LocusZoom.js

Interactive web-based visualization tool for genome and phenome wide association data

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Interpreting association signals requires <u>context</u>.

LocusZoom.js is a **JavaScript/D3** library for visualizing genetic association data from many data sets with abundant context and real-time interaction for insightful data exploration on the web.
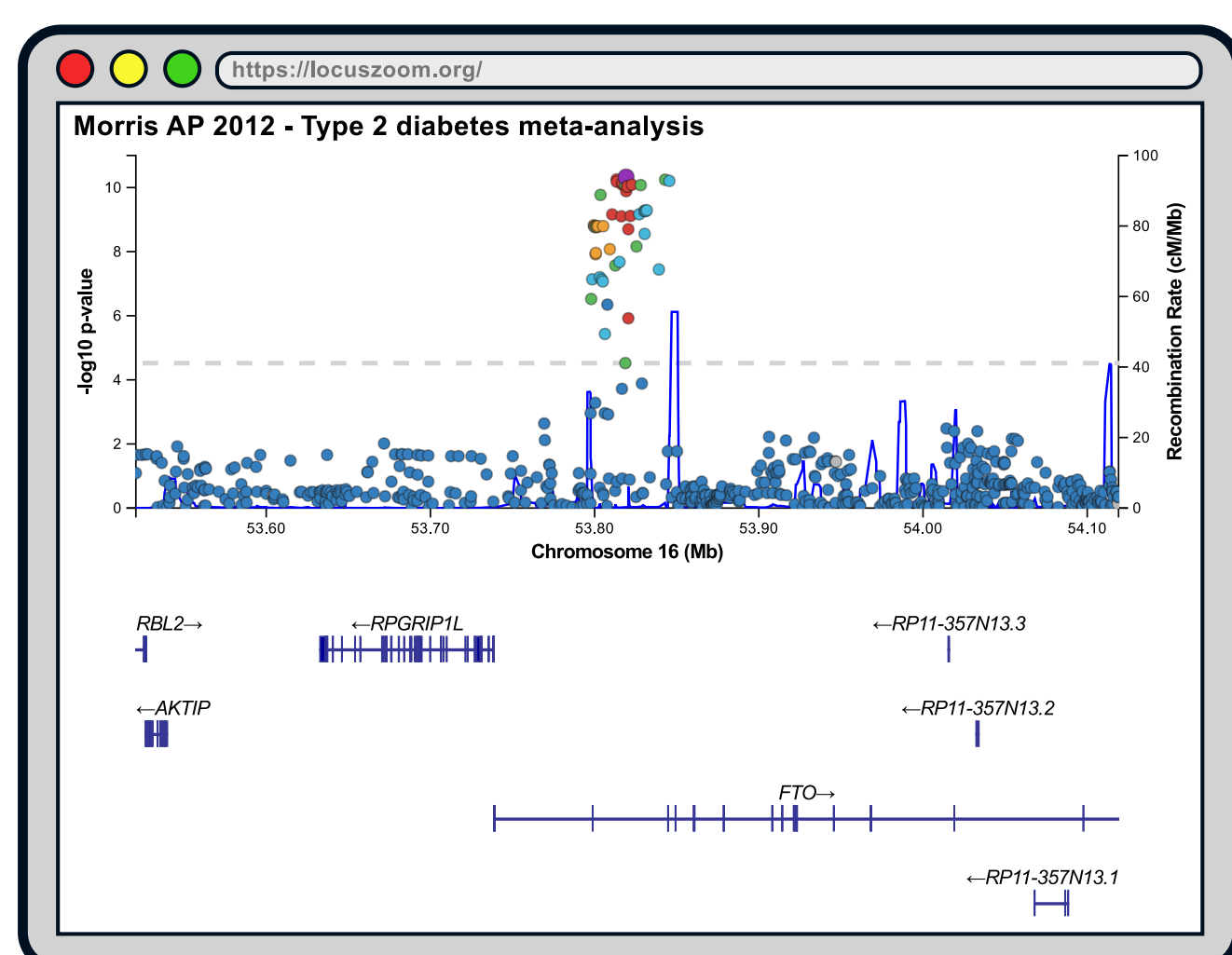

JS
- Runs natively on the web

D3
- Streams data from any web API

HTML 5
- Displays data interactively
- Open source + comprehensive docs
- Embeddable in web apps to build dynamic portals to large data sets

