Datamining for automated in-situ classification

Copepods

Larvae

Larvae (facing right)

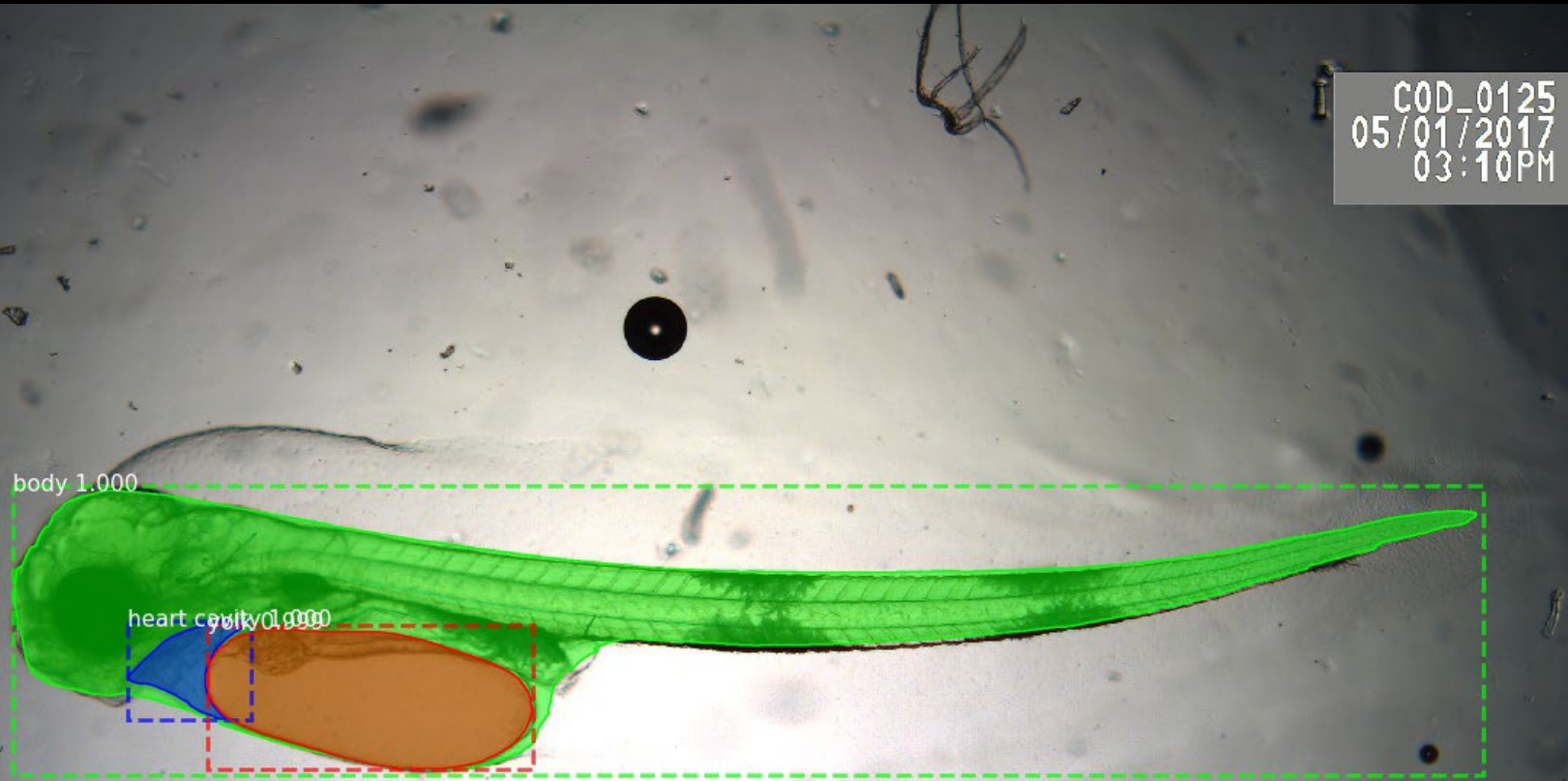Eggs

Other

Other

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Automated measurements

We analyse ~1000 microscope images per hour for:

