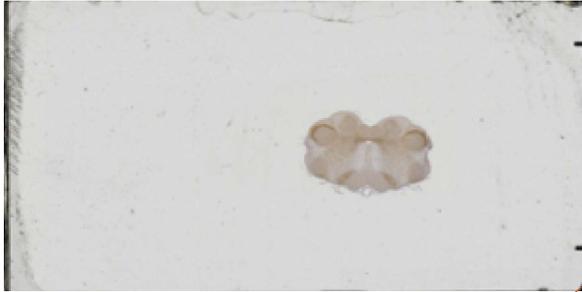
These areas can be defined at the time each slide is loaded, or a predefined area used for all slides. Users

can select specific slides to acquire, or choose to scan all slides in all cassettes in one run.

Imaging can be performed in brightfield and/or epifluorescence modalities, with results tiled or presented as image stacks.



# Acquisition

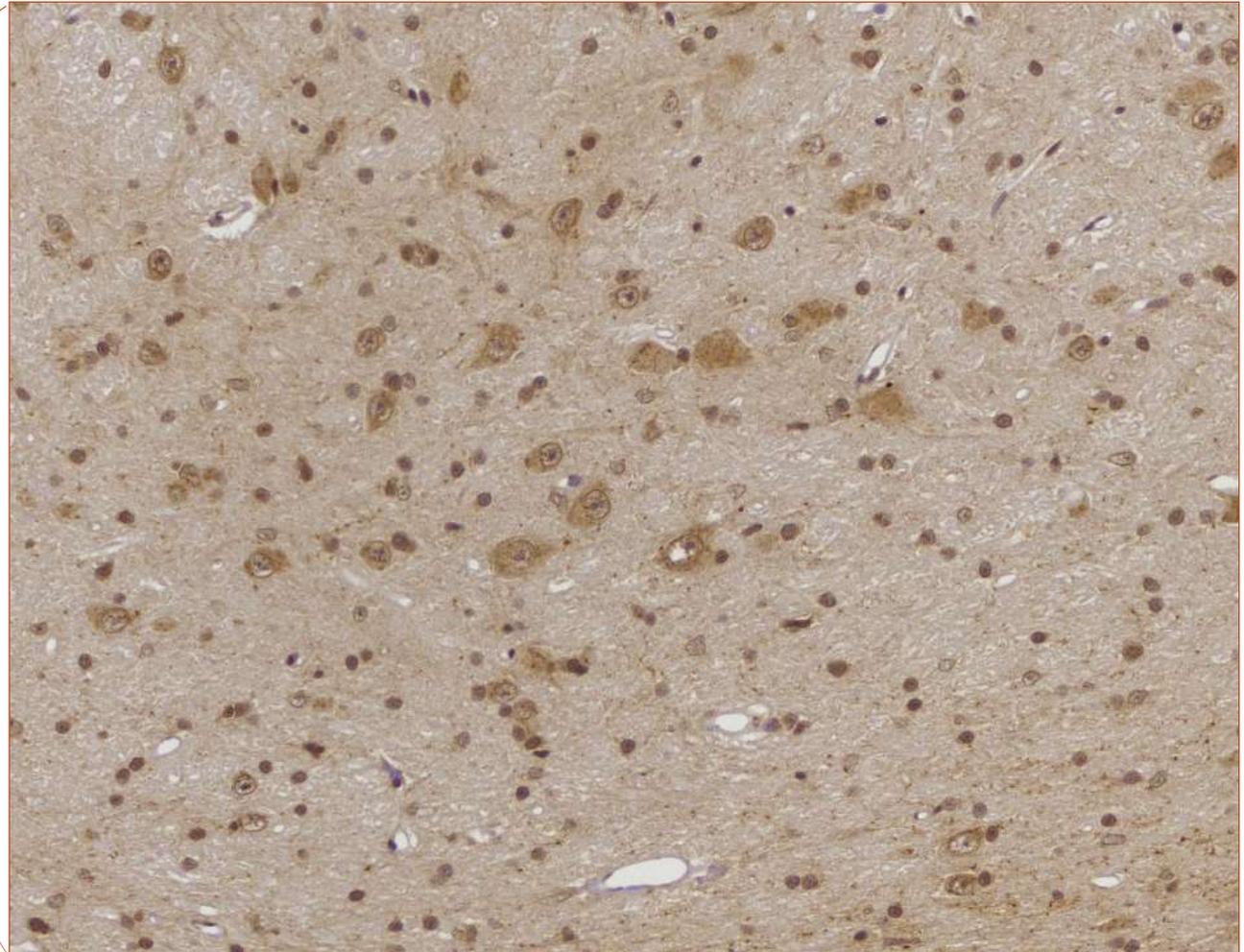


Slides can be quickly scanned at low magnification to locate items of interest, including several separate items per slide...