SVG
- Exports images for use in publication

Real-Time Interactivity
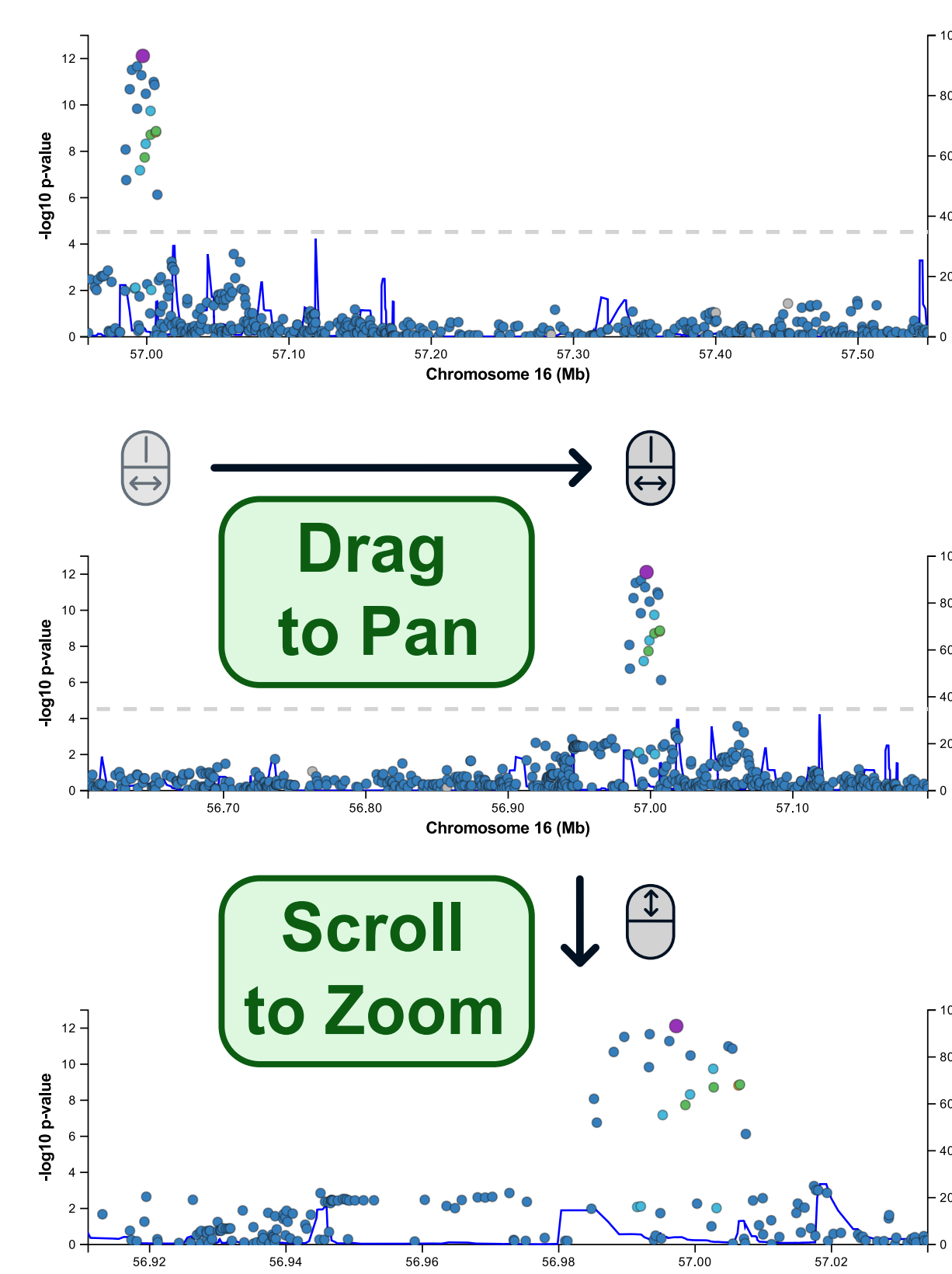
Use mouse gestures to Pan and Zoom
Data can be automatically fetched to fill in the gaps

