Galaxy

University of Oregon January 25, 2018

Dave Clements
Johns Hopkins Univeristy
Galaxy Community

bit.ly/gxy-bgmp-2018



Agenda

What is Galaxy? Features / Live demo Galaxy's audience Galaxy's availability Deploying your own Galaxy **Galaxy Project Galaxy Community**

What is Galaxy? The Project's definition

Galaxy is an open, web-based platform for accessible, reproducible, and transparent computational biomedical research.

What is Galaxy? Kieth Bradnam's definition

"A web-based platform that provides a simplified interface to many popular bioinformormatics tools."

From

"13 Questions You May Have About Galaxy"

http://bit.ly/13questions

Agenda

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Features / Live Demo

usegalaxy.org

Agenda

What is Galaxy? Features / Live demo Galaxy's audience Galaxy's availability Deploying your own Galaxy **Galaxy Project Galaxy Community**

Galaxy for biologists

Clear win.

Galaxy for bioformaticians?

Reproducibility

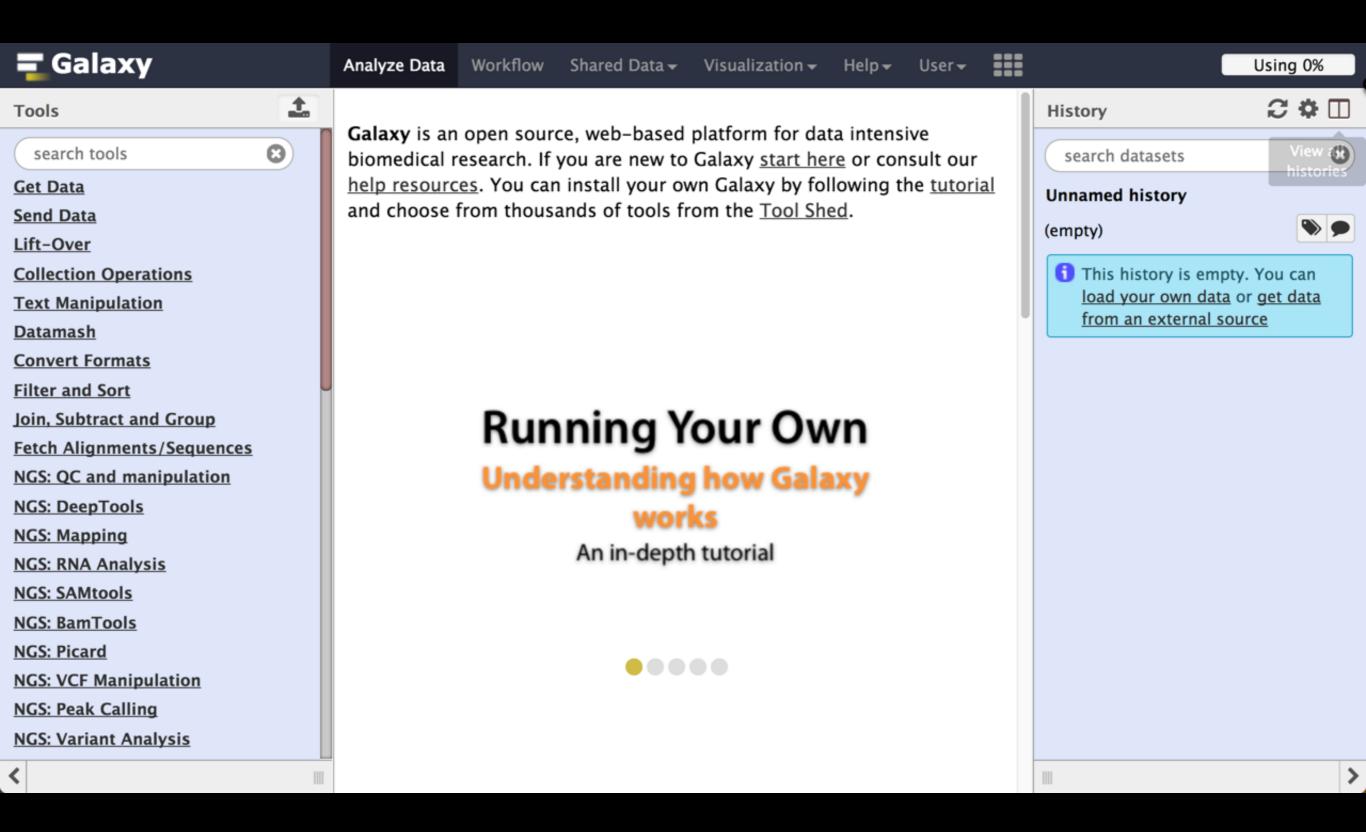
Sharing and publishing

(and there's an API - you can access Galaxy programmatically)

Agenda

What is Galaxy? Features / Live demo Galaxy's audience Galaxy's availability Deploying your own Galaxy **Galaxy Project Galaxy Community**

