PerkinElmer®
*For the Better*

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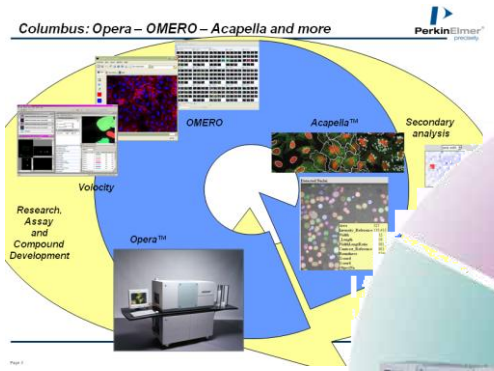
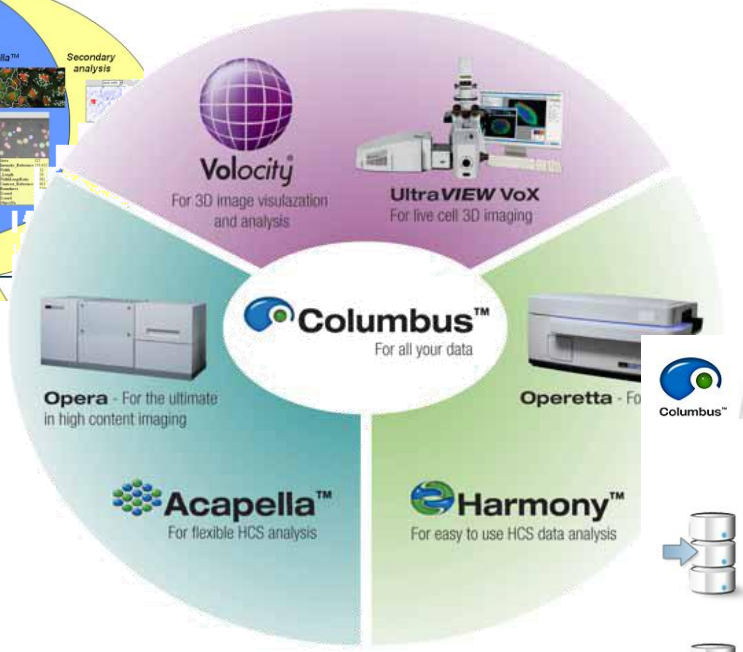
# Columbus
# HCS solution based on OMERO

Karsten Kottig, Martin Daffertshofer

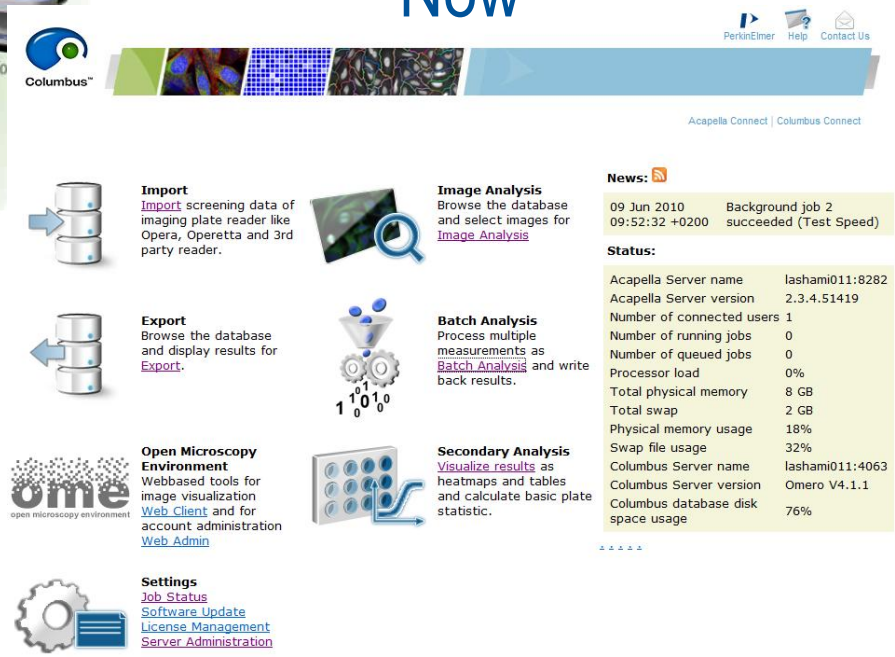
## Starting Point – OME User Meeting 2008




