LIMPID/BisQue

A scalable infrastructure for reproducible, image driven data science

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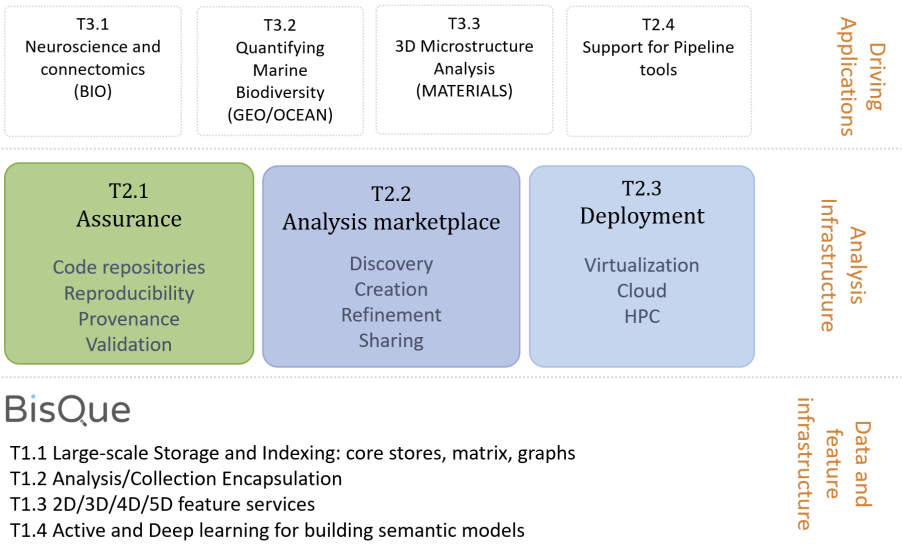
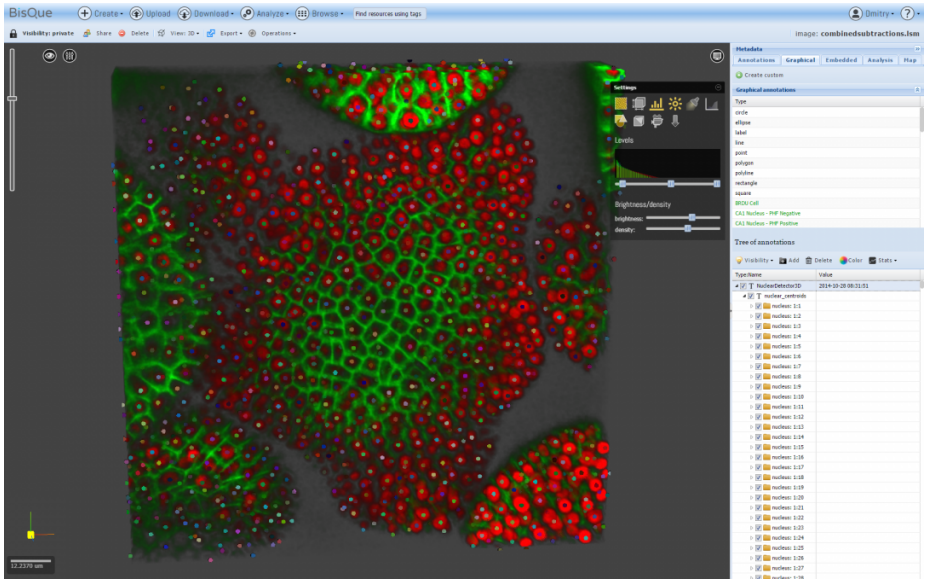
LIMPID/BisQue Overview

- LIMPID is built on cloud-based analysis platform BisQue
- Management, analysis, and sharing of images and metadata for large-scale data science
- Flexible and scalable query system across network of multimodal data items
- Module system for scalable integration of analysis tasks over images and metadata
- 200+ life science image and video formats
- Analysis marketplace: easy sharing and discovery of analysis modules