As a free for everyone service on the web: usegalaxy.org



Public Galaxy servers

General Purpose / Genomics servers 19 servers as of yesterday

Domain Specific

37 servers

Tool publishing servers

44 servers

Total

100 servers

bit.ly/gxyServers

Galaxy Services













jetstream-cloud.org

Can't use a service? Galaxy is available on other Clouds



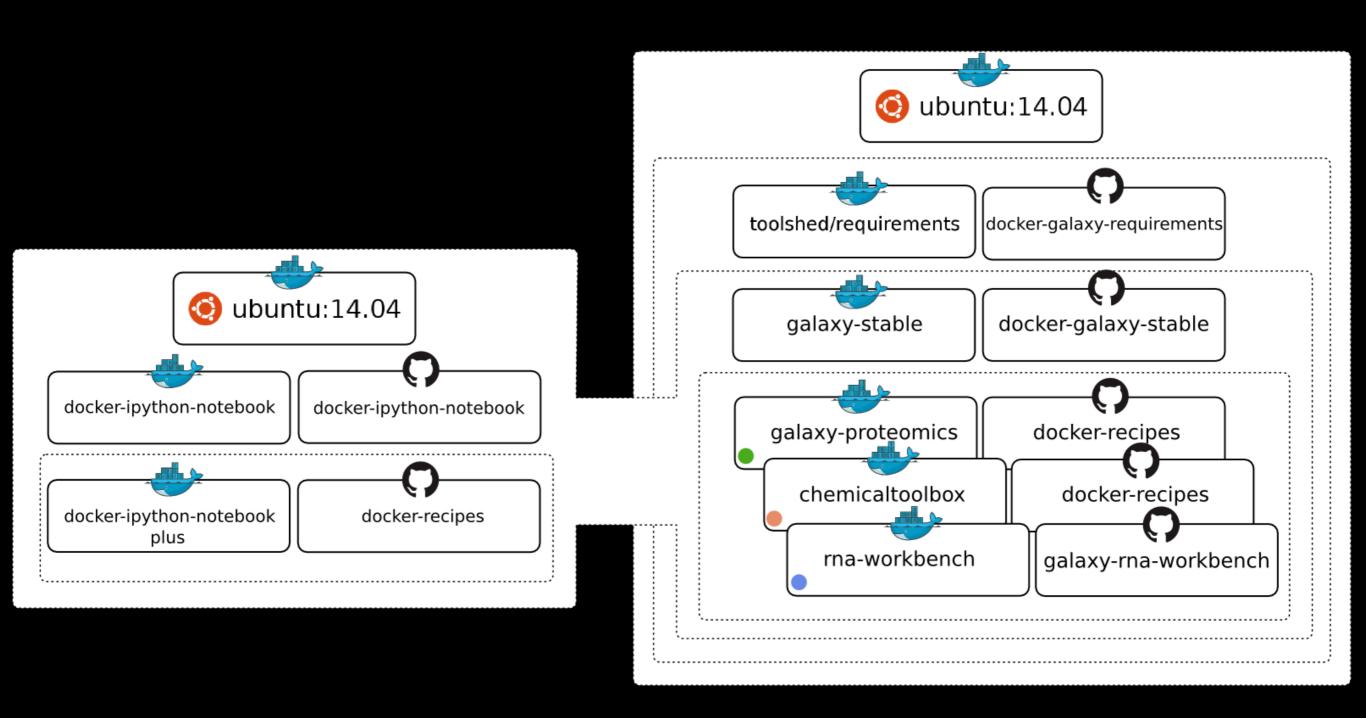






http://aws.amazon.com/education http://globus.org/ http://wiki.galaxyproject.org/Cloud https://launch.usegalaxy.org/

Galaxy is available in Docker



https://github.com/bgruening/docker-galaxy-stable

Galaxy is open source software

getgalaxy.org

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As needed and/or easy options

Galaxy on Docker
Galaxy on AWS
Globus Genomics
Galaxy on Jetstream

getgalaxy.org

Creating a local server

- Non-trivial
 - authentication
 - using org's compute & storage infrastructure
- Less work
 - Wrapping your own tools
- Pretty easy
 - Customizing the tool set from the tool shed.
 - Customizing the genomes
 - Connecting genomes with tools

Agenda

What is Galaxy? Features / Live demo Galaxy's audience Galaxy's availability Deploying your own Galaxy **Galaxy Project Galaxy Community**

Technology

- Python
- JavaScript
- Git & GitHub
- Travis CI
- Anisible

Process

- Releases every 4 months
- Public roadmap on GitHub
- Maximal use of GitHub for issues, etc
- Core team & committers widely dispersed
 - Slack / IRC / Gitter for chat
 - Group video w/ Google or Zoom
- Core team members: daily short status

Core Team, Committers, and Commits

- Core team funded by NIH Galaxy grant
 - Penn State, Johns Hopkins, OHSU, Cleveland Clinic
- Committers are a mix of core team and global contributor community
- All changes submitted as pull requests and reviewed by a committer before merging
- Anyone can submit a pull request

