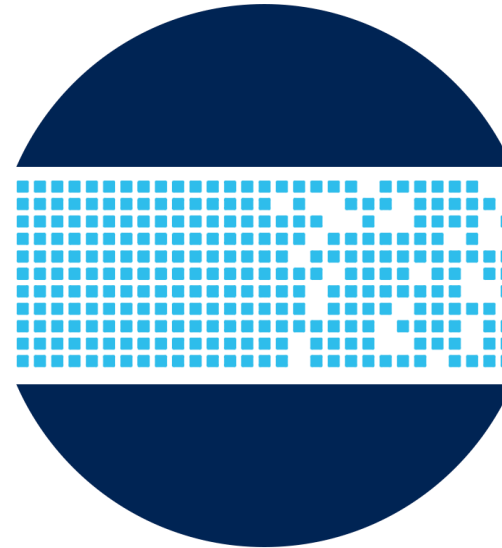


Workshop

Building Research Collaboration Networks

Leveraging Sponsored Research Data

Robert Pilgrim, rpilgrim@uark.edu



2024
**Research
Analytics
Summit**

*Building Capacity, Empowering Skill Transfer,
and Energizing a Growing Community*

Check out my blog



Connect with me



Make sure you have **Microsoft Power BI Desktop installed**

Mac Users: You can also do this in the cloud it should look the same

<https://app.powerbi.com/>

Data www.rpilgrim.com/networkdata

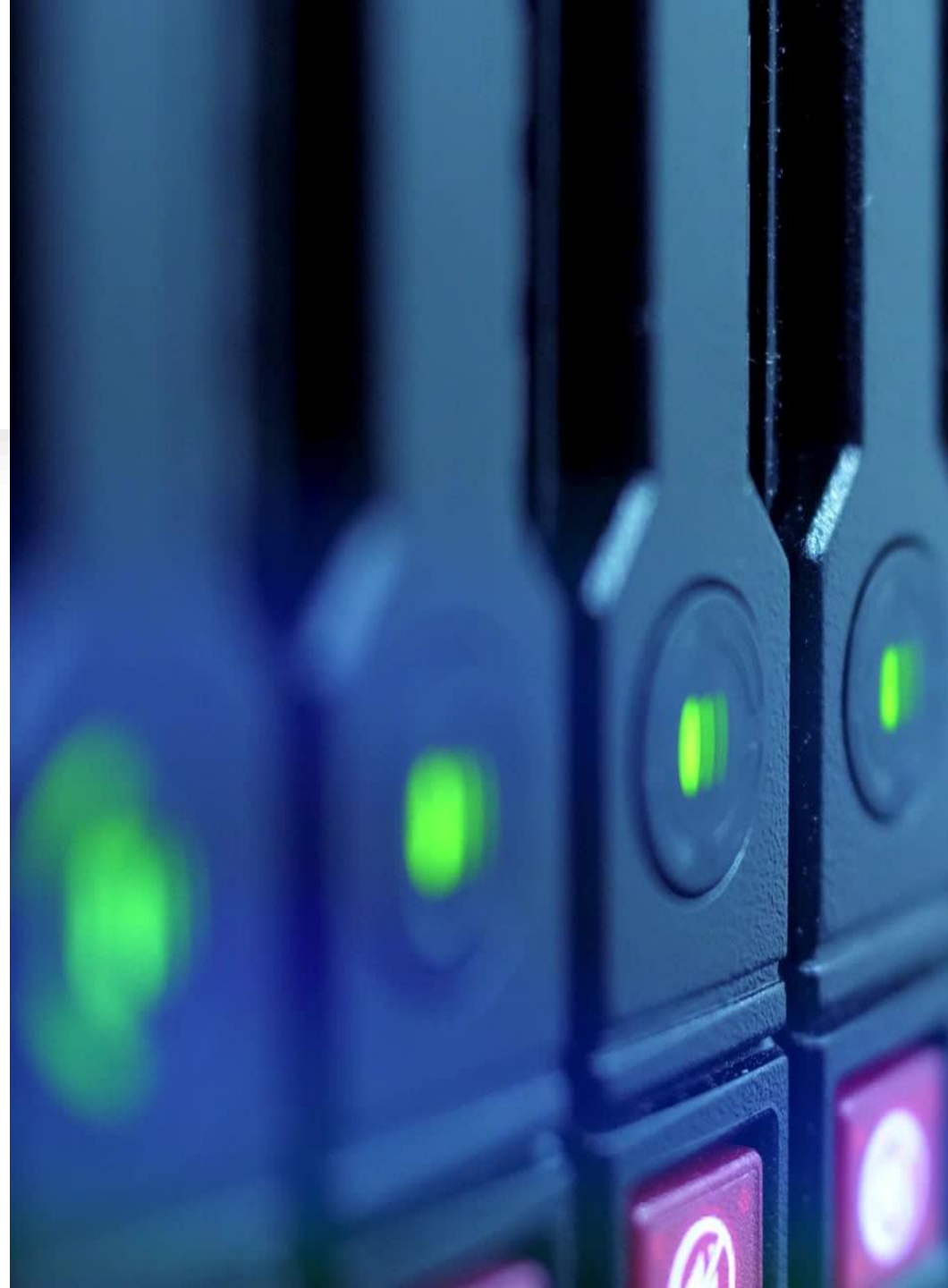
Overview

- Part 1
 - Bring data into Power BI
 - Build some report pages
 - Load 2 custom visuals
 - Build an Interactive Network
- Part 2
 - Applications (May not get through all of these)
- Who has used Power BI before?
 - Please help others if needed.



Does Everyone have what they Need?

- Power BI Desktop OR you have web-based access
 - <https://app.powerbi.com/>
 - log in or sign up for free
- Data Download
 - **rpilgrim.com/networkdata**
 - Or get usb from me



Open Power BI Desktop

The screenshot displays the Power BI Desktop application interface. At the top, the title bar shows "Untitled - Power BI Desktop" and a search bar. The ribbon includes tabs for File, Home, Insert, Modeling, View, Optimize, Help, and External tools. The Home tab is active, showing various icons for data acquisition (Get data, Excel, OneLake, SQL Server, Enter data, Dataverse, Recent sources), data manipulation (Transform data, Refresh), visualization creation (New visual, Text box, More visuals), calculations (New measure, Quick measure), sensitivity analysis, and sharing (Publish). The main workspace area contains a central message: "Add data to your report. Once loaded, your data will appear in the Data pane." Below this message are four buttons: "Import data from Excel", "Import data from SQL Server", "Paste data into a blank table", and "Try a sample semantic model". A link "Get data from another source" is positioned below these buttons. On the right side, there are three task panes: "Visualizations" (containing a "Build visual" section with various chart icons and a "Values" section with a text input field), "Performance analyzer", and "Data" (containing a search bar and a message: "You haven't loaded any data yet. Get data").

What is a Research Network

Visualizing your Research Community



Concept

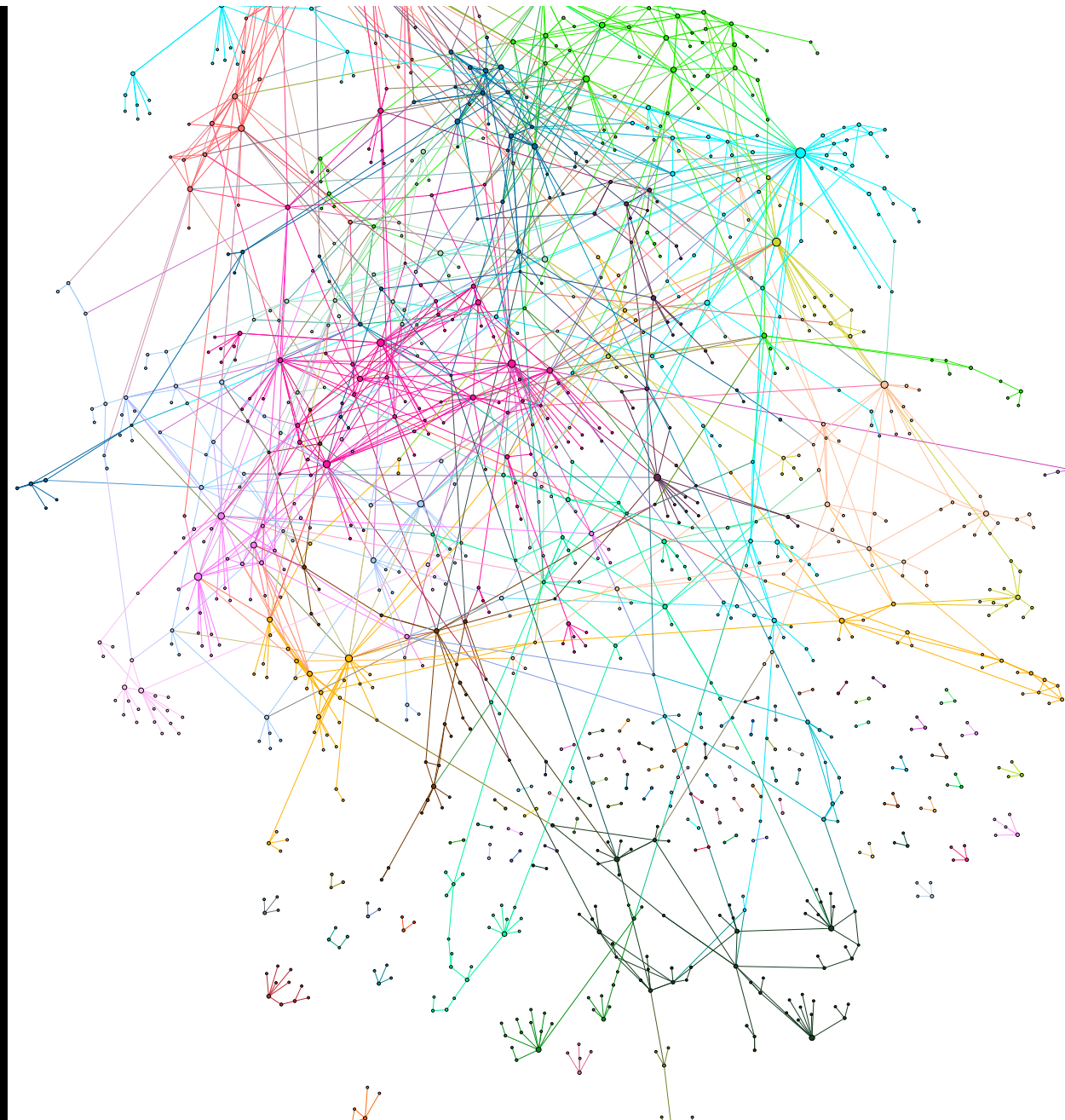
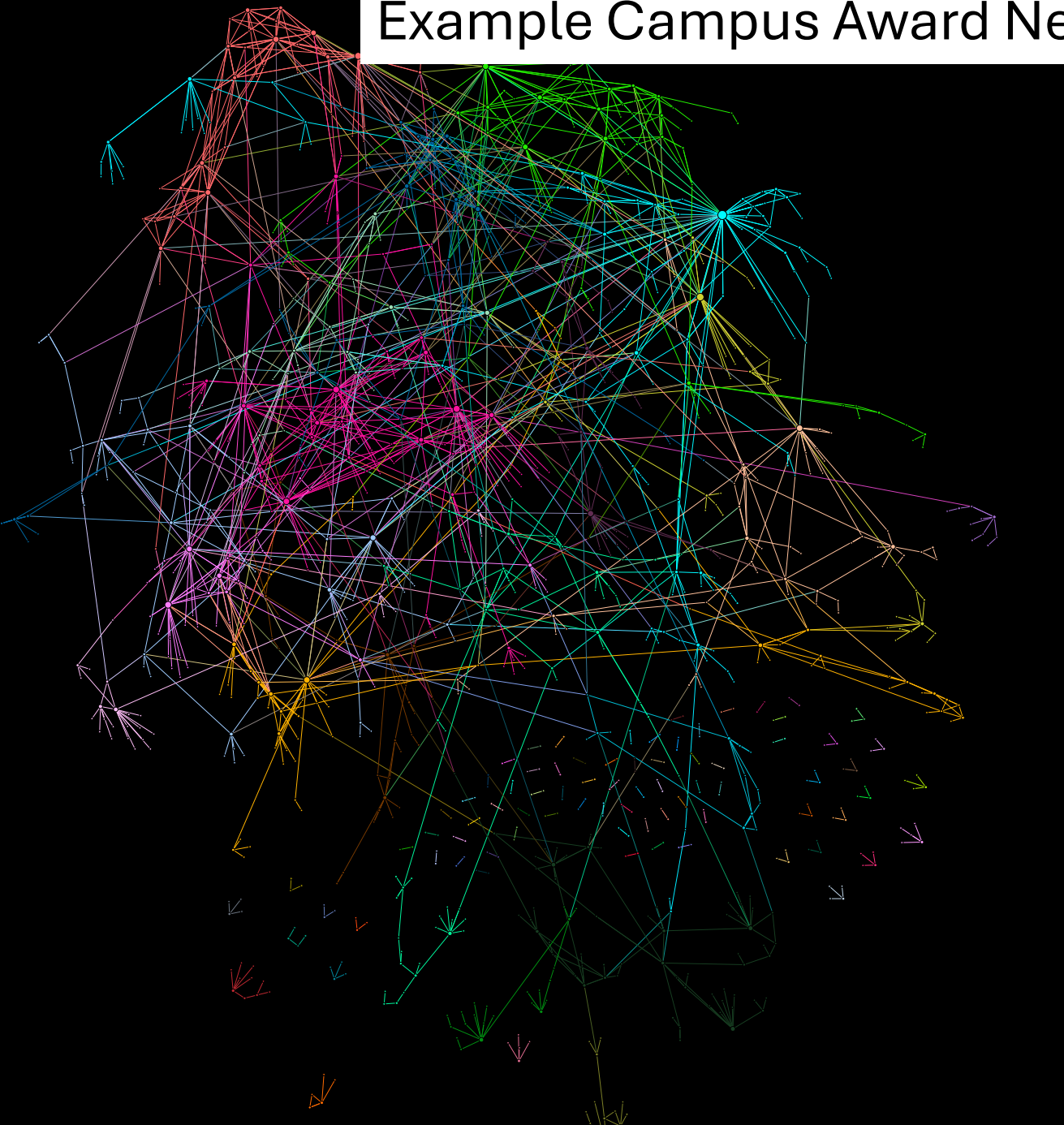
- List all research faculty on Post-it Notes
 - Join PI-COI by a line
 - The more lines connecting the same people, the closer the post-it notes
 - Let's look at an example
-