Get context with Tool Tips
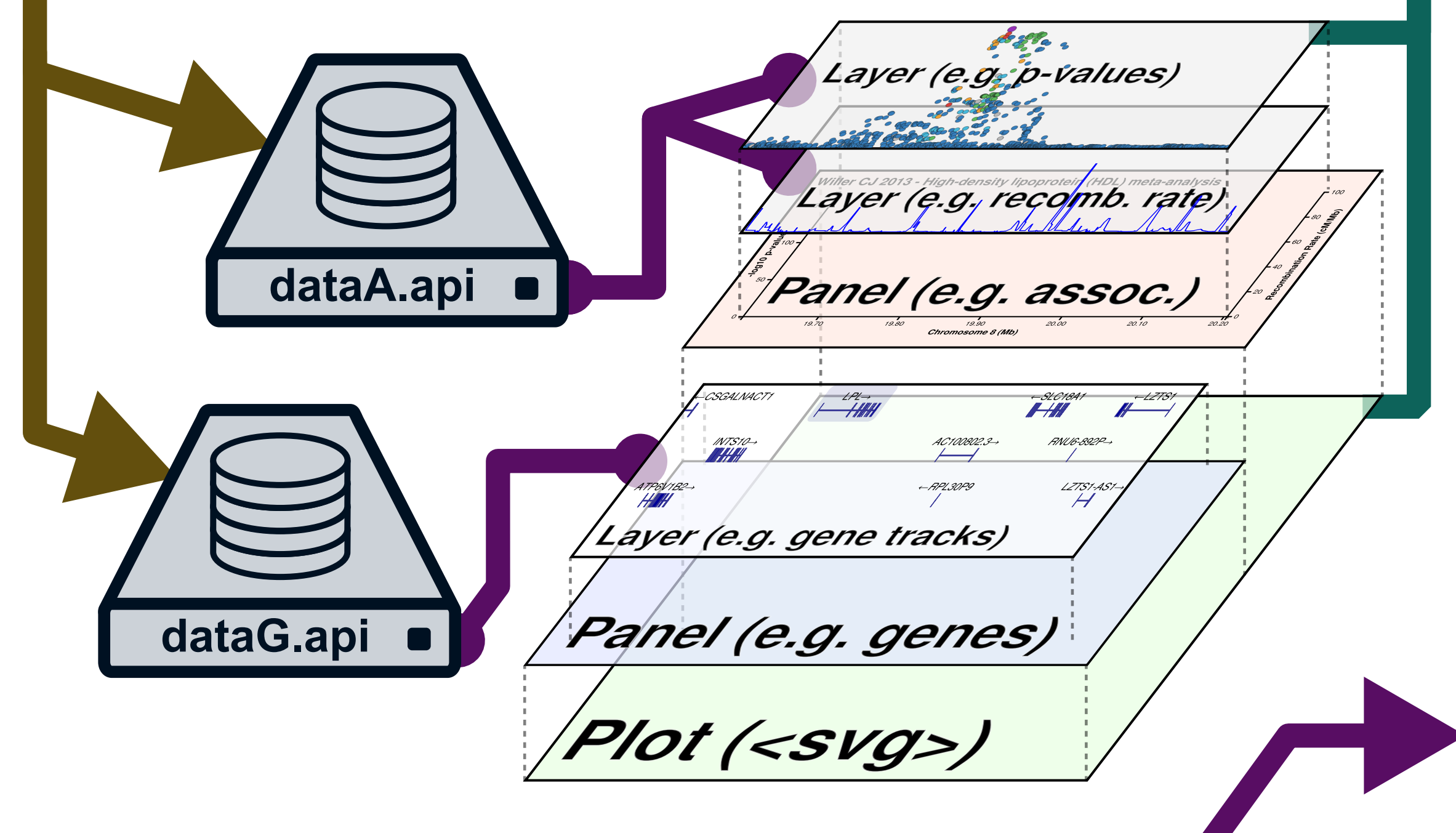Tool tips can also present interfaces to build a model, showing changes in real time

