Breakout Session 1: Track B

NCI CRDC Cloud Transfer of TP53 Website and Database

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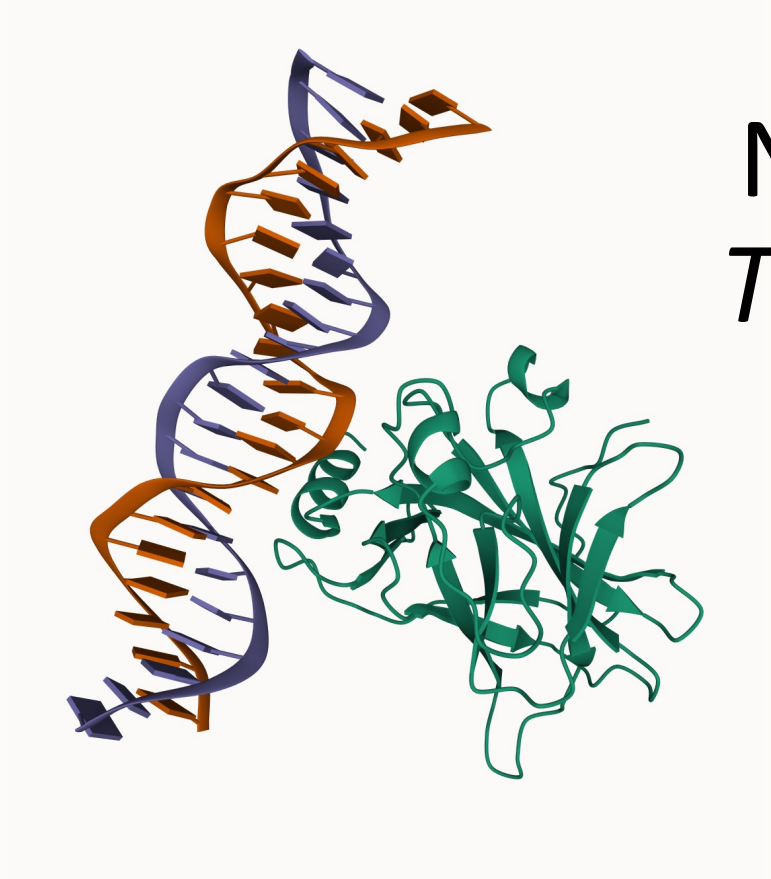
Senior Software Engineer, Institute for Systems Biology



NCI CRDC Cloud Transfer of *TP53* Website and Database

William Longabaugh

Senior Software Engineer, Institute for Systems Biology

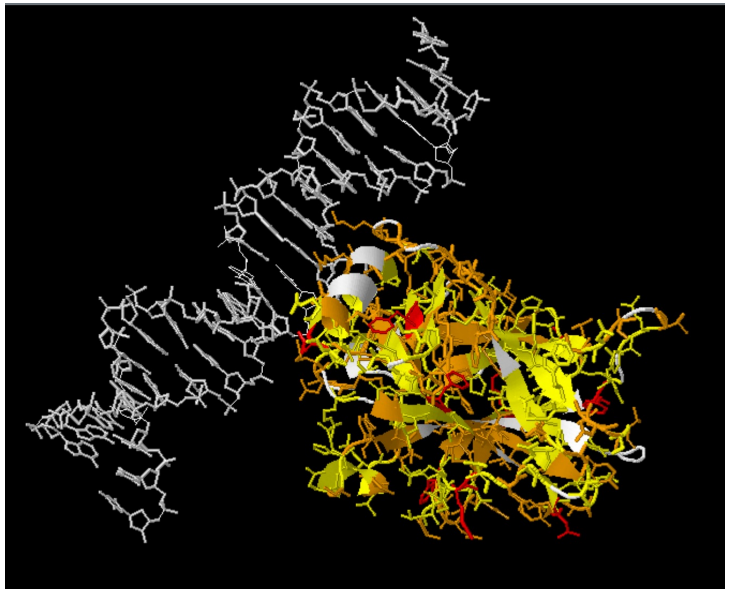
Jan 17 2024

Funding

- We received funds from *"FY2021 Request for ODSS Funds to Catalyze Migration to and Usage of the Cloud via the STRIDES Initiative (HVD 21)"*
- Google cloud credits were provided to us to support cloud operations underlying our migration of the IARC WHO TP53 database (now retired) to become part of the ISB-CGC Cloud Resource, a component of the Cancer Research Data Commons (CRDC)
- Additionally, the credits covered cloud operation costs of our development, test, and production tier Google cloud projects until September 2023