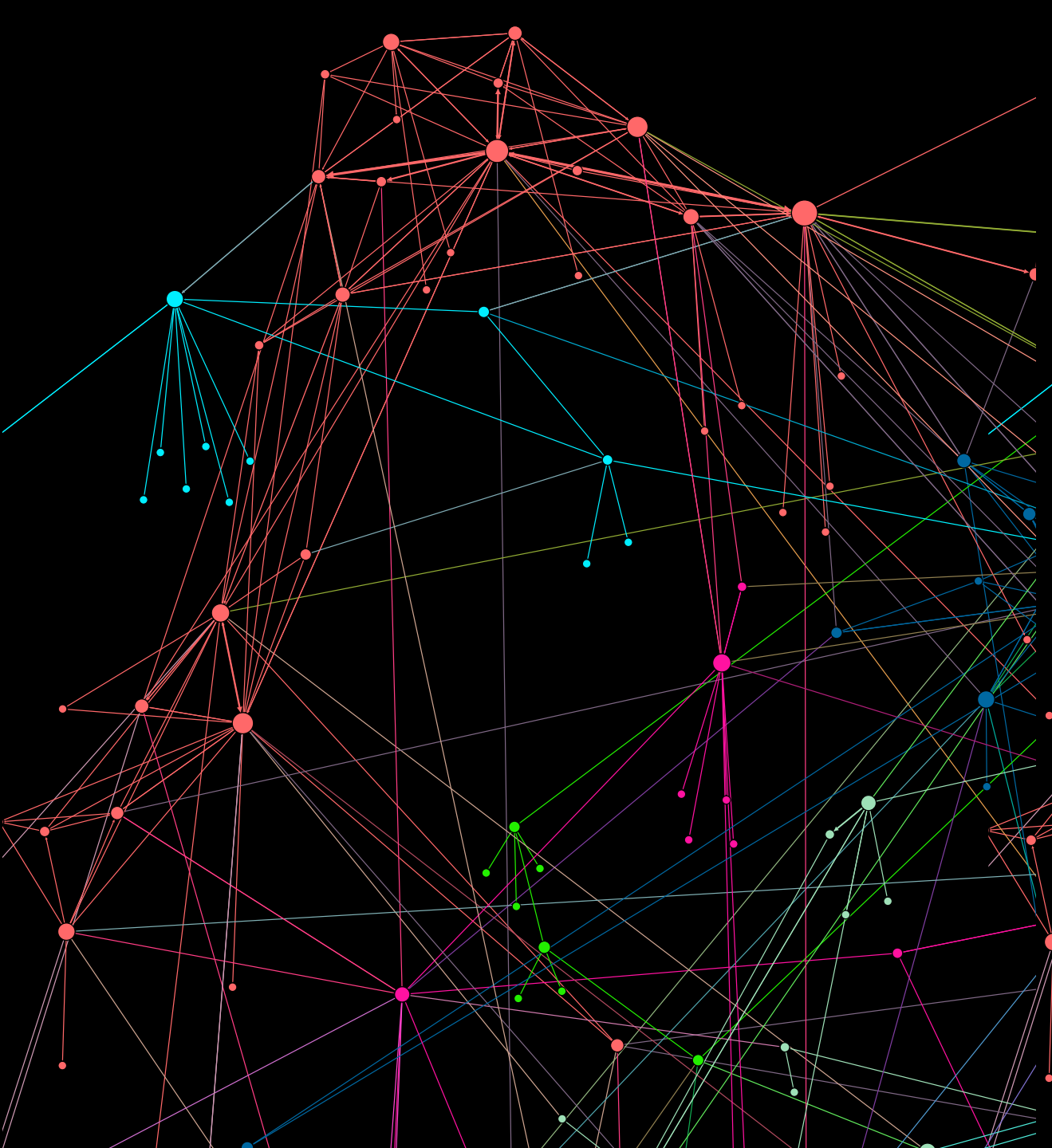


Picture is
worth
“1,000
Words”



Example Campus Award Network (Close-Up Next Slide)





Power BI 101

Quick Start

Open Power BI Desktop | Do this First

The image shows the Power BI Desktop interface with the 'Options and settings' dialog box open. The 'Options' tab is selected, and the 'Data Load' section is expanded. A red box highlights the 'Autodetect new relationships after data is loaded' checkbox, which is currently unchecked. A black callout box with white text says 'Make sure this is NOT CHECKED'. Blue arrows point from the 'Options and settings' button in the bottom-left corner of the Power BI Desktop window to the 'Options' tab in the dialog box, and from the 'Data Load' section in the dialog box to the 'Autodetect new relationships after data is loaded' checkbox. Another red box highlights the 'File' menu in the top-left corner of the Power BI Desktop window.

Options and settings

- Options
- Data source settings

Options

- GLOBAL
 - Data Load
 - Power Query Editor
 - DirectQuery
 - R scripting
 - Python scripting
 - Security
 - Privacy
 - Regional Settings
 - Updates
 - Usage Data
 - Diagnostics
 - Preview features
 - Save and Recover
 - Report settings
 - Copilot (preview)
- CURRENT FILE
 - Data Load
 - Regional Settings
 - Privacy

Type Detection

- Detect column types and headers for unstructured sources

Relationships

- Import relationships from data sources on first load ⓘ
- Update or delete relationships when refreshing data ⓘ
- Autodetect new relationships after data is loaded ⓘ

[Learn more](#)

Background Data

- Allow data previews to download in the background

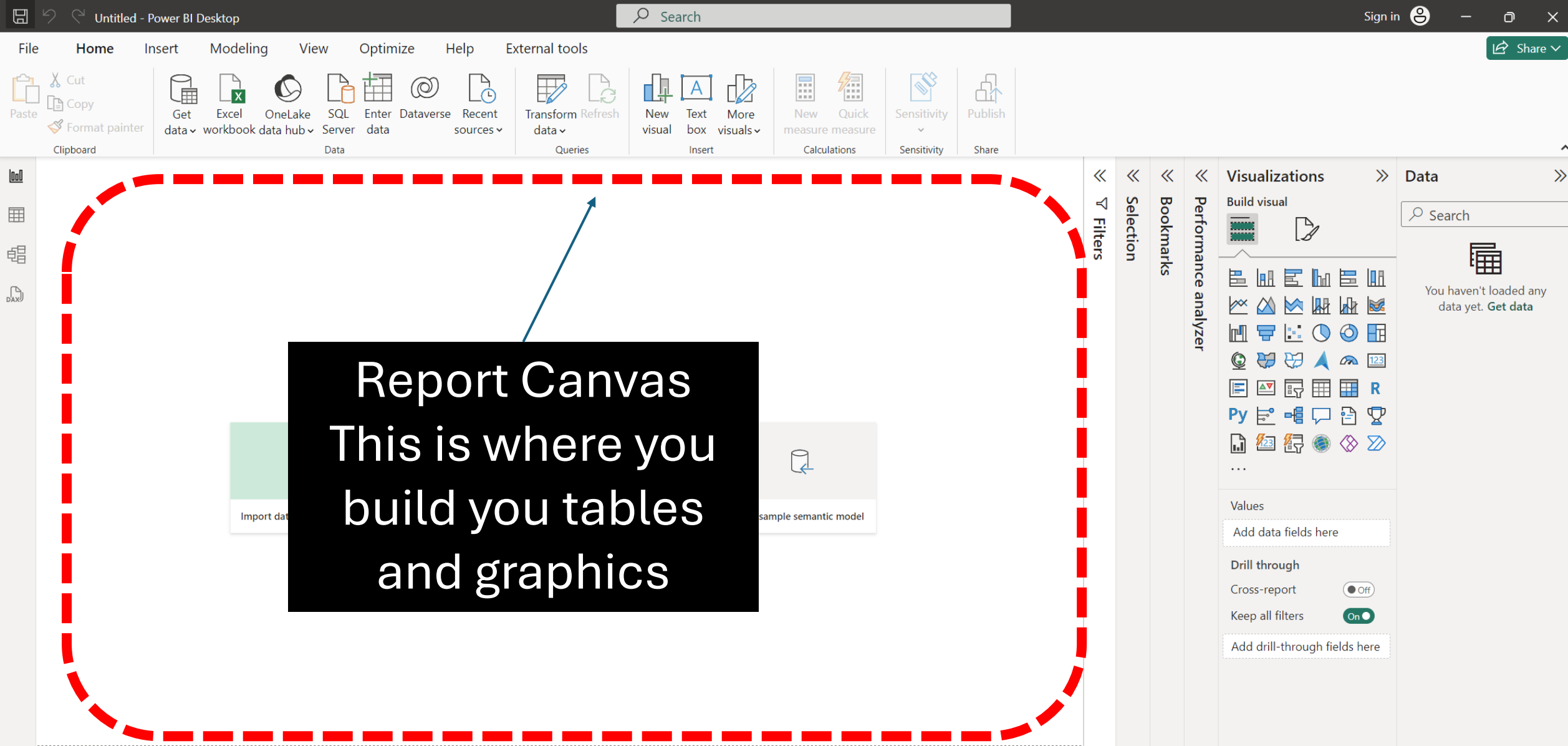
Parallel loading of tables ⓘ

Maximum number of concurrent jobs [Learn more](#)

- Default
- One (disable parallel loading)
- Custom

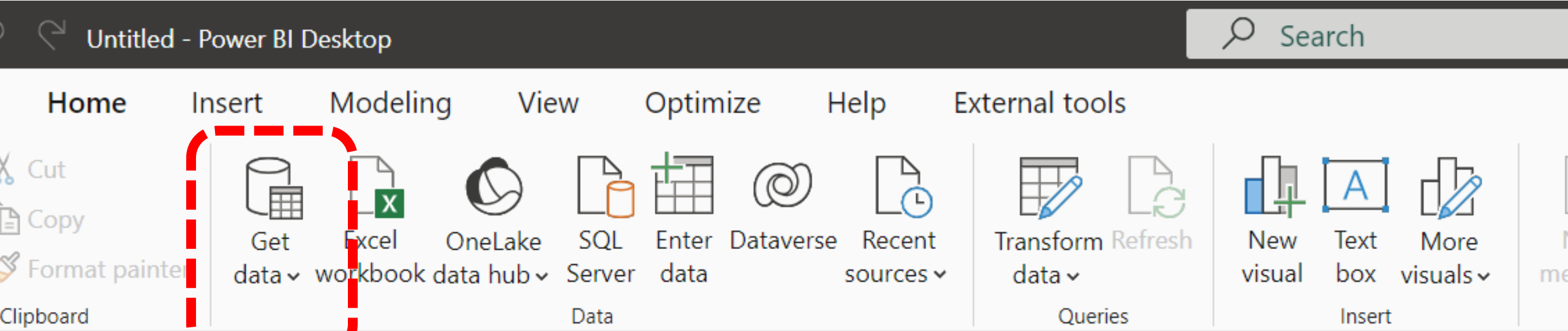
Make sure this is NOT CHECKED

Power BI 101



Report Canvas
This is where you build your tables and graphics

Power BI 101



Get your data



File

Home

Insert

Modeling

View

Optimize

Help

External tools



Cut



Copy



Format painter

Clipboard



Get data



Excel workbook



OneLake data hub



SQL Server



Enter data



Dataverse



Recent sources

Data



Transform data



Refresh

Queries



New visual



Text box



More visual

Insert



Canvas



Data View



Data Model

Add data to your report


Once loaded, your data will appear in the **Data** pane

report

ar in the Data pane.



into a blank table



Try a sample semantic model

source →

Filters

Selection

Bookmarks

Performance analyzer

Visualizations

Build visual



Data

Search



You haven't loaded any data yet. [Get data](#)

Default Visuals

Data Variables

Values

Add data fields here

Drill through

Cross-report Off

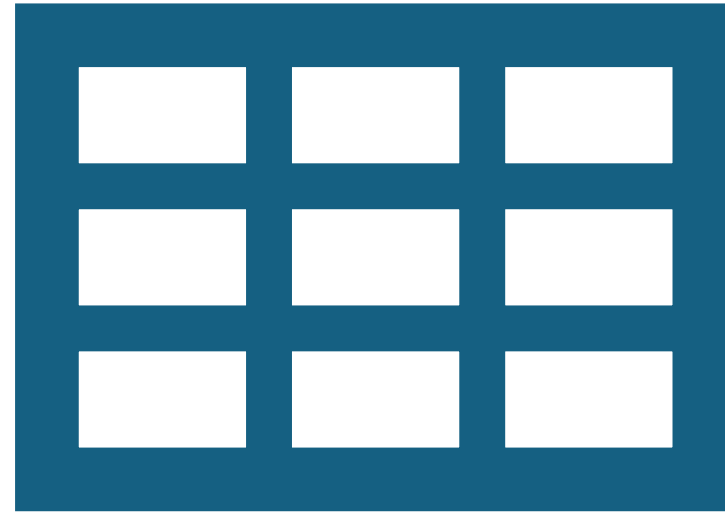
Keep all filters On

Add drill-through fields here



Data Load

We will make 2 Tables:
“Proposals” and “Proposal
Networks”



This Data I Found Online

It has been modified for this talk,
it is not real



Using your Own Data

- It must be in this format
- Columns for PI
- Column for COI/Investigators

| Proposal Number | PI | Investigator |
|-----------------|-----------------------|----------------------------|
| FP00040740 | Thornton, Trevor John | Alford, Terry Lynn |
| FP00040740 | Thornton, Trevor John | Goodnick, Stephen Marshall |
| FP00040740 | Thornton, Trevor John | Nemanich, Robert John |
| FP00040740 | Thornton, Trevor John | Thornton, Trevor John |

Load your Data

Untitled - Power BI Desktop

File Home Insert Modeling View Optimiz

Paste Cut Copy Format painter Clipboard

Get data Excel workbook OneLake data hub SQL Server Enter D data

Common data sources

- Excel workbook
- Power BI semantic models
- Dataflows
- Dataverse
- SQL Server
- Analysis Services
- Text/CSV
- Web

Once

Navigator

Display Options

Network_Workshop_Data.xlsx [5]

- Awards
- Fiscal Year
- List Investigator
- Proposals**
- Sheet4

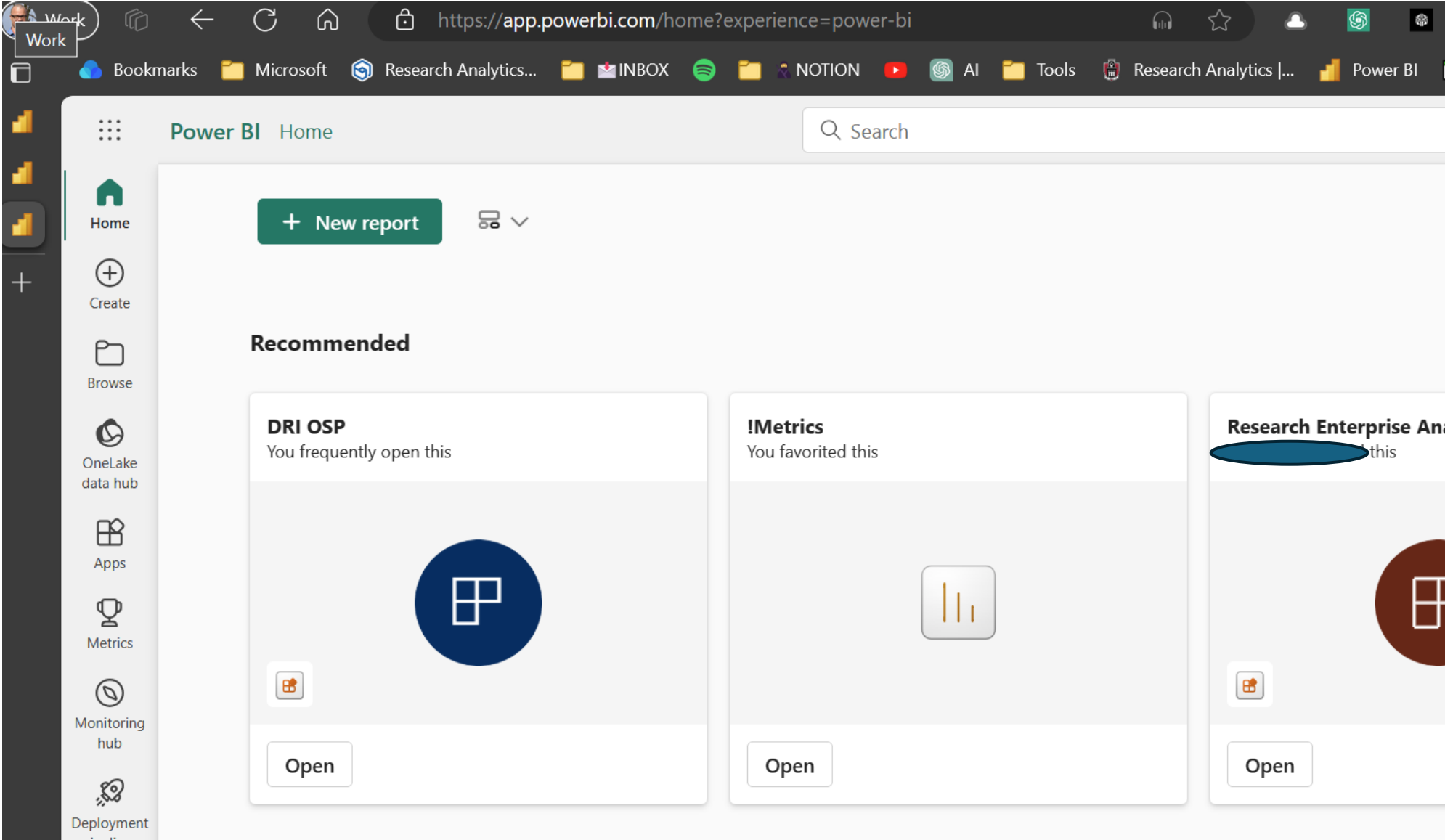
Proposals

| | Home College | Proposal Number | Strategic Initiative |
|------|---|-----------------|----------------------|
| 2024 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00038953 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00038352 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037805 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037728 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037728 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037728 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037680 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037680 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037680 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037555 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037452 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037313 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037313 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037313 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037313 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037292 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037206 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037021 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037021 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037010 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00037009 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00036951 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00036767 | None |
| 2023 | Engineering, Ira A. Fulton Schools of (IAFSE) | FP00036610 | None |

Load Transform Data Cancel

Web-Based

- Who is using web?



