

# Cancer Moonshot Data Visualization Methods and Tools Development (R33)

Dr. David Miller, Division of Cancer Biology

New Enabling Technologies - Cancer Moonshot Implementation Team

# Overall Goal

- Stimulate the development of new cancer data visualization tools that have the potential to make data from Cancer Moonshot areas more explorable and interpretable by the broader cancer research community.



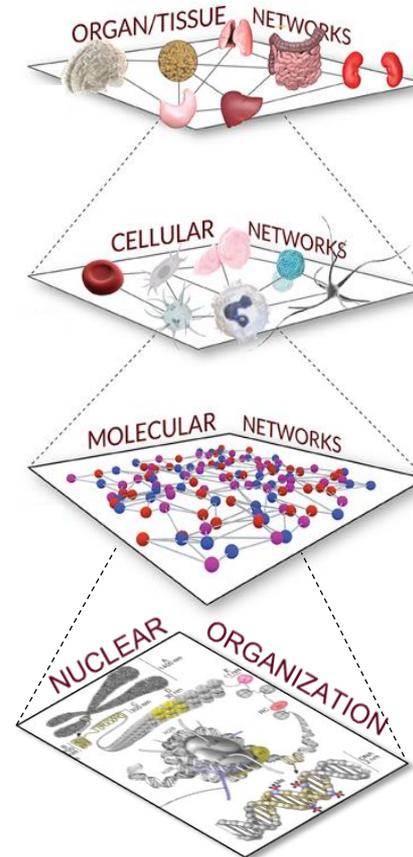
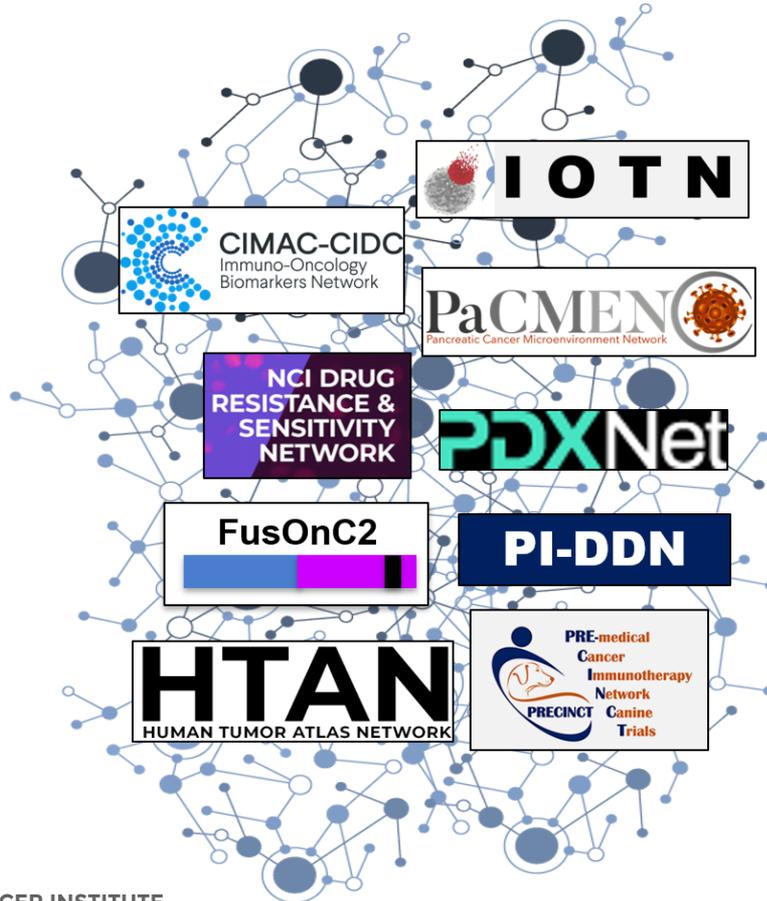
# Data Visualization to enhance Cancer Moonshot areas

- Data Visualization is cross-cutting and timely
- Data are being generated across Moonshot areas
- NCI needs to support tools to get ahead of these data

# A Need for Data Visualization Tools Across Moonshot Areas

- The Moonshot BRP identified data visualization as a cross-cutting need
- Common challenges persist for the broader cancer research community for gaining insights from emerging data and information:
  - Deconvolution of high-dimensional data
  - Visualizing complex data as lower-dimensional embeddings
  - Integrated visualization of data from single cell genomics and radiological images
  - Viewing subsets of data of interest to a particular research community while maintaining the larger context of the full data resource

