

# de.NBI-epi RNA Bioinformatics Center

## University of Freiburg

### Chair of Bioinformatics

Fkz 031L0101C

Björn Grüning, Joachim Wolff  
University of Freiburg, Germany

## Description of de.NBI-epi

The de.NBI-epi project in Freiburg offers:

Visualization, normalization and quality assessment:

- Hi-C data analysis
- MethylC-Seq data analysis
- ChIP-Seq
- Bisulfite sequencing analysis pipelines

Training and user support:

- Galaxy HTS data analysis workshops
- Self learning material on training.galaxyproject.org
- Direct user support via gitter, GitHub or guest researcher

Available on:

- All in one Gateway: <https://usegalaxy.eu>
- Your computer with virtualized and personalized instances

## General information on the project

As part of the de.NBI-epi project in Freiburg, Joachim Wolff and Björn Grüning, are working closely with the RBC, de.NBI and ELIXIR to deliver high-class services for epigenetic research.

## General information on the project

### Community based infrastructure

#### BIOCONDA

Bioconda is a conda channel which provides software for biomedical research.

- 25,649 commits on GitHub
- 856 contributors
- > 6,500 packages



#### Biocontainers

BioContainers provides system-agnostic executable environments for bioinformatics software.

- Based on Docker & rkt
- > 8,400 tools
- Automatic builds from Bioconda

#### Galaxy

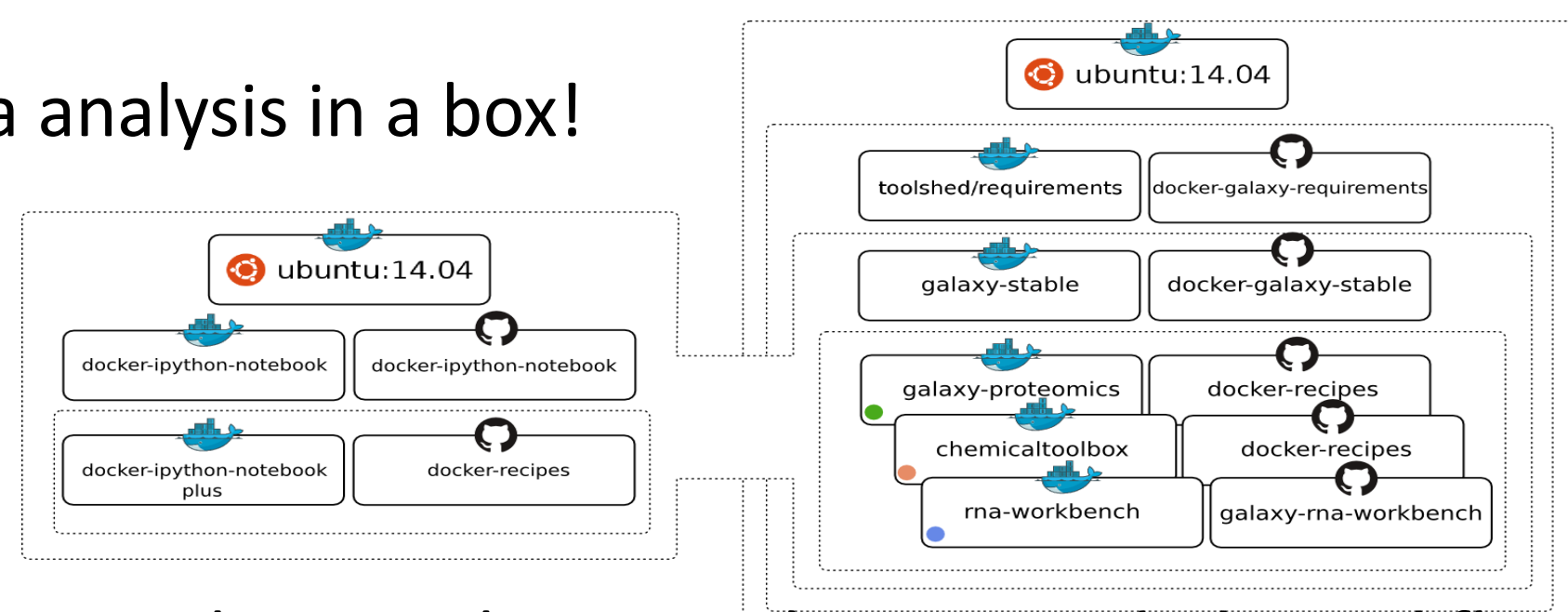
Galaxy is an open, web-based platform for data intensive research.