Web | Copy/Paste Data from Spreadsheet

Add data to start building a report



Paste or manually enter data



Pick a published semantic model

Don't see the source you're looking for? [Download the desktop app.](#)

Web

- Open Spreadsheet
- Copy/Paste proposal data
- Name “Proposals”

Power Query

Get data

Enter data

Copy and paste data into the table, or enter data manually. Be sure the data type matches the values in each column. [Learn more](#)

Use first row as headers

We have detected delimiters in the data that you pasted. Undo delimiter detection

| | Column1 | Column2 | Column3 | Column4 | Column5 | Column6 | Column7 | Column8 | Column9 | Column10 | Column11 |
|----|-------------|----------------------------|-----------------|----------------------|----------------------------|----------------------------|------------|------------------------|-----------------|-------------------------|----------------------|
| 1 | Fiscal Year | Home College | Proposal Number | Strategic Initiative | Proposal Title | PI | PI ID | Investigator | Investigator ID | Direct Sponsor | Direct Sponsor Group |
| 2 | 2024 | Engineering, Ira A. Ful... | FP00038953 | None | Transforming Enginee... | Johnson, Mina Cather... | 1200807716 | Mignolet, Marc Paul | 1000421035 | National Science Fou... | Federal |
| 3 | 2023 | Engineering, Ira A. Ful... | FP00038352 | None | Mid-scale RI-2: ARISE... | Shrivastava, Aviral | 1001056600 | Tongay, Sefaattin | 1208165227 | National Science Fou... | Federal |
| 4 | 2023 | Engineering, Ira A. Ful... | FP00037805 | None | FMRG Eco: A New 3D... | Song, Kenan | 1214189300 | Deng, Shuguang | 1210058860 | National Science Fou... | Federal |
| 5 | 2023 | Engineering, Ira A. Ful... | FP00037728 | None | Global Centers Track ... | Fini, Elham H | 1216000045 | Deng, Shuguang | 1210058860 | National Science Fou... | Federal |
| 6 | 2023 | Engineering, Ira A. Ful... | FP00037728 | None | Global Centers Track ... | Fini, Elham H | 1216000045 | Phelan, Patrick E | 1000420782 | National Science Fou... | Federal |
| 7 | 2023 | Engineering, Ira A. Ful... | FP00037728 | None | Global Centers Track ... | Fini, Elham H | 1216000045 | Oswald, Jay | 1204445185 | National Science Fou... | Federal |
| 8 | 2023 | Engineering, Ira A. Ful... | FP00037680 | None | Collaborative Researc... | Yan, Feng | 1227798951 | Zhuang, Houlong | 1213769074 | National Science Fou... | Federal |
| 9 | 2023 | Engineering, Ira A. Ful... | FP00037680 | None | Collaborative Researc... | Yan, Feng | 1227798951 | Li, Lin | 1227637933 | National Science Fou... | Federal |
| 10 | 2023 | Engineering, Ira A. Ful... | FP00037555 | None | FuSe: Next-generatio... | Sanchez Esqueda, Ivan | 1000846792 | Tongay, Sefaattin | 1208165227 | National Science Fou... | Federal |
| 11 | 2023 | Engineering, Ira A. Ful... | FP00037452 | None | FUSE: Material and D... | Kalarickal, Nidhin Kuri... | 1227571321 | Susarla, Sandhya | 1227337165 | National Science Fou... | Federal |
| 12 | 2023 | Engineering, Ira A. Ful... | FP00037313 | None | FMRG: ECO: Zero-Wa... | Hwa, Yoon | 1220395683 | Kasbaoui, Mohamed ... | 1215879327 | National Science Fou... | Federal |
| 13 | 2023 | Engineering, Ira A. Ful... | FP00037313 | None | FMRG: ECO: Zero-Wa... | Hwa, Yoon | 1220395683 | Chan, Candace Kay | 1204459420 | National Science Fou... | Federal |
| 14 | 2023 | Engineering, Ira A. Ful... | FP00037313 | None | FMRG: ECO: Zero-Wa... | Hwa, Yoon | 1220395683 | Kwon, Beomjin | 1215875219 | National Science Fou... | Federal |
| 15 | 2023 | Engineering, Ira A. Ful... | FP00037313 | None | FMRG: ECO: Zero-Wa... | Hwa, Yoon | 1220395683 | Jamesari Ladani, Leila | 1217783333 | National Science Fou... | Federal |
| 16 | 2023 | Engineering, Ira A. Ful... | FP00037292 | None | Defect and Surfactant... | Sieradzki, Karl | 1000418742 | Chan, Candace Kay | 1204459420 | National Science Fou... | Federal |
| 17 | 2023 | Engineering, Ira A. Ful... | FP00037206 | None | Collaborative Researc... | Singh, Arunima | 1215887764 | Dey, Sandwip Kumar | 1000418695 | National Science Fou... | Federal |
| 18 | 2023 | Engineering, Ira A. Ful... | FP00037021 | None | DMREF: Computation... | Nannenga, Brent Lane | 1000600030 | Oswald, Jay | 1204445185 | National Science Fou... | Federal |
| 19 | 2023 | Engineering, Ira A. Ful... | FP00037021 | None | DMREF: Computation... | Nannenga, Brent Lane | 1000600030 | Nielsen, David Ross | 1202345876 | National Science Fou... | Federal |
| 20 | 2023 | Engineering, Ira A. Ful... | FP00037010 | None | DMREF: Topological ... | Nian, Qiong | 1203092275 | Zhuang, Houlong | 1213769074 | National Science Fou... | Federal |
| 21 | 2023 | Engineering, Ira A. Ful... | FP00037009 | None | ISS: Investigating the ... | Holloway, Julianne L | 1210360785 | Acharya, Abhinav P | 1215875206 | National Science Fou... | Federal |
| 22 | | | | | | | | | | | |

Auto-create report

Create a blank report

Create a semantic model only

Auto-create report

Auto-create report

Cancel

This is Power Query

Rename Data “Proposals”

1. Change Format

| | Proposal Status | Calendar M/Y | Role | Proposal Total | Home Unit |
|---|-----------------|--------------|-------|----------------|-----------|
| 1 | SF) Denied | | 45108 | COI | |
| 2 | SF) Denied | | 45078 | COI | |
| 3 | SF) Denied | | 45017 | COI | |
| 4 | SF) Denied | | 45047 | COI | |
| 5 | SF) Denied | | 45047 | COI | |
| 6 | SF) Denied | | 45047 | COI | |
| 7 | SF) Denied | | 45017 | COI | |
| 8 | SF) Denied | | 45017 | COI | |

PAUSE: Does everyone have this loaded...

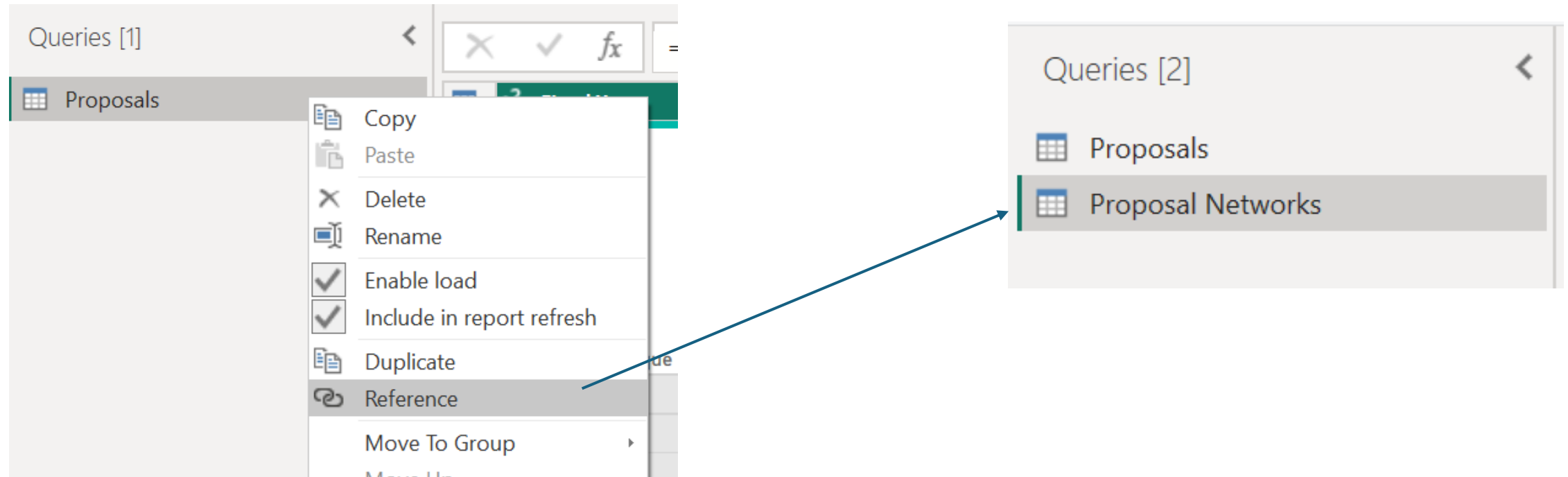
Next | PI ->COI Table

- Lets make a table containing the PI->COI connections
- We need to do some cleaning

| Proposal Number | PI | Investigator |
|-----------------|------------------------|----------------------------|
| FP00040740 | Thornton, Trevor John | Alford, Terry Lynn |
| FP00040740 | Thornton, Trevor John | Goodnick, Stephen Marshall |
| FP00040740 | Thornton, Trevor John | Nemanich, Robert John |
| FP00040740 | Thornton, Trevor John | Thornton, Trevor John |
| FP00040731 | Mousavi, Masoumeh | Lamanna, Anthony J |
| FP00040731 | Mousavi, Masoumeh | Mousavi, Masoumeh |
| FP00040727 | Adler, Jacob Benjamin | Adler, Jacob Benjamin |
| FP00040724 | Arenz, Christian | Arenz, Christian |
| FP00040717 | Takamura, John Hiroomi | Blum, Nita |
| FP00040717 | Takamura, John Hiroomi | Takamura, John Hiroomi |
| FP00040712 | Hartnett, Hilairy | Hartnett, Hilairy |
| FP00040710 | Nittler, Larry R | Nittler, Larry R |
| FP00040709 | Van Engelen, Alexander | Van Engelen, Alexander |
| FP00040706 | Ozev, Sule | Ozev, Sule |
| FP00040706 | Ozev, Sule | Sanyal, Arindam |
| FP00040701 | Zhao, Ming | Pedrielli, Giulia |
| FP00040701 | Zhao, Ming | Zhao, Ming |
| FP00040701 | Zhao, Ming | Zhou, Xuesong |
| FP00040699 | Harker, Samantha A | Braden, Brittany Blair |
| FP00040699 | Harker, Samantha A | Chen, Kewei |
| FP00040699 | Harker, Samantha A | Lewis, Candace Renee |
| FP00040699 | Harker, Samantha A | Yudell, Michael |

Make a Separate Table with the PI-COI Details

- 1. Right-Click “Proposals” then click “Reference”
 - This will make a copy
- 2. Rename it “**Proposal Networks**”



Proposal Networks | Keep Columns

- Select
 - PI
 - Investigator
 - Proposal Number
- Right-Click
- “Remove Other Columns”

The screenshot shows the Power Query ribbon with the 'Remove Columns' and 'Remove Other Columns' options highlighted. The ribbon includes tabs for File, Home, Transform, Add Column, View, Tools, and Help. The 'Remove Columns' group contains 'Choose Columns', 'Remove Columns', 'Keep Rows', and 'Remove Rows'. The 'Remove Other Columns' group contains 'Remove Other Columns' and 'Sort'. The 'Remove Other Columns' option is highlighted in blue.

The screenshot shows a Power Query column header 'Proposal Number' with a right-click context menu open. The menu includes options like 'Copy', 'Remove Columns', 'Remove Other Columns', 'Add Column From Examples...', 'Remove Duplicates', 'Remove Errors', 'Replace Values...', 'Fill', and 'Change Type'. The 'Remove Other Columns' option is highlighted in blue. A blue arrow points from this option to the 'Remove Other Columns' option in the ribbon screenshot above.

Queries [2]

- Proposals
- Proposal Networks

fx = Table.SelectColumns(Source,{"PI", "Investigator", "Proposal Number"})

| | PI | Investigator | Proposal Number |
|---|--|---|--|
| | <ul style="list-style-type: none">Valid 100%Error 0%Empty 0% <p>260 distinct, 104 unique</p> | <ul style="list-style-type: none">Valid 100%Error 0%Empty 0% <p>280 distinct, 96 unique</p> | <ul style="list-style-type: none">Valid 100%Error 0%Empty 0% <p>567 distinct, 395 unique</p> |
| 1 | Johnson, Mina Catherine | Mignolet, Marc Paul | FP00038953 |
| 2 | Shrivastava, Aviral | Tongay, Sefaattin | FP00038352 |
| 3 | Song, Kenan | Deng, Shuguang | FP00037805 |
| 4 | ... | ... | ... |

It Should look like this

The screenshot displays the Power BI Desktop interface for a query named "Proposal Networks". The ribbon includes tabs for File, Home, Transform, Add Column, View, Tools, and Help. The Transform tab is active, showing various data manipulation options like "Close & Apply", "New Source", "Recent Sources", "Enter Data", "Data source settings", "Manage Parameters", "Refresh Preview", "Properties", "Advanced Editor", "Manage", "Choose Columns", "Remove Columns", "Keep Rows", "Remove Rows", and "Sort".

A yellow warning banner at the top of the preview pane states: "This preview may be up to 6 days old." with a "Refresh" button.

The formula bar contains the DAX expression: `= Table.Distinct("#Filtered Rows")`.

The preview pane shows three columns: "A^B_C PI", "A^B_C Investigator", and "A^B_C Proposal Number". Each column has a data quality summary and a bar chart. The data quality summary for each column is as follows:

| Column | Valid | Error | Empty |
|---|-------|-------|-------|
| A ^B _C PI | 100% | 0% | 0% |
| A ^B _C Investigator | 100% | 0% | 0% |
| A ^B _C Proposal Number | 100% | 0% | 0% |

Below the data quality summary for each column is a bar chart showing the distribution of values. The counts for each column are:

- A^B_C PI: 260 distinct, 104 unique
- A^B_C Investigator: 281 distinct, 97 unique
- A^B_C Proposal Number: 567 distinct, 394 unique

