

Use Cases for the EOSC Federation: **Image Analysis Workflows in Galaxy**

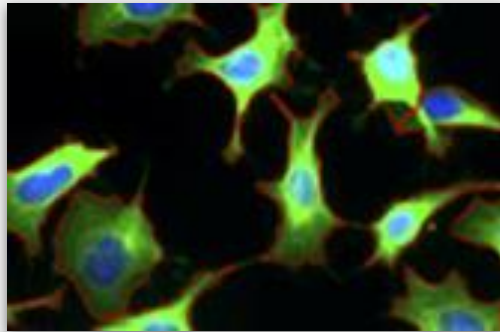
Beatriz Serrano-Solano

24 June 2026, 15:00-16:30

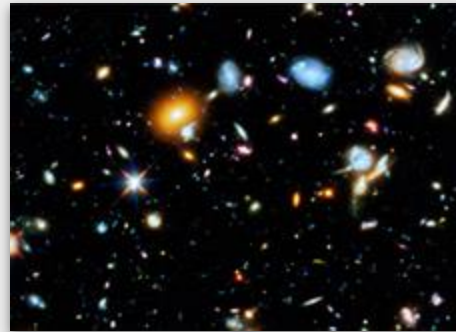


The goal

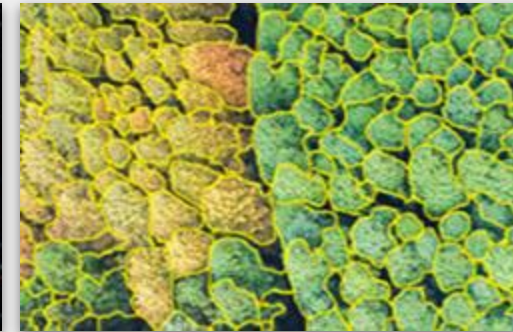
Communities
with similar
image analysis
needs



MICROSCOPY



ASTRONOMY



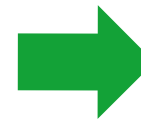
ENVIRONMENTAL SCIENCES



SILOED WORKING PRACTICES

→ **Fragmented methods** used to extract quantitative data from images

→ **Lack of shared terminology** to describe image analysis tasks

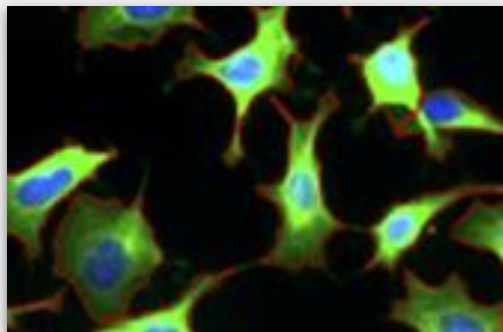


Limited reusability
of workflows across
domains

The resources

Communities

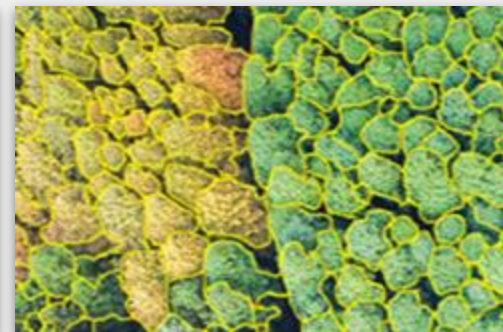
with similar
image analysis
needs



MICROSCOPY

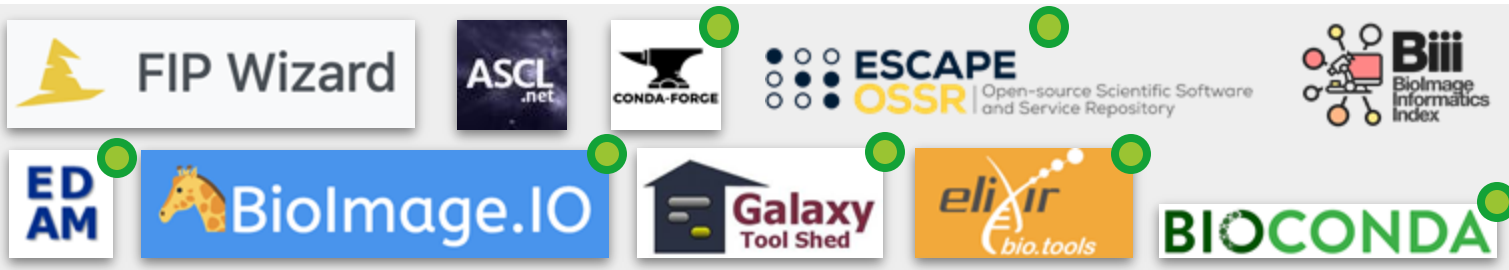


ASTRONOMY

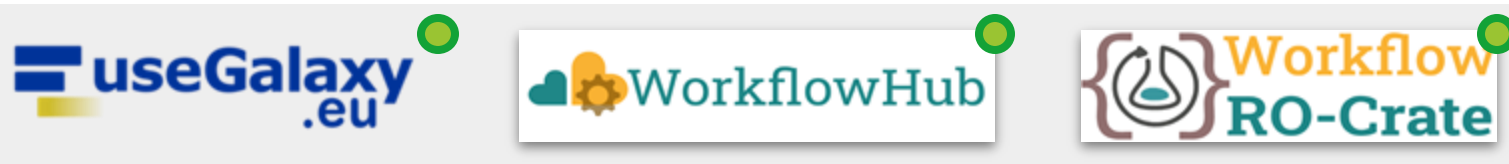


ENVIRONMENTAL SCIENCES

FAIR- enabling resources



Workflows as a service



 Resource listed in the EOSC EU Node

eOSC Node | EUDAT
Data, Computing and Digital

eOSC Node | Data Terra
Environment

eOSC Node | Life Sciences Connect
Health & Food

eOSC Node | Germany

eOSC Node | SURF
The Netherlands

eOSC Node | European Commission

eOSC Node | Finland

eOSC Node | Digital Twin of the Ocean
Environment

CORE CHALLENGE

Similar computational **tasks** exist across domains but are **not interoperable** or **discoverable**

1

Develop reusable image analysis **workflows** between scientific domains

2

Embed the FAIRification of the diverse image data, analysis tools and workflows into the research process

3

Raise awareness, foster **knowledge transfer** and strengthen capacity building efforts across disciplines

The screenshot displays the Galaxy Imaging interface. On the left is a sidebar with navigation icons and labels: Upload, Tools, Workflows, Workflow Invocations, Visualization, Histories, History Multiview, Datasets, Pages, Libraries, and Notifications. The main area is titled 'Welcome to the Imaging flavour of Galaxy' and includes a search bar for tools, a list of tool categories (Get Data, Send Data, Collection Operations, GENERAL TEXT TOOLS, STATISTICS AND VISUALISATION), and a 'Get started' section with links for 'Get started', 'Training', and 'Partners'. Below this is a 'Lesson' section listing 'Analyse HeLa fluorescence siRNA screen', 'End-to-End Tissue Microarray Image Analysis with Galaxy-ME', and 'Introduction to Image Analysis using Galaxy'. The right-hand panel shows a 'History' section with a search bar and a message stating 'This history is empty. You can load your own data or get data from an external source.'

Workflows

Galaxy Imaging
Using 0% of 250.0 GB beatrizserrano

- Upload
- Tools
- Workflows
- Workflow Invocations
- Visualization
- Histories
- History Multiview
- Datasets
- Pages
- Notifications
- More

Workflow Preview

- 33% +

Download
 Edit
 Run

About This Workflow

CP_object_tracking_example (imported from uploaded file) - Version 0

Author
beatrizserrano

All published Workflows by beatrizserrano

Description
example cellprofiler pipeline

Tags
CellProfiler
imaging

License
No License specified

Last Updated
Sunday Mar 21st 20:20:11 2021 GMT+1

Sharing
This workflow is not published and cannot be shared.
[Publish this workflow](#)

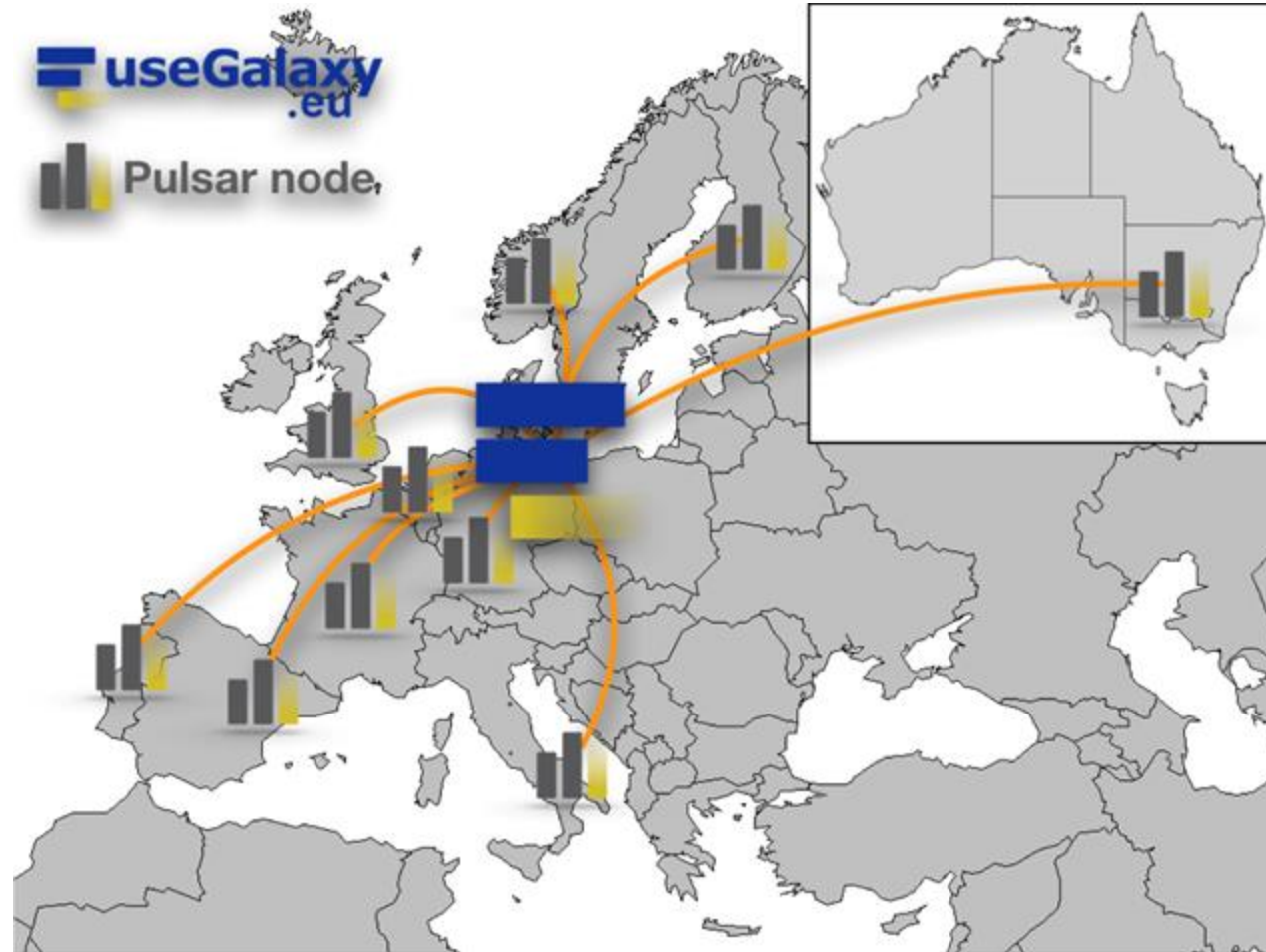
OK

edited almost 4 years ago never run

edited almost 4 years ago never run

The Pulsar Network

Distributed compute



How similar are our analyses?

MICROSCOPY

- Object segmentation (cells, organelles, ...)
- Tracking (cells, ...)
- Object counting (cells, ...)
- Double segmentation (nucleoli, ...)
- Feature extraction (shape, intensity, texture, ...)

ASTRONOMY

- Object segmentation (galaxies, stars, ...)
- Tracking (satellites, ...)
- Object counting (stars, ...)
- Double segmentation (supernovas, ...)
- Feature extraction (shape, intensity, ...)



EARTH OBSERVATION

- Object segmentation (forests, fields, water, ...)
- Tracking (deforestation, glacier retreat, coastal erosion, clouds, ...)
- Object counting (buildings, ships, ...)
- Classification (land cover, vegetation, ...)
- Feature extraction (spectral signatures, texture, thermal properties, ...)

The Galaxy Training Network (GTN)

A FAIR repository for training materials



Lesson	Slides	Hands-on	Recordings	Input dataset	Workflows
<p>Analyse HeLa fluorescence siRNA screen</p> <p>Image segmentation Object feature extraction Image thresholding</p> <p>High-throughput screening Overlay Fluorescence microscopy</p>					
<p>End-to-End Tissue Microarray Image Analysis with Galaxy-ME</p> <p>Image segmentation Tissue imaging</p>					
<p>Nucleoli segmentation and feature extraction using CellProfiler</p> <p>Image segmentation Object feature extraction Multi-channel image</p>					
<p>Object tracking using CellProfiler</p> <p>Isolated object tracking Multi-channel image</p>					
<p>Quantification of electrophoresis gel bands using GuPath and Galaxy imaging tools</p> <p>ROI selection Conversion Object feature extraction Multi-channel image</p>					
<p>Quantification of single-molecule RNA fluorescence in situ hybridization (smFISH) in yeast cell lines</p> <p>IDR dataset Spot detection Rasterisation Overlay</p>					
<p>Segmentation of Anatomical Structures in Medical 3-D Images</p> <p>Image segmentation Conversion Overlay Object feature extraction Medical imaging</p> <p>Computed tomography 3D image Volume rendering</p>					
<p>Tracking of mitochondria and capturing mitoflashes</p> <p>Isolated object tracking Temporal analysis Time-lapse data</p>					
<p>Using BioImage.IO models for image analysis in Galaxy</p> <p>Image segmentation Image annotation Deep learning</p>					

Voronoi segmentation

Voronoi segmentation

Author(s) Even Moa Myklebust Riccardo Massei Leonid Kostrykin Anne Fouilloux

Reviewers

Overview

Questions:

- How do I partition an image into regions based on which object they are nearest to (Voronoi segmentation)?
- How should images be preprocessed before applying Voronoi segmentation?
- How can I overlay two images?
- How can Voronoi segmentation be used to analyze spatial relationships?
- How can extracted image properties be used to categorize identified objects?

Objectives:

- How to perform Voronoi Segmentation in Galaxy.
- How to extract a single channel from an image.
- How to overlay two images.
- How to count objectives in a layer map.

Requirements:

- [Introduction to Galaxy Analyses](#)
- [Hands-on: FAIR Bioimage Metadata](#)
- [Hands-on: REMBI - Recommended Metadata for Biological Images - metadata guidelines for biol imaging data](#)
- [Hands-on: Introduction to Image Analysis using Galaxy](#)

⌚ Time estimation: 1 hour

Supporting Materials:

[Datasets](#) [Workflows](#) [FAQs](#) [Available on these Galaxies](#)

📅 Published: May 13, 2025

📅 Last modification: May 27, 2025

📄 License: Tutorial Content is licensed under [Creative Commons Attribution 4.0 International License](#). The GTN Framework

🌐 PURL: <https://gxy.io/GTN:T06534>

↩️ Revision: 3

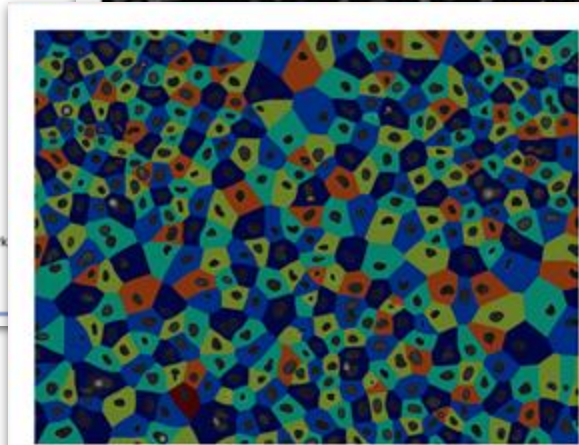
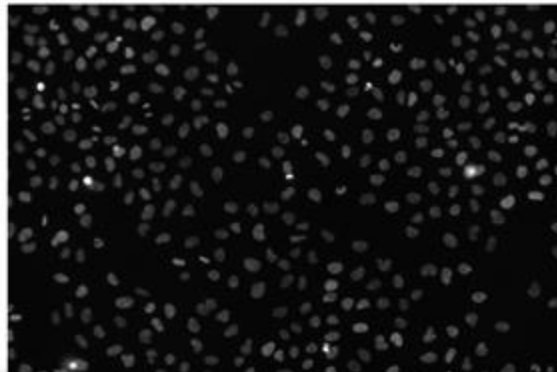


Figure 2: Segmented cell image.

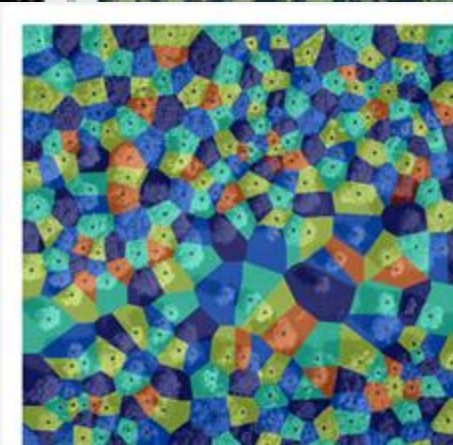


Figure 4: Segmented tree crown image.

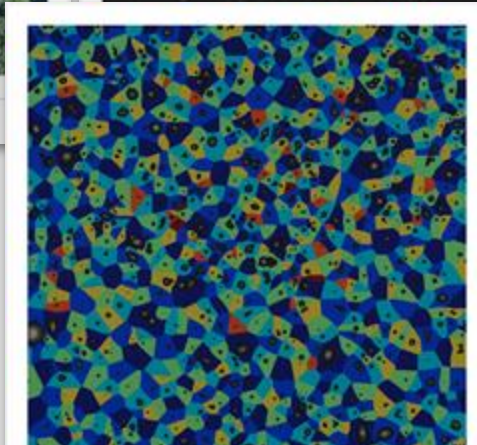
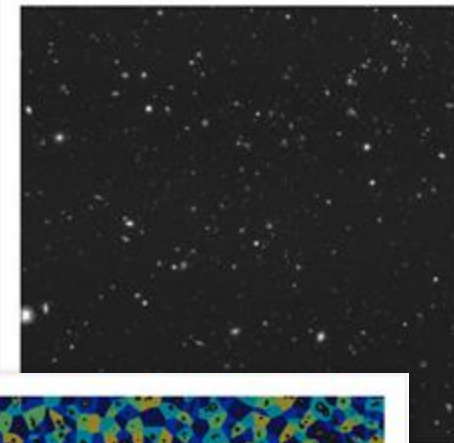
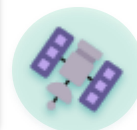
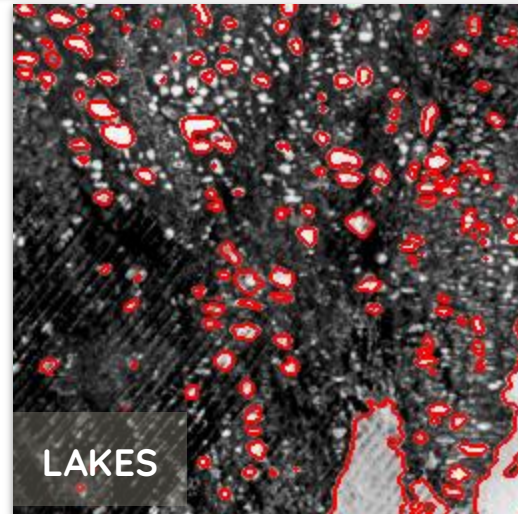
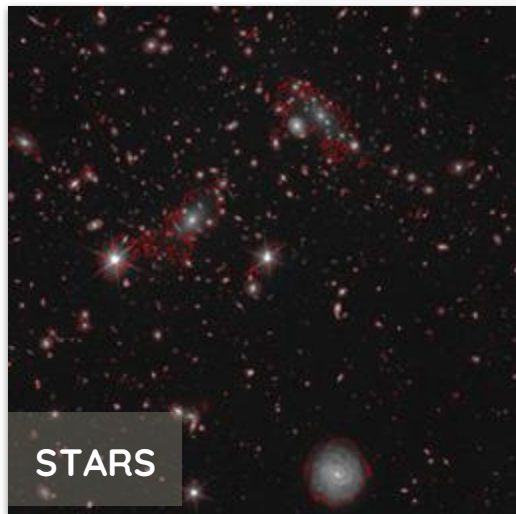
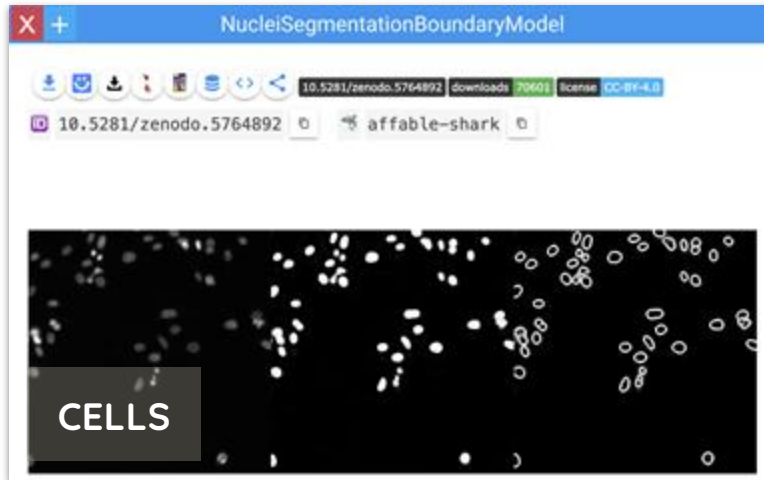


Figure 6: Segmented sky image.

Cross-disciplinary workflows and tutorials for broader image analysis tasks

[Biolmage.IO](https://biomage.io)
Model
trained on
bioimages



Voronoi segmentation	<input checked="" type="checkbox"/> cells	<input checked="" type="checkbox"/> stars	<input checked="" type="checkbox"/> trees
AI model from Biolmage.IO	<input checked="" type="checkbox"/> nuclei	<input checked="" type="checkbox"/> stars	<input checked="" type="checkbox"/> lakes
Source Extractor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Object tracking	<input checked="" type="checkbox"/> cells		<input checked="" type="checkbox"/> Atmospheric rivers
Image reconstruction			

- **Data**
 - Sources are different and scattered
 - Formats are different
- **Analysis**
 - Identify common image analysis tasks
 - Lack of common vocabularies
- **Interoperability**
 - Lack of common ontologies for tool annotations
 - Different levels of adoption of EDAM Ontology
- **Quality and interpretation of results**



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<https://zenodo.org/communities/fiesta-oscars>

<https://github.com/FAIR-imaging/OSCARS-FIESTA>

Stay in contact!



<https://eosc.eu/academy>



academy@eosc.eu