More than just the core project

BioBlend	a Python library for interacting with CloudMan and Galaxy's API		
galaxy-lib	a subset of the Galaxy core code base designed to be used as a library.		
Planemo	set of command-line utilities to assist in building tools for the Galaxy project.		
StarForge	help build Galaxy things in virtualization		
sequence_utils	set of Python modules for reading, analyzing, and converting sequence formats.		
Pulsar	Python server application that allows a Galaxy server to run jobs on remote systems (including Windows)		

More than just the core project

ephemeris	Python library and set of scripts for managing the bootstrapping of Galaxy plugins - tools, index data, and workflows.		
CloudLaunch	New platform for launching multiple appliances on multiple cloud platforms		
nebulizer	Command-line utilities for managing users, data libraries and tools in a Galaxy instance		
CloudBridge	provides a simple layer of abstraction over different cloud providers		
Galaksio	New Galaxy user interface that emphasizes workflows over tools		

https://github.com/galaxyproject/

Agenda

What is Galaxy? Features / Live demo Galaxy's audience Galaxy's availability Deploying your own Galaxy **Galaxy Project Galaxy Community**

We are an open source project

The Core Galaxy Team





Dave Clements Nate Coraor Jeremy Goecks Sam Guerler Jen Jackson



https://galaxyproject.org/galaxy-team



Postdoctoral Scholars

At Cleveland Clinic

At Johns Hopkins University

Software Engineers

At Johns Hopkins University

Interested?

Working for the Galaxy team provides a rare opportunity to perform research and develop software at the leading edge of life sciences, genomics, data-intensive computing, and big data analytics.

We develop Galaxy, a free, open-source platform that (a) enables researchers to store, analyze, visualize and share genomic data and analyses, and (b) provides genomic tool developers with the ability to deploy their tools within a complete analysis framework. Galaxy is well known with thousands of researchers worldwide using it on a daily basis. Our team members are well regarded and widely recognized within the biomedical research. With genomics being the pivot of future life sciences and healthcare, joining the Galaxy project will open an immense array of possibilities.

Positions are currently available at

- . Genomic Medicine Institute, Cleveland Clinic Lerner Research Institute in Cleveland, Ohio in the Blankenberg Lab
- Johns Hopkins University in Baltimore, Maryland in the Taylor Lab

Postdoctoral Scholars

At Cleveland Clinic

The Blankenberg Lab in the Genomic Medicine Institute at the Cleveland Clinic Lerner Research Cleveland Clinic Institute has several Postdoctoral Fellowships available. We utilize high-throughput omics technologies, such as next generation sequencing, and data-intensive computing to explore biomedical research questions. The











Viva contributors!



Galaxy















































Thank you for contributing to Galaxy IUC tools.



News

January 2018 News of the Galaxy! – New events, blog posts, publications, jobs, ...

All-new CloudLaunch release – Manages your credentials, multiple clouds, multiple apps,...

GCCBOSC2018 Training Topic Nominations – Choose

Events

Plant & Animal Genome XXVI (PAG 2018) – Galaxy is for Plants and Animals too...

Packaging your bioinformatics tool with Bioconda and Galaxy – from Melbourne Bioinformatics

Developing bioinformatics training materials – from Melbourne Bioinformatics

@galaxyproject



Galaxy Project @galaxyproject

The RepeatExplorer public #usegalaxy server is impressive. Everything you ever wanted to know/learn/discover about repeats. And they have an integrated @usejbrowse as well.

repeatexplorer.org #PAGXXVI





OPEN CHAT

Lots of ways to contribute

- Core code
- Ancillary code
- Support
- Documentation
- Training & Training Materials
- Outreach

Community Hub



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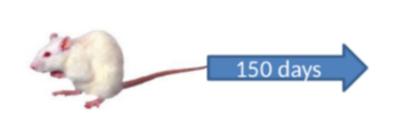
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Latest Tutorials and Trainings

The Galaxy community maintains a wide variety of trainings at https://training.galaxyproject.org. Check out the latest metagenomics tutorial by @bebatut and @shiltemann.





Eat, get fat, and be merry

News

Galaxy Cloud embraces the GVL – From Galaxy 17.09, Galaxy cloud instances use the GVL framework

GCCBOSC 2018 Training Topic Vote! – Voting closes January 31

January 2018 News of the Galaxy! – New events, blog posts, publications, jobs, ...

Events

Galaxy-P: an accessible resource for multi-omics analysis – at Lorne Proteomics

Bioinformatic Analysis of Next Generation Sequencing
Data – 4-Day Hands On Workshop

An Introduction to Integrative Bioinformatics and Novel Tools in Multi-Omics – Galaxy for Clinical & Pharmaceutical Analysis

@galaxyproject

Galaxy Project Retweeted

[SGCI] sciencegateways @sciencegateways

#ScienceGatewaysBootcamp is for leaders of digital offerings (aka #portal, #VRE) offering "a rip-roaring, intensive ride through tested methods that help project leaders define and execute successful projects." Next session is 5/14-5/18 @TACC in Austin:

sciencegateways.org/bootcamp

galaxyproject.org

Galaxy Events



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Galaxy Event Horizon

Upcoming (and past) events with Galaxy-related content.

