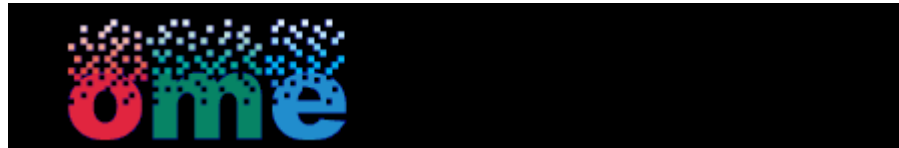




Image Processing with KNIME



Open Microscopy Environment

<http://www.openmicroscopy.org>

Bio-Formats

Java library for
reading and writing
biological image files



<http://www.loci.wisc.edu/bio-formats>

OME-XML¹⁾

A common
specification for storing
details of microscope
set-up and image
acquisition.



<http://www.ome-xml.org>

OMERO- Platform

A client-server
software for
visualisation,
management and
analysis of biological
microscope images.



...

1) Goldberg, I.; Allan, C.; Burel, J.-M.; Creager, D.; Falconi, A.; Hochheiser, H.; Johnston, J.; Mellen, J.; Sorger, P. & Swedlow, J. The Open Microscopy Environment (OME) Data Model and XML file: open tools for informatics and quantitative analysis in biological imaging Genome Biology, 2005, 6, R47



Image Definition in OME

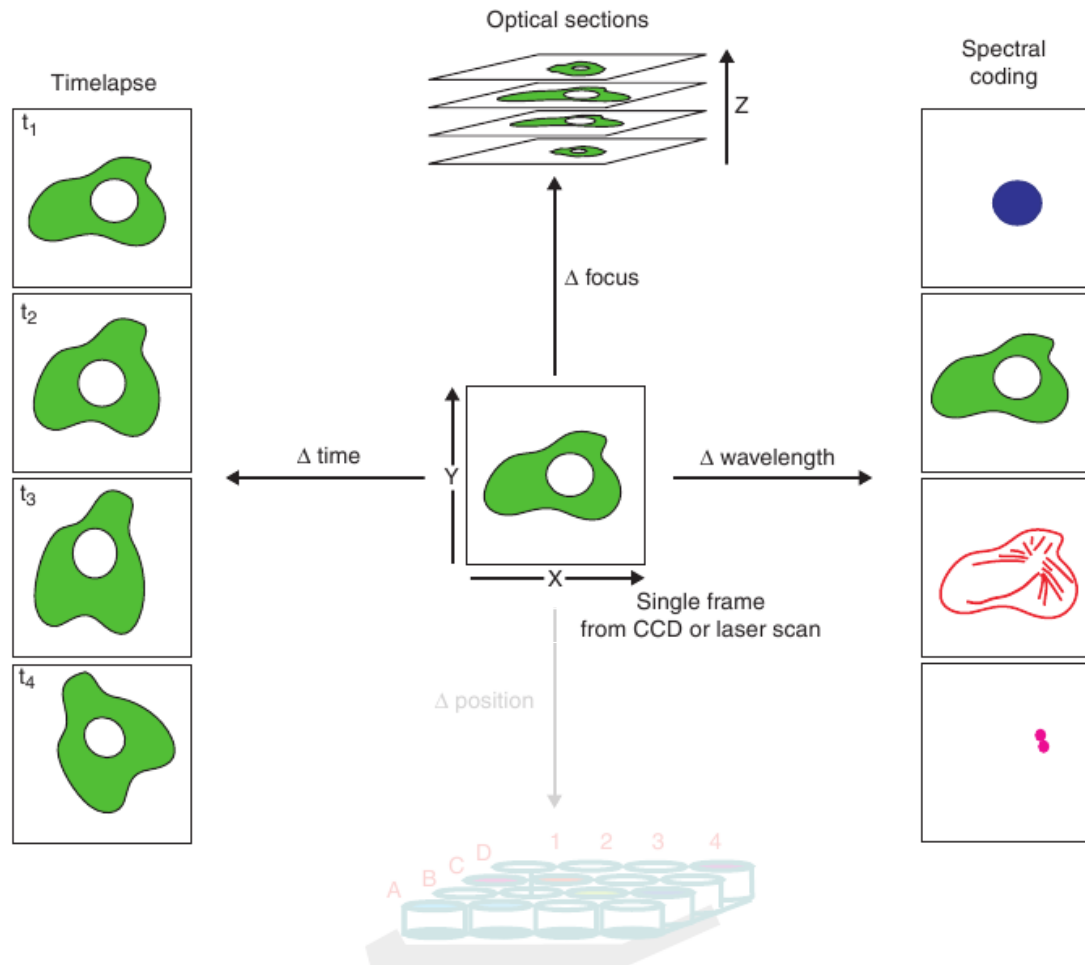




Image Definition in KNIME

Image Data Cell

Image Plane Stack

- # focal planes (*Z*)
- # channels (*C*)
- # time points (*T*)