Drag to Pan

Scroll to Zoom
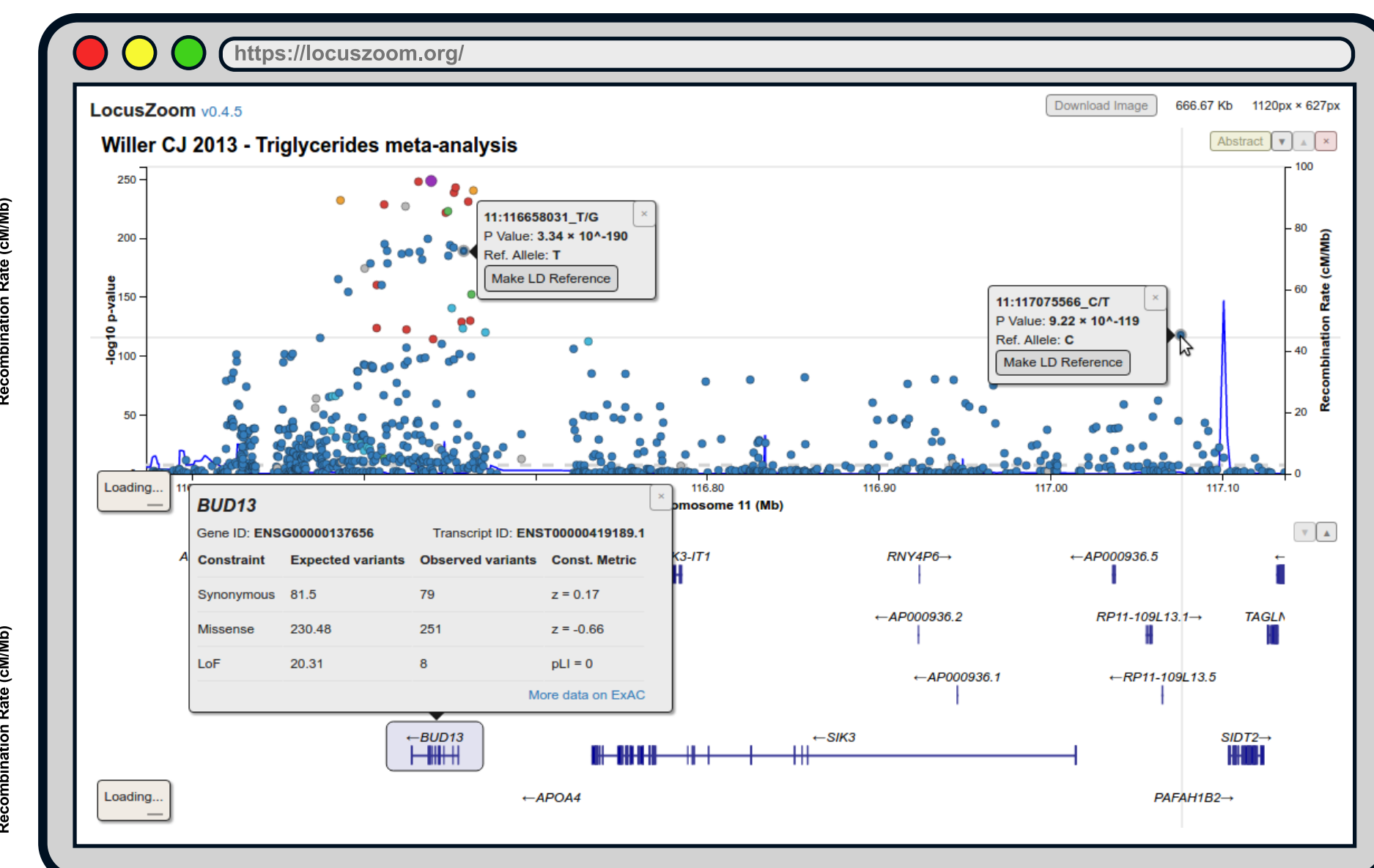
How to Make it Work

LocusZoom plots are created by **populating a DOM element** with **Data Sources** and a **Layout**