Remove Rows

- Networks=Connections
- Remove PI=COI

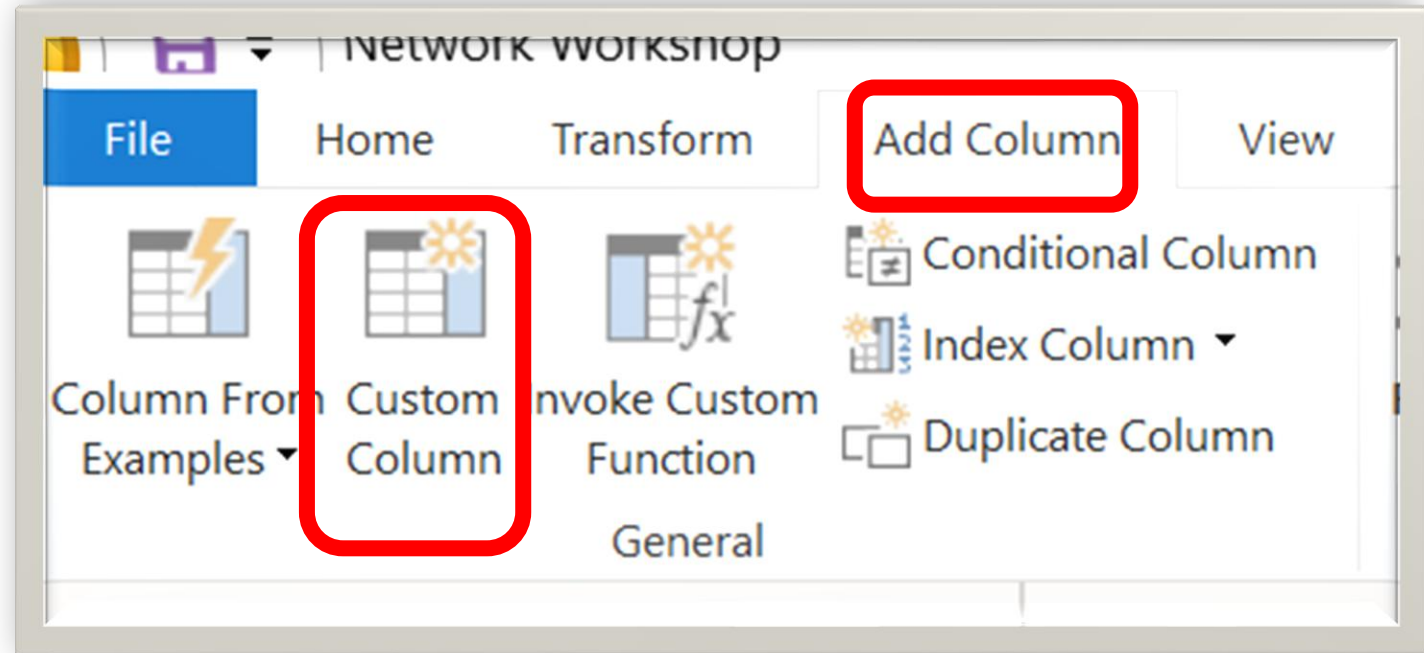
| Proposal Number | PI | Investigator |
|--|--|-----------------------------------|
| <input type="checkbox"/> FP00040740 | <input type="checkbox"/> Thornton, Trevor John | Alford, Terry Lynn |
| <input type="checkbox"/> FP00040740 | <input type="checkbox"/> Thornton, Trevor John | Goodnick, Stephen Marshall |
| <input type="checkbox"/> FP00040740 | <input type="checkbox"/> Thornton, Trevor John | Nemanich, Robert John |
| <input type="checkbox"/> FP00040740 | <input type="checkbox"/> Thornton, Trevor John | Thornton, Trevor John |
| <input type="checkbox"/> FP00040731 | <input type="checkbox"/> Mousavi, Masoumeh | Lamanna, Anthony J |
| <input type="checkbox"/> FP00040731 | <input type="checkbox"/> Mousavi, Masoumeh | Mousavi, Masoumeh |
| <input type="checkbox"/> FP00040727 | <input type="checkbox"/> Adler, Jacob Benjamin | Adler, Jacob Benjamin |
| <input type="checkbox"/> FP00040724 | <input type="checkbox"/> Arenz, Christian | Arenz, Christian |
| <input type="checkbox"/> FP00040717 | <input type="checkbox"/> Takamura, John Hiroomi | Blum, Nita |
| <input type="checkbox"/> FP00040717 | <input type="checkbox"/> Takamura, John Hiroomi | Takamura, John Hiroomi |
| <input type="checkbox"/> FP00040712 | <input type="checkbox"/> Hartnett, Hilairy | Hartnett, Hilairy |
| <input type="checkbox"/> FP00040710 | <input type="checkbox"/> Nittler, Larry R | Nittler, Larry R |
| <input type="checkbox"/> FP00040709 | <input type="checkbox"/> Van Engelen, Alexander | Van Engelen, Alexander |
| <input type="checkbox"/> FP00040706 | <input type="checkbox"/> Ozev, Sule | Ozev, Sule |
| <input type="checkbox"/> FP00040706 | <input type="checkbox"/> Ozev, Sule | Sanyal, Arindam |
| <input type="checkbox"/> FP00040701 | <input type="checkbox"/> Zhao, Ming | Pedrielli, Giulia |
| <input type="checkbox"/> FP00040701 | <input type="checkbox"/> Zhao, Ming | Zhao, Ming |
| <input type="checkbox"/> FP00040701 | <input type="checkbox"/> Zhao, Ming | Zhou, Xuesong |
| <input type="checkbox"/> FP00040699 | <input type="checkbox"/> Harker, Samantha A | Braden, Brittany Blair |
| <input type="checkbox"/> FP00040699 | <input type="checkbox"/> Harker, Samantha A | Chen, Kewei |
| <input type="checkbox"/> FP00040699 | <input type="checkbox"/> Harker, Samantha A | Lewis, Candace Renee |
| <input type="checkbox"/> FP00040699 | <input type="checkbox"/> Harker, Samantha A | Yudell, Michael |

Proposal Networks

Let's Add a Column to Remove Self References

- Columns
 - PI
 - Investigator
- We want to remove rows PI=Investigator

| Award | PI | Investigator | Role |
|-----------------|---------------------|---------------------|---------------|
| A001 | Person A | Person A | PI |
| A001 | Person A | Person B | COI |
| A001 | Person A | Person C | COI |



Proposal Networks | Custom Columns

Custom Column

Add a column that is computed from the other columns.

New column name

Custom column formula ⓘ

```
= if [PI]=[Investigator] then "true" else "false"
```

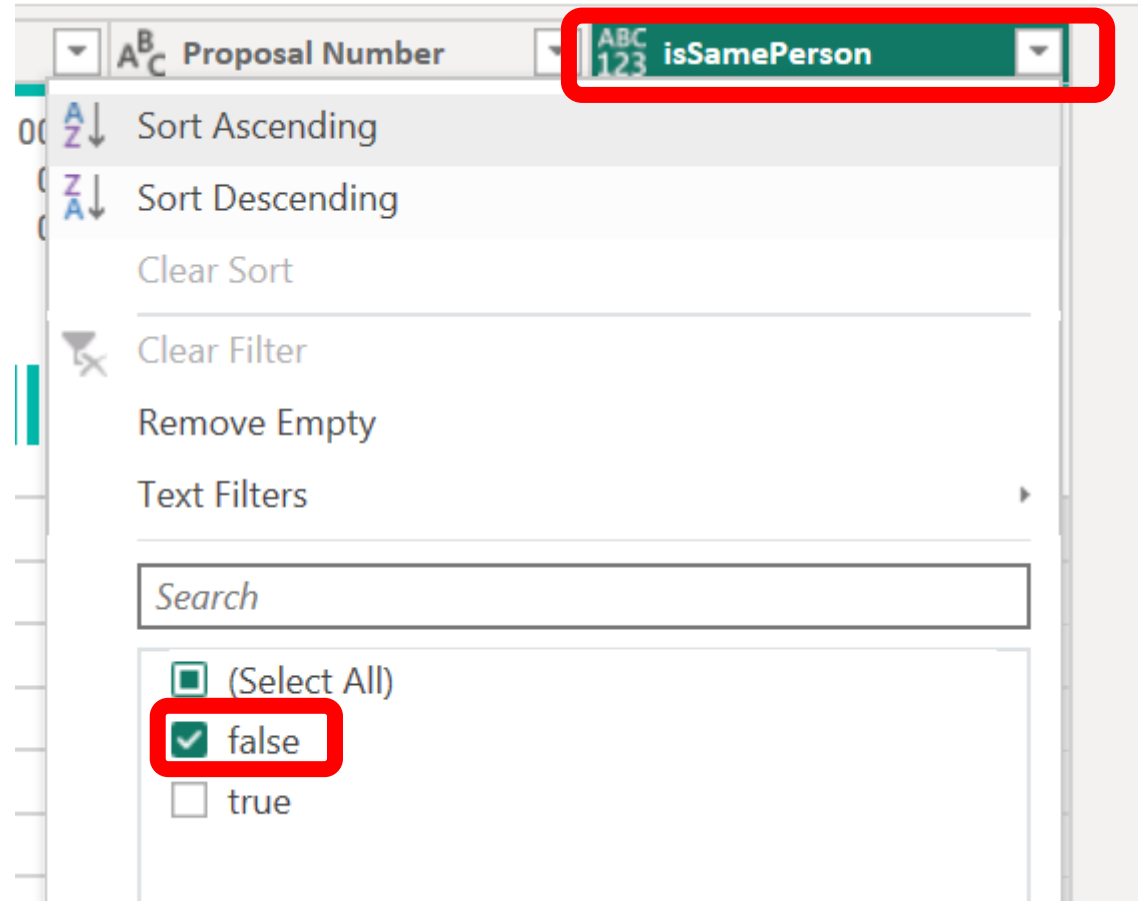
Available columns

- PI
- Investigator
- Proposal Number

You can click variable names

isSamePerson | Filter=False

- IF PI=COI then remove
- Click Drop-Down
- Only keep “false”



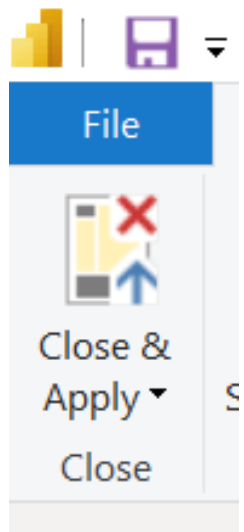
Proposal Networks | Remove Duplicates

- Select all Columns, “Remove Duplicates”
- Once done, “Close & Apply”

1.

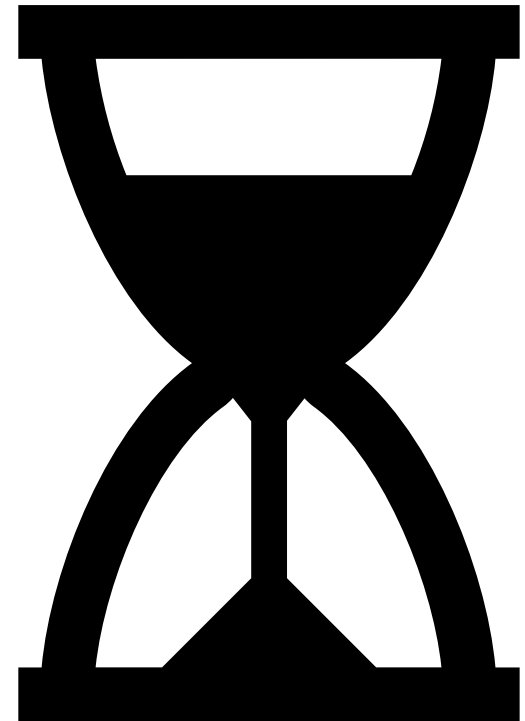
| | PI | Investigator | Proposal Number |
|---|--|---|--|
| | Valid 100%, Error 0%, Empty 0% 260 distinct, 104 unique | Valid 100%, Error 0%, Empty 0% 281 distinct, 97 unique | Valid 100%, Error 0%, Empty 0% 567 distinct, 394 unique |
| 1 | Johnson, Mina Catherine | Mignolet, Marc Paul | FP00038953 |
| 2 | Shrivastava, Aviral | Tongay, Sefaattin | FP00038352 |
| 3 | Song, Kenan | Deng, Shuguang | FP00037805 |
| 4 | Fini, Elham H | Deng, Shuguang | FP00037728 |

2.

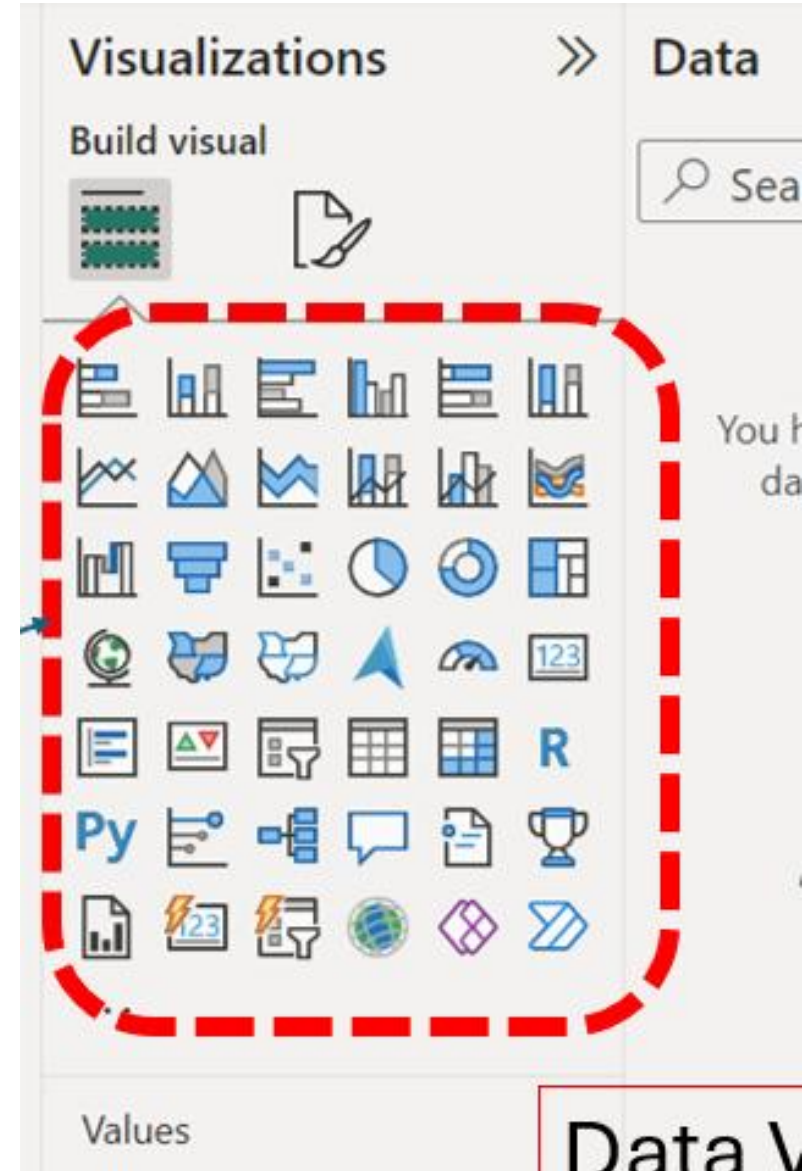


Let's Take a Second to Catch Up

- Two Tables
 - “Proposals”
 - “Proposal Networks”



Let's Build a Report Page



“Proposal Table” Variables (Hints Next Page)

Proposal Bar Chart

2018 2024

Proposal Status: All

Home College: All

Originating Sponsor Group: All

| Originating Sponsor | Proposal Total |
|--|------------------------|
| DOD-DARPA: Information Innovation Office (IIO) | \$29,991,058 |
| DOD-DARPA: Microsystems Technology Office (MTO) | \$24,051,514 |
| DOD-DARPA: Strategic Technology Office (STO) | \$3,363,490 |
| DOD-Navy: Naval Information Warfare Center Atlantic (NIWC) | \$199,996 |
| DOD-NAVY: Naval Research Laboratory (NRL) | \$283,541 |
| DOD-Navy: Naval Supply Systems Command (NAVSUP) | \$17,688,553 |
| Total | \$7,848,320,270 |

| Fiscal Year | Proposal Total |
|-------------|----------------|
| 2018 | \$0.94bn |
| 2019 | \$0.97bn |
| 2020 | \$1.21bn |
| 2021 | \$1.33bn |
| 2022 | \$1.32bn |
| 2023 | \$1.38bn |
| 2024 | \$0.71bn |

Visualizations

Build visual

Filters

Proposals

Proposal Networks

- Proposal Total
- Calendar M/Y
- Direct Sponsor
- Direct Sponsor Group
- Direct Sponsor Type
- Fiscal Year
- Home College
- Home Unit
- Investigator
- Investigator ID
- isSameName
- Originating Sponsor
- Originating Sponsor Group
- Originating Sponsor Type
- PI
- PI ID
- Proposal Number
- Proposal Status
- Proposal Title
- Role
- Strategic Initiative

X-axis: Fiscal Year

Y-axis: Proposal Total

Legend: Add data fields here

Small multiples: Add data fields here

Tooltips: Add data fields here

Robert Pilgrim, rpilgrim@uark.edu. This is NOT real data. Original data has been modified from its original, public source.