The events listed here are also available in the Galaxy Events Google Calendar. The Galaxy Other Events Google Calendar lists additional events that are relevant to the Galaxy Community, but that are not known to feature significant Galaxy content.

If you know of any event that should be added to this page and/or to the Galaxy Event Calendar, please add it here or send it to outreach@galaxyproject.org. For events prior to this year, see the Events Archive.

Upcoming Events

Date	Topic/Event	Venue/Location		Contact	
January 13th 2018	Plant & Animal Genome XXVI (PAG 2018)	San Diego, California	P	See web page	*
January 18th 2018	Packaging your bioinformatics tool with Bioconda and Galaxy	Melbourne Bioinformatics, Carlton, Victoria, Australia		Saskia Hiltemann, Eric Rasche	*
January 22nd 2018	Developing bioinformatics training materials	Melbourne Bioinformatics, Carlton, Victoria, Australia	٨,	Saskia Hiltemann, Eric Rasche	
February 1st 2018	Galaxy-P: an accessible resource for multi-omics analysis	Lorne Proteomics Symposium, Lorne, Victoria, Australia	۹,	Maria Doyle	
February 12th 2018	Supporting Highly Scalable Scientific Data Analysis with Galaxy	Converged IT & the Cloud, San Francisco, California, United States	E.	James Taylor	
February 21st 2018	RNA Sequencing and Differential Expression	University of Aberdeen, Scotland,		Sophie Shaw OPEN CHA	AT



Home » Events »

EVENTS

Past meetings and conferences

Past webinars

Galaxy community kickoff meeting and Galaxy User

Conference

- march 2018, 08:00 to Fri 16 March 2018, 18:00
- Lecture Hall, Otto-Krayer-Haus, Albertstraße 25, Freiburg im Breisgau, 79110, Germany
- Add to calendar

The ELIXIR Galaxy community will have a kickoff meeting in 14-16th March 2018, in Freiburg/Germany. We will combine this with a Galaxy User Conference and the official launch of the usegalaxy.eu server.

This event will also be coordinated with the EMBL in Australia to also launch usegalaxy.au at the same time.

Cape Town, 3-5 April 2018 Data-intensive biology for the African continent National

Regional events

GCCBOSC 2018



Galaxy's Community Conference & OBF's Bioinformatics Open Source Conference are colocating in 2018

Please join us in Portland, Oregon, United States
June 25-30, 2018

https://gccbosc2018.sched.com/

Galaxy News Feed



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Galaxy News

This page contains announcements of interest to the Galaxy Community. These include items from the Galaxy Team or the Galaxy community and address anything that is of wide interest to the community.

Also see the Galactic Blog for more.

See Add a News Item below for how to get an item on this page and the RSS feed. Older news items are available in the Galaxy News Archive.

January 5th 2018	January 2018 News of the Galaxy!	New events, blog posts, publications, jobs,		
January 5th 2018	All-new CloudLaunch release	Manages your credentials, multiple clouds, multiple apps,		
December 14th 2017	GCCBOSC2018 Training Topic Nominations	Choose your own training adventure!		
December 7th 2017	December 2017 Galaxy News	New events, blog posts, publications, jobs,		
November 15th 2017	European Galaxy Administrator Workshop	5 days of admin training in Oslo		
November 2nd 2017	Galaxy Release 17.09	Singularity, download collections, switch tool versions in workflows,		
October 31st 2017	November 2017 Galaxy News	Galactic Blog launches, new events, pubs, tools,		

January 2018 Galaxy News

Welcome to the January 2018 *Galactic News*, a summary of what is going on in the Galaxy community. If you have anything to add to next month's newsletter, then please send it to outreach@galaxyproject.org.



Events

There are a plenitude of Galaxy related events coming up in the next few months:

GCCBOSC 2018 Training Nominations Extended to January 12

Nominate a training topic now.



The joint 2018 Galaxy Community and Bioinformatics Open Source Conferences start with training and the training topics are determined by you. Topic nominations have been extended January 12. Any topics of interest to these communities can be nominated.

GCCBOSC2018 will be held 25-30 June in Portland, Oregon, United States. It will feature two days of training: the second of which is multi-track and will feature content for both the BOSC and Galaxy communities.