- 43,998 commits
- 223 contributors
- One of the biggest Galaxy instances available for de.NBI in Freiburg

#### The Galaxy Docker Project

The Galaxy Docker Image is an easy distributable full-fledged Galaxy installation, that can be used for testing, teaching and presenting new tools and features.

Portable data analysis in a box!



Based on the main Galaxy Docker virtualisation, a dedicated flavor for epigenetics was developed: [github.com/bgruening/docker-galaxy-epigenetic](https://github.com/bgruening/docker-galaxy-epigenetic)

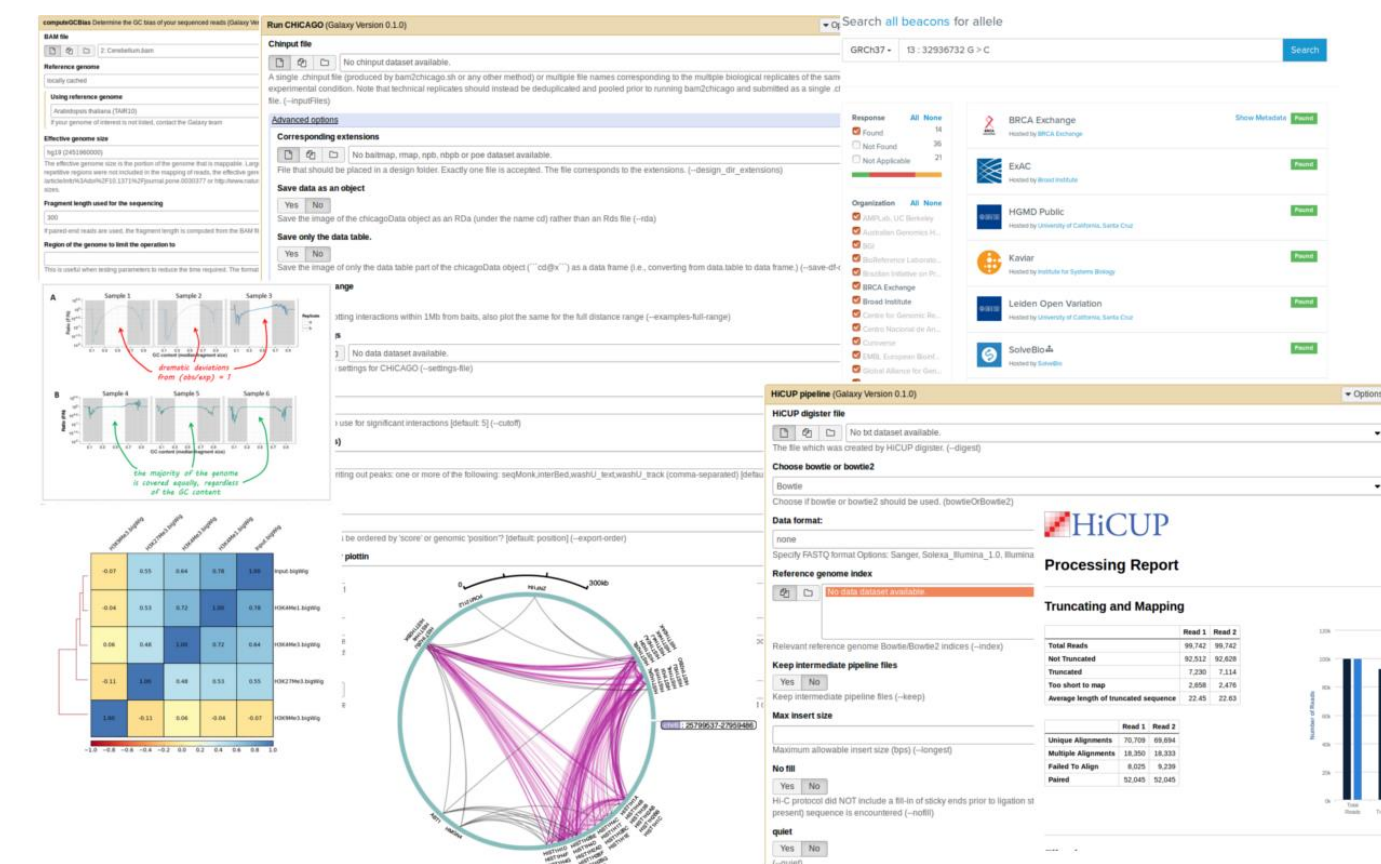
## Publications

- High-resolution TADs reveal DNA sequences underlying genome organization in flies.  
doi: 10.1101/115063
- Jupyter and Galaxy: Easing entry barriers into complex data analyses for biomedical researchers.  
doi: 10.1371/journal.pcbi.1005425
- The RNA workbench: best practices for RNA and high-throughput sequencing bioinformatics in Galaxy  
doi: 10.1093/nar/gkx409
- BioContainers: an open-source and community-driven framework for software standardization  
doi: 10.1093/bioinformatics/btx192