Thank you to the Office of Data Science Strategy

The *TP53* Database: Aim and Scope



Database compiles *TP53* variant data from 1989

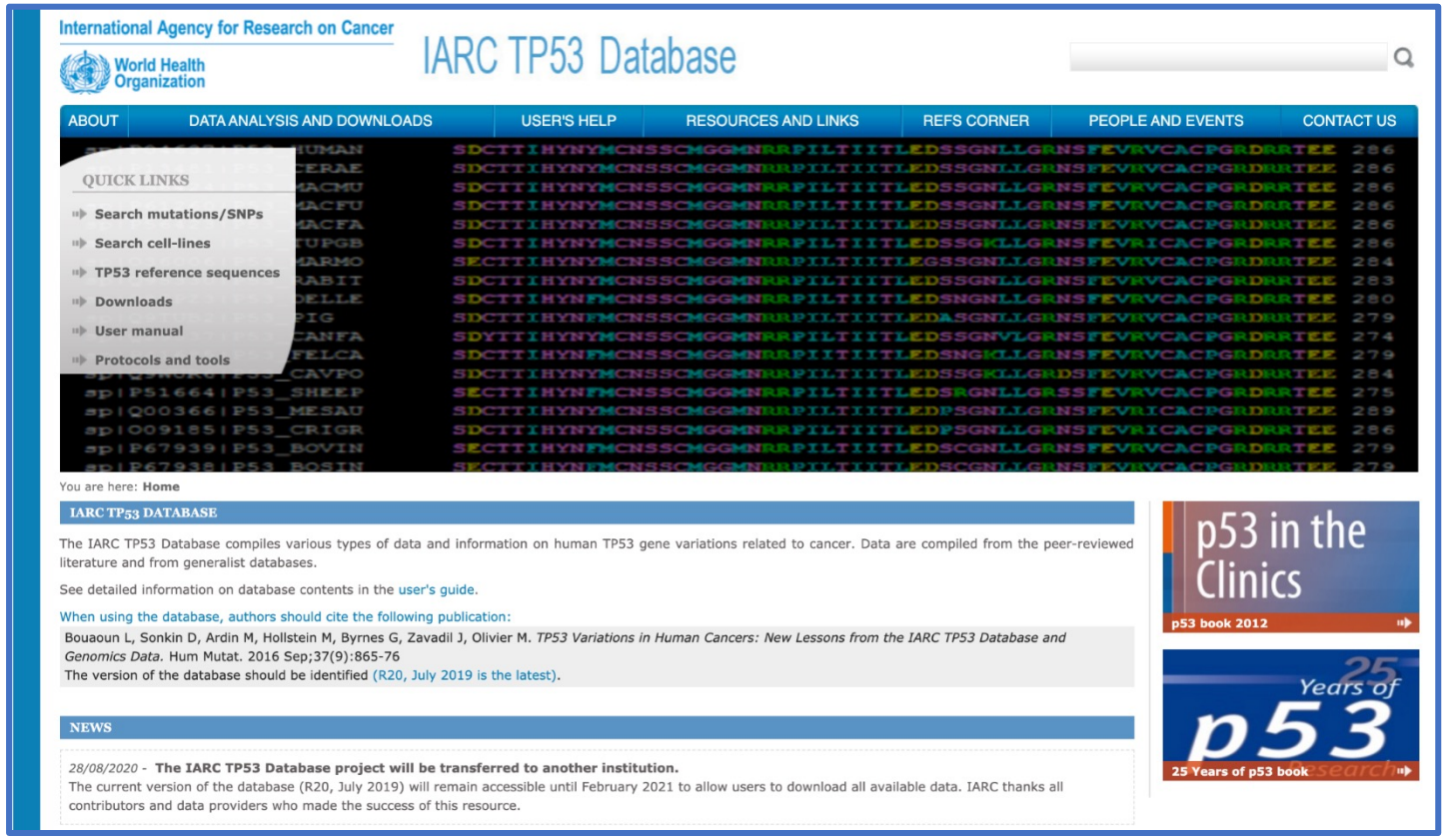
Currently holds information on 24,547 *TP53* variants