Data Sources are **functions** that establish where data comes from

```javascript
<script type="text/javascript">

var DATA_SOURCES = new LocusZoom.DataSources()
  .add("assoc", ["AssocLZ", "http://dataA.api/"])
  .add("genes", ["GeneLZ", "http://dataG.api/"]);

</script>
```
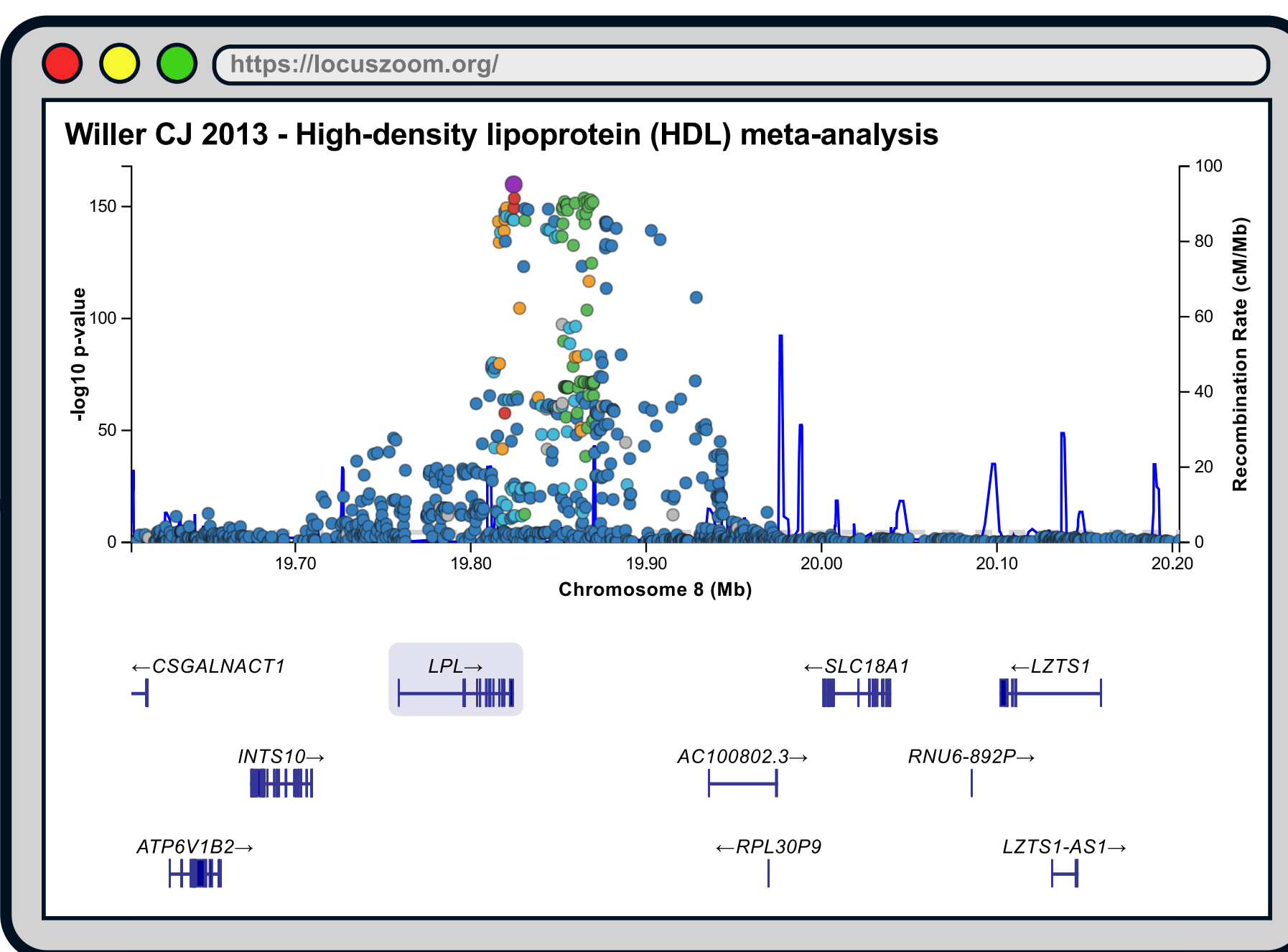
Layouts are **JSON objects** that describe a plot's structure