- *More information on BisQue:* http://bioimage.ucsb.edu/bisque

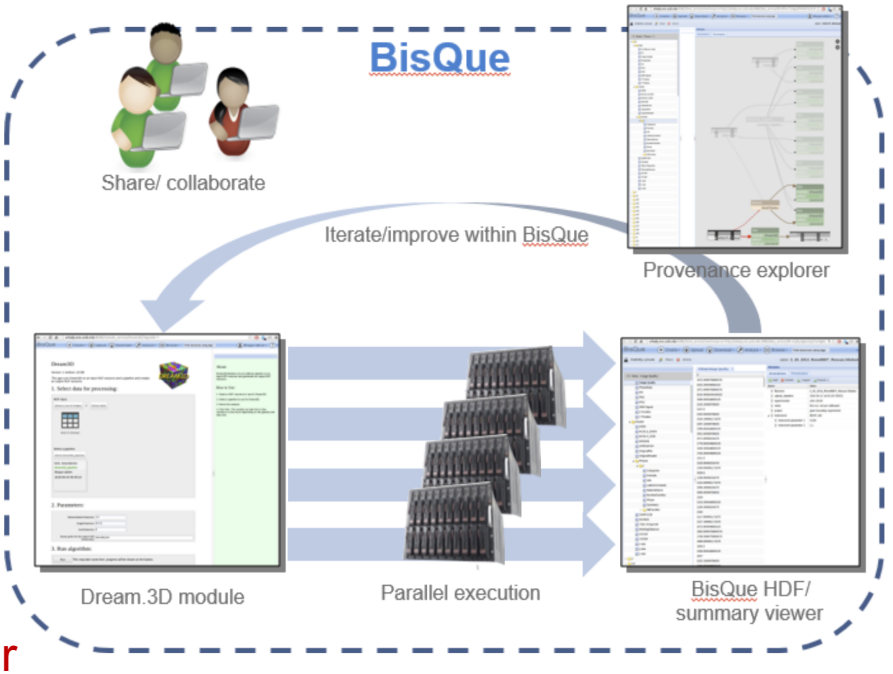


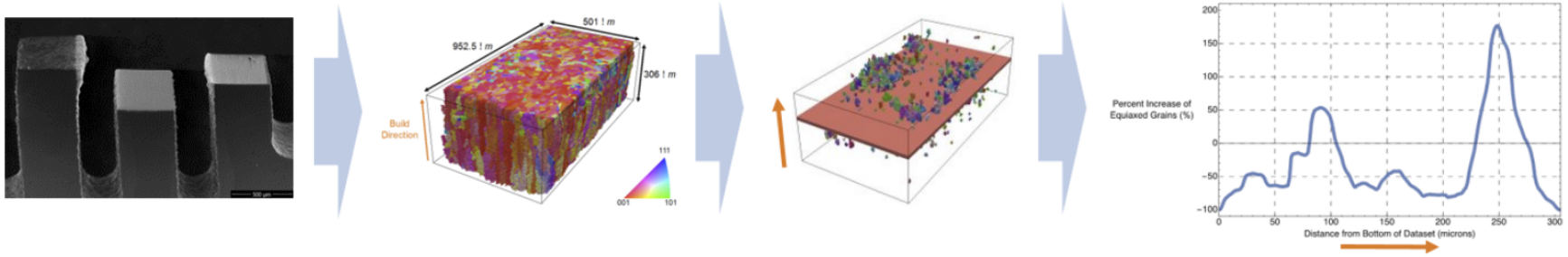


Dream.3D Integration

(Use Case: Materials Structure Analytics)

- Large acquired Materials Science datasets analyzed in desktop apps such as Dream.3D
- Dream.3D pipelines and execution integrated in BisQue
- Datasets and pipelines can be shared with collaborators
- Parameter variations are parallelized over compute grid
- Large datasets viewable in web browser
- Provenance tracking for improved repeatability