...then rescanned at high resolution and high magnification, so that only the areas of the slide with useful data are acquired and tiled.

High resolution images make up the tiled scan. Not acquiring blank areas results in much faster scanning and less storage space required per slide.



# Image Analysis



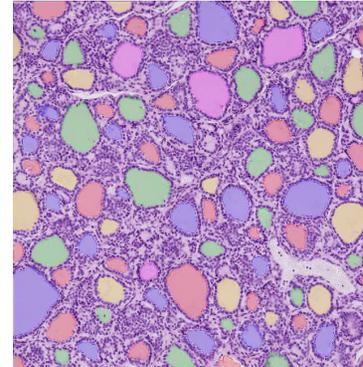
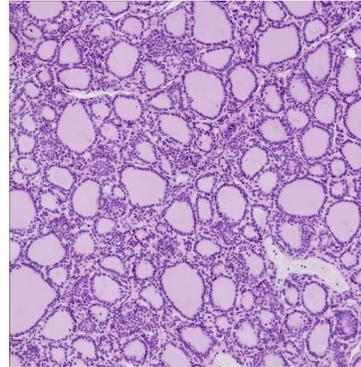
NIS-Elements' **General Analysis** engine employs a powerful processing and analysis toolbox for users.

Dedicated turnkey assays can be applied to image data as well as user-customized assays for specific applications.

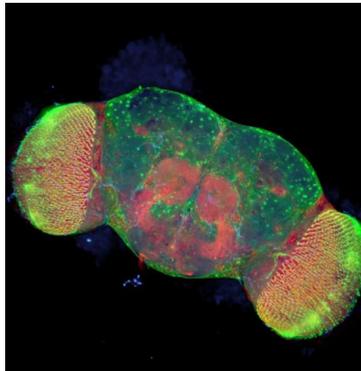
All routines can be executed during acquisition, for example: to modify the course of an experiment, or post-acquisition on the dedicated server.

Assay results can be collated and statistical information displayed, or be exported.

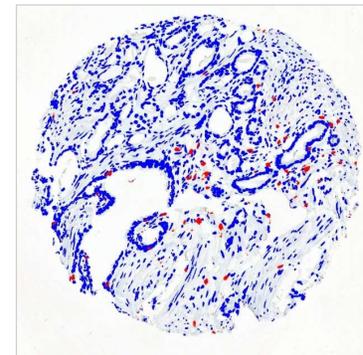
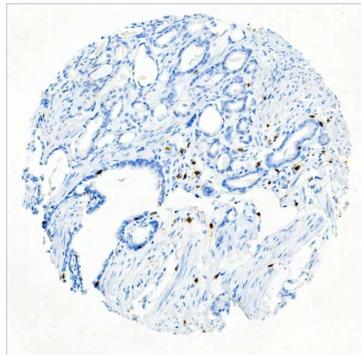
Some examples are shown here.



There are many tools which can be customized to detect and automatically segment and classify objects. In this example, pituitary gland sections were imaged over a large field of view, tiled, and colloids were auto-detected and measured.