- Heart cavity area
- Myotome length
- Myotome height
- Yolk area
- Yolk length
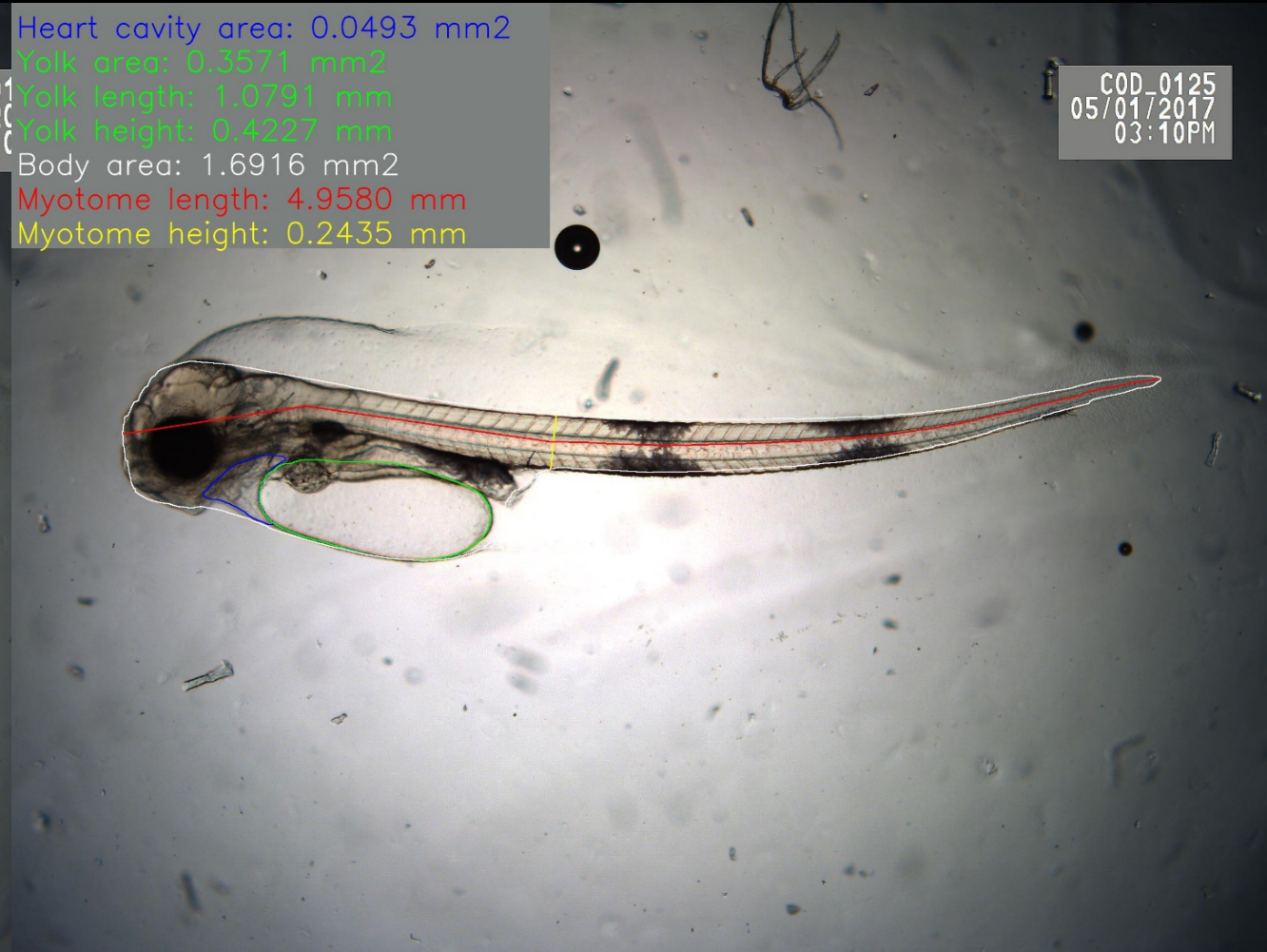- Yolk height
- Body area
- Heart rate
- Deformation

Automated measurements

Man (600sec.) Machine (3sec.)

