COPAS *VISION*™

Large Particle Flow Cytometer with Imaging and Sorting

COPAS VISION, our newest large particle flow cytometer, adds brightfield imaging to our large particle sorting capabilities. As with our original COPAS platform of flow cytometers it provides automated high throughput analysis and sorting of viable multicellular organisms, cell clusters, bead-based libraries and other sample types that are too large or too fragile for traditional flow cytometers. **COPAS VISION** has expanded on these capabilities in several ways, most noteworthy is the ability to capture images of the sample objects.

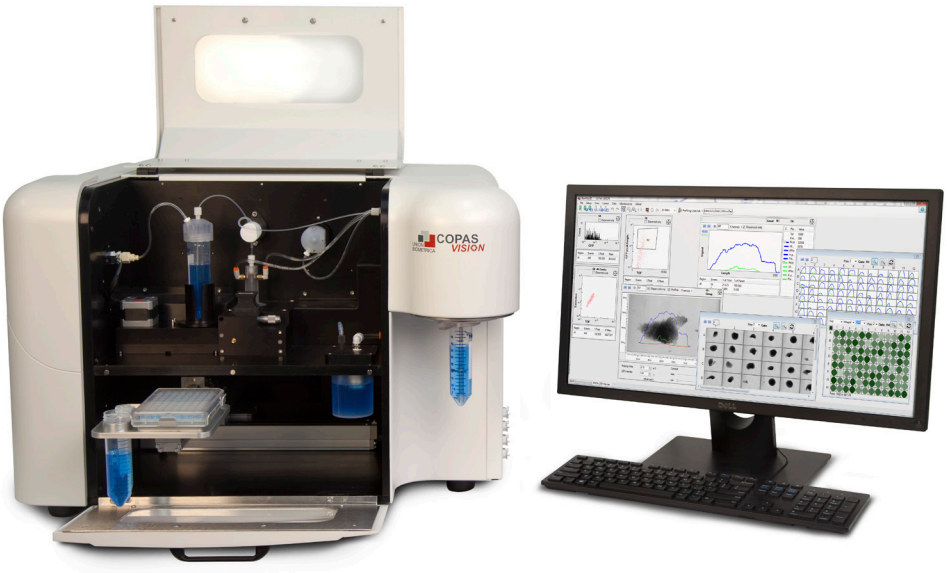
Large Particle Flow Cytometry

Traditional flow cytometry is well established for analyzing, and in some cases sorting, single cells. This technology was not available to the study of larger objects. Researchers of larger sample types were limited to the use of microscopes for analysis and manual manipulation, techniques that are tedious, error prone and severely limited in throughput. So there was a need for high throughput sorting technology of larger objects.

UNION BIOMETRICA

Large Particle Analysis and Sorting

Since 1998 researchers have been using Union Biometrica's COPAS™ family of sorters for analysis and sorting of particles which are too large or too fragile for traditional flow cytometers. These systems operate at lower pressures and use a proprietary, gentle air stream diverter for sorting.



The **COPAS VISION** provides a new level of capabilities for individual laboratories working with large particle samples and can benefit from having images, such as surveys of individuals in a sample (population monitoring) or verification of the identity of sorted events (in multiwell plate assays).

There are benefits to studying multicellular structures intact rather than reducing them to their individual cell components. Once cells self-organize into clusters they communicate and behave differently than in isolation. The **COPAS VISION** large particle cytometer allows you to study the cell-cell interactions found in tissues, tumors or organoids without the need to disrupt the clusters as for traditional analysis. Or, if you are working with model organisms, replacing manual sorting with a **COPAS VISION** instrument provides fast, sensitive, reproducible automation for gentle sorting and high throughput screens.