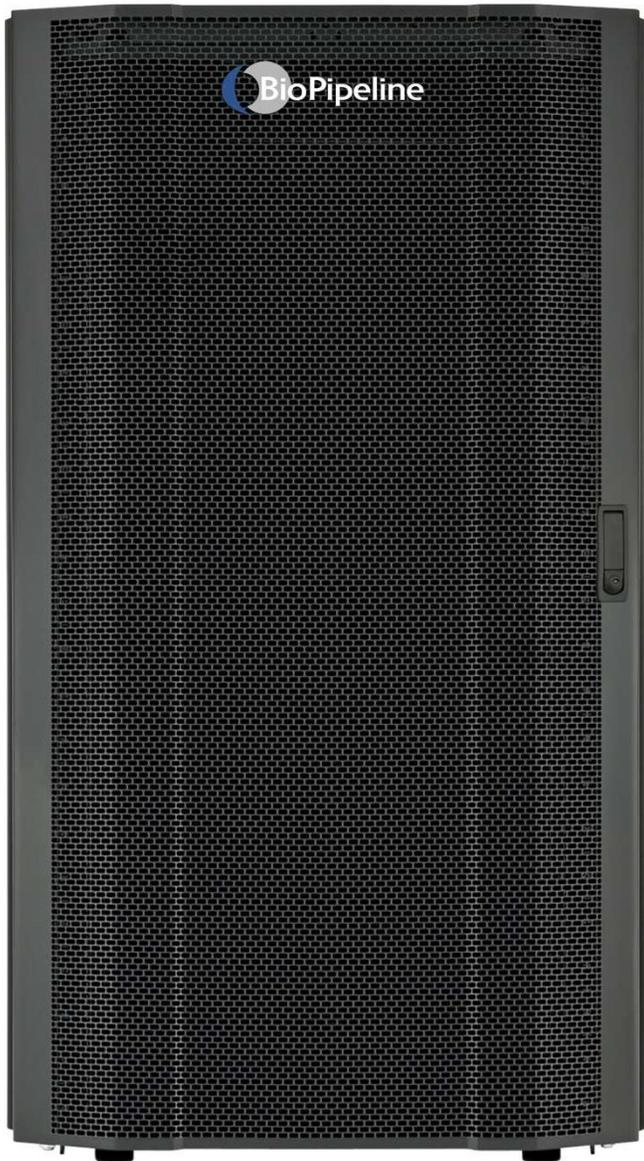


This example tool computes areas occupied by different fluorescence markers in tiled brain images.



This tissue microarray punch was segmented using an IHC detection tool which automatically finds hematoxylin and diaminobenzidine (DAB) colors.

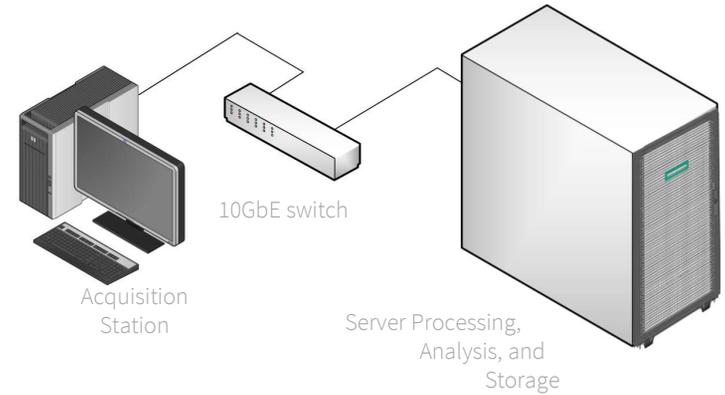
# Dedicated Server



## Server-side Processing, Analysis, and Storage

Because data can be saved directly to the server, it means multiple users can view their data while the system is busy acquiring new images. Likewise, the server can perform processing and analysis tasks automatically on designated locations when data is placed there.

Because the server is connected to the imaging workstation by a dedicated switch, slow traffic on the existing network will not affect the transfer speed between acquisition and storage devices.



## Data Transfer

BioPipeline's data transfer rates from the imaging workstation to the dedicated server exceed most traditional networks by 10-100x by using dedicated 10 GbE connections.



## Storage Capacity

Having over 40x the storage capacity of a typical high-end imaging workstation, with expandability for more, the included **BioPipeline Server** with direct dedicated 10GbE network connection allows for more uninterrupted imaging and offline processing and analysis.

Typical Imaging workstation: 6TB

BioPipeline Server: 200TB\*

\*expandable

# Configurations

## Full Configuration



Microscope



Robotics



Software and modules



Workstation



DIA and EPI light sources



Server storage



Server-side software



Anti-vibration table

## Lite Configuration



Microscope



Robotics



Software and modules



Workstation



DIA light source

The Lite configuration of BioPipeline Slide is for users who may not require epifluorescence or are space limited, and do not require server processing or storage.