Database includes:

- *TP53* **functional** and **structural** data
- *TP53* **tumor** variants in sporadic cancer
- *TP53* **germline** variants in cancer patients, families with cancers
- *TP53* gene status in human **cell-lines**
- **Mouse models** with engineered *p53*
- **Experimentally-induced** *TP53* variants

Holds information on *TP53* variants for a broad range of scientists and clinicians who work in different research areas

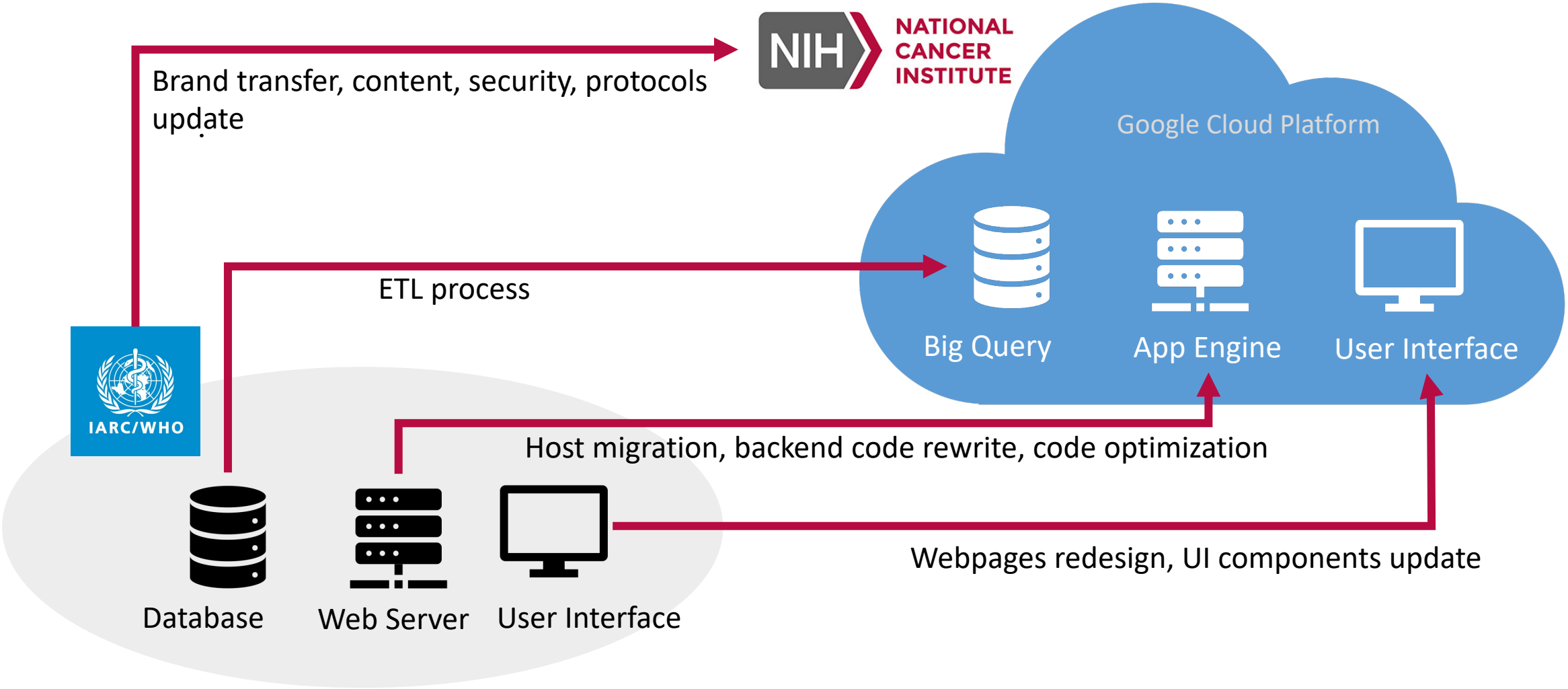
IARC *TP53* Database



IARC TP53 Database Website in 2020

The original ***TP53* database** was initiated in 1991, further developed and maintained by WHO's **International Agency for Research on Cancer** until 2021.

