

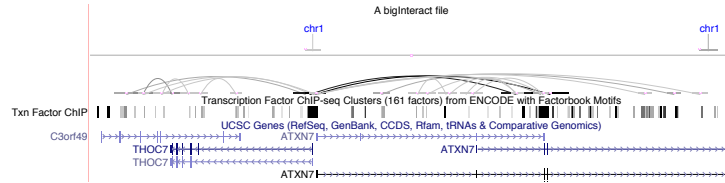
UCSC Genome Browser: New Interact Format and GeneHancer Data

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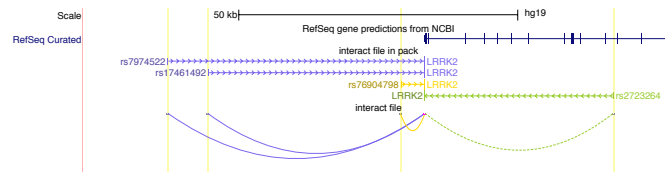
Visualize your regulatory and chromatin interactions in the UCSC Genome Browser

New Interact Format

The UCSC Genome Browser (<https://genome.ucsc.edu>) is a free, web-based tool that allows researchers to visualize and explore genomic data and has a **new interact track format**, used in native Browser tracks and available for use in custom tracks, or in tracks hubs in a binary format (**bigInteract**).



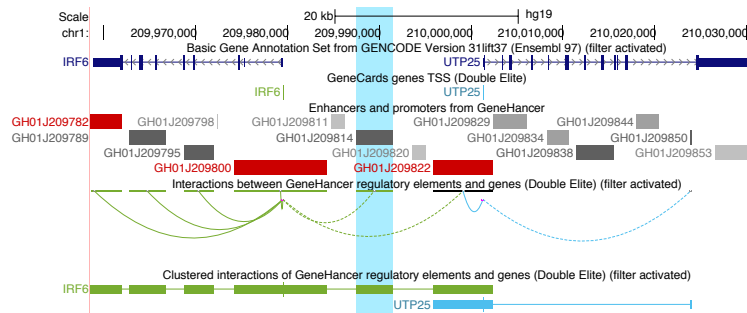
Interact is used to display pairwise **interactions as arcs or half-rectangles** connecting two genomic regions on the same chromosome, and can represent cross-chromosomal interactions. The format can be used to display physical low-density chromatin interactions, such as Chromatin Interaction Analysis by Paired-End Tag Sequencing (**ChIA-PET**), as well as **virtual (regulatory) relationships** such as **enhancers** or **SNP/gene interactions**. In the pack display, the direction of the interaction and the named ends are displayed. These two images represent examples shared on the [interact help page](https://genome.ucsc.edu/goldenpath/help/interact.html) (<https://genome.ucsc.edu/goldenpath/help/interact.html>).



GeneHancer human regulatory interactions now in the UCSC Genome Browser

New GeneHancer Track Data

The first native Browser track to use the new interact format displays data from the **GeneHancer** database, **linking human regulatory elements (enhancers and promoters) as arcs to their inferred target genes**. Over 1 million regulatory elements, obtained from seven genome-wide databases by GeneHancer, are visualizable on the human hg19 and hg38 assemblies as color-coded curves ending on their respective target.



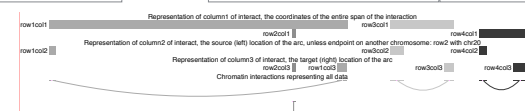
This image shows the GeneHancer track, where enhancers (grey blocks) and promoters (red blocks) interact with nearby genes displayed as arcs. A grey **GH01J209814 enhancer** (vertically highlighted) is associated with the transcription start site (TSS) for the **gene IRF6** (Interferon Regulatory Factor 6). A dashed arc indicates an upstream connection from the enhancer to the TSS of IRF6, where GH01J209814 harbors regulatory non-coding variants strongly associated with Van Der Woude Syndrome 1 (VWS1), a disease involving cleft lip and cleft palate. Below the interact arcs, additional **clustered views** of all interactions are seen as two color-coded bars (green for IRF6 and blue for UTP25), where clicking into each will give genomic coordinates for all enhancers and promoters related for each gene.

See interact examples

Understanding the New Interact File Format



track	type	interact	name	description	chromatin	interactions	usedScore	maxHeight	level	visibility	full				
chr1	chr1	6450802	6450134	3	0	chr3	6450802	6450134	3	0	chr3	6450802	6450134	3	0
chr3	chr3	6450802	6450134	3	0	chr3	6450802	6450134	3	0	chr3	6450802	6450134	3	0
chr3	chr3	6450802	6450134	3	0	chr3	6450802	6450134	3	0	chr3	6450802	6450134	3	0



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More Information @ ASHG 2019 Houston

ASHG Workshop: 7:15 am Fri. Oct. 16th (362D/Level 3)

Interact Help Page:

<https://genome.ucsc.edu/goldenpath/help/interact.html>

Download this poster:

http://genomewiki.ucsc.edu/index.php/File:ASHG_2019_Interact.pdf

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References

Haeussler M, Zweig AS, Tyner C, Speir ML, Rosenbloom KR, Raney BJ, Lee CM, Lee BT, Hinrichs AS, Gonzalez JN, Gibson D, Diekhans M, Clawson H, Casper J, Barber GP, Haussler D, Kuhn RM, Kent WJ. The UCSC Genome Browser database: 2019 update. *Nucleic Acids Res.* 2018 Nov 8; <https://doi.org/10.1093/nar/nyg1095>

Latest Work

Interact track details pages include a click through to a **Multi-Region** view creating a slice of the genome of the source and target regions side-by-side. The new "InteractMultiRegion on" setting enables quickly viewing cross-chromosomal interactions in one screen when defined by the interact file format.