Epifluorescence can be added to this configuration if desired.

# Selectable Components



## Options for All Configurations



Detectors



Objectives



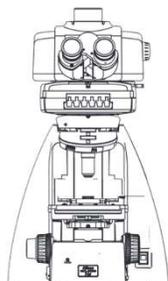
Additional software modules



Workstation desk

Both full and lite configurations have selectable detectors, objective lenses, and additional software components to customize the system for the desired applications.

# Specifications



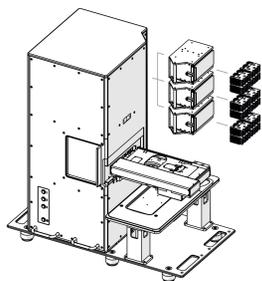
## Microscope Specifications

<b>Imaging Modalities</b>	Transmitted Light Brightfield Widefield Epifluorescence Point Scanning confocal (option with C2)
<b>Illumination</b>	8 channel Epifluorescence LED LED transmitted Light Laser illumination for confocal sources (option)
<b>Objectives</b>	All air objectives lenses can be used for high content
<b>Imaging Methods</b>	Multidimensional XY, Z, wavelength, multi-stage position including tiling
<b>Autofocus</b>	Software contrast-based autofocus
<b>Hardware Triggering</b>	Supports direct hardware triggering of light sources and shutters
<b>Antivibration Table</b>	Included 30x48" x 6" table with full system
<b>Dimensions (without detector*)</b>	32cm x 60cm x 510cm typical (height increases 70mm with additional EPI port)
<b>Power Consumption</b>	

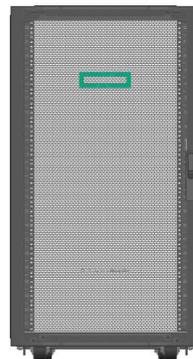
\*see detector brochures for detector specification details

## Slide Loader Specifications

<b>Device</b>	Marzhauser Wetzlar SlideExpress2
<b>Application</b>	Slide loading
<b>Capacity</b>	3 Cassettes each holding up to 40 1x3 inch glass slides: total of 120 slides
<b>Robotics</b>	Internal elevator robot and picker robot
<b>Communication</b>	USB through Tango controller
<b>Power Requirements</b>	100V / 50Hz 115V / 60Hz / 240V / 50Hz ; switchable
<b>Stage Specifications</b>	Accuracy +/- 1um; repeatability <1um bidirectional; resolution 0.05um step; max speed 100mm/s
<b>Power Consumption</b>	<100W
<b>Dimensions</b>	108 x 75 x 108.5cm



## Server Specifications



<b>Rack Size</b>	22U
<b>Processor</b>	Intel Xeon Silver 412 2.6 GHz
<b>OS</b>	Windows Server
<b>RAM</b>	128 GB
<b>Storage Type</b>	SAS
<b>Storage Capacity</b>	250TB
<b>Network</b>	12x 10GBase-T + 4x 1Gbit/10Gbit SFP+
<b>Support</b>	3 year Foundation Care Service and Support
<b>Power Consumption</b>	600W (average) – 1300W
<b>Options</b>	Tape Backup, 144TB Expansion
<b>Physical Dimensions</b>	(W x D x H) 90.00 x 129.20 x 151.00 cm

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. August 2019 ©2019 Nikon Instruments, Inc.

 <b>WARNING</b>	TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT.
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**WARNING-LASER RADIATION  
AVOID EXPOSURE TO BEAM  
CLASS 3B LASER PRODUCT**  
Total Power 500mW MAX.  
CW 400~700nm  
IEC/EN60825-1 : 2007, 2014

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

**DANGER-VISIBLE AND INVISIBLE  
LASER RADIATION AVOID EYE  
OR SKIN EXPOSURE TO DIRECT  
OR SCATTERED RADIATION  
CLASS 4 LASER PRODUCT**  
Total Power 1500mW MAX.  
CW 370~790nm  
IEC/EN60825-1 : 2007, 2014

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No.50 dated June 24, 2007.



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