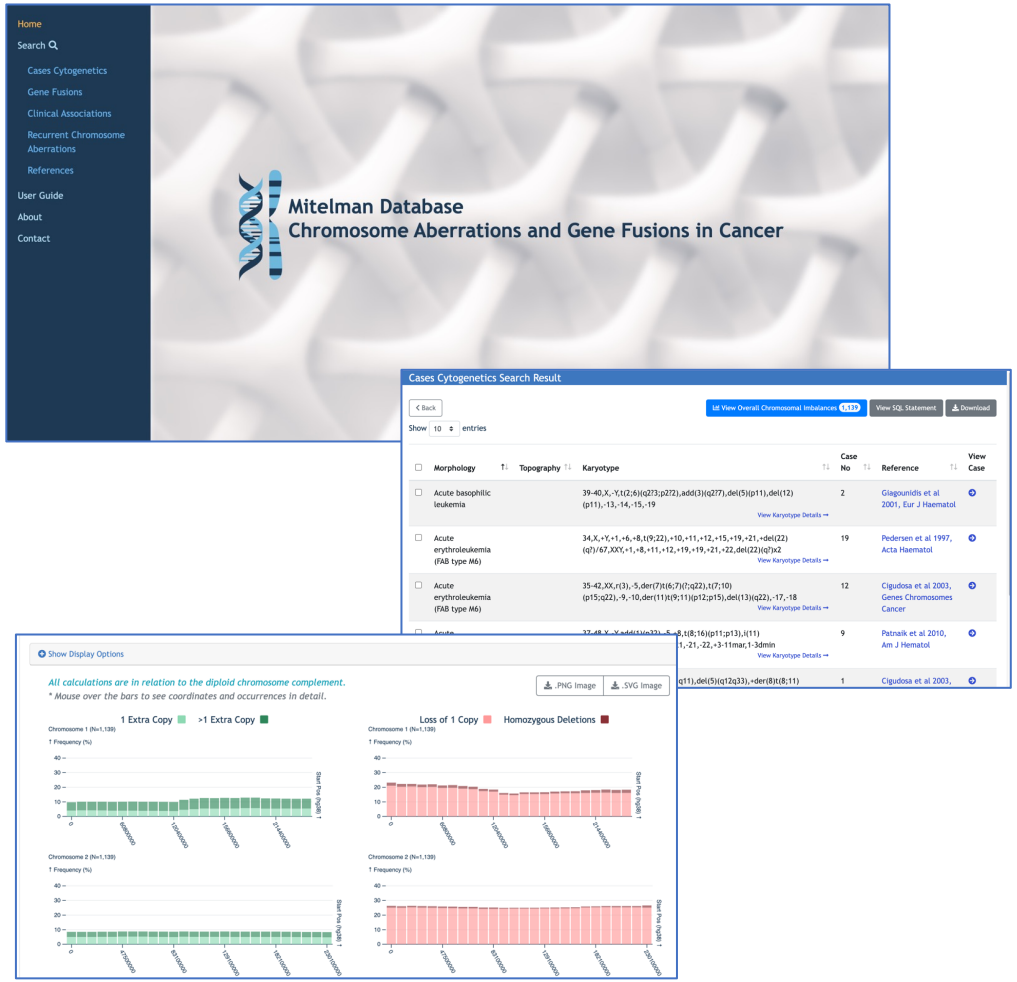
Transfer of Website and Database into the Cloud