Proposal Bar Chart

Propos

Rename this page to Proposal Bar Chart

Proposal Bar Chart

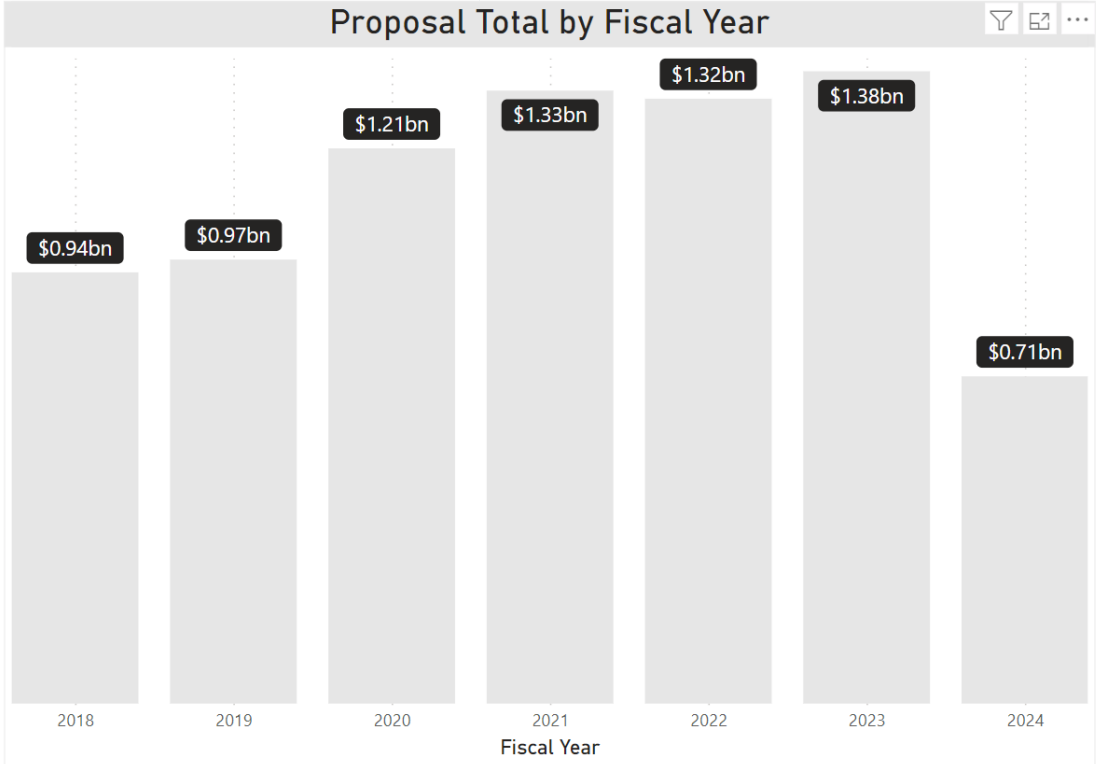
2018 2024

Proposal Status
All

Home College
All

Originating Sponsor Group
All

| Originating Sponsor | Proposal Total |
|--|------------------------|
| HHS: National Institutes of Health (NIH) | \$2,040,883,868 |
| National Science Foundation (NSF) | \$1,773,992,450 |
| US Department of Education (DOEd) | \$484,773,461 |
| National Aeronautics Space Administration (NASA) | \$408,753,882 |
| NASA: Headquarters | \$242,849,422 |
| DOE: Office of Energy Efficiency and Renewable Energy (OS) | \$228,954,609 |
| science (OS) | \$139,392,373 |
| Total | \$7,848,320,270 |



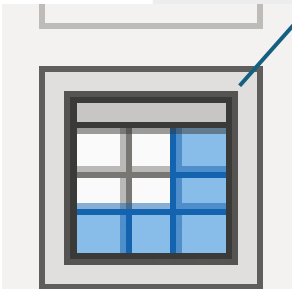
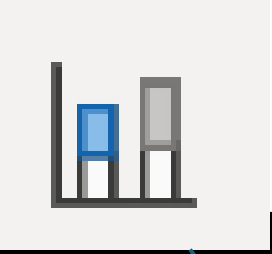
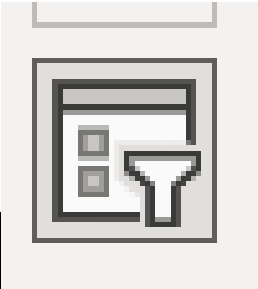
Navigation: << Data >>

Visualizations: Search

Build visual

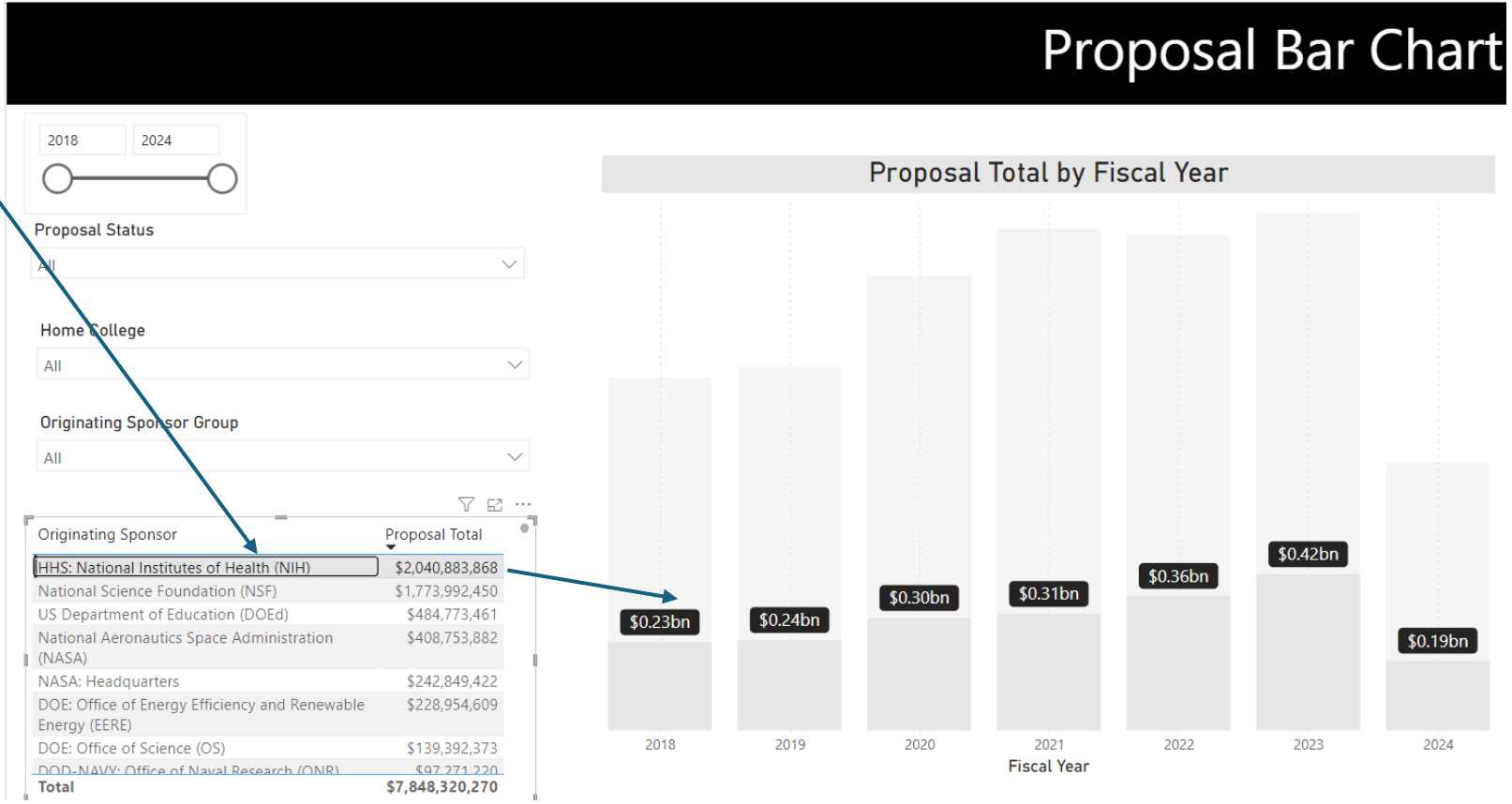
Values

Data View



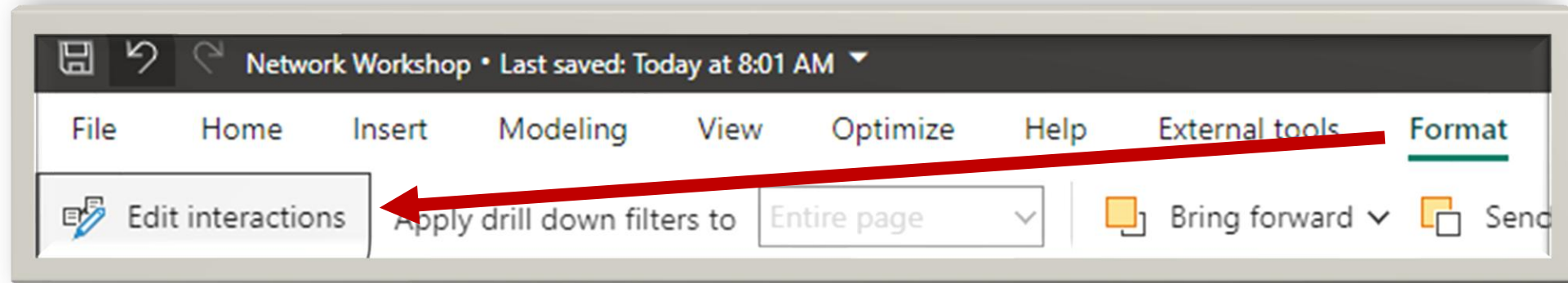
Fix the Interaction “Highlight” or Filter?

- Click a row
- How do you want the bar chart to react?



Change “Interaction”

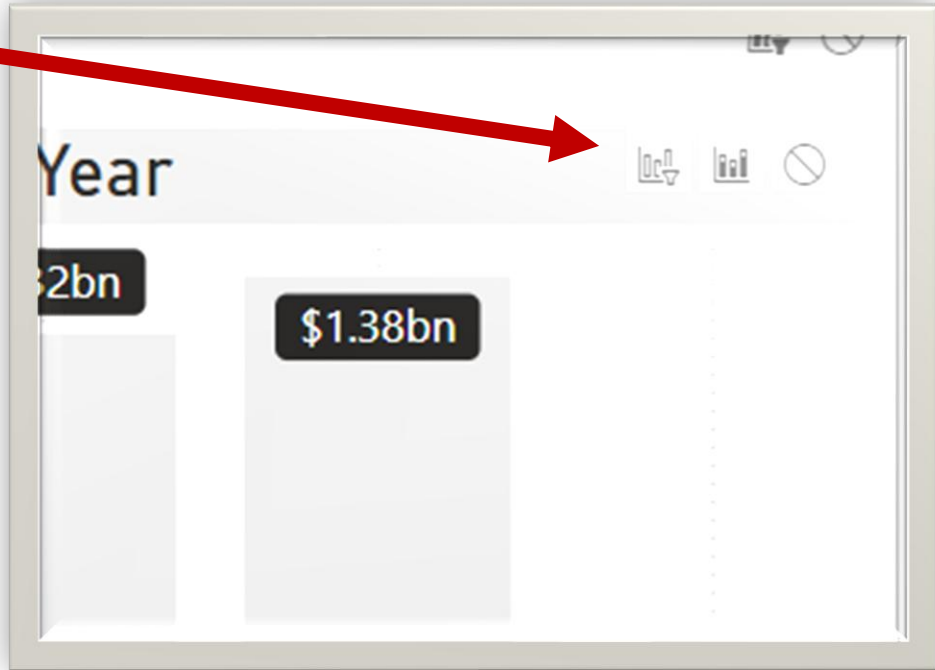
1. Edit Interactions



2. Click on your table

| Originating Sponsor | Proposal Total |
|---|------------------------|
| 100,000 Strong In The Americas | \$49,996 |
| 1907 Research | \$120,000 |
| 3M Company | \$659,795 |
| Abdulla Al Ghurair Foundation for Education | \$4,041,514 |
| ACF: Burton Family Foundation | \$202,264 |
| ACS: Herman Frasch Fund for Chemical Research | \$250,000 |
| ACS: Petroleum Research Fund | \$4,729,999 |
| Act One | \$70,465 |
| Acumen, LLC | \$98,202 |
| Total | \$7,848,320,270 |

3. Select “Filter”



Duplicate the First Page Rename “Proposal Network”

Proposal Bar Chart

2018 2024

Proposal Status: All

Home College: All

Originating Sponsor Group: All

| Originating Sponsor | Proposal Total |
|--|------------------------|
| HHS: National Institutes of Health (NIH) | \$2,040,883,868 |
| National Science Foundation (NSF) | \$1,773,992,450 |
| US Department of Education (DOEd) | \$484,773,461 |
| National Aeronautics Space Administration (NASA) | \$408,753,882 |
| NASA: Headquarters | \$242,849,422 |
| DOE: Office of Energy Efficiency and Renewable Energy (EERE) | \$228,954,609 |
| DOE: Office of Science (OS) | \$139,392,373 |
| Total | \$7,848,320,270 |

| Fiscal Year | Proposal Total |
|-------------|----------------|
| 2018 | \$0.94bn |
| 2019 | \$0.97bn |
| 2020 | \$1.21bn |
| 2021 | \$1.33bn |
| 2022 | \$1.32bn |
| 2023 | \$1.38bn |
| 2024 | \$0.71bn |

Filters: Visualizations, Data, Search, Proposal Network, Proposals

Build a Network Table

- Replace bar chart with table
- **“Proposal Network”** Table

The image shows a Power BI report titled "Proposal Network". The main view is a table with two columns: "PI" and "Investigator". The table contains 25 rows of data. To the right of the table is the "Data" pane, which shows a list of fields under the "Proposal Networks" table. The fields are "Investigator", "isSamePerson", "PI", and "Proposal Number". The "Investigator" and "PI" fields are checked, indicating they are selected as filters. The "Columns" section of the pane shows "PI" and "Investigator" are added to the table. The "Drill through" section shows "Cross-report" is turned off and "Keep all filters" is turned on.

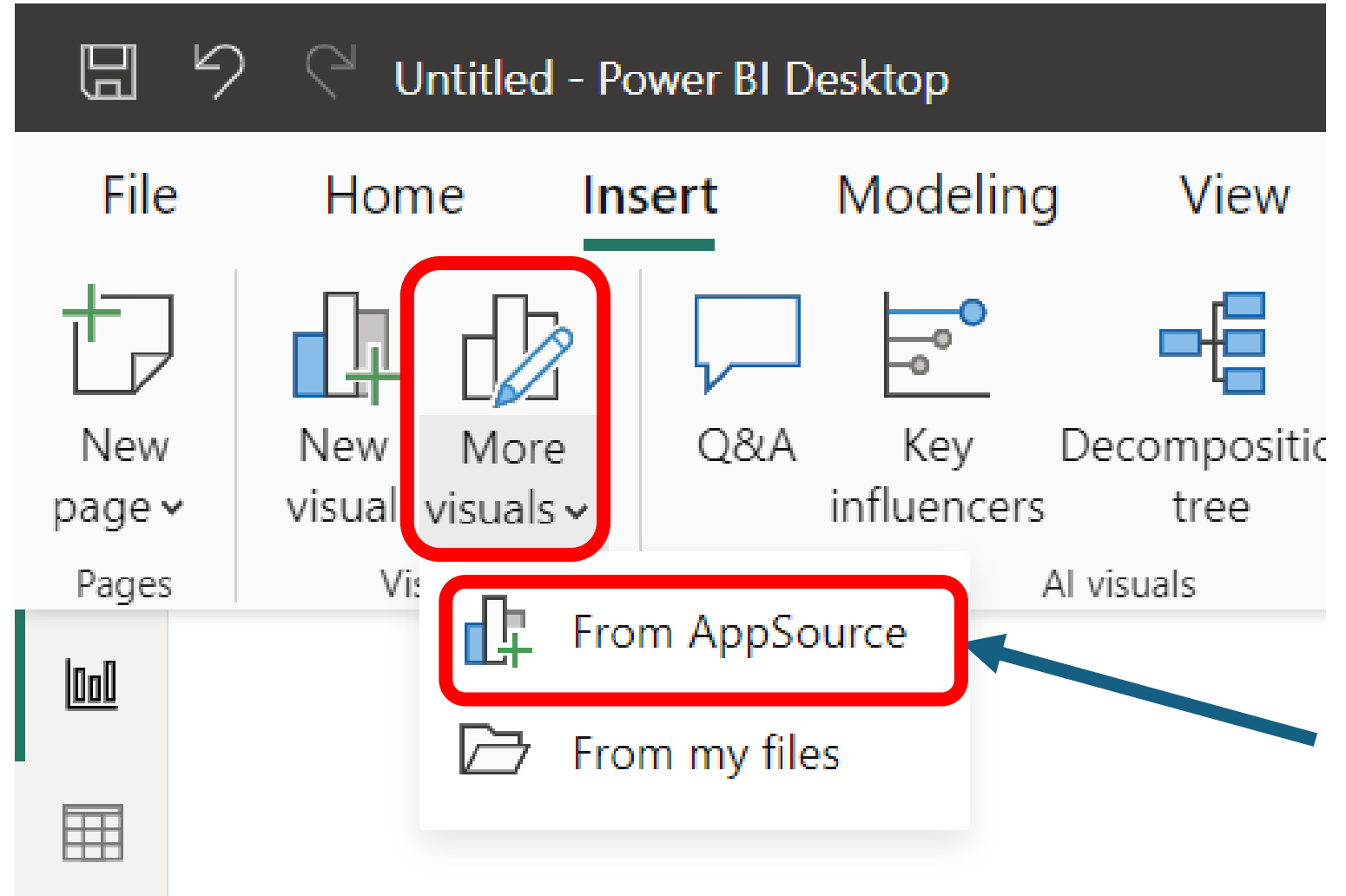
| PI | Investigator |
|------------------------|-------------------------------|
| Ahn, Gail-Joon | Bao, Youzhi |
| Ahn, Gail-Joon | Wang, Ruoyu |
| Aktipis, C Athena | Fewell, Jennifer Harrison |
| Aktipis, C Athena | Pavlic, Theodore Paul |
| Aktipis, C Athena | Pilarski, Nicholas Leo Casmir |
| Aktipis, C Athena | Roschke, Kristy Joanne |
| Ameri, Farhad | Bansal, Srividya Kona |
| Ameri, Farhad | Ko, Hyunwoong |
| Ameri, Farhad | Starly, Binil |
| Barnaby, Hugh James | Boyce, Ayesha Sherita |
| Barnaby, Hugh James | Holbert, Keith Edwin |
| Barnaby, Hugh James | Jamison-Hooks, Tracee L |
| Bartelle, Benjamin B | Andrews, Madeline Gail |
| Bartelle, Benjamin B | Plaisier, Christopher L |
| Birkel, Christina | Azeredo, Bruno Pavanelli |
| Bliss, Daniel Wesley | Brunhaver, John Steven |
| Bliss, Daniel Wesley | Chakrabarti, Chaitali |
| Bliss, Daniel Wesley | Michelusi, Nicolo |
| Bliss, Daniel Wesley | Rong, Yu |
| Calhoun, Ronald Joseph | Yang, Sui |
| Cao, Yu | Barnaby, Hugh James |
| Cao, Yu | Kozicki, Michael N |
| Cao, Yu | Sanchez Esqueda, Ivan |
| Cao, Yu | Seo, Jae-sun |
| Chakrabarti, Chaitali | Cao, Yu |