# Data emerging from and aligned with Cancer Moonshot



# Data Visualization is distinct from Imaging

## **Cancer Data Visualization**

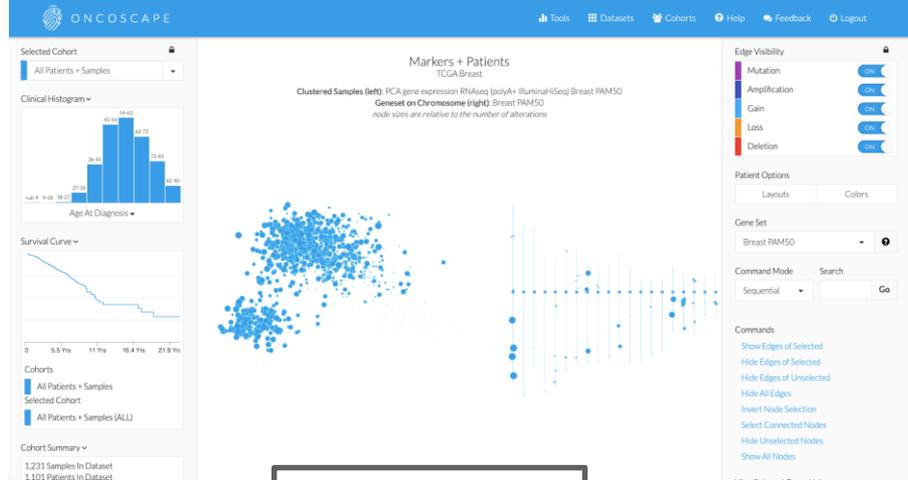
- The visual display of data and relationships, often via transformations of the data
- Tools can be tailored to enable biological insights or be more exploratory, depending upon the need

## **Cancer Imaging**

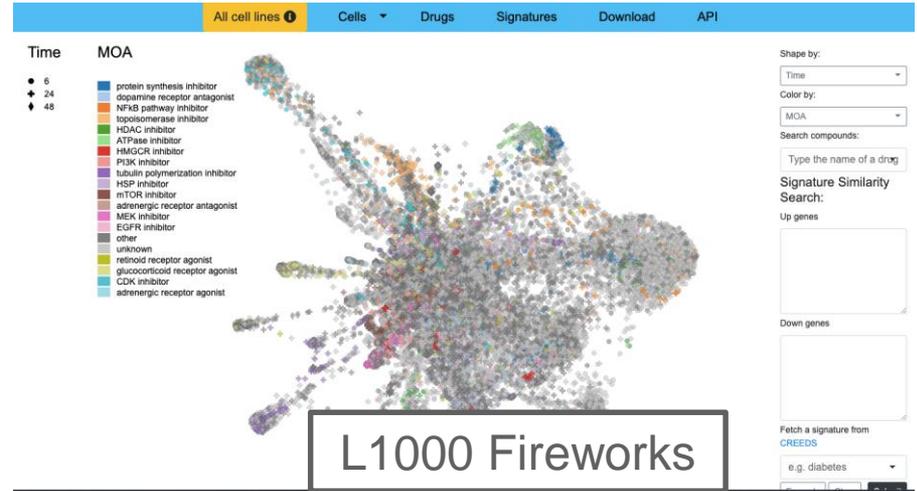
- Viewing, processing, & management of imaging data
- Instrumentation and microscopy development
- Molecular & fluorescent probe development