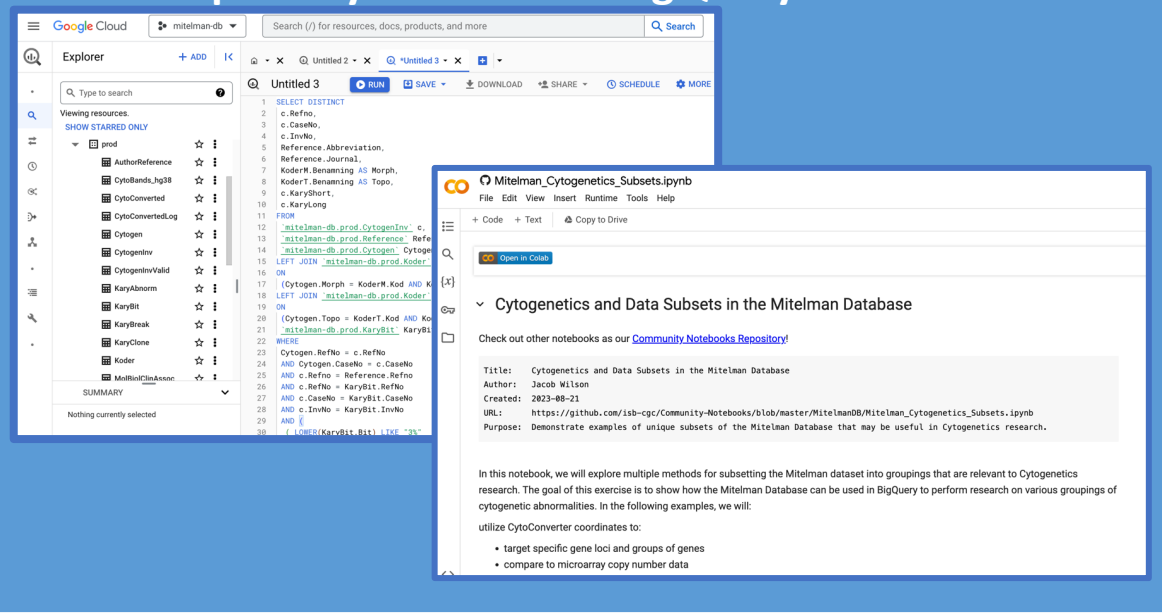
Transfer of Website and Database into the Clouds: Mitelman Database

- The **Mitelman Database** was part of CGAP (Cancer Genome Anatomy Project, NCI)
- That website was retired on 2019
- ISB-CGC was responsible for transferring all web components to the Google Cloud Platform
- The application has been further developed for advanced queries and additional features