Nominated topics can cover a wide range. For example:

- · How to use open source software using just a web browser (e.g., Intro to Using Galaxy)
- · How to use software packages (The Newbie's Guide to BioRuby)
- · Advanced applications of software (Genome Assembly with Galaxy, or Proteomics with BioPython)
- · Software installation and configuration (Tool Wrapping for Galaxy, or Using CloudLaunch)
- Open source community (Building a Curation Community using Apollo, or Training using the Galaxy Training Network)

These are only examples. If you are looking for ideas, see topics nominated for GCC2017, GCC2016, GCC2015, and the Galaxy Events page, which lists what training the community is offering outside of GCCs. Training is not limited to Galaxy-related

Events

GCCBOSC 2018 Training Nominations Extended to January 12

Galaxy (and GMOD) at Plant and Animal Genome XXVI

GMOD @ PAG

Intro to Galaxy Workshop at CSUSM

ELIXIR Galaxy Community Kickoff and Meeting

2018 Big Genomics Data Skills Training course

All Upcoming events

New Galactic Blog Entries: Galaksio

Publications

Highlighted Publications

Publication Topics

Who's Hiring

Public Galaxy Server News

EuPathDB Galaxy Data Analysis Service

Langille Lab PICRUSt server

Public Servers in Publications

Commercial Support: Intero Life

Galactic Blog



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The Galactic Blog

Welcome to the *Galactic Blog*, a list of Galaxy related blog posts from community members. This blog contains longer form posts or pointers to longer form posts that are elsewhere on the web.

The Galactic Blog complements the Galxy News feed.

Add your voice!

See the hub CONTRIBUTING page in general, and the blog section in particular for directions on how to add a blog entry.



Here's what people are saying

Date	Author(s)	Topic
2018 Jan 08	Ming Chen from Staton Lab	Galaxy R Markdown Tools Using R Markdown as a framework to develop Galaxy tools
2017 Dec 12	Tomas Klingström from the Galactic Blog	Galaksio: a Galaxy user interface focused on running prepared workflows Make your workflows more accessible to non-bioinformaticians
2017 Dec 11	Tomas Klingström from Freiburg Galaxy Team Blog	Bioinformatic training with the B3Africa project Training using the Galaksio interface
2017 Dec 01 Vimalkumar Velayudhan Setup your own instance of the Galaxy Bioinfo Setup a DigitalOcean droplet with Galaxy, Apache and P	Setup your own instance of the Galaxy Bioinformatics platform on DigitalOcean	
		Setup a DigitalOcean droplet with Galaxy, Apache and PostgreSQL OPEN CHA

Mailing Lists



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The lists

Galaxy has several active mailing lists, each for a different purpose in the Galaxy community.

List Link	Description	List Email Address	Archives (see Searching	
galaxy- announce	Announcements of interest to the Galaxy community. Moderated and low volume.		Nabble, Mailman	
galaxy-dev	Local installation, configuration, and tool integration help, or to propose new features. <i>High volume</i> .	galaxy-dev AT lists DOT galaxyproject DOT org	Nabble, Mailman	
galaxy- proteomics	Proteomics related questions, announcements, and anything else of interest to the Galaxy proteomics community. Low volume.	galaxy- proteomics AT lists DOT galaxyproject DOT org	Nabble, Mailman	
galaxy- training	If you have a question about teaching bioinformatics with Galaxy, or about teaching Galaxy itself, then this is a good place to find an answer. This is also the official mailing list of the Galaxy Training Network (GTN).	galaxy- training AT lists DOT galaxyproject DOT org	Nabble, Mailman	
galaxy- france	Cette liste est destinée à l'information (et aux discussions) de la Communauté française Galaxy. (This list is for announcements to (and discussion within) the	galaxy- france AT	Nabble, Mailman	

Support: Galactic Search



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Suppor

sgRNA

Q

) Edit

Searching the Galaxy

Welcome to the comprehensive Galaxy search interface. This is a Google Custom Search Engine that will search all things Galaxy. This includes a the codebase (Galaxy and related projects), the mailing lists, biostars and more.

If you haven't already, enter your query into the box in the musthead, and results will appear below.

All results Use Hub Corpus Code Admin/Dev Discussion Shared Tools Requests

About 87,900 results (0.49 seconds)

shrnaseq

This tool performs differential representation analysis on either a fastq file of sgRNA/shRNA sequencing reads or a table of counts specifying sgRNA/shRNA counts. There are options to use exact tests or generalised linear models, the latter allowing for gene set testing. The outputs contain a MDS ...

