

Circos

Eric Rasche  
736B 9013

What is it?

Circos in Galaxy  
Screenshots

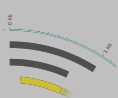
Roadmap

Q&A

# A Generic Circos Galaxy Tool

Eric Rasche

June 29, 2016



# Circos is a Circular Data Plotter

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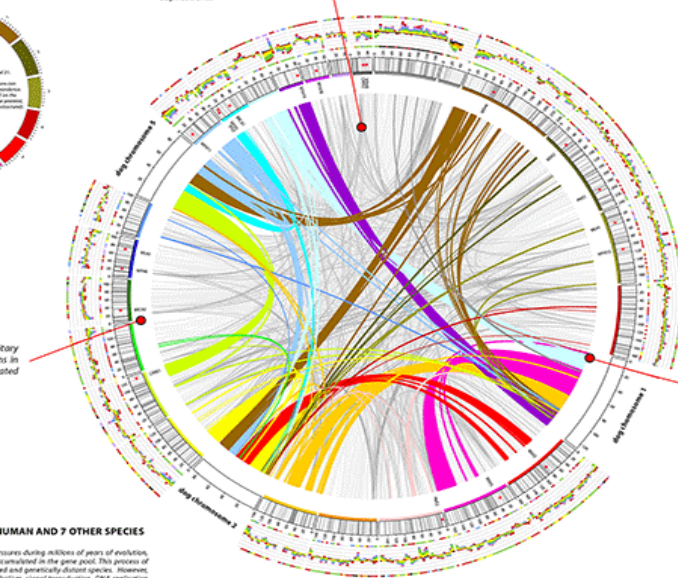
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- Wide variety of standard plots (histograms, line graph, x-y plots, heatmaps, cytogenetic bands, ticks, grids, backgrounds, tiles, glyphs)
- Rule based plot customisation
- Chord Plots (ribbons, links)



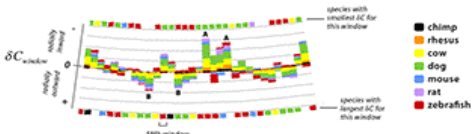
Each position on dog a chromosome links to the most similar region on the human genome. The color of link is coded by the target human chromosome.

Synteny between dog and human has a block structure. Large contiguous regions of dog chromosome 1 have high degree of similarity with regions of human chromosomes 6, 9, 18 and 19. This block structure is seen in most syntenic relationships and reflects the underlying mechanism of recombination of genetic material.

## HUMAN AND 7 OTHER SPECIES

processes during millions of years of evolution, conserved in the gene pool. This process of selection and genetically distant species. However, the basic research of laboratory and medicine. For example, by examining the extent of evolutionary drift between organisms. This kind of study is the

other organisms help establish the degree of evolutionary drift between organisms. This kind of study is the



## ILLUSTRATING CONSERVATION

For each 500 bp window in the human genome, conservation is shown for 7 different species: chimp (*Pan troglodytes*), rhesus (*Rhesus macaque*), cow (*Bos taurus*), dog (*Canis familiaris*), mouse (*Mus musculus*), rat (*Rattus norvegicus*) and zebrafish (*Danio rerio*). For a given species, conservation is shown as the relative difference between average conservation within the window and the genome.

$$\delta C_{\text{window}} = \frac{\text{avg}_{\text{window}} C - \text{avg}_{\text{genome}} C}{\text{avg}_{\text{genome}} C}$$

Some regions of the human genome have drifted further (A) and have negative relative conservation differences for each species. Other regions (B) show large positive conservation differences, indicating that this region is preferentially conserved relative to the whole genome.

# Why Circos as a Tool? Workflows!

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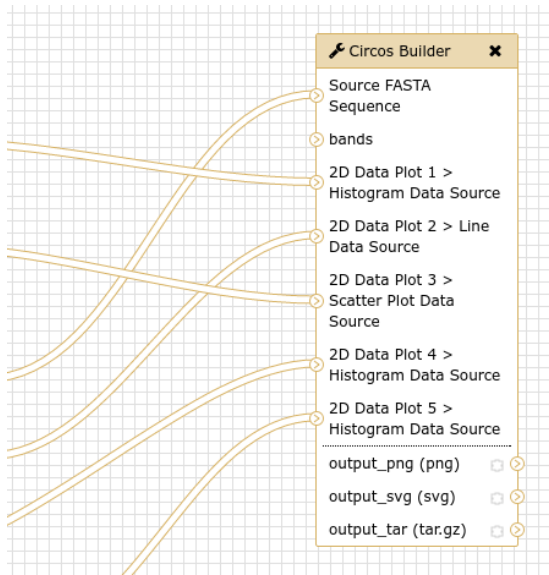
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# In-depth Controls