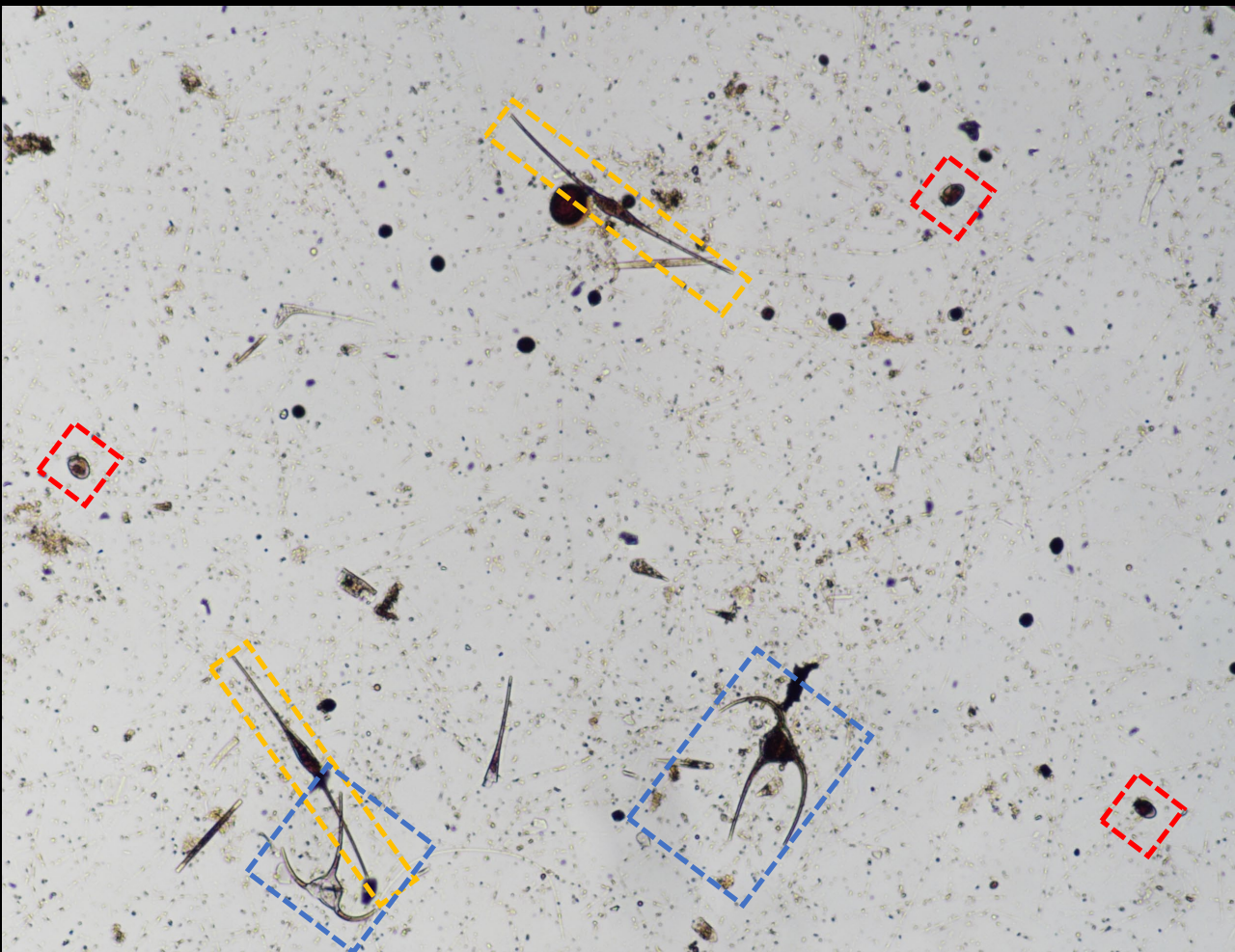Heart cavity area: 0.0493 mm2
Yolk area: 0.3571 mm2
Yolk length: 1.0791 mm
Yolk height: 0.4227 mm
Body area: 1.6916 mm2
Myotome length: 4.9580 mm
Myotome height: 0.2435 mm

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Automated algae classification