from its original public source

The image features a central white circle with a thick light green border. Inside this circle, the text "Load Custom Visuals" is written in a white, sans-serif font. Surrounding the central circle are various abstract elements: a white zigzag line on the left, a small light orange circle at the bottom left, a larger light orange circle at the top right, a set of four parallel white diagonal lines on the right, and a large light orange circle at the bottom right. The background is solid black.

Load Custom Visuals

We are going to use 2 custom visuals



Open the
Custom
Visual Store

Magical Place

Power BI visuals

By clicking 'Add' and/or 'Download Sample' and downloading a visual, you agree to the provider's Terms and Conditions and Privacy Policy on the visual's page and agree Microsoft can share your account details to provider for their transactional purposes. Use of Microsoft's AppSource is subject to the [Microsoft Commercial Marketplace Terms](#) and [Privacy Statement](#).

All visuals Organizational visuals AppSource visuals

Search

Explore all available visuals to magnify your business insights [Learn more](#)

Filter by All

Sort by: Popularity

- All
- Change Over Time
- Comparison
- Correlation
- Distribution
- Filters
- Flow
- Infographics
- KPI
- Maps
- Narratives
- Other
- Part-to-Whole
- R visuals

All the visuals approved for use in your organization.

★★★★★ (15)

Play Axis (Dynamic ...

mprozil

★★★★★ (43)

Box and Whisker C...


MAQ LLC

★★★★★ (61)

Histogram by PQ S...

PQ Systems


★★★★★ (6)



HTML Content

Daniel Marsh-Patrick


★★★★★ (29)



Animated Bar Chart...

Wishyoualization


★★★★★ (44)



Calendar by MAQ S...

MAQ LLC


★★★★★ (64)



Zebra BI Charts

Zebra BI


★★★★★ (38)



Gantt Chart - xViz

xViz LLC


★★★★★ (25)



Filter by List


DEVSCOPE

★★★★★ (7)



Gantt Timeline


Stratada



Drilldown Chorople...

Microsoft Corporation

★★★★★ (28)

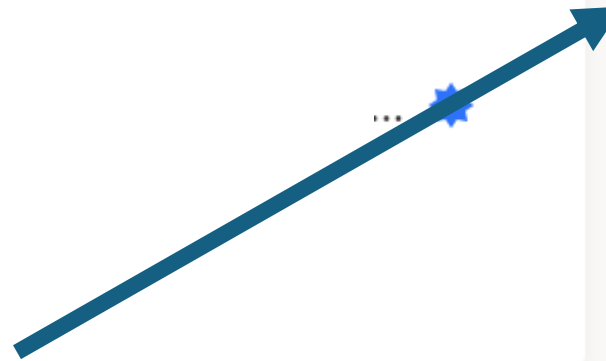


Bullet Chart

Microsoft Corporation

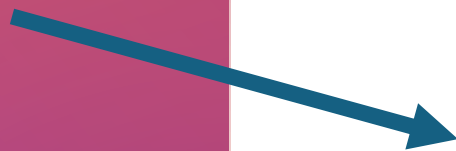
★★★★★ (40)

Load the
Network
Visual



A screenshot of a software catalog grid. The top row features a tile for 'Network Navigator...' by Microsoft Corporation, which is highlighted with a red rounded rectangle. This tile includes a network diagram icon, the text 'Network Navigator...', 'Microsoft Corporation', and a 4.5-star rating with '(16)' reviews. Below it is a tile for 'MAQ Software' featuring a line graph icon and the text 'MAQ Software'. To the right, a partial view of a 'Social' tile is visible, showing profile pictures and the name 'Arthur'. The interface includes a search bar at the top and a grid of application tiles.

Load the Word Cloud Visual



Power BI visuals

i By clicking 'Add' and/or 'Download Sample' and downloading a visual, you agree to their transactional purposes. Use of Microsoft's AppSource is subject to the [Microsoft AppSource Terms of Use](#).

All visuals Organizational visuals AppSource visuals

Explore all available visuals to magnify your business insights [Learn more](#)

Filter by

Word Cloud

Microsoft Corporation

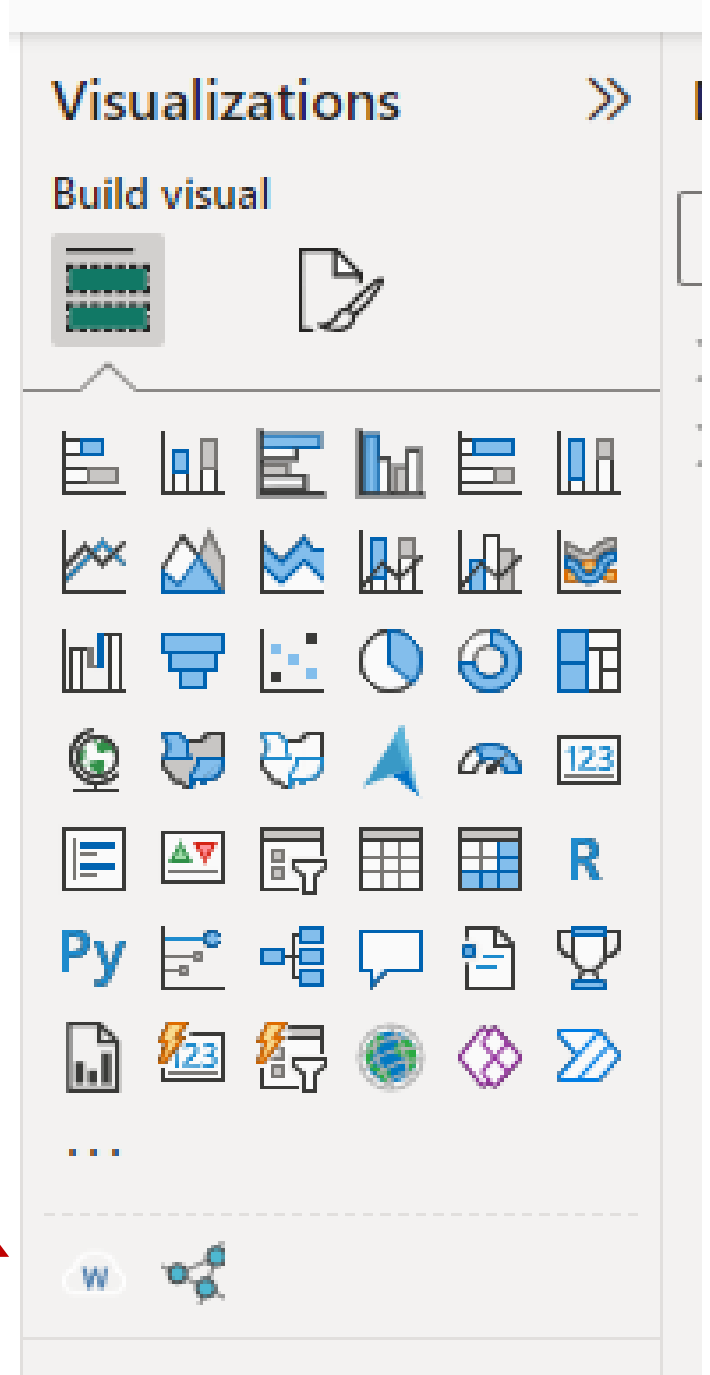
★★★★★ (140)

Mass Filter

Insiders.coop

★★★★★ (11)

Where are
my Custom
Visuals?

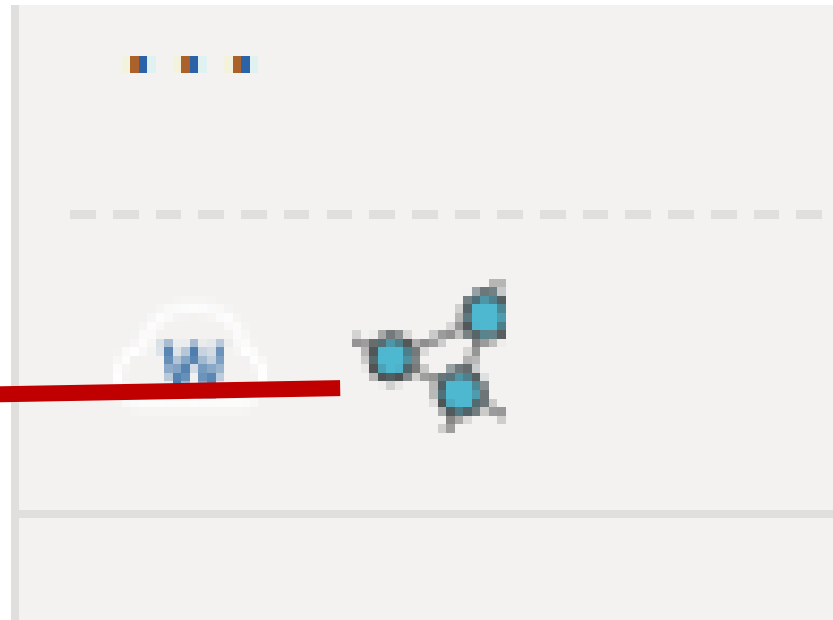


Our First Network

- “Proposal Network” Page
- Change “Table” to “Network.”

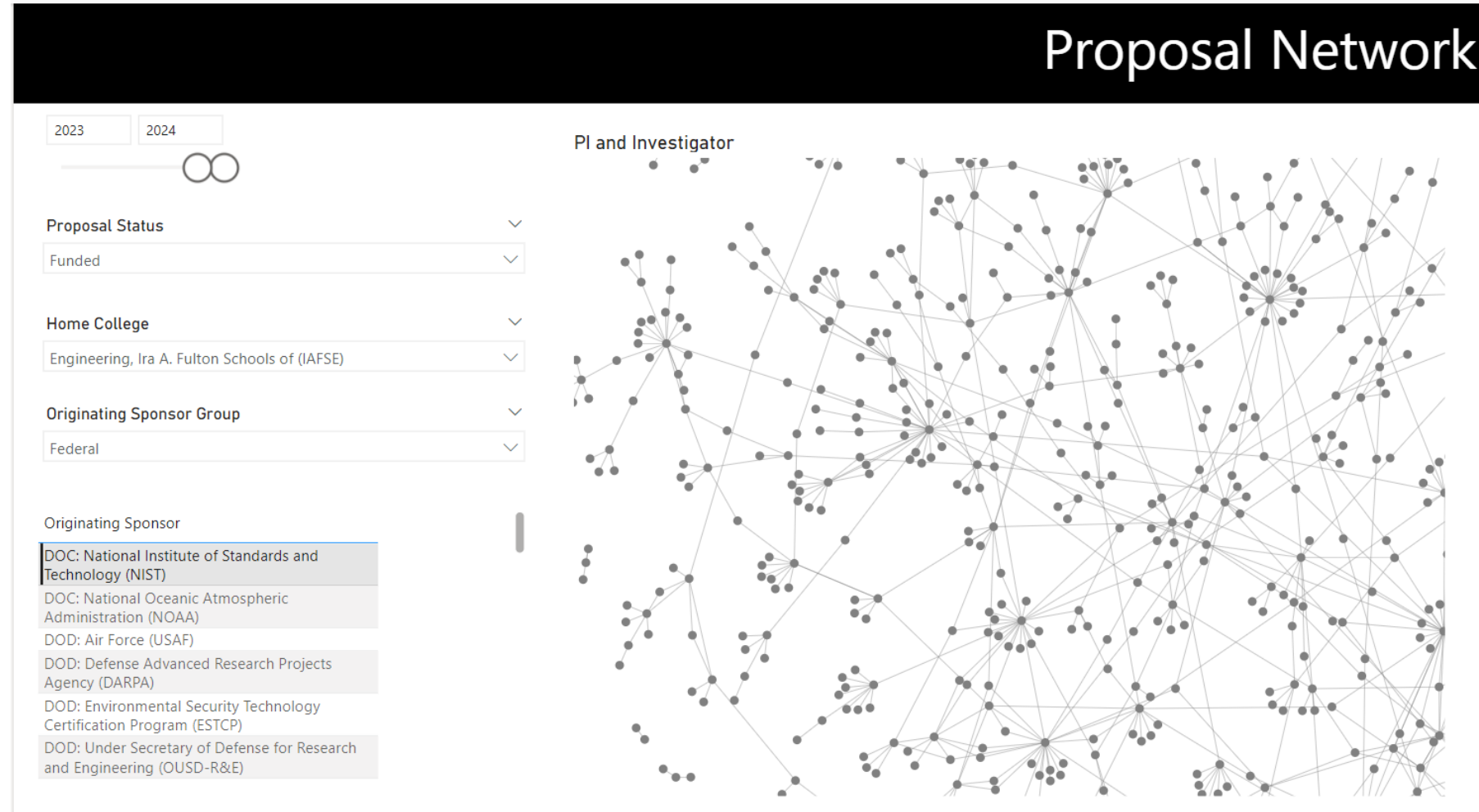
Proposal Network

| PI | Investigator |
|---------------------------|---------------------------------|
| Adams, Marc Anthony | Sklar, David |
| Adams, Marc Anthony | Todd, Michael Wayne |
| Adams, Marc Anthony | Vega-Lopez, Sonia |
| Adler, Jacob Benjamin | Kerner, Hannah Rae |
| Adrian, Ronald John | Peet, Yulia V |
| Aggarwal, Rimjhim M | Anbar, Ariel David |
| Agloro, Alexandrina Renee | Guevarra Jr, Rudy Poscablo |
| Agloro, Alexandrina Renee | Hita, Liza Cohen |
| Agusdinata, Buyung | Choi, Thomas Younghoon |
| Agusdinata, Buyung | Goodman, Rebekka |
| Agusdinata, Buyung | Mishra, Ashok Kumar |
| Ahmad, Adil | Xiao, Xusheng |
| Ahn, Gail-Joon | Bao, Youzhi |
| Ahn, Gail-Joon | Wang, Ruoyu |
| Ai, Weining | Peterson, Timothy Michael |
| Aktipis, C Athena | Bennett, Gaymon L |
| Aktipis, C Athena | Fewell, Jennifer Harrison |
| Aktipis, C Athena | Karimi, Robert Farid |
| Aktipis, C Athena | O’Neil, Erica L |
| Aktipis, C Athena | Pavlic, Theodore Paul |
| Aktipis, C Athena | Pilarski, Nicholas Leo Casmir |
| Aktipis, C Athena | Roschke, Kristy Joanne |
| Aktipis, C Athena | Scott, Jason Davids |
| Aktipis, C Athena | Zarka-Tsakiris, Emily Elizabeth |
| Alford, Terry Lynn | Liu, Jingyue |
| Alkhateeb, Ahmed A. | Trichopoulos, Georgios |
| Allee, David Ray | Marrs, Michael A |



