## CSSI Element: Large-Scale Image Processing Infrastructure Development (LIMPID)



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**Applications** 

Plant cell

Segmentation

Neuroscience and

Connectomics

3D Microstructure

Analysis (MATERIALS)

Quantifying

**Biodiversity** (GEO/OCEAN)

#### **BisQue Overview**

LIMPID is built on the cloud-based analysis platform BisQue developed in the Centre for Multimodal Big Data and Health at **UCSB** 

Data and Feature

Infrastructure

Large-scale

Storage and

Indexing,

2D/3D/4D/5D

PostgreSQL

Analysis

Infrastructure

**Discovery** 

Refinement

Sharing

Reproducibility

**Provenance** Validation

**Dockerization** 

Cloud

docker

Management, analysis

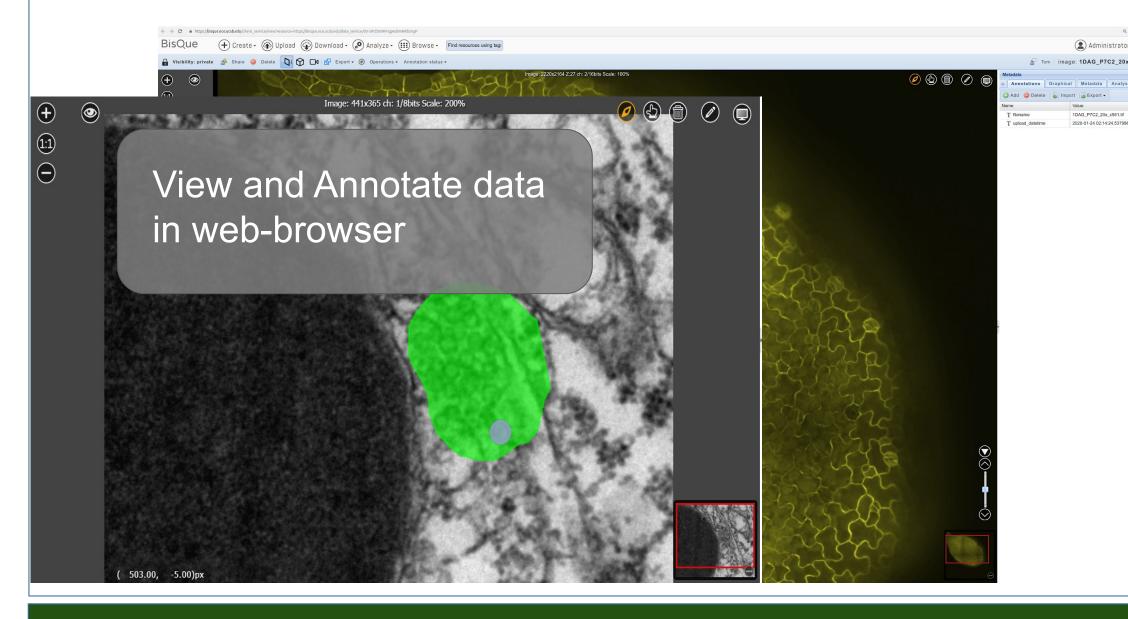
and sharing of images and metadata for large-scale problems