## OME User Meeting 2009




## Now



# Columbus: Covering High Content Analysis Workflow




**Import**
Import screening data of imaging plate reader like Opera, Operetta and 3rd party reader.

**Export**
Browse the database and display results for Export.

**Open Microscopy Environment**
Webbased tools for image visualization Web Client and for account administration Web Admin

**Settings**
Job Status
Software Update
License Management
Server Administration

**Image Analysis**
Browse the database and select images for Image Analysis

**Batch Analysis**
Process multiple measurements as Batch Analysis and write back results.

**Secondary Analysis**
Visualize results as heatmaps and tables and calculate basic plate statistic.

**News:**

| | |
|---|---|
| 09 Jun 2010 09:52:32 +0200 | Background job 2 succeeded (Test Speed) |

**Status:**

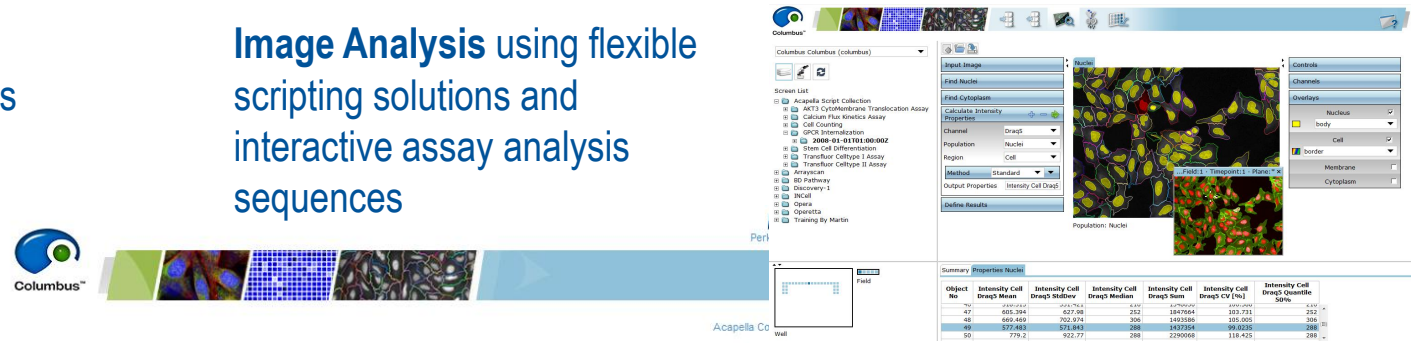
| | |
|---|---|
| Acapella Server name | lashami011:8282 |
| Acapella Server version | 2.3.4.51419 |
| Number of connected users | 1 |
| Number of running jobs | 0 |
| Number of queued jobs | 0 |
| Processor load | 0% |
| Total physical memory | 8 GB |
| Total swap | 2 GB |
| Physical memory usage | 18% |
| Swap file usage | 32% |
| Columbus Server name | lashami011:4063 |
| Columbus Server version | Omero V4.1.1 |
| Columbus database disk space usage | 76% |