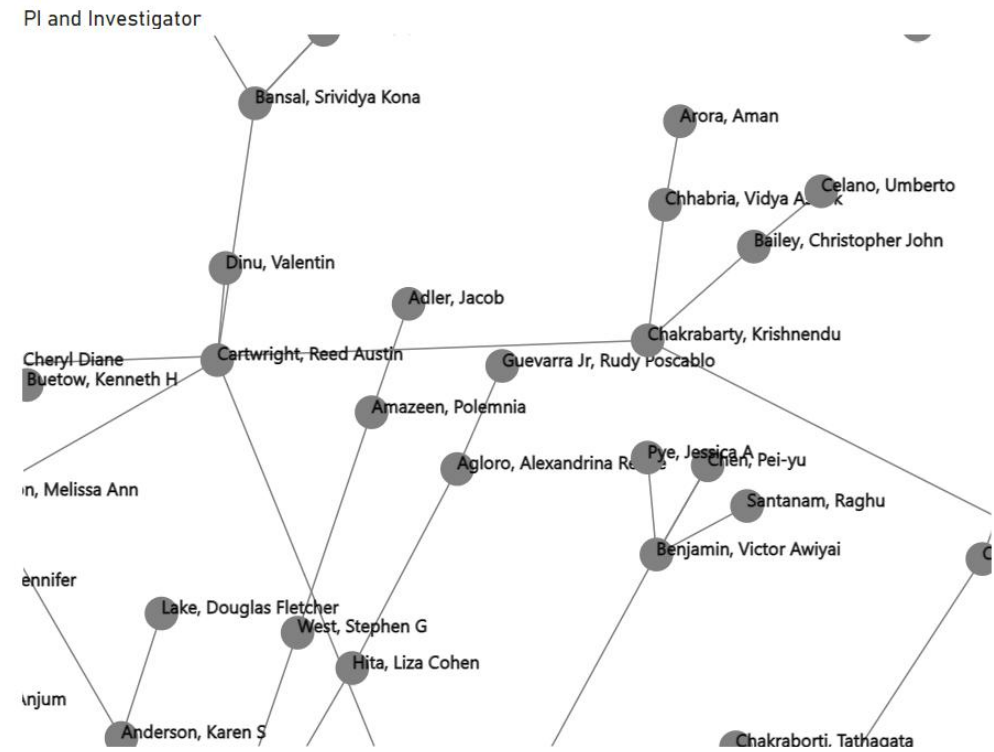
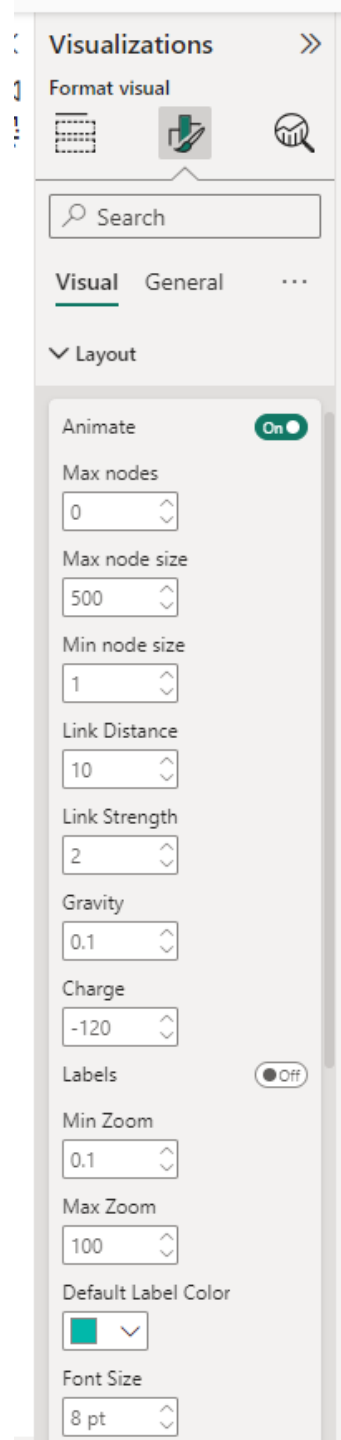
Network Diagram

- Make it larger
- Everyone have this?
- Let's add names



Play around with Format

- Turn “Labels” on
- Change color to black
- Basic navigation
- Zoom via mouse wheel
- Click and hold in network to move



What is Wrong with this Page?

2018 2024

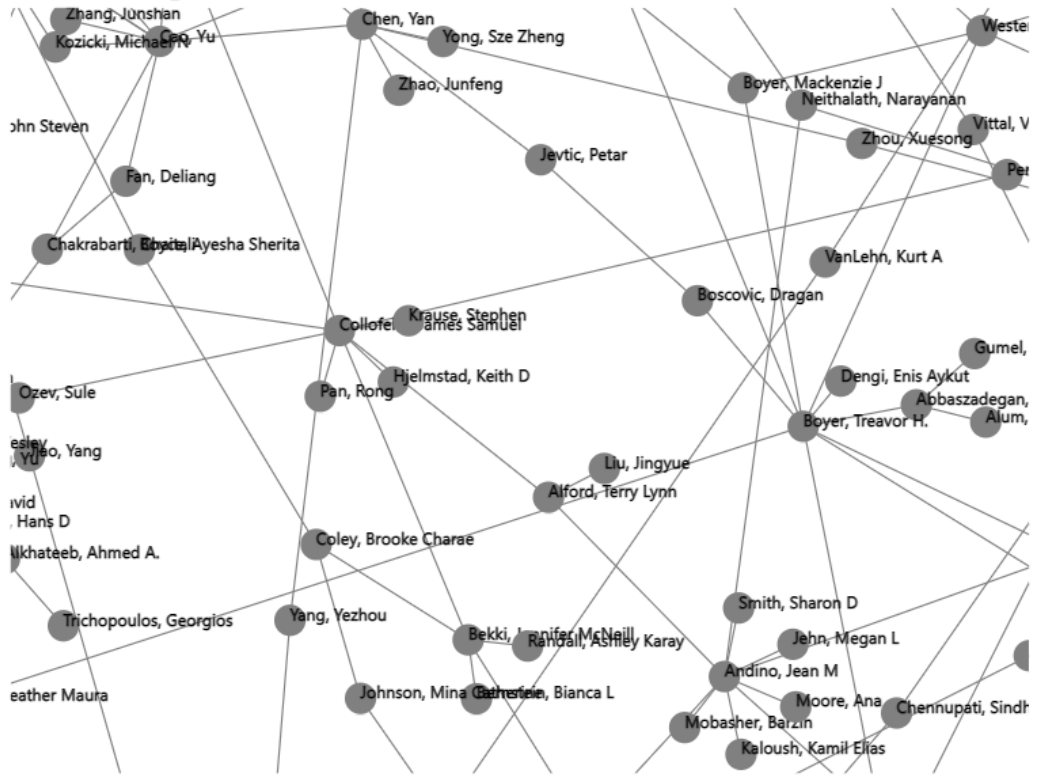
Proposal Status: Funded

Home College: All

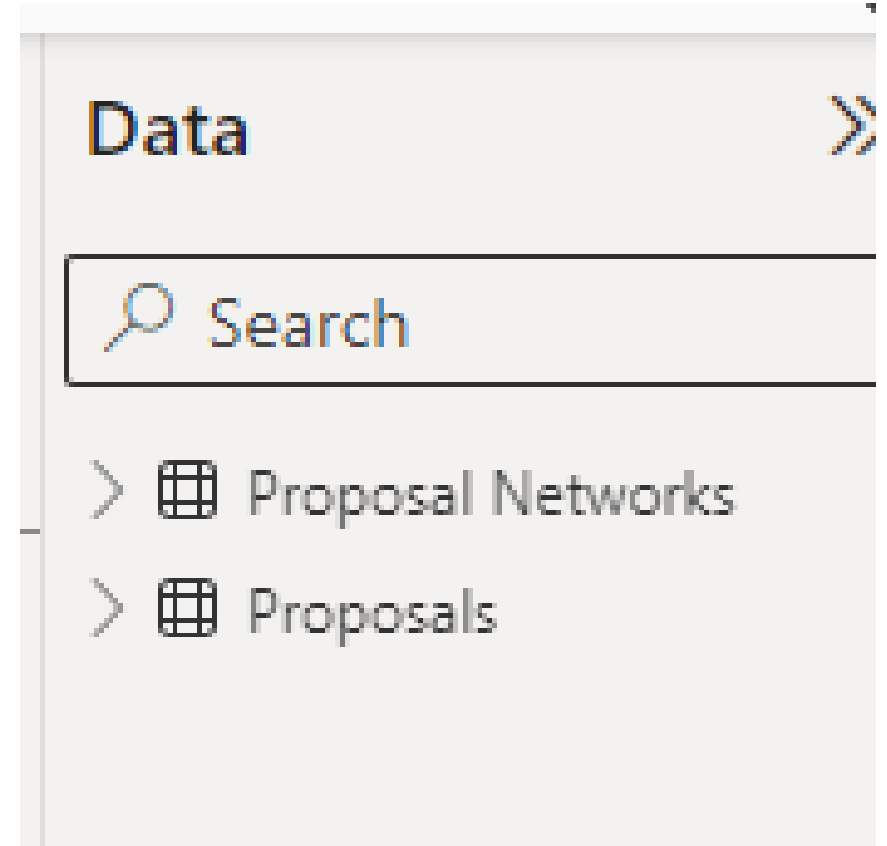
Originating Sponsor Group: Federal

| Originating Sponsor | Proposal Total |
|--|------------------------|
| National Science Foundation (NSF) | \$319,914,837 |
| US Department of Education (DOEd) | \$255,092,163 |
| HHS: National Institutes of Health (NIH) | \$226,690,110 |
| National Aeronautics Space Administration (NASA) | \$176,572,171 |
| NASA: Headquarters | \$48,957,336 |
| DOE: Office of Science (OS) | \$45,381,351 |
| NASA: Shared Services Center (NSSC) | \$35,504,339 |
| DOD-NAVY: Office of Naval Research (ONR) | \$32,002,305 |
| US Agency for International Development | \$26,431,846 |
| Total | \$1,566,585,647 |

PI and Investigator



Why are the filter NOT Working?





There is no Connection

We need a Data Model

What is the Connection?

A screenshot of a data visualization interface. On the left, a vertical toolbar contains icons for a bar chart, a grid, a connection icon, and a document icon labeled 'DAX'. The main area shows two panels. The 'Proposals' panel on the left lists fields: Originating Sponsor Group, Originating Sponsor Type, PI, Σ PI ID, Proposal Number, Proposal Status, Proposal Title, and Role. The 'Proposal Networks' panel on the right lists fields: Investigator, isSamePerson, PI, and Proposal Number. Both panels have a 'Collapse ^' button at the bottom. The interface has a light gray background and a vertical toolbar on the left.

Build a Data Model | Connect the Tables

The image shows a Power BI interface with a left-hand navigation pane and two table views. In the navigation pane, the 'Model' icon (three overlapping rectangles) is highlighted with a red box and a blue arrow. The 'Proposals' table view lists fields: Σ PLID, Proposal Number (highlighted with a red box), Proposal Status, Proposal Title, Role, Strategic Initiative, Count Investigators, and Proposal Count. The 'Proposal Networks' table view lists fields: Investigator, isSamePerson, PI, and Proposal Number (highlighted with a red box). A red box highlights the relationship between the 'Proposal Number' fields in both tables, showing a one-to-many relationship with a double-headed arrow and asterisks on both ends.

Now the Filters will Work

Proposal Network

2022 2023

Proposal Status

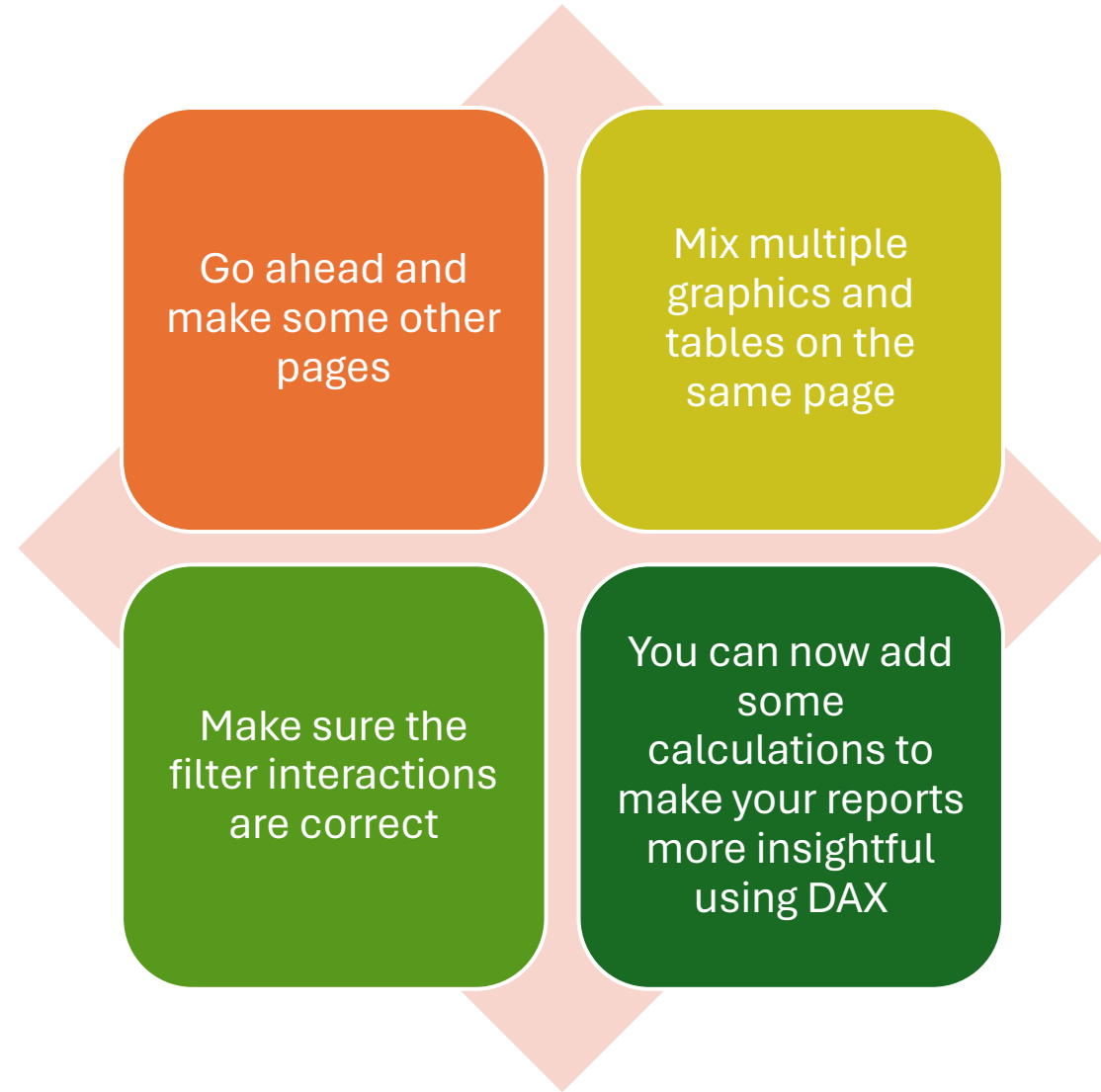
Home College

Originating Sponsor Group

| Originating Sponsor | Proposal Total |
|--|------------------|
| AZ: City of Phoenix | \$386,603 |
| Maricopa Association of Governments | \$168,240 |
| AZ-Maricopa County: Department of Transportation | \$125,000 |
| AZ: City of Maricopa | \$50,000 |
| AZ-Maricopa: Town of Gilbert | \$39,017 |
| AZ: City of Chandler | \$25,000 |
| AZ: City of Mesa | \$21,831 |
| AZ: City of Peoria | \$14,800 |
| Total | \$830,491 |

PI and Investigator

These are the Basics



Some Calculations

- Which faculty have collaborated the most?
- Are we becoming a more interdisciplinary campus , what does this look like broken down by Fiscal Year?
- Correlation between collaboration and funding?