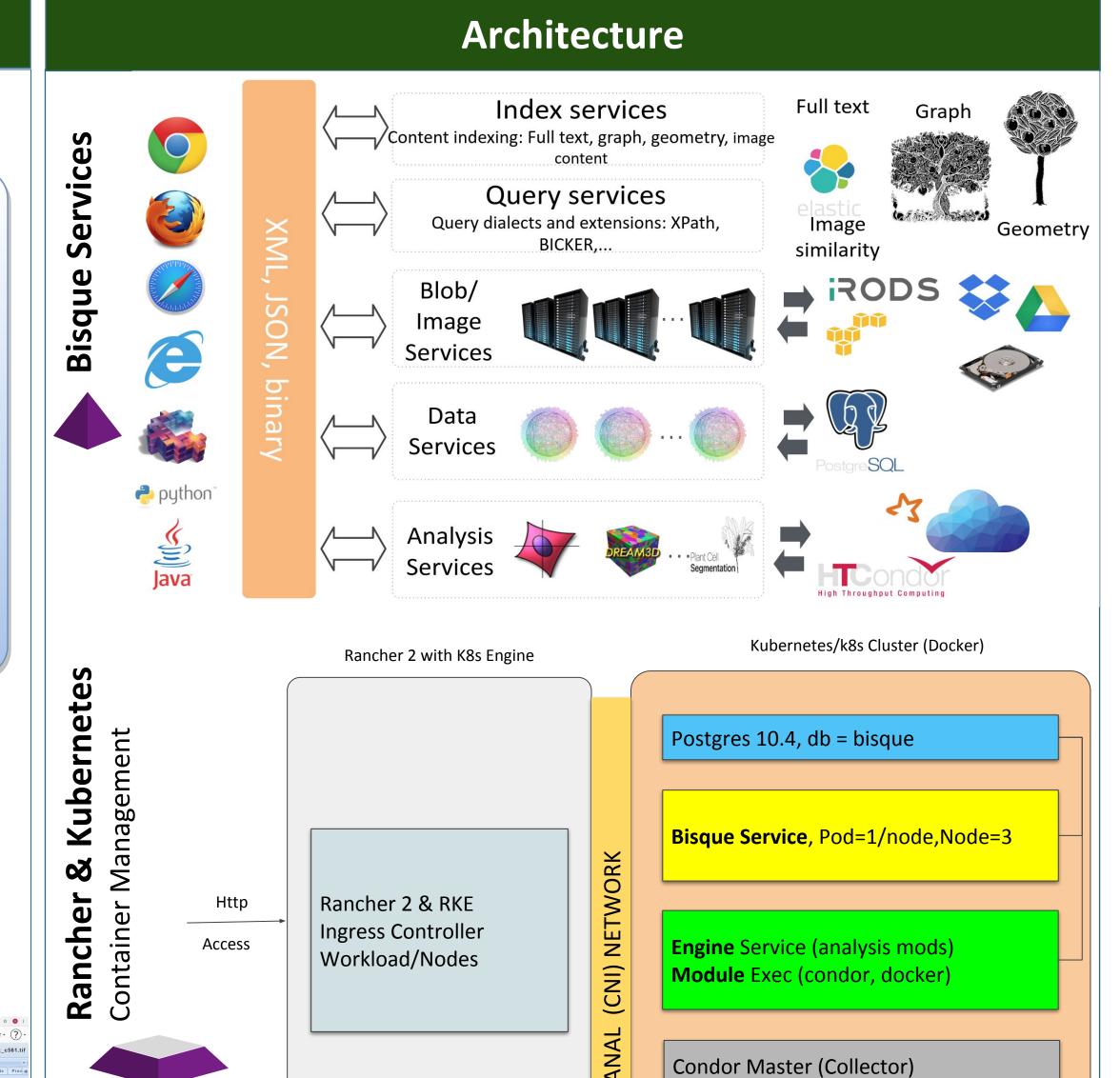
Flexible and scalable query system across the network for multimodal data items

Simple and scalable module integration

system for analysis tasks over images and metadata

- Web based provenance viewer to explore past analysis run for improved repeatability
- Supports 250+ life science image and video formats
- Github page : <a href="https://github.com/UCSB-VRL/bisque">https://github.com/UCSB-VRL/bisque</a>





