

Introduction to Power BI: Making Visualizing Data More Accessible

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The University of Alabama

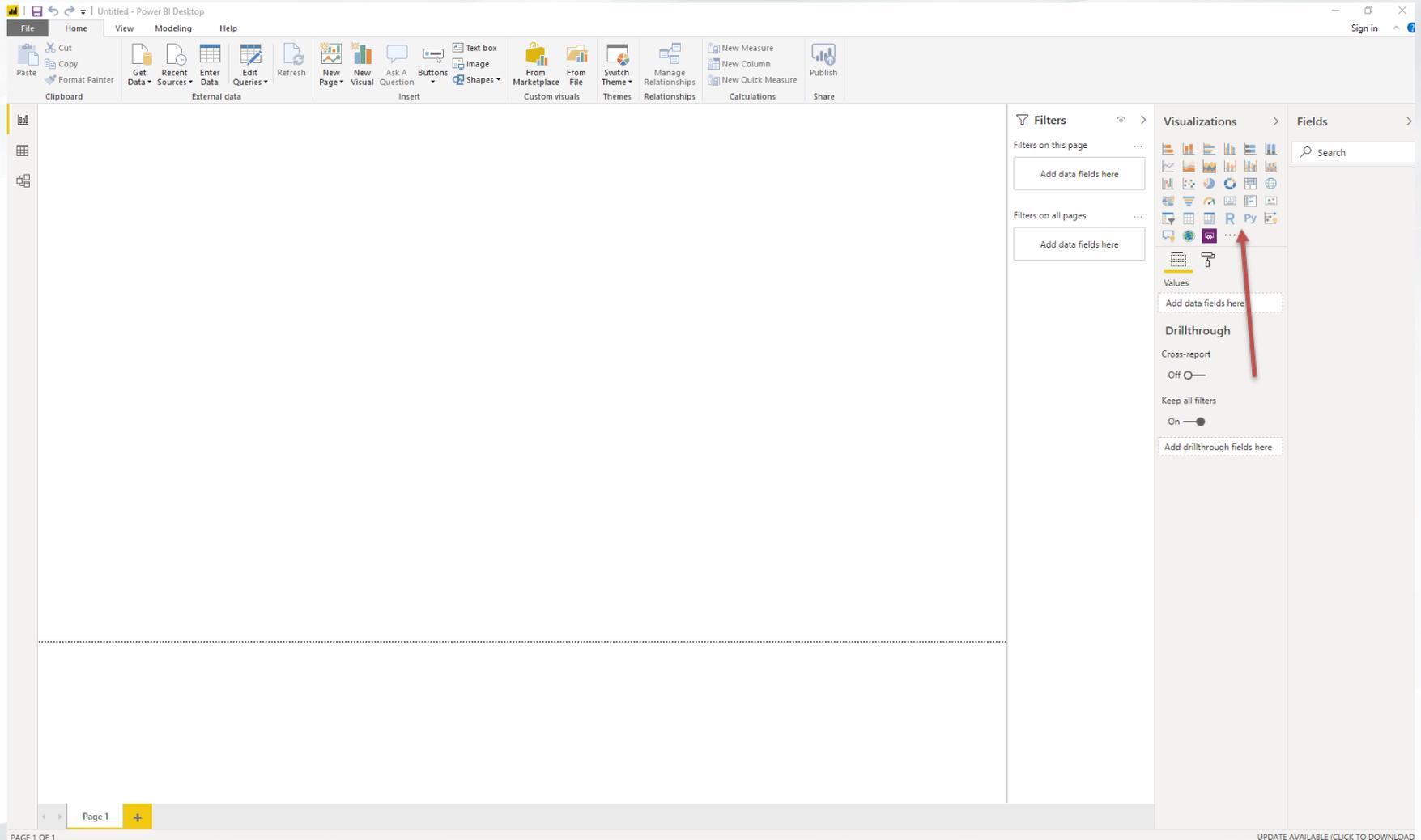
What does “BI” stand for?

- The “BI” in Power BI stands for

Business Intelligence

- Technology-driven analysis of data for the purpose of making strategic decisions

Power BI Desktop Workspace



Power BI Desktop Workspace

The screenshot displays the Power BI Desktop interface. The main workspace shows a report page titled "Count of UnitID" with a blank visualization area. The ribbon at the top includes tabs for File, Home, View, Modeling, Help, Visual tools, Format, and Data / Drill. The Visual tools ribbon contains various options like Cut, Copy, Paste, Get Data, Recent Sources, Enter Data, Edit Queries, Refresh, New Page, New Visual, Ask A Question, Buttons, Image, Text box, From Marketplace, From File, Switch Theme, Manage Relationships, New Measure, New Column, New Quick Measure, and Publish.