https://toolshed.g2.bx.psu.edu/view/shians/shrnaseq

Labeled Tools

CRISPR Screens sequence analysis

https://usegalayy.org/u/ckmah/w/mageck-count-conversion

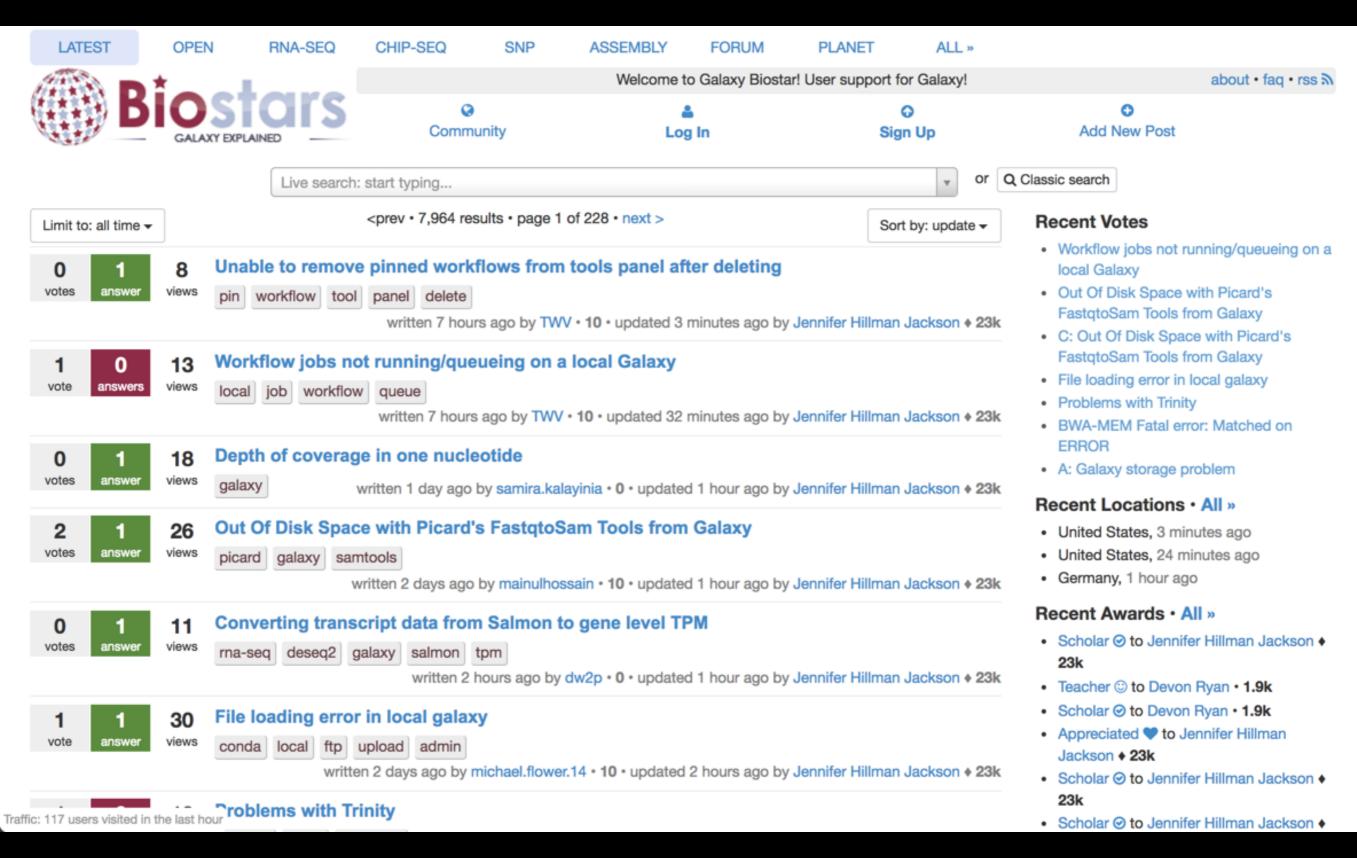
Add New Post. Question: CRISPR Screens sequence analysis. 0. gravatar for falaksher2. 15 months ago by. falaksher2 • 0. United States. falaksher2 • 0 has support for CRISPR screens e.g. sgRNA sequence analysis pipeline Thanks, Falak. galaxy • 289 views. ADD COMMENT • link •. Not following. https://biostar.usegalaxy.org/p/19090/