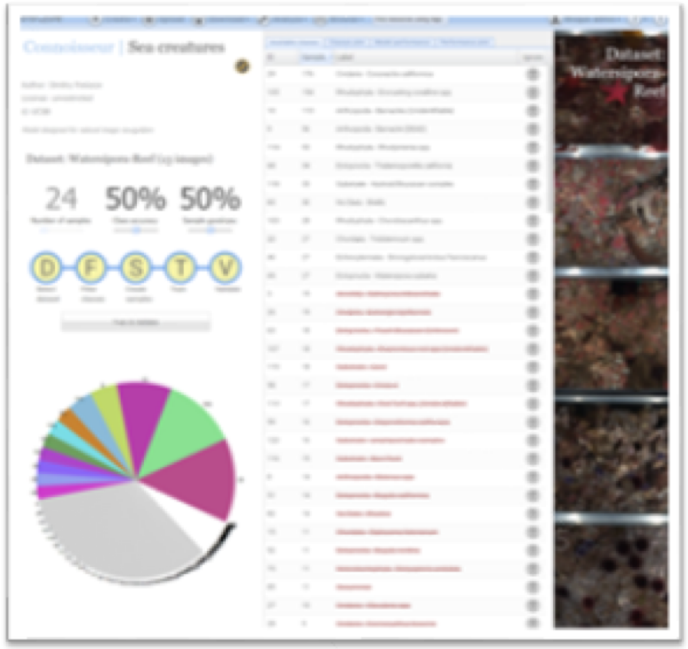


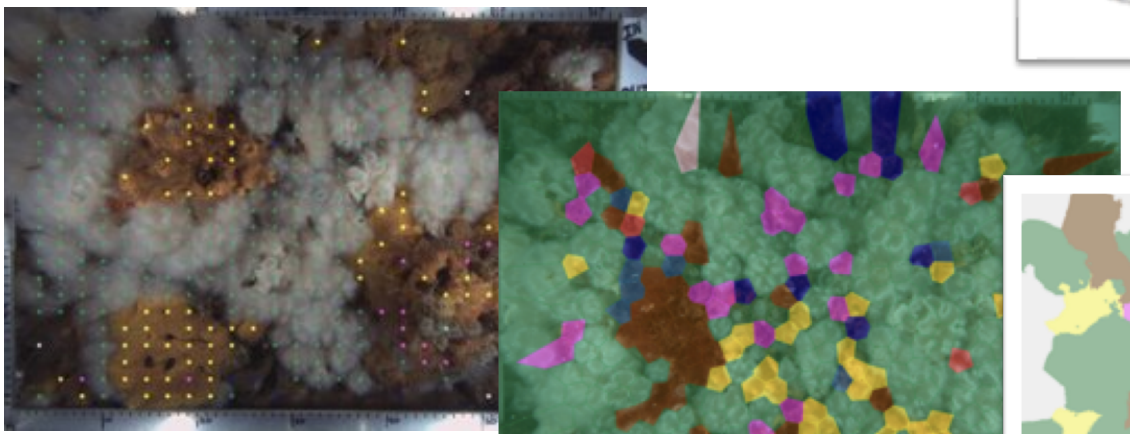


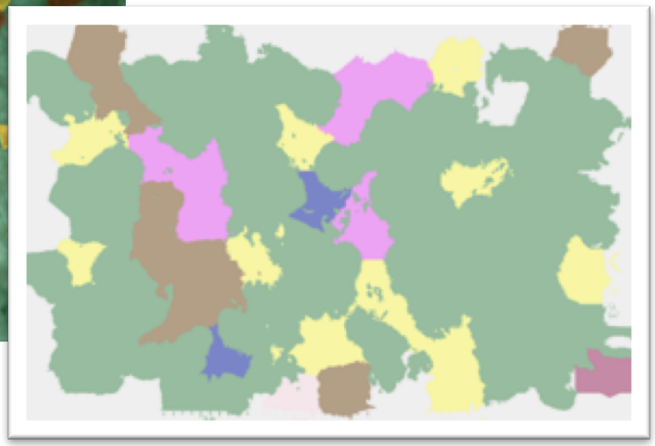
Deep Learning Integration

(Use Case: Quantifying Marine Biodiversity)

- **Goal:** Automate annotations without engineer in reduced time for specific datasets
- Metadata driven training set selection
- Automatic parallelization
- Integrated validation (model selection)
- Multiple imaging modalities: photographs, satellites, microscopes



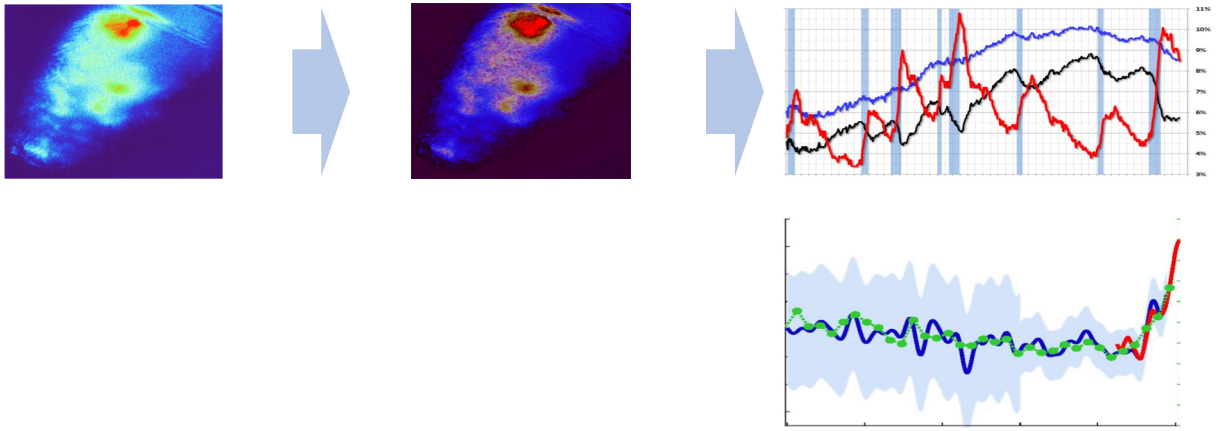




Deep learning method development

(Use Case: live Calcium imaging in neurons)

Application: Quantify and map changes in fluorescent signal in 4D data acquired from live imaging of neuronal activity in insect nervous system



- Requires registration of images to compensate for movement.
- Automated identification of neurons from background based on shape, position and fluorescent changes.
- In a post processing phase quantify fluorescent changes over time for each neuron identified.
- Create plots of runs for evaluation as supervised parameters are altered, to create summarized data.