Tripos fusus | **Tripos longipes** | **Dinophysis acuminata**

Existing techniques

Fluorescence e.g. for cyanobacteria

Size e.g. LISST-100x

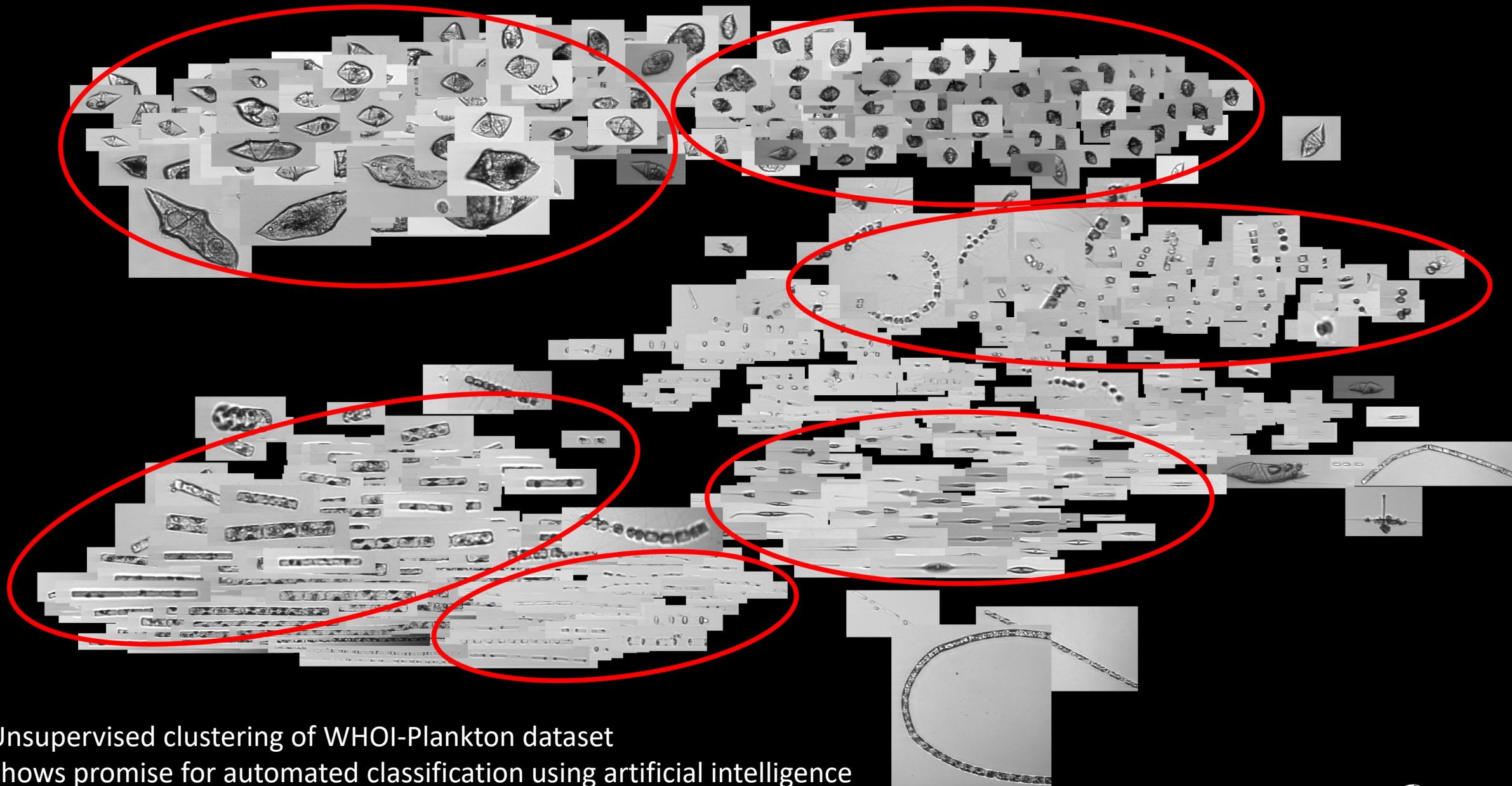Apparent Optical Properties and spectral fingerprinting

- These are proxies, not direct measurement.
- Seldom provide measurements in more detail than bulk population statistics.

Our focus

Automated in-situ imaging – "seeing is believing"

+ reduce man-hours

+ rapid reporting

+ explicit & direct measurement

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Automated algae classification

Unsupervised clustering of WHOI-Plankton dataset
Shows promise for automated classification using artificial intelligence

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