```javascript
var LAYOUT = {
  width: 700, height: 600,
  panels: [
    { id: "assoc_panel",
      data_layers: [
        { id: "pvalue_data", type: "scatter" },
        { id: "recomb_data", type: "line" }
      ] },
    { id: "genes_panel",
      data_layers: [
        { id: "gene_tracks", type: "genes" }
      ] }
    ...
};
```
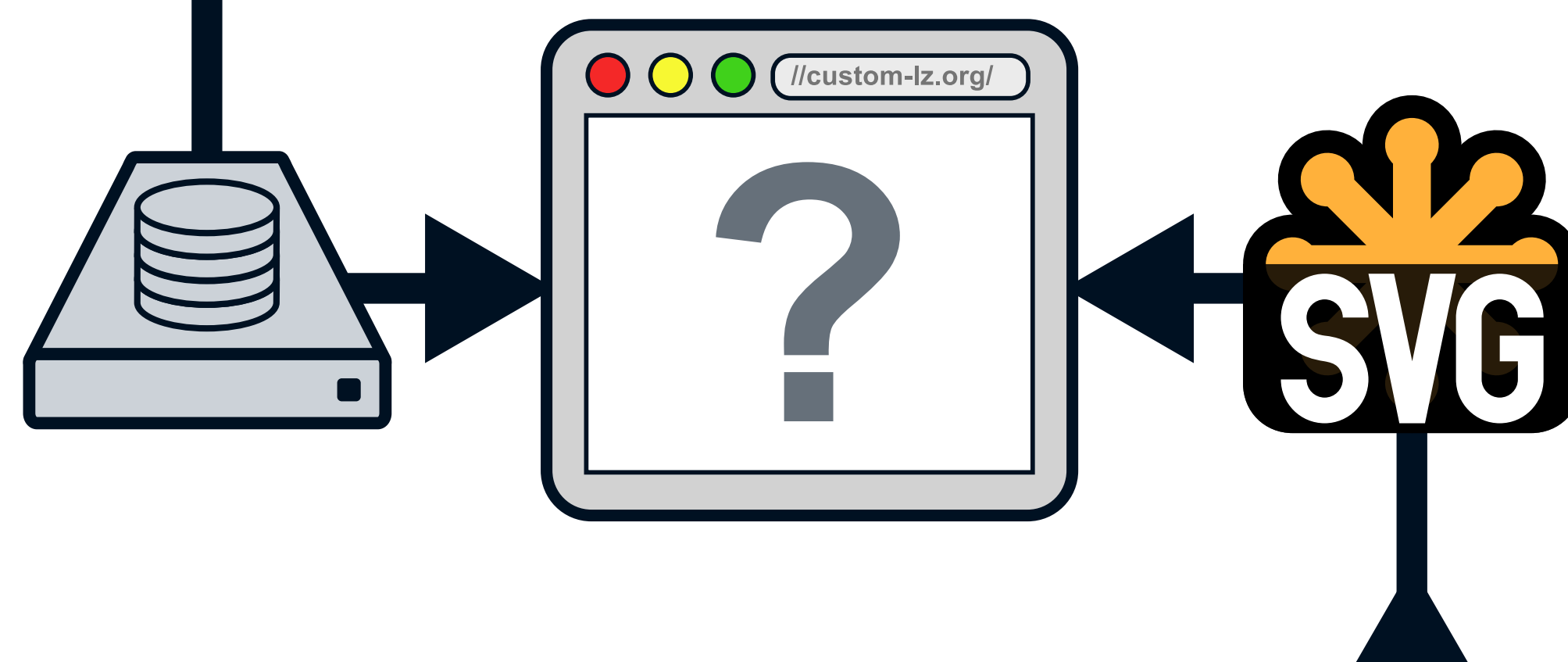