Distributed compute infrastructure

Rancher 2.0 with power of kubernetes

Bisque is containerized using docker

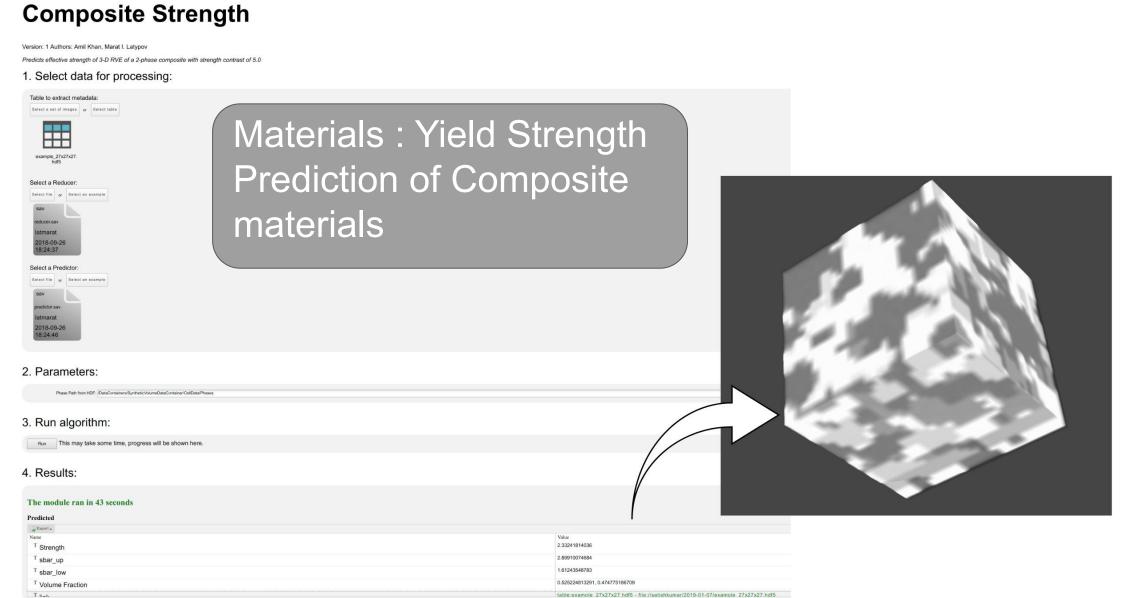
RESTful communication between web client and BisQue services

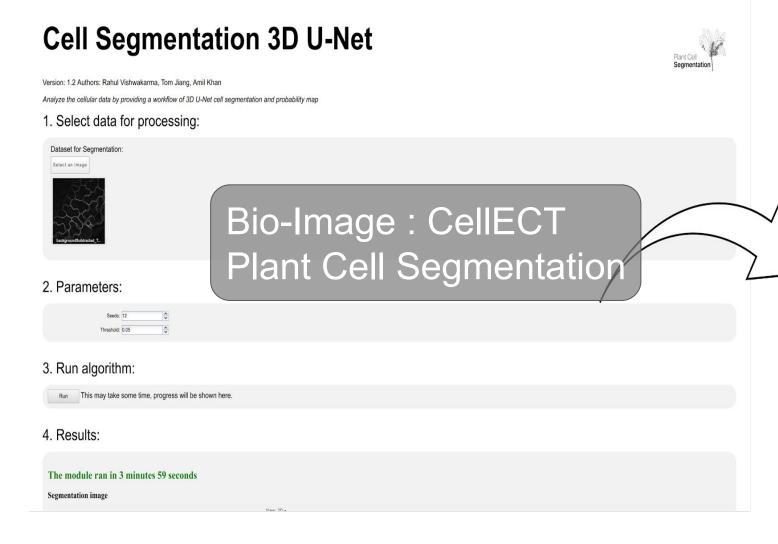
Condor Worker (1..N)

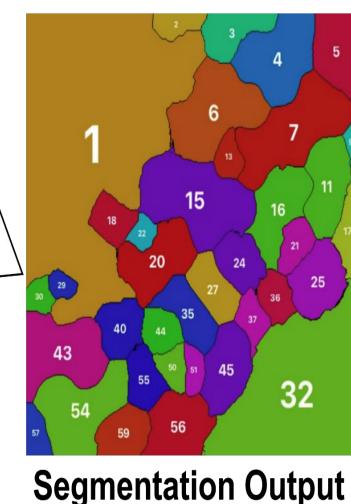
NFS /run/bisque mount for cluster

Dockerization of Analysis modules

### **Deep Learning Analysis Infrastructure**







#### Features:

- Powerful Image Viewer and Annotator
- All-in-all Import/Export data
- Easy Share of data as well as analysis
- Large datasets in the web browser
- Multi-modal search and mining in the datasets

# Materials: Dream.3D workflow in BisQue Equiaxed Grains (%)

#### References

1. Dmitry Fedorov and B.S. Manjunath and Christian Lang and Kristiam Kvilekval, Scalable Image Informatics, Academic Press Library in Signal Processing, Volume 6, September 2017, http://escholarship.org/uc/item/7nf7492x