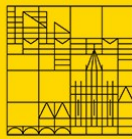
Image Plane

- image width (*X*)
- image height (*Y*)

Pixel Data

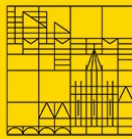
- max value

```
1 143 255
23 5 0
100 55 32
200 234 34
```



Exemplary Class Usage

```
ImagePlaneStack ips =  
    ((ImagePlaneStackValue)cell).getImagePlaneStack();  
  
//get the image plane at the specific coordinate (Z,C,T)  
ImagePlane ip = ips.getImagePlaneAt(0,1,0);  
WritableImagePlane wip = ip.getWritableInstance();  
  
//iterate over the image plane  
for(int x = 0;x < ip.getWidth(); x++) {  
    for(int y = 0;y < ip.getHeight(); y++) {  
        //modify the pixel data  
        int val = ip.getPixel(x,y);  
        wip.setPixel(x, y, ip.getMaxValue() - val);  
    }  
}  
...  
...
```



Some basic Nodes

Image Reader



Reads image(-stacks)

Image Writer



Writes image stacks

Single Cell Viewer



To view Image stacks

Stack Combiner



Stack Splitter



ImageJ Macro



To execute ImageJ macros

Connected Component Analysis



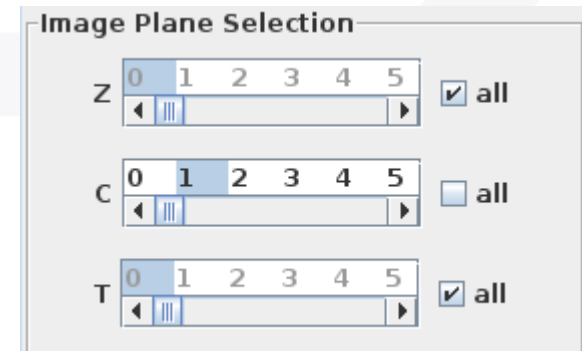
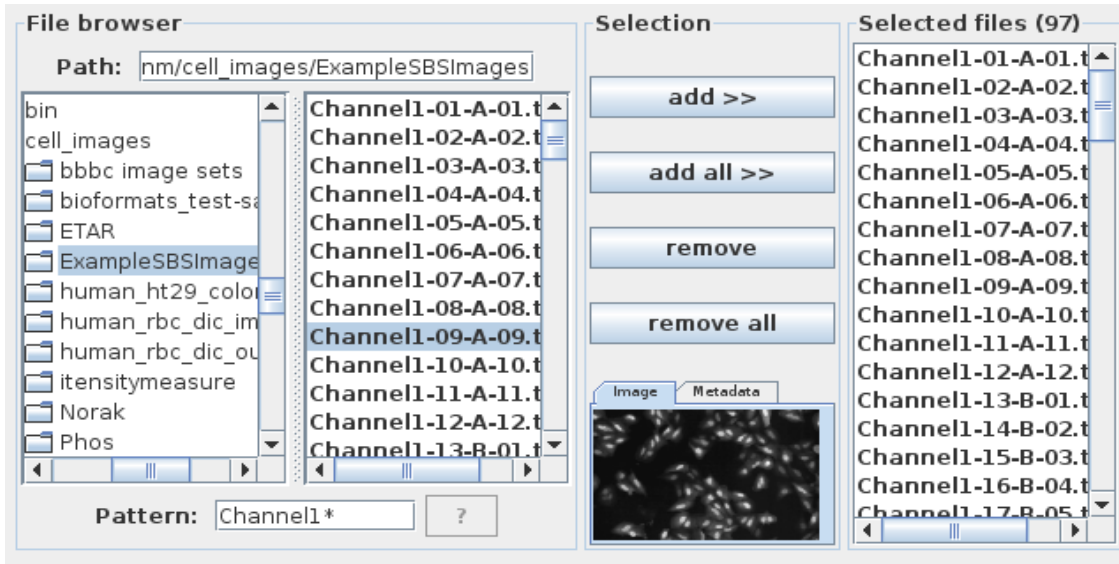
Node 10

Image Conversion



Node 9

Supported file formats: bmp, jpeg, jp2, avi, png, mov, tiff, img, seq, flex, lsm, ...





Some basic Nodes

Image Reader



Reads image(-stacks)

Image Writer



Writes image stacks

Single Cell Viewer



To view Image stacks

Stack Combiner



Stack Splitter



ImageJ Macro



To execute ImageJ macros

**Connected Component
Analysis**



Node 10

Image Conversion



Node 9

Supported file-formats: avi, jpeg, png, mov, tiff, eps, ics, jp2, ome



Some basic Nodes

Image Reader



Reads image(-stacks)

Image Writer



Writes image stacks

Single Cell Viewer



To view image stacks

Stack Combiner



Stack Splitter



ImageJ Macro



To execute ImageJ macros

Connected Component
Analysis

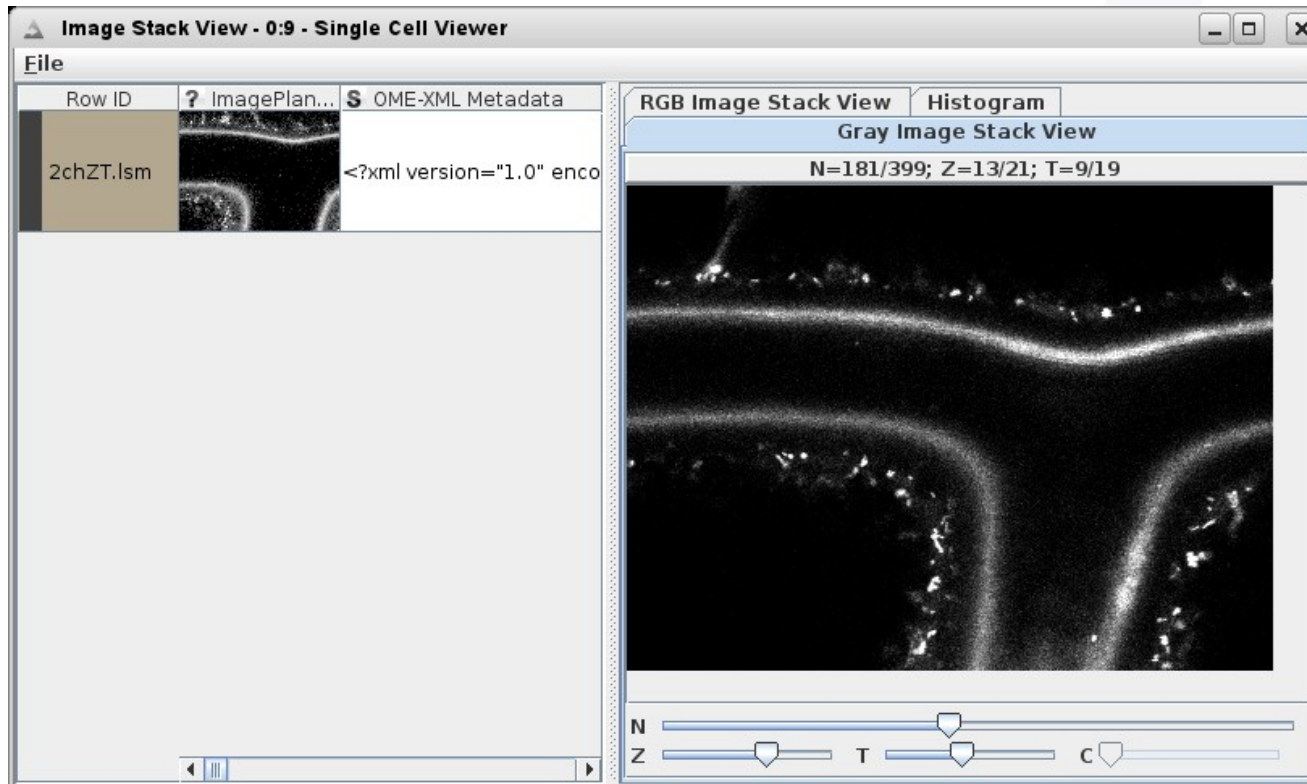


Node 10

Image Conversion



Node 9





Some basic Nodes

Image Reader



Reads image(-stacks)