Willer CJ 2013 - High-density lipoprotein (HDL) meta-analysis

```html
<div id="PLOT"></div>
<script>
LocusZoom.populate("#PLOT", DATA_SOURCES, LAYOUT);
</script>
```

Customize It

```javascript
<script type="text/javascript">

var CUSTOM_DATA_SOURCE = LocusZoom.Data.Source.extend(
  function(init){ this.parse(init); },
  "CustomDataSource"
);

LocusZoom.Data.CustomDataSource.getData = function(){
  /* Request any data in any format */
};

</script>
```



```javascript
<script type="text/javascript">

LocusZoom.DataLayers.add("CustomLayer", function(LAYOUT){
  this.DefaultLayout = { alpha: true, beta: false };
  this.render = function(){
    /* Draw any data using D3+SVG */
  };
});

</script>
```

Planned Features

- New data layers for representing annotation tracks, burden tests, credible sets, and more

- Services to generate interactive LocusZoom plots from uploaded data

- Tools to access/export a plot's underlying data

- More resources for developers integrating LocusZoom into their own apps (API methods, documentation, etc.)

github.com/statgen/locuszoom

Where to Play With It

type2diabetesgenetics.org

The AMP Type 2 Diabetes Knowledge Portal
Accelerating Medicines Partnership (AMP) database of DNA sequence, functional/epigenomic data, and clinical data from studies on type 2 diabetes with analytical tools for academic+industry researchers
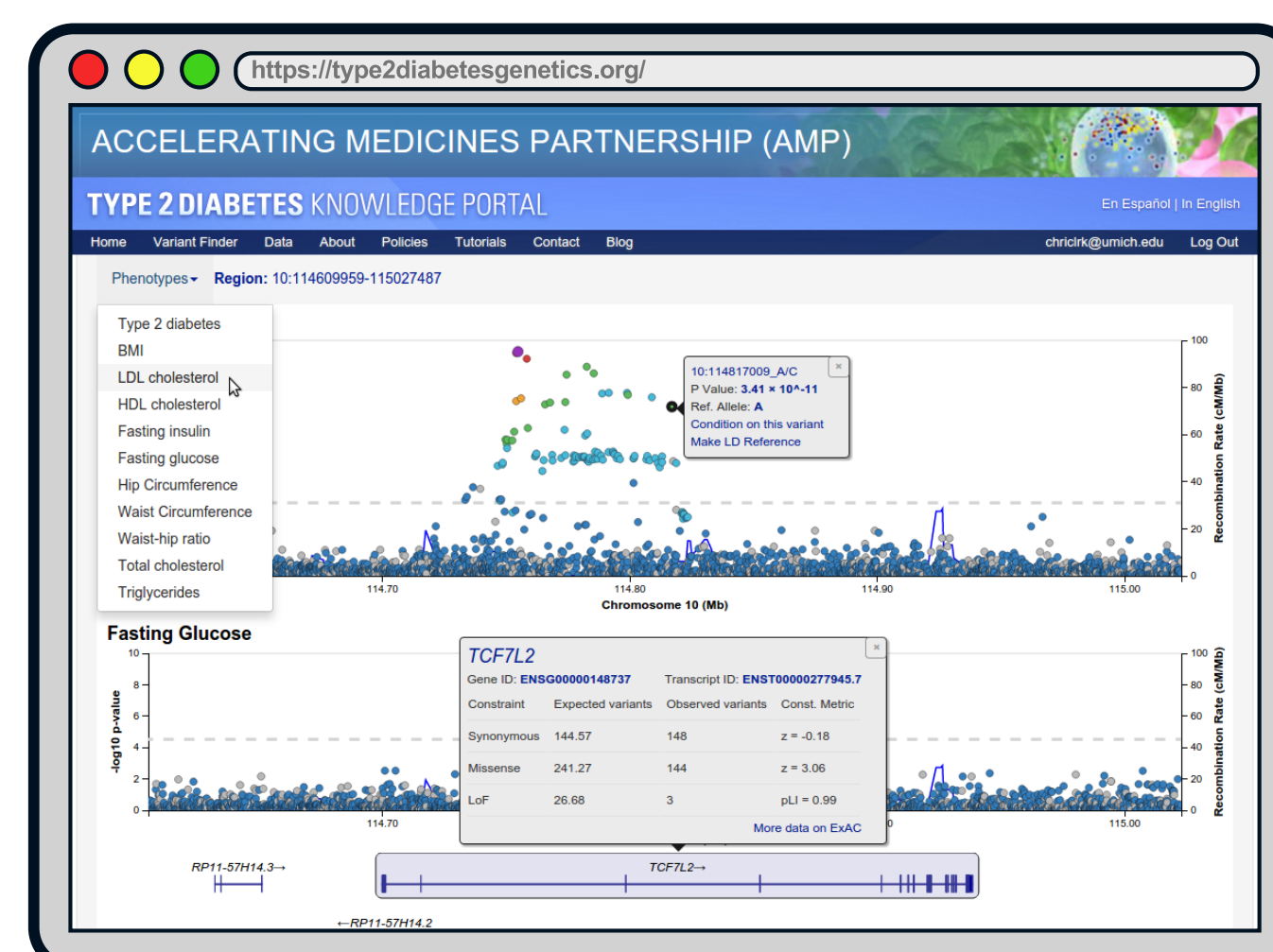
michigangenomics.org