https://mitelmandatabase.isb-cgc.org

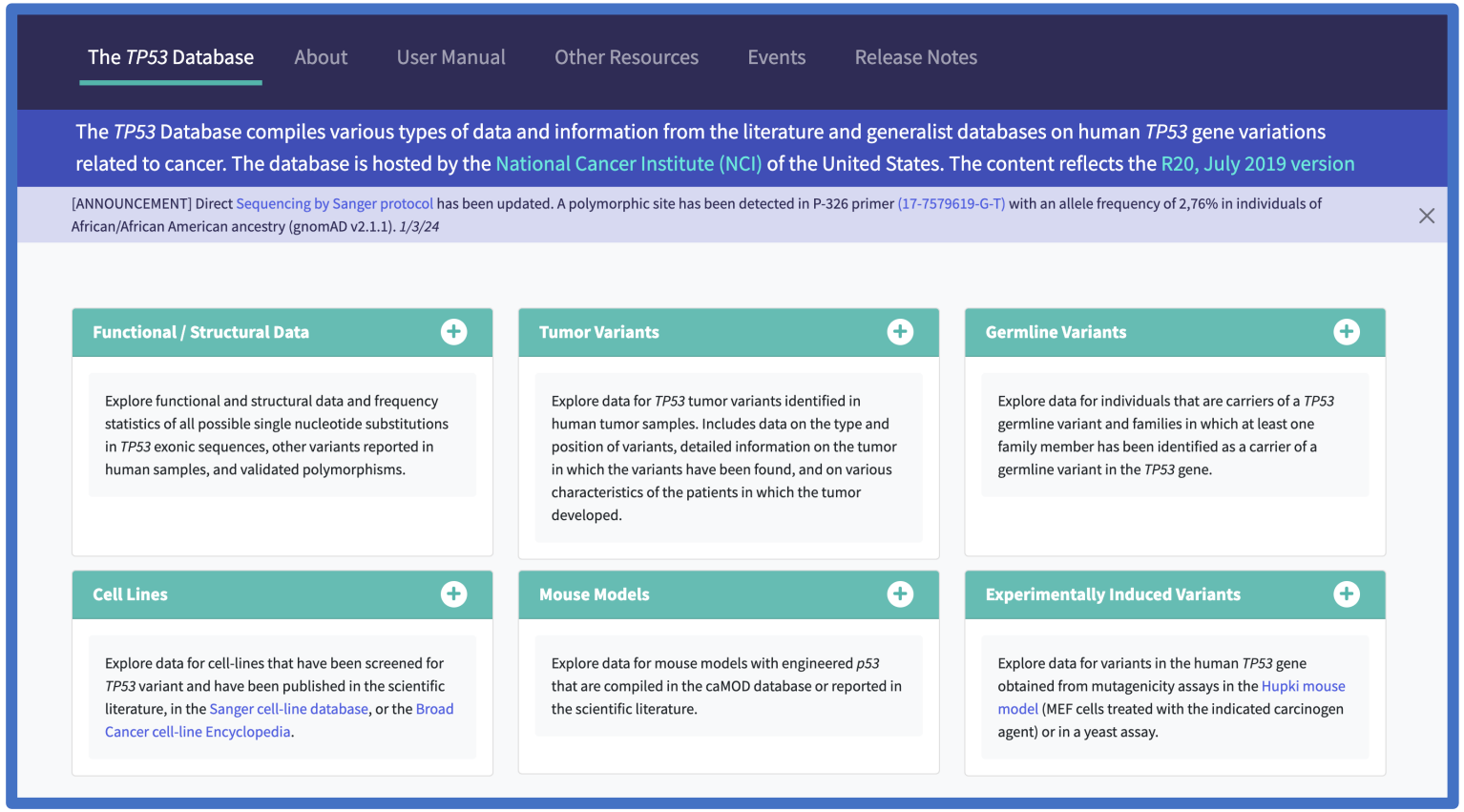


All data is **publicly available in BigQuery**.



Transfer of Website and Database into the Clouds: The *TP53* Database

https://tp53.isb-cgc.org

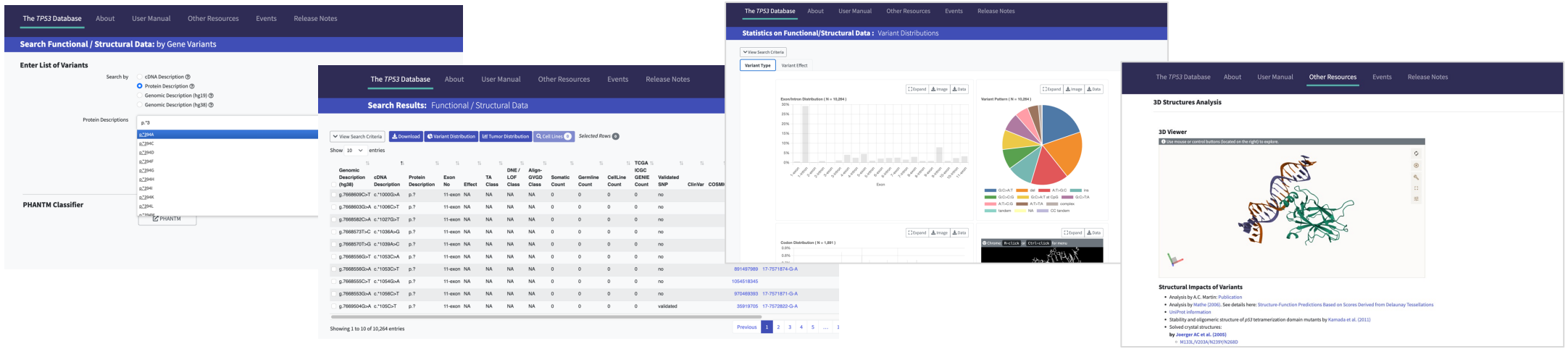


The TP53 Database of NCI was launched in 2021 with all of its web components operating under **Google Cloud Platform**.
All web queries are directly run in **BigQuery.**