# Columbus: Covering High Content Analysis Workflow…and more

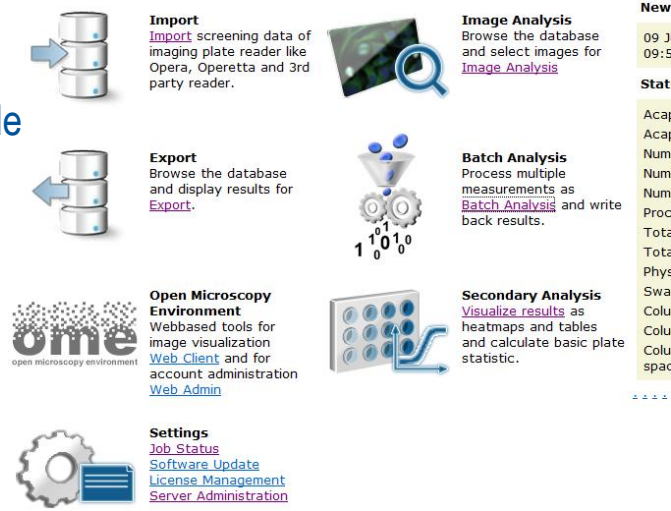


**Import** most popular HCS images + meta-data + results Opera, Operetta, Arrayscan, InCell, Biostation, Pathway, Discovery-1, ScanR,…