## de.NBI services

Maintenance, development and integration of software into Galaxy to provide easy access for epigenetic analysis software:

- deepTools
- Bismark
- HiCUP
- CHiCAGO
- Methyldackel
- Methtools
- HiCExplorer



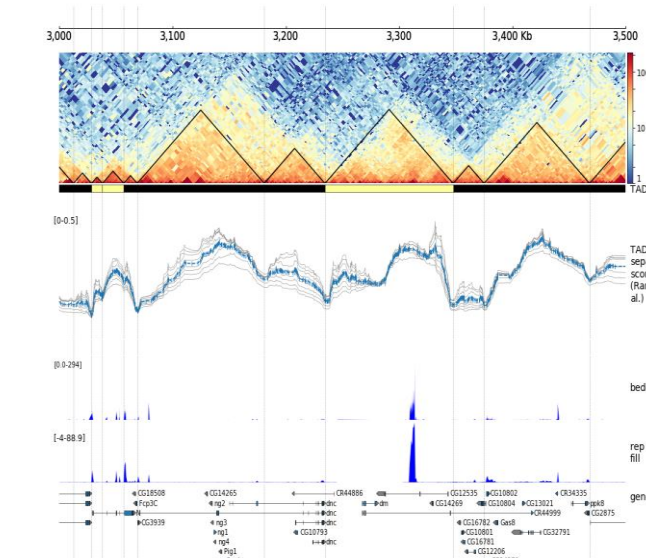
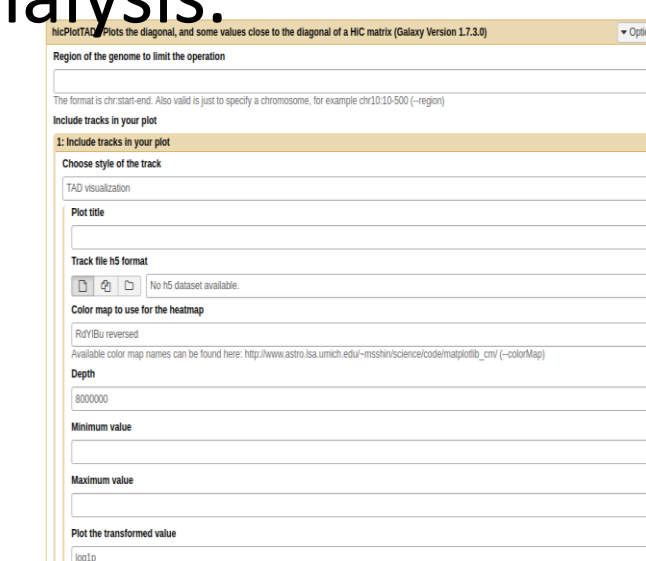
- Galaxy
- Container: Docker, rkt, Singularity

## Progress report

Development and maintenance of software for Hi-C data analysis.

#### HiCExplorer:

- Maintenance of HiCExplorer
  - Extending available tools with new functions
- Loop detection
- Support of more file formats
- Support of cHi-C data:



- Validation of loops
- Improved training material: [hicexplorer.readthedocs.io](https://hicexplorer.readthedocs.io)

#### scHiCExplorer:

New software to support single-cell Hi-C data analysis:

- Tools to demultiplex raw fastq files
- Create mCool matrices and manipulation
- Methods to reduce dimensions of scHi-C data
- Methods to cluster scHi-C data

## de.NBI Training and education

Hands-on training material for self-study available on [training.galaxyproject.org](https://training.galaxyproject.org)

- Introduction to HTS
- RNA-Seq
- ChIP-Seq
- Proteomics
- MethylC-Seq
- ...and many more!



#### 2018 / 2019 past events

06 <sup>th</sup> – 07 <sup>th</sup> Dec 2018	Galaxy RNA-Seq analysis workshop	Freiburg
25 <sup>th</sup> Feb – 01 <sup>st</sup> Mar 2019	Galaxy Workshop	Freiburg
1 <sup>st</sup> – 6 <sup>th</sup> Jul 2019	Host of Galaxy Community Conference	Freiburg
24 <sup>th</sup> Jul 2019	ISMB: Workshop for reproducible research	Basel
16 <sup>th</sup> Sept 2019	GCB: Workshop for Workflows, Tools and Data Management	Heidelberg
23 <sup>rd</sup> – 27 <sup>th</sup> Sept 2019	Galaxy Workshop	Freiburg