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## Ticks

### Show Ticks

☒ Yes ☐ No

### Radius

1.0

### Color

☒ Select a color

### Multiplier

0.001

1e-3 means your tick spacing will be

### Tick Group

#### 1: Tick Group

### Tick Spacing

5000.0

Number of bases

### Tick Size

10.0

### Show Tick Labels

☒ Yes ☐ No

### Label Size

20.0

### Label Offset

## 2D Data

### 2D Data Plot

#### 1: 2D Data Plot

### Outside Radius

0.89

### Inside Radius

0.8

### Orient Inwards

☒ Yes ☐ No

When yes/true, the plot will face i

### Plot Format

Histogram

### Histogram Data Source



11: volvox.gff3  
9: (hidden) volvox  
3: volvox\_sine.wig

If multiple files are selected, th

[Plot Format Specific Options](#)

### Rules

### Axes

### Backgrounds

## Rules

### Rule

#### 1: Rule

### Conditions to Apply

#### 1: Conditions to Apply

### Condition

Apply to Every Point

[+ Insert Conditions to Apply](#)

### Actions to Apply

#### 1: Actions to Apply

### Action

Change Fill Color based on Value

### Fill Color

Diverging: Brown - Blue Green

### Expected minimum value of dataset

-1.0

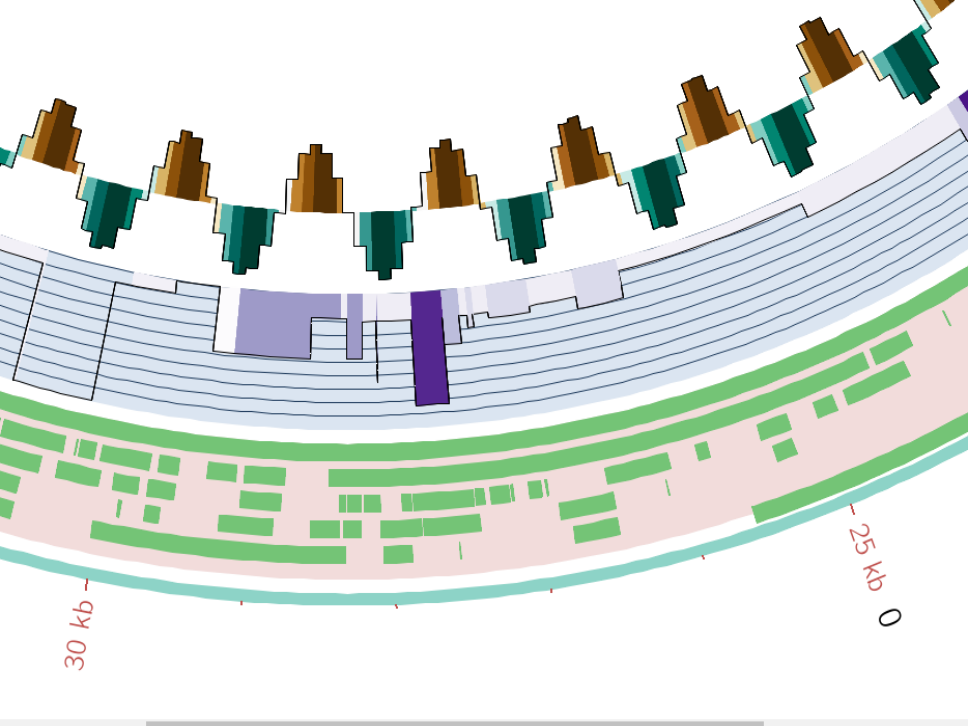
### Expected maximum value of dataset

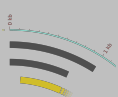
1.0

[+ Insert Actions to Apply](#)

### Continue flow

☒ Yes ☐ No





# Roadmap

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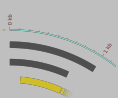
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Completed: Histograms, Line, Scatter, Heatmaps, Tiles, Axes, Backgrounds

In Progress: Saskia Hiltemann has an open pull request adding support for Links and Ribbons

Future: More advanced rule implementations, User facing documentation, Z-depth control, Move to tools-iuc



# Q&A

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## Thank you!

Circos Tool Development	<a href="https://git.io/voN8N">https://git.io/voN8N</a>
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## Bugs, Feature Requests welcome!