- NOTE
 - Network are about collaborations
 - Research that involved just the PI will NOT show up

Word Cloud

Proposal Word Cloud



Formatting on next page

this is NOT real data. Original data has been modified from its original, public source.

Visualizations >>

Build visual

Filters

Category: Originating Sponsor

Values: Proposal Total

Excludes: Add data fields here

Drill through

Cross-report: Off

Keep all filters: On

Add drill through fields here

Improve the Look



Format visual

Visual General ...

Search

General

Minimum number of rep...
1

Max number of words
200

Min font size (%)
20

Max font size (%)
100

Word-breaking

Special characters

Reset to default

Format visual

Visual General ...

Search

General

Data colors

Stop Words

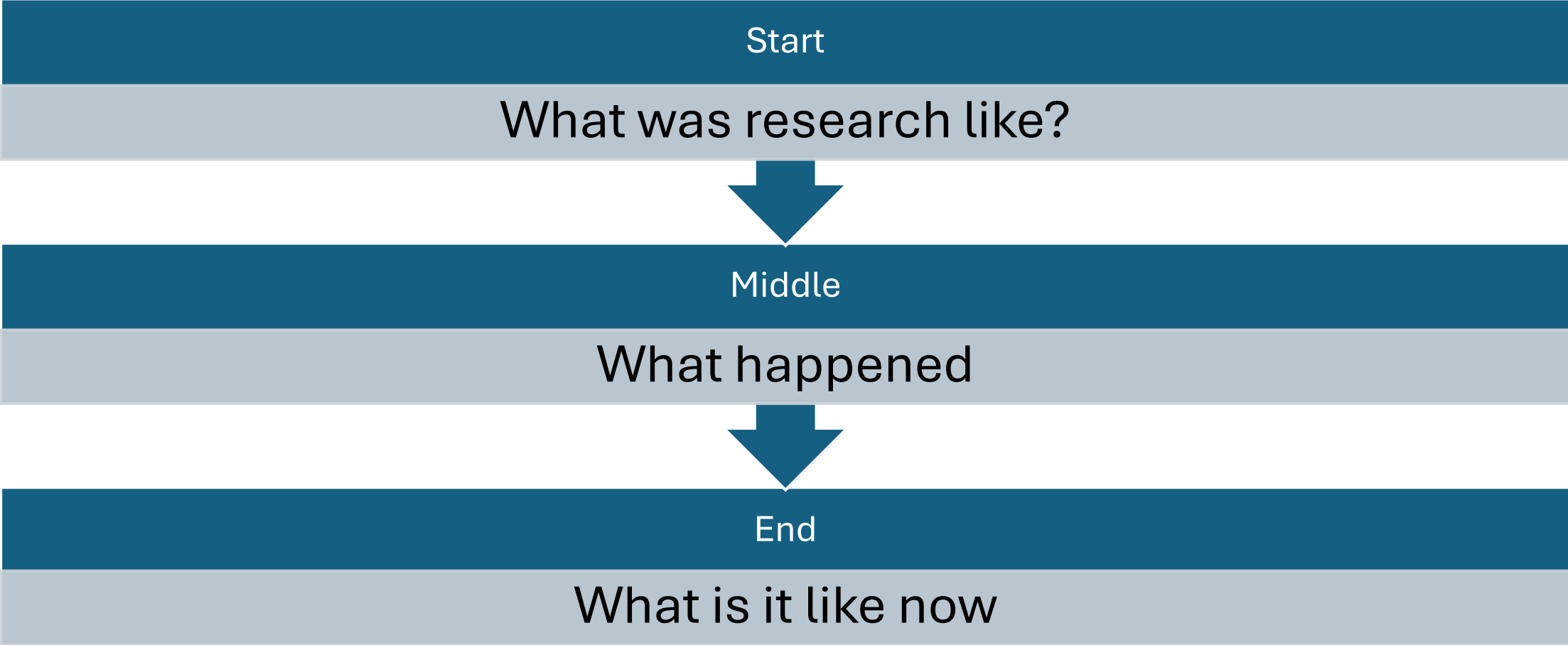
Rotate Text

Performance

You are a Story Teller

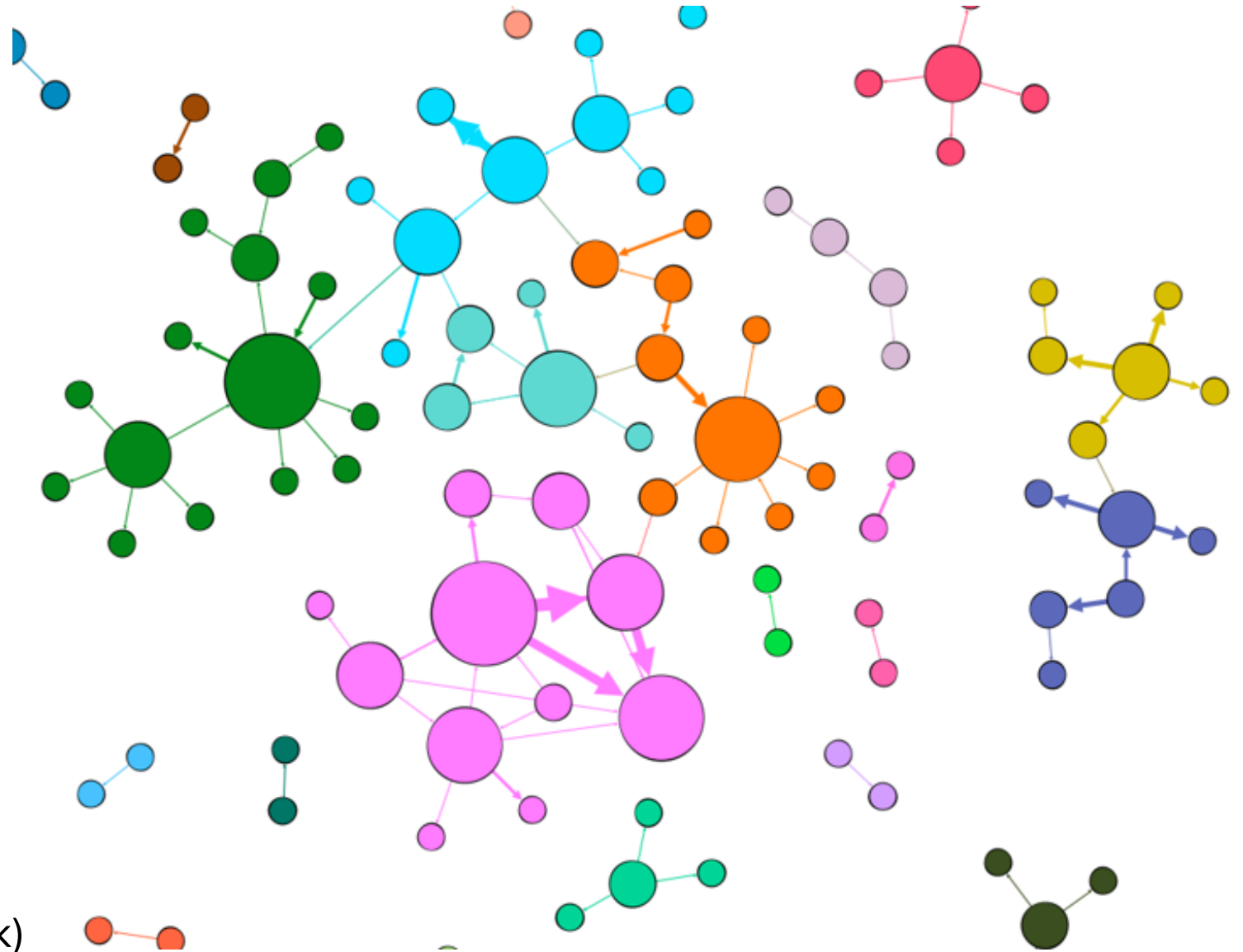
Networks are the best way for telling a stories

Stages in a Story



Example | Change in NSF Proposals Collaborations

- 5 Years Ago
- How would you describe this?
- Circles are people
- Color is research group
- Lines are connections



Example | Change in NSF Proposals Collaborations

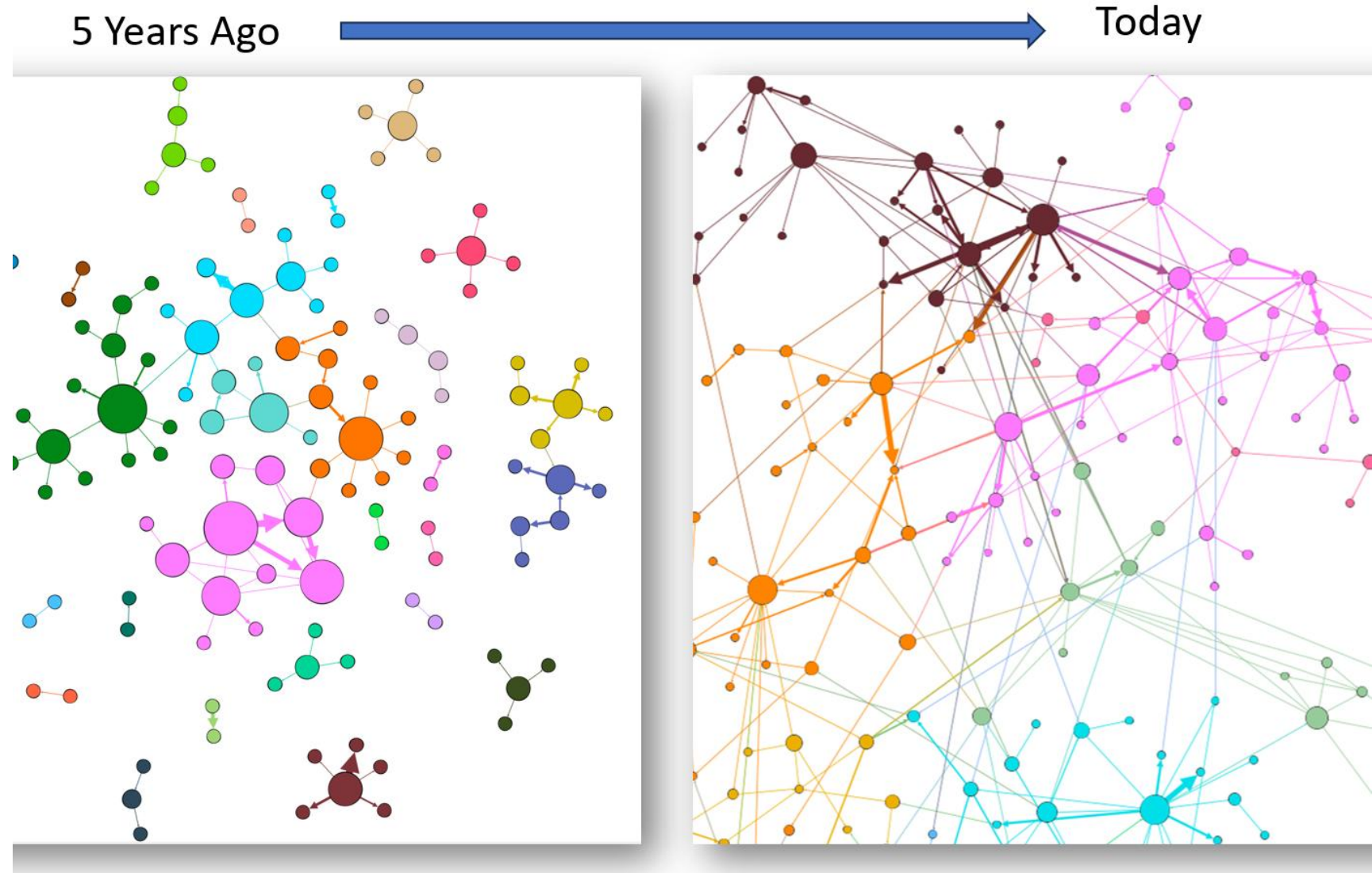
- Today
- How would you describe this?
- Circles are people
- Color is research group
- Lines are connections

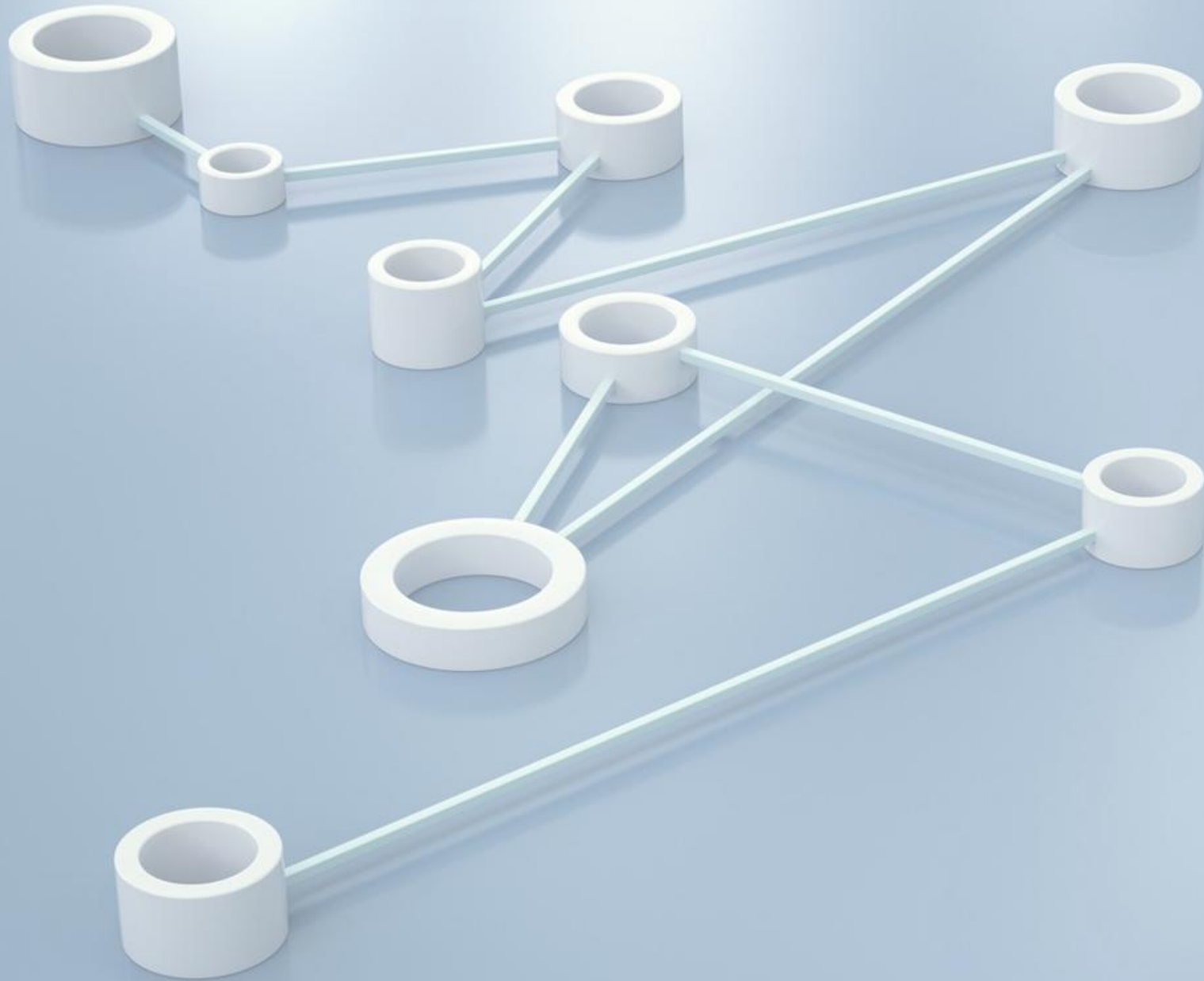


(Hypothetical Network)

Comparison

- Density Increased
- Which is more “resilient?”
 - 10 Random people leave.
- Decrease in group isolation





Strategic Initiatives

Leveraging Networks

Stories

- New Building
- Innovation Fund
- Strategic Hires

- Research Development
- Faculty Start-Up Funding
- Diversity Analysis