**Image Analysis** using flexible scripting solutions and interactive assay analysis sequences



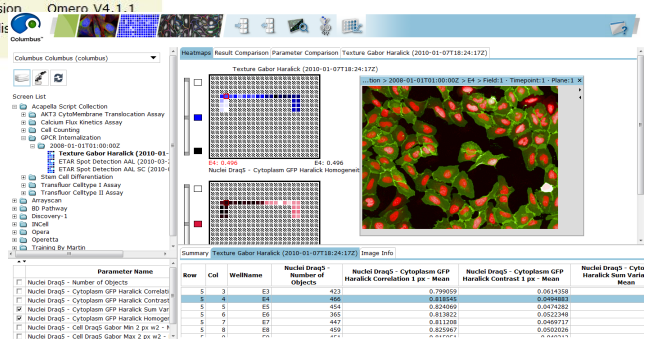

**Export** images (various formats incl. OME-TIF) + analysis + results incl. single cell results




**Batch Analysis** applies image analysis solution to multiple measurements

Includes **OME Community Tools** WebAdmin, WebClient, Insight, Importer,…

**Secondary Analysis** displays results and plate statitics as heatmaps, scatter plots, fingerprints, tables,…



# New in Columbus 2.1: Interactive Image Analysis using Assay Language

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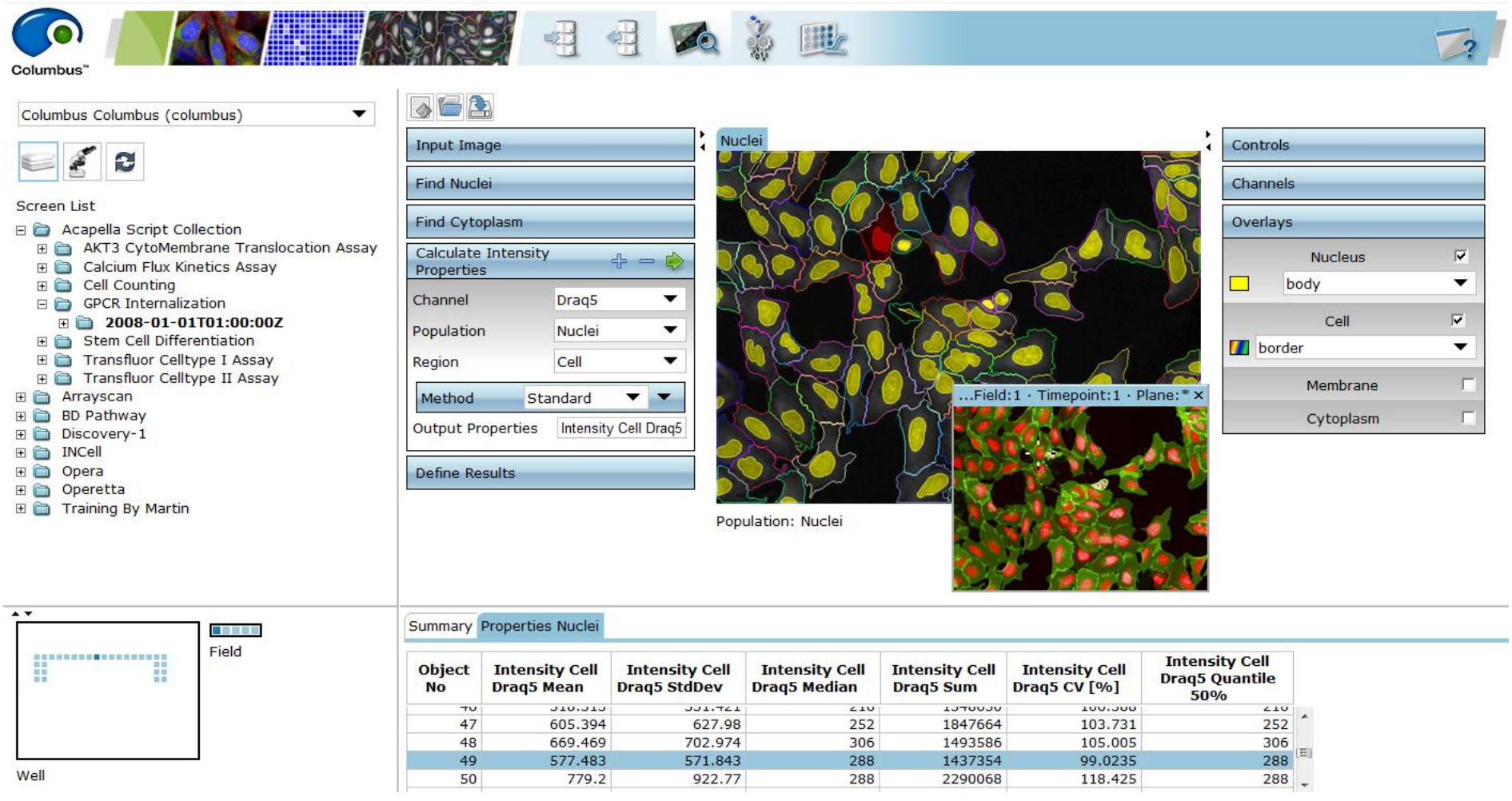
Scientific analysis with **Visual Feedback** for illustration and optimization