Labeled Discussion Use

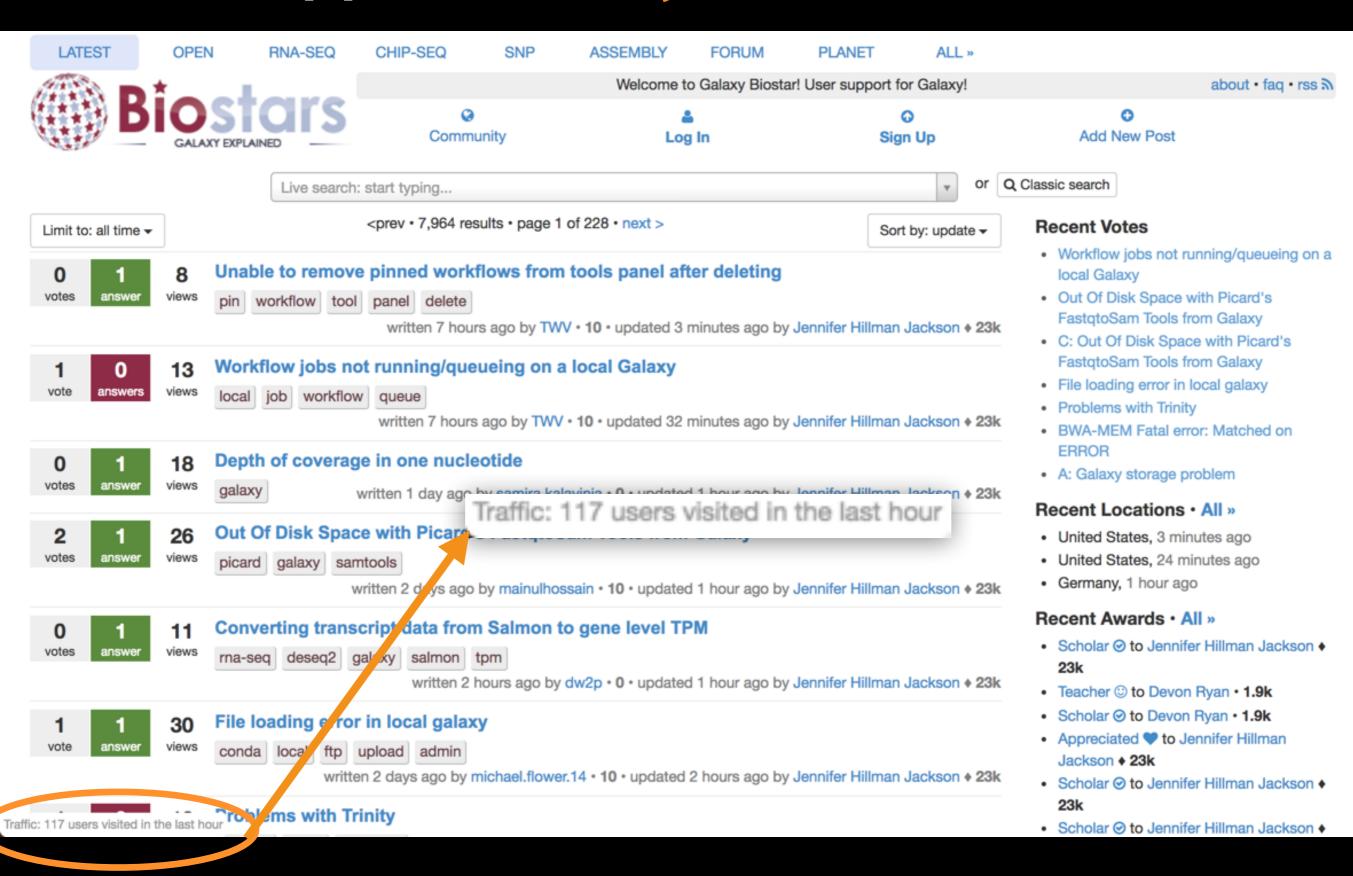
Salaxy | Published Workflow | MAGeCK count table to .GCT for IGV

Find pattern. sgRNA. Replace with. Name. Step 9: Add column. Add this value. prefix. to Dataset. Output dataset 'output' from step 3. Iterate? NO. Step 1 tabular dataset. Output dataset 'output' from step 8. in column. 2. Find pattern.

Support: Galaxy Biostars Forum



Support: Galaxy Biostars Forum



Support: Gitter Chat

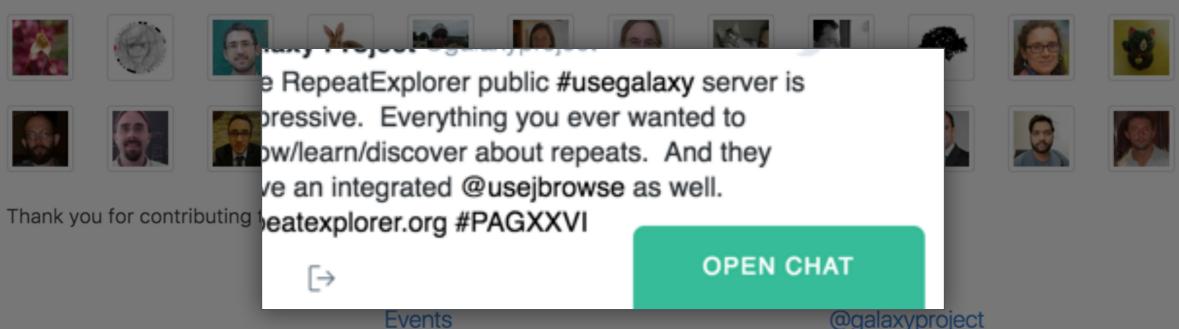


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Viva contributors!