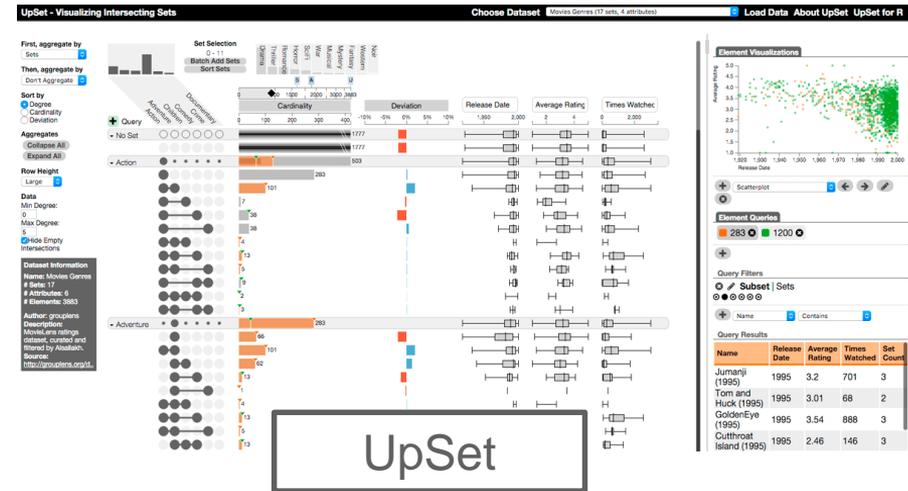
Cytoscore



Oncoscape



L1000 Fireworks



UpSet

# R33 Funding Opportunity (RFA)

Development of new visualization tools and approaches addressing Cancer Moonshot-aligned use cases and priorities

- **Open to applications from all investigators**
- Investigator-identified use cases, user communities, and insights to be gained
- Each proposed tool will enable visualization of Cancer Moonshot data addressing the specified use case and user community
- Expectation of tool validation studies
- Award lengths of 4 years

Visualization Tools Development Grants (R33)

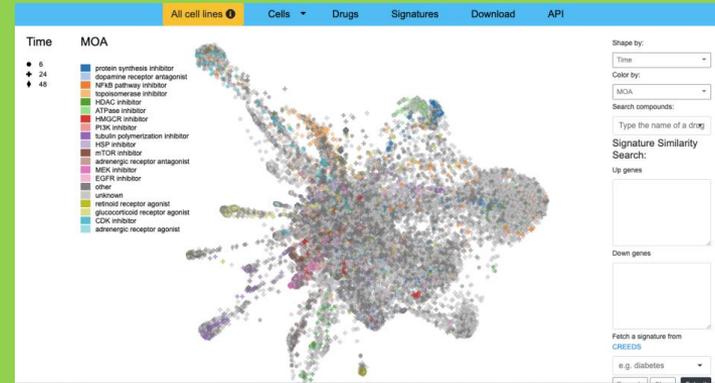
FY2021

FY2022

FY2023

FY2024

# Anticipated Effort



- Assessment of user community
- New visualization development
- Interface & interaction design
- Iterative refinement & user testing
- New documentation

# Cancer Moonshot Data Visualization Methods and Tools Development (R33)

Applicants instructed to:

- Identify a data visualization use case aligned to Cancer Moonshot and specify a targeted user community that is currently underserved by existing data visualization tools.
- Propose the development of a data visualization software tool that addresses the use case, the insights to be gained for the user community.
- Describe plans for validation of the proposed tool(s), and plans for community engagement.
- Project lengths up to 4 years at \$250K/yr direct. Anticipate a total of four awards will be made. The total cost for all years is \$5M.

# Thank You



**NATIONAL  
CANCER  
INSTITUTE**

[www.cancer.gov](http://www.cancer.gov)

[www.cancer.gov/espanol](http://www.cancer.gov/espanol)

# Portfolio Analysis

- R01 Awards
  - No NCI R01 awards for exploratory data visualization
  - When present, exists as a secondary effort
- SBIR Awards
  - A current NCI contract topic for visualizing multiscale data
  - Available only to small business research community
- ITCR Awards
  - Supports informatics tool development, few data visualization awards
  - Awards made have been for advanced development of existing tools

Assay Target	Tissue Structure		Genome		Chromatin		Transcriptome		Proteome		Metabolome	Microbiome
	Macro	Micro	Bulk	Single-cell	Bulk	Single-cell	Bulk	Single-cell / -nucleus	Bulk	Single-cell	Bulk	Bulk
<b>Atlas Team</b> Boston U			X	X			X	X	X	X		
CHOP	X	X	X		X	X	X	X	X	X		
DFCI		X	X				X	X	X	X		
Duke			X	X			X		X	X		
HMS		X	X				X	X	X	X		
MSKCC		X				X		X	X	X		
OHSU	X	X	X	X		X	X		X	X		
Stanford			X		X		X	X	X	X	X	X
VUMC			X					X	X	X		X
WUSTL	X		X		X		X	X	X	X		
PCAPP			X				X		X	X		
HTAPP		X	X				X	X	X	X		

<https://humantumoratlas.org/dashboard>