Easy access to **Single Cell** information

# New in Columbus 2.1: Enhanced Result Visualization

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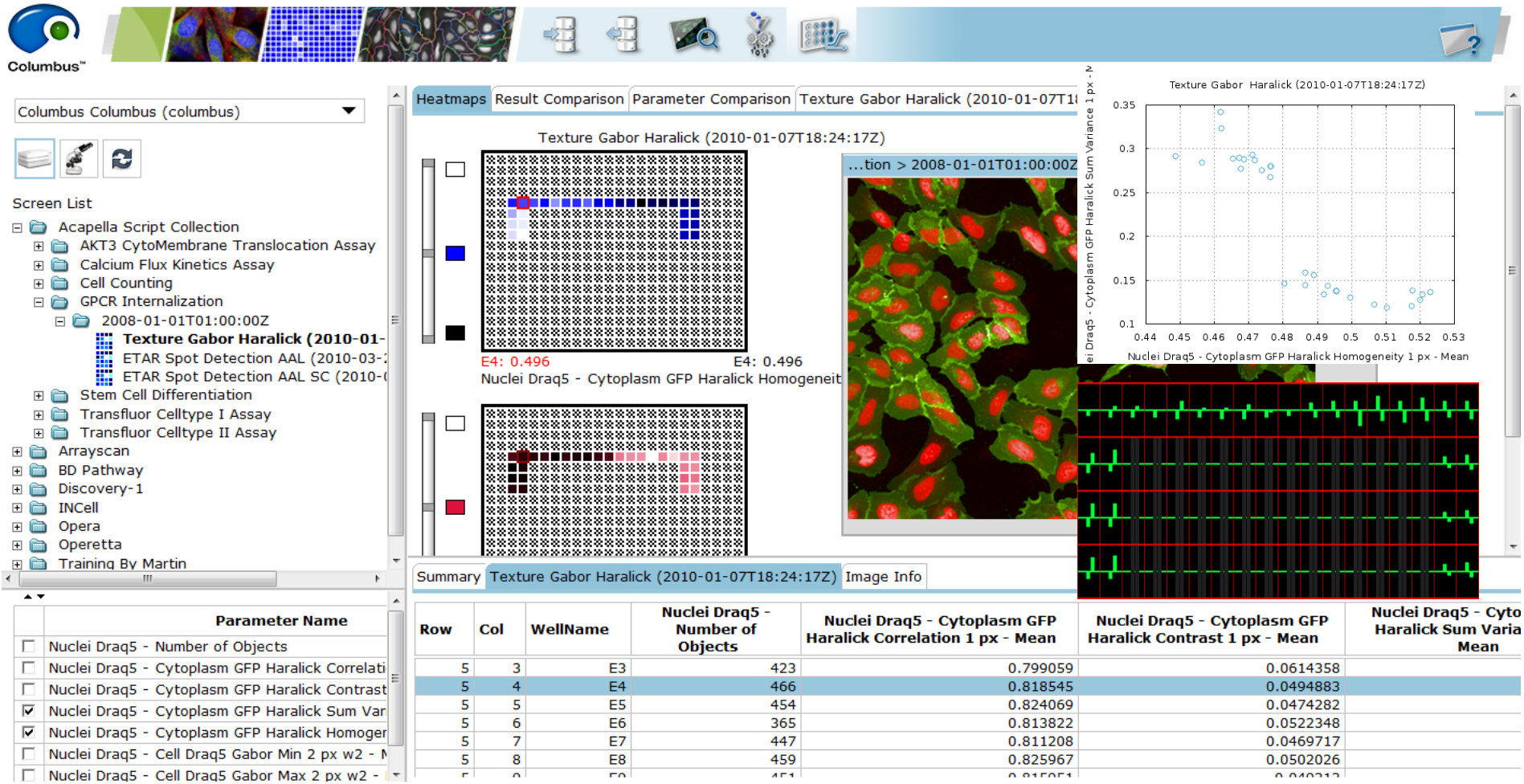
## Scientific analysis with **Visual Feedback** for illustration and optimization




| Row | Col | WellName | Nuclei Draq5 - Number of Objects | Nuclei Draq5 - Cytoplasm GFP Haralick Correlation 1 px - Mean | Nuclei Draq5 - Cytoplasm GFP Haralick Contrast 1 px - Mean | Nuclei Draq5 - Cyto Haralick Sum Varia Mean |
|---|---|---|---|---|---|---|
| 5 | 3 | E3 | 423 | 0.799059 | 0.0614358 | |
| 5 | 4 | E4 | 466 | 0.818545 | 0.0494883 | |
| 5 | 5 | E5 | 454 | 0.824069 | 0.0474282 | |
| 5 | 6 | E6 | 365 | 0.813822 | 0.0522348 | |
| 5 | 7 | E7 | 447 | 0.811208 | 0.0469717 | |
| 5 | 8 | E8 | 459 | 0.825967 | 0.0502026 | |