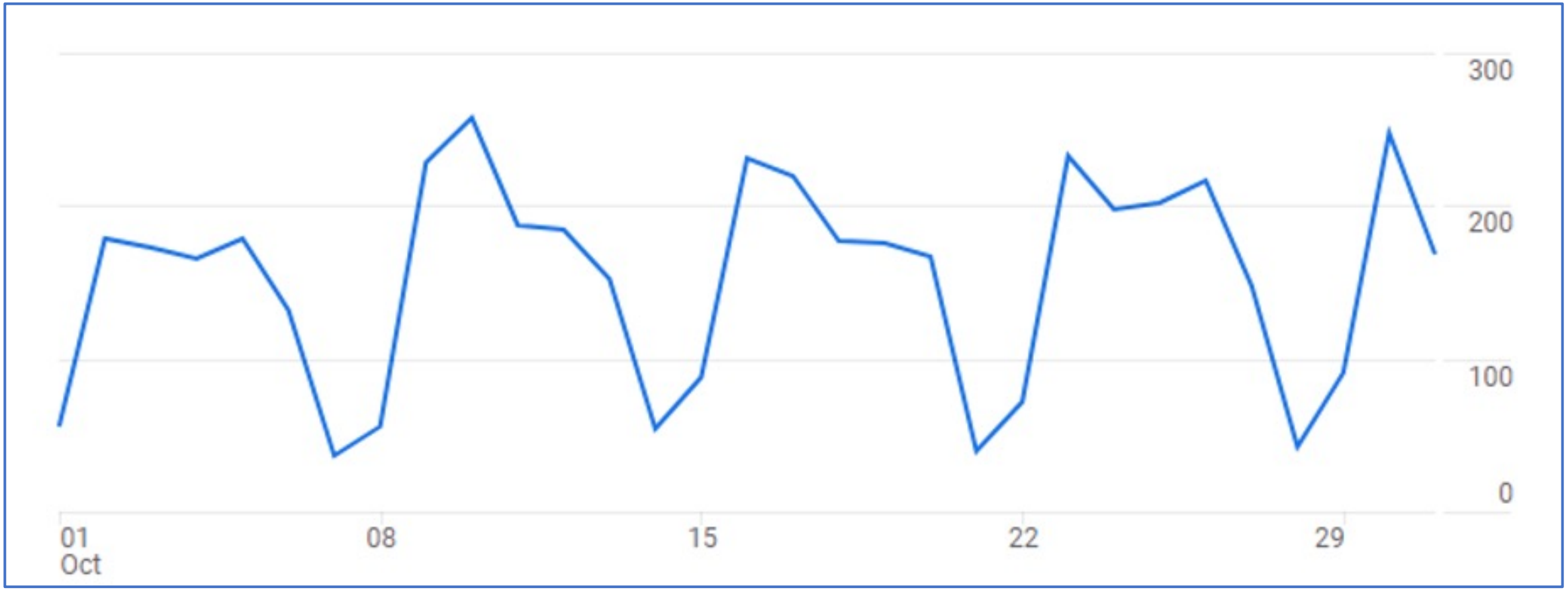
The *TP53* Database of NCI

Application is now

- Faster to search or run analyses
- Easier to navigate
- Secure
- Shares the same development, deployment, hosting, testing, and security framework with other ISB-CGC components