The Michigan Genomics Initiative (MGI)
A University of Michigan Phenome-Wide Association Study (PheWAS) that combines a repository of over 30,000 genotypes with ~1,500 phenotypes gleaned from electronic medical record (EMR) data
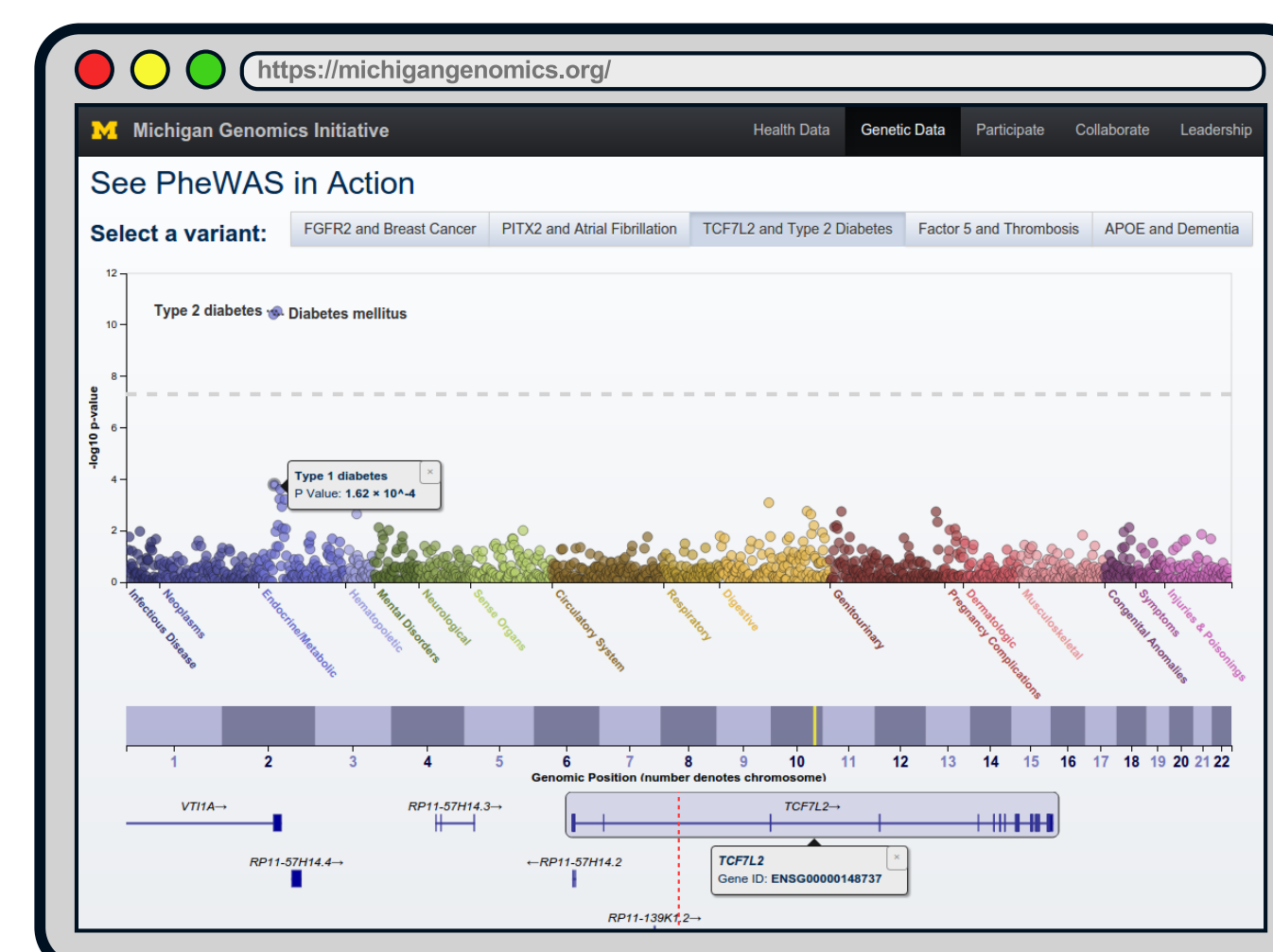
locuszoom.org

The LocusZoom Homepage at UofM CSG
Main website for LocusZoom as a service of the Univeristy of Michigan Center for Statistical Genetics. Create static plots of published GWAS or uploaded data and interactive plots of published GWAS data