

# Galaxy Genome Annotation: Galaxy and GMOD for Annotation, Teaching, and Genomic Databases

Eric Rasche, Björn Grüning, Nathan Dunn, Anthony  
Bretaudeau

June 14, 2017

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current  
Expansion  
Future

Q&A

Galaxy has room to expand into the Genome Annotation space. Needs community, we are that community. Needs tooling, we're building that. Needs integrations, we're building that.

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA  
Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current  
Expansion  
Future

Q&A

- Björn Grüning
- Eric Rasche
- Anthony Bretaudeau
- Peter van Heusen
- Nathan Dunn
- Eduardo de Paiva Alves
- Suzanna Lewis
- Torsten Seemann
- (...you!)

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current  
Expansion  
Future

Q&A

- Small components enhancing integration
- Standalone services augmenting the experience
- Which all build to: Completely pre-configured Galaxy+Apollo deployments with optional Tripal/Chado additions

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA  
Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life  
Background  
Current  
Expansion  
Future

Q&A

- **Docker Image: Galaxy + Annotation Tools** (Apollo Tools, Tripal Admin Tools, Circos, JBrowse, BLAST+, InterProScan, Glimmer, Augustus, FASTA manipulation tools, Spades, Mira, CD-Hit, ClustalW, AntiSmash, mummer, EMBOSS, BLAST, Diamond, Blast2GO)
- **Dockerized GMOD Deployment** (Most GMOD projects pre-configured to work together seamlessly)
- **Apollo Client library** (+parsec like tool, “Arrow”)
- **Various Apollo support projects** (git-backup, experimental google docs integration)

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current  
Expansion  
Future

Q&A

- Docker images for major GMOD projects (Apollo, Chado, Tripal)
- Galaxy image with huge array of tools
- Docker-compose configuration for entire deployment

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA  
Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current  
Expansion  
Future

Q&A

- Initially simple tooling to move data in/out of Apollo
- Expanded to include annotation automation, tools for creating / removing “human-created” annotations.
- Jenkins scripts ran functional annotation workflows automatically, regularly.
- The Galaxy-Apollo bridge grew out of use in an undergraduate course
- We have improved upon them as students find new bugs and corner cases we did not expect

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current  
Expansion  
Future

Q&A

- Used in Course
- Current Course Applications
- Ongoing Expansions
- Future Work



Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

**Background**  
Current  
Expansion  
Future

Q&A

- Undergraduate phage annotation course
- Genome sequence to publication
- (Parallel track for environmental sample to isolated phage)

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
**Current**  
Expansion  
Future

Q&A

- Apollo for annotation
- But how to democratize annotation?
- Galaxy Tools can create genomes, update permissions
- (But we do end up having to check user's apollo permissions at every step)

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current

Expansion  
Future

Q&A

- Using automated Chado export in Apollo
- Adding on Tripal + JBrowse-based public sequence display
- Internal sample tracking database
- More GMOD projects to come?

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current  
Expansion  
**Future**

Q&A

- More tools (IUC, GGA)
- More annotation community

Galaxy for  
Genome  
Annotation

ER, BG, ND,  
AB

GGA

Who  
What

Projects

Docker Images  
Galaxy/Apollo

Real Life

Background  
Current  
Expansion  
Future

Q&A

Thank you

GGA GitHub  
GGA Gitter

[galaxy-genome-annotation.github.io](https://galaxy-genome-annotation.github.io)  
[gitter.im/galaxy-genome-annotation/Lobby](https://gitter.im/galaxy-genome-annotation/Lobby)

This material is based upon work supported by the National Science Foundation under Grant Number  
1565146