TP53 Database Usage

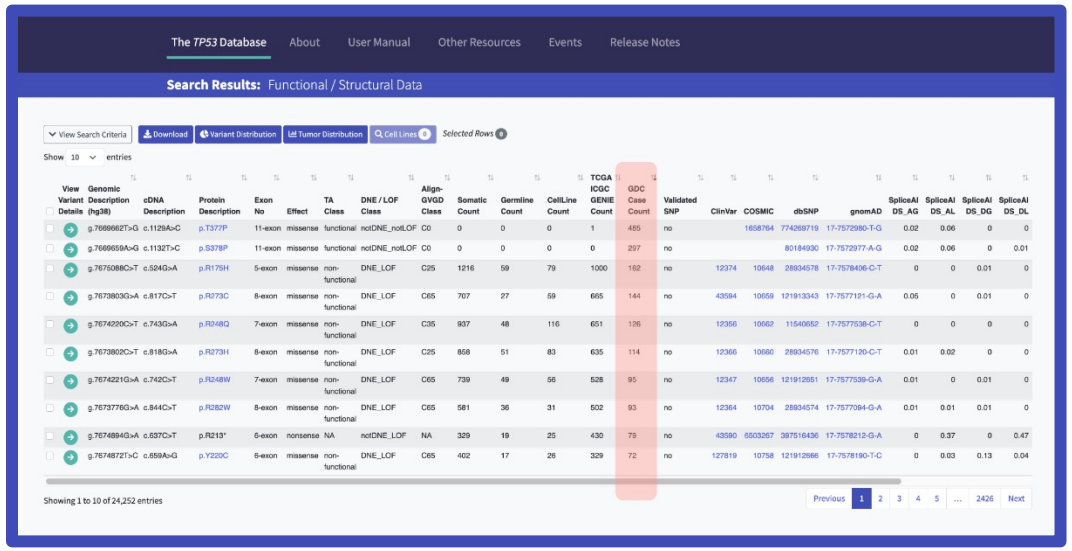


Future Development:
Easy Access to *TP53* dataset in BigQuery

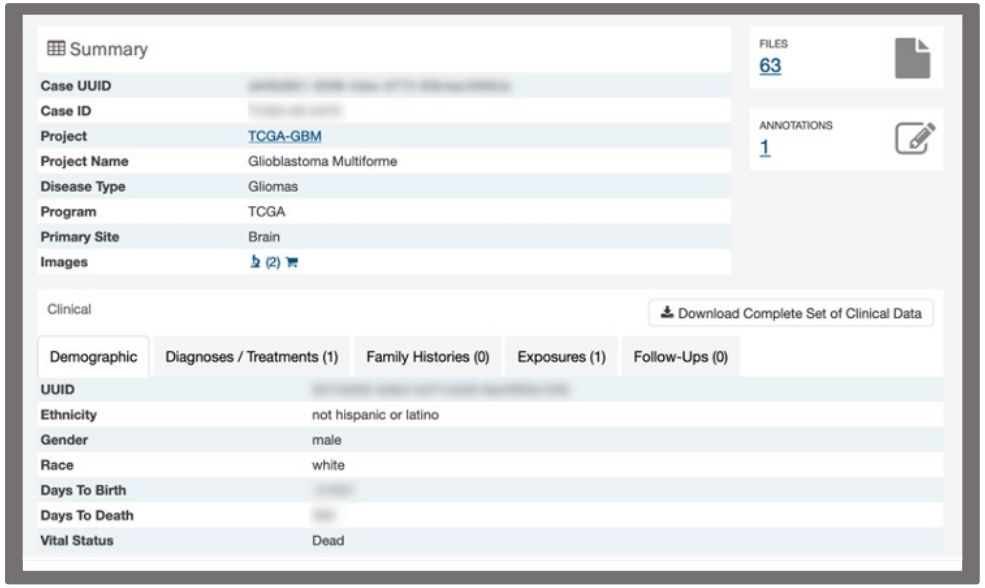
- The current BigQuery tables are not yet public (*cf.* Mitelman Database)
- The current data tables are too complex
  - The data is extracted from 70 tables, which have over 500 columns all together
  - Need to optimize the data by trimming fields that are not related to *TP53* variants
  - Need to remove extraneous columns that were never exposed
- Making the data in BigQuery public will make it easily accessible to any researcher or clinician
- The field of the data analysis can then be easily expanded with arbitrary queries

Future Development:
Linking *TP53* variant data with GDC case data

With TP53 now part of the CRDC, we can use the data to inform analyses of CRDC data



Prototype: TP53 variant search results with GDC case info



Genomic Data Common case page

ISB-CGC

ISB

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https://tp53.isb-cgc.org/