## Link between Results and Images

# Columbus: Extendable by Open Source and Open Standards

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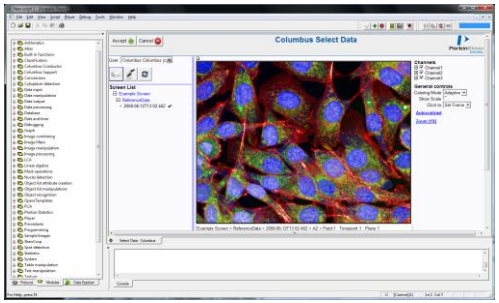
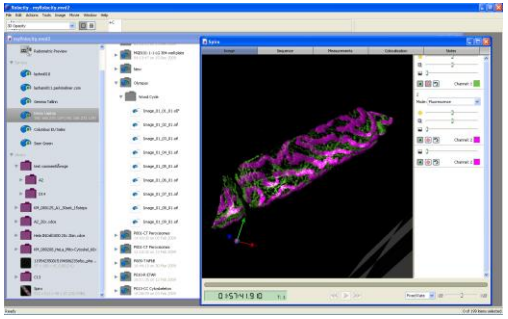
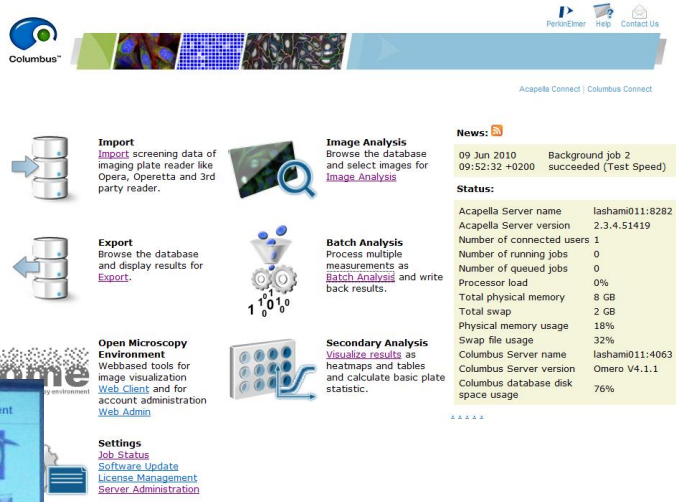
## Acapella

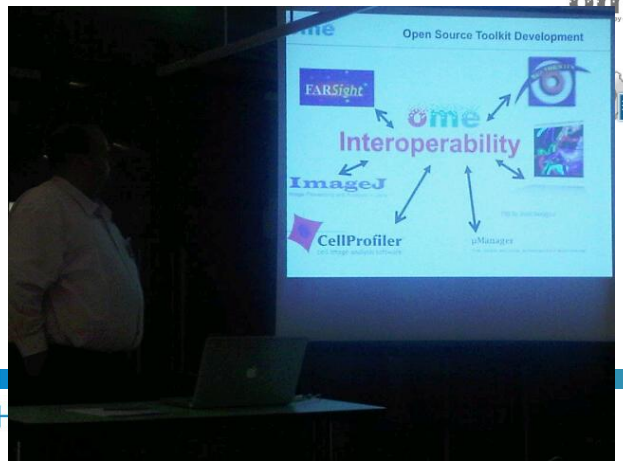



## Volocity

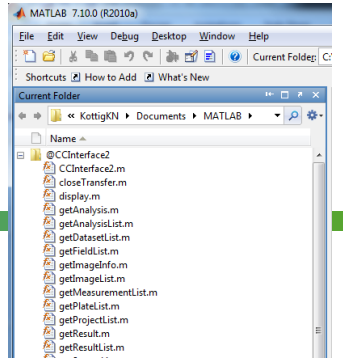


**Open Interface** by SOAP/wsdl webservice technology allows integration by open source and closed source components




## Matlab



**Stability / Speed**

- Scalability of image retrieval (Memory leaks, Table query overhead. Change pixels concept?)
- Better utilization of multi-core system

**Covered in OMERO 4.2?**

- Results (Well, Field, Frame as Table, Functional, Overlays-ROI)
- Plate Definition prepared for Assay Layout and Analysis Layout
- Replace Screen Acquisition by Plate Acquisition
- More granularity on and manageable user rights

**OME-TIF/XML/Schema**

- clean up content from “reader point of view” (use cases)
- integrate orientation matrix
- support multidimensional data (FLIM, Spectral, Non-Imaging,…)
- More/flexible levels (User-Project-Screen-Plate-Measurement-Wells)

**Beta/Release?**

- remove partly working parts before “release” a “beta”

# Many Thanks To…



Jason Swedlow
...and the full OME Team


PerkinElmer
- Martin Daffertshofer
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- Kaupo Palo
- Heiki Sonajalg
- Michael Heitmann
- Mike Randell
- Steve Baxter

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- Michael Klemm

IP Paris
- Anne Danckaert
- Nathalie Aulner
- Spencer Shorte

Novartis
Monash

...and a lot more ...

karsten.kottig@perkinelmer.com