Features:

- Realtime brightfield imaging
- 10 - 750 µm objects
- 4 excitation lasers, 4-8 fluorescence detectors
- Profiler™ graphically displays optical density and fluorescence intensities along the axis of each particle
- Sorting by size, optical density, scatter, fluorescence and Profiler measurements
- Sorting principle by gentle air diverting, maintains sample integrity
- Collection in multiwell plate, tubes, and various receptacles

Sample Types:

Cellular

- Large Cells – hepatocytes, cardiomyocytes, other myocytes (multinucleated), osteoclasts
- Cell clusters – stem cell clusters (EBs, neurospheres), tumors/cancer (tumorspheres)
- Organotypic tissue fragments (kidney tubules, nephrons, pancreatic islets)
- Transient interactions – immune cells with target cells (dendritic cells)
- Encapsulated cells and cell clusters

Model organisms

- *C. elegans*, Drosophila, zebrafish

Marine samples

- Meiofauna, zooplankton, phytoplankton
- Freshwater samples – similar to marine samples, algae, mosquitoes
- Aquaculture – clam/scallop larvae collection, algae farming
- Water monitoring – public health, quality control

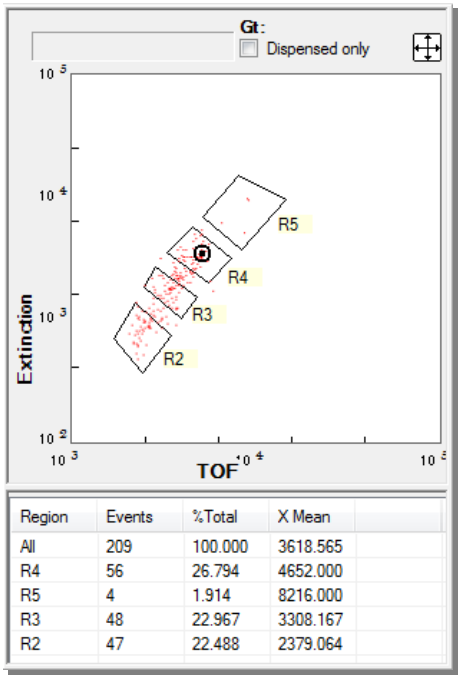
Paleolimnology

- Pollen grains, sediment samples

Plant and agricultural samples

- Arabidopsis and tobacco seeds, parasitic soil nematodes, insect eggs and larvae

Dispense Region:



Region	Events	%Total	X Mean
All	209	100.000	3618.565
R4	56	26.794	4652.000
R5	4	1.914	8216.000
R3	48	22.967	3308.167
R2	47	22.488	2379.064

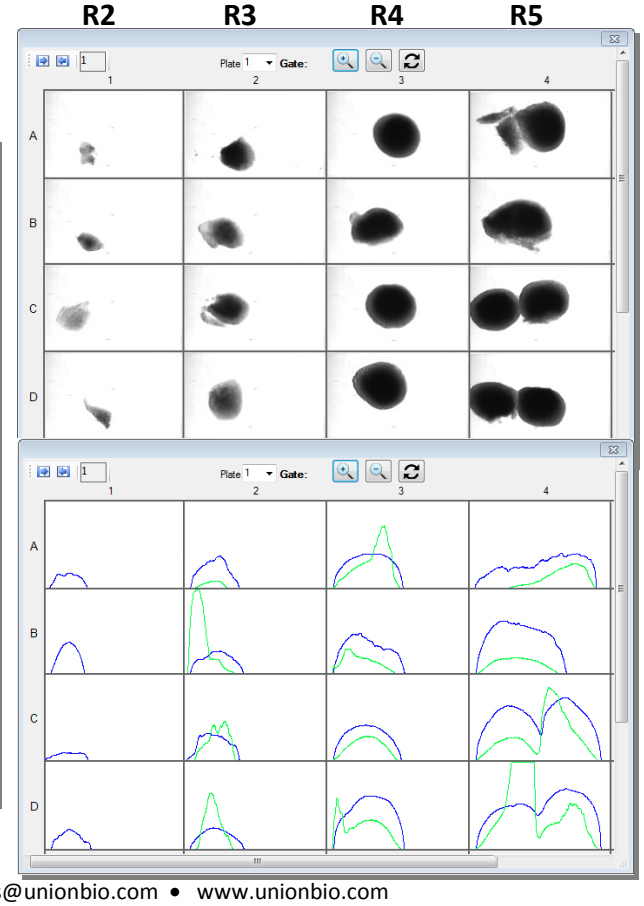


Plate View Feature of Dispensed Object images:

Plate View Feature of Dispensed Object Profiles:

Use of Imaging Data:

Object identification

- What is in a particular gate region
- Better assessment of size for sample types, such as worms, that can take various orientations in flow.
- Count and concentration

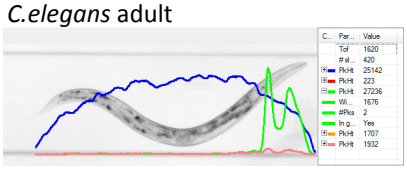
Morphology

- Post data collection analysis
- Measure grayscale morphological characteristics - circularity, elongation and curl, granularity, smooth vs rough surface, and more
- What objects/organisms make up this sample

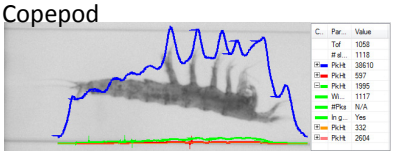
Quality control

- Support and verify the identity of a dispensed object
- Quality control for assays of all types in drug discovery, toxicology, basic research

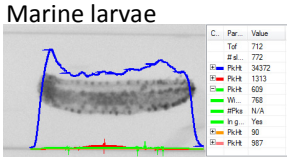
C.elegans adult



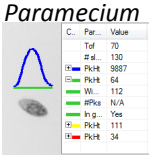
Copepod



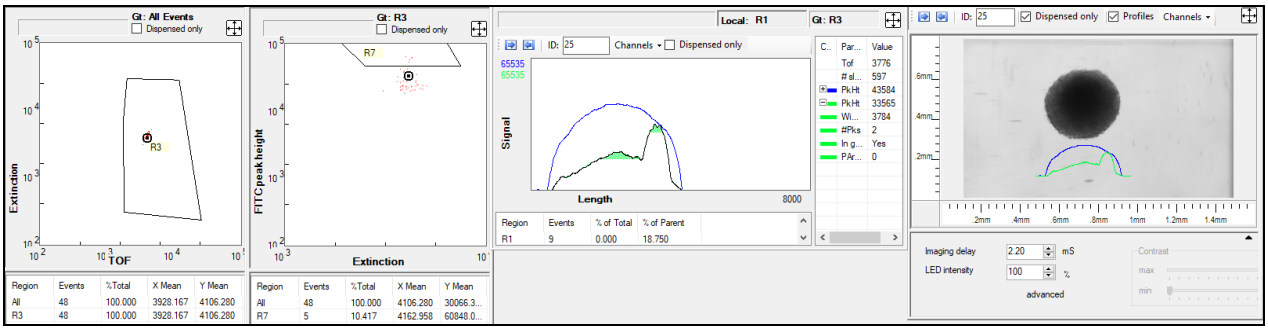
Marine larvae



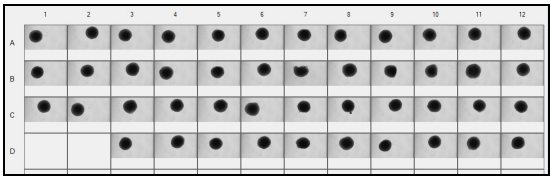
Paramecium



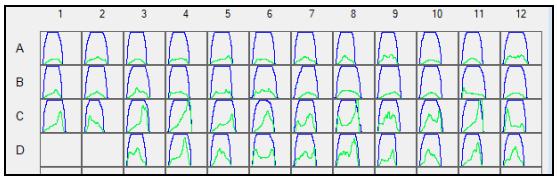
Images in flow:



Imaging and dispensing organoids with non-uniform GFP expression



Dispensed organoids to wells



Profiles of dispensed organoids by well

We wish to thank the Petr Baranov lab, Schepens Eye Research Institute, MGH, Boston, MA for providing organoid samples.

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