Image Writer



Writes image stacks

Single Cell Viewer



To view Image stacks

Stack Combiner



Stack Splitter



ImageJ Macro



Execute ImageJ macros

**Connected Component
Analysis**

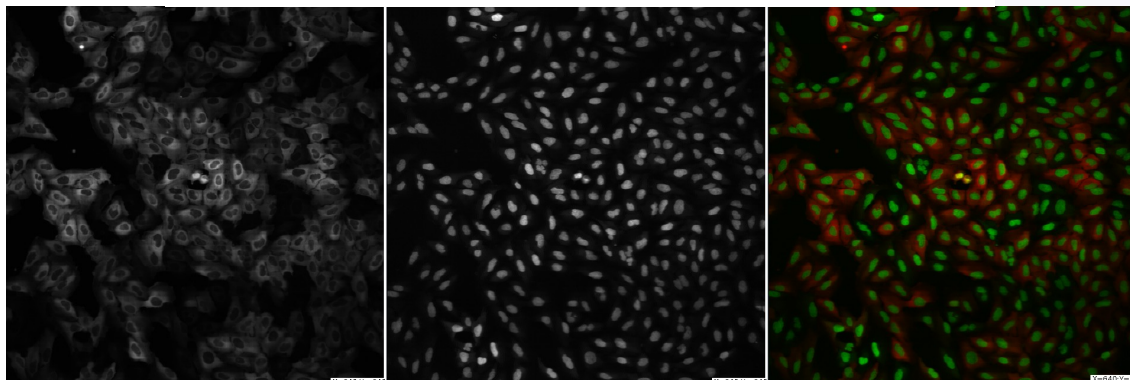
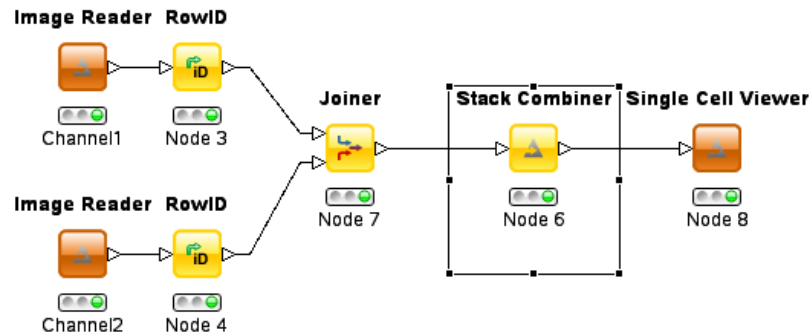


Node 10

Image Conversion



Node 9





Some basic Nodes

Image Reader



Reads image(-stacks)

Image Writer



Writes image stacks

Single Cell Viewer



To view Image stacks

Stack Combiner



Stack Split



ImageJ Macro



To execute ImageJ macros

**Connected Component
Analysis**



Node 10

Image Conversion



Node 9



Some basic Nodes

Image Reader



Reads image(-stacks)

Image Writer



Writes image stacks

Single Cell Viewer



To view Image stacks

Stack Combiner



Stack Splitter



ImageJ Macro



To execute ImageJ macro

Connected Component
Analysis



Node 10

Image Conversion



Node 9

Image Reader



Node 1

Histogram
Operations



Node 2

Binary operations

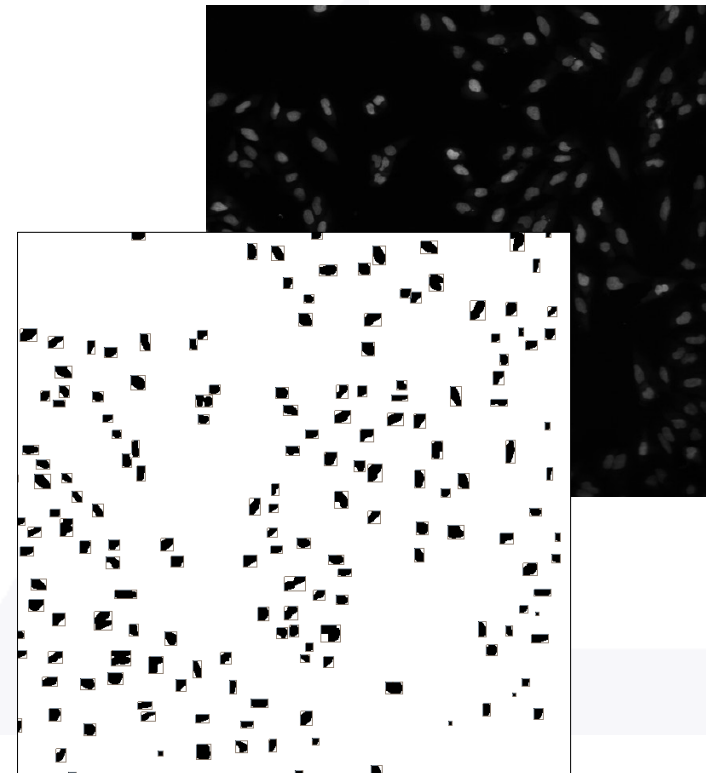


Node 3

Connected Component
Analysis



Node 4





Some basic Nodes

Image Reader



Reads image(-stacks)

Image Writer



Writes image stacks

Single Cell Viewer



To view Image stacks

Stack Combiner



Stack Splitter



ImageJ Macro



To execute ImageJ macros

Connected Component
Analysis



Node 10

Image Conversion



Node 9

Change image size

Resize (%)

Change pixel domain

Maximal pixel value



Thank you!