News

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Developing bioinformatics training materials – from Melhourne Riginformatics



Galaxy Project galaxyproject

The RepeatExplorer by blic #usegalaxy server is impressive. Everything you ever wanted to know/learn/discover about reparts. And they have an integrated @usejbrowse a. well. repeatexplorer.org #PAGXXVI





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Support: Gitter Chat

GITTER

Where communities thrive

FREE FOR COMMUNITIES

JOIN OVER 800K+ PEOPLE JOIN OVER 90K+ COMMUNITIES CREATE YOUR OWN COMMUNITY

EXPLORE MORE COMMUNITIES

Browser, Desktop and Mobile Apps.



galaxyproject/Lobby Data intensive science for everyone. http://galaxyproject.org | Use now! http://u...





Thanks guys! Ping @nekrut - just copying those columns directly from the SRA data with either the Mac's Numbers or Google Charts seems to work when just pasting the data into Galaxy.



Yvan Le Bras @yvanlebras Groooovy!

Jan 12 12:21



galaxybot @galaxybot

Jan 12 13:24

[jxtx] Awesome.



Martin Cech @martenson

Jan 12 13:50

@jmchilton cool beans! The table is live, right?

because once we get this in, it would be awesome to extend it to csvlike dataset editing 😀



John Chilton @jmchilton

Jan 12 13:52

It is reactive - as you add rules (columns, filters, swap things, sorting rules, etc...) it redraws in real time.

Yeah - the rules backend is a little JSON language I'm building up with the widget - it is meant to be portable and executable on the backend. It would be cool to a tool that would apply the rules to datasets in addition to uploads like this (also to apply to existing collections in the middle of a workflow - this could serve as the most expressive collection operation I think).

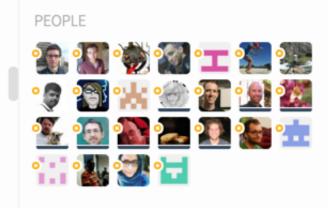


Martin Cech @martenson

Jan 12 14:01

The library also supports direct edit it seems.

SIGN IN TO START TALKING



SEE ALL (343 PEOPLE)

Galaxy Training Network



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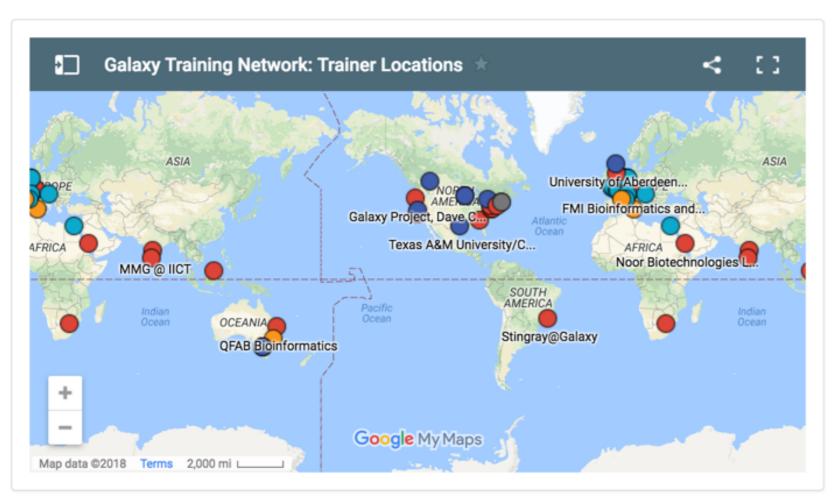
Support -

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Galaxy Trainer Directory



The Galaxy Trainer Directory is a service of the Galaxy Training Network which aims to make it easy to share and find Galaxy training resources. This directory lists individuals and groups that do Galaxy training. The contacts listed here are willing to present Galaxy at meetings and workshops. The directory includes particular areas of expertise and how far the instructors are willing to travel.

Do you or your organization do Galaxy training? Then please tell the Galaxy Community! You can

Trainers

Global

The Centre for

Bioinformatics and

Computational Biology

The FMI Bioinformatics

Core Facility

Freiburger Galaxy

Project

Galaxy Project

GalaxyP Project

Geneclat Technologies

Memorial Sloan

Kettering Cancer

Center, Rätsch

Laboratory

MMG@IICT

Noor Biotechnologies

Ltd.

OpenHelix

QFAB Bioinformatics

Stingray@Galaxy

University of Bradford

School of Me OPEN CHAT

Soionooc Kr

Galaxy Training Network



Fork me on GitHub Help *

Welcome to Galaxy Training!

Collection of tutorials developed and maintained by the worldwide Galaxy community.

Galaxy for Scientists

Topic	Tutorials
Introduction to Galaxy	10
Assembly	3
ChIP-Seq data analysis	2
Epigenetics	1
Metagenomics	2
Proteomics	8
Sequence analysis	6

Galaxy for Developers and Admins

Topic	Tutorials
Galaxy Server administration	8
Development in Galaxy	13
Train the trainers	6

http://galaxyproject.github.io/training-material/

Acknowledgements

You! UO BGMP
The Galaxy Community

NIH

Johns Hopkins University
Penn State University
Oregon Health & Science University
Cleveland Clinic



Thanks

Galaxy Project
Johns Hopkins University
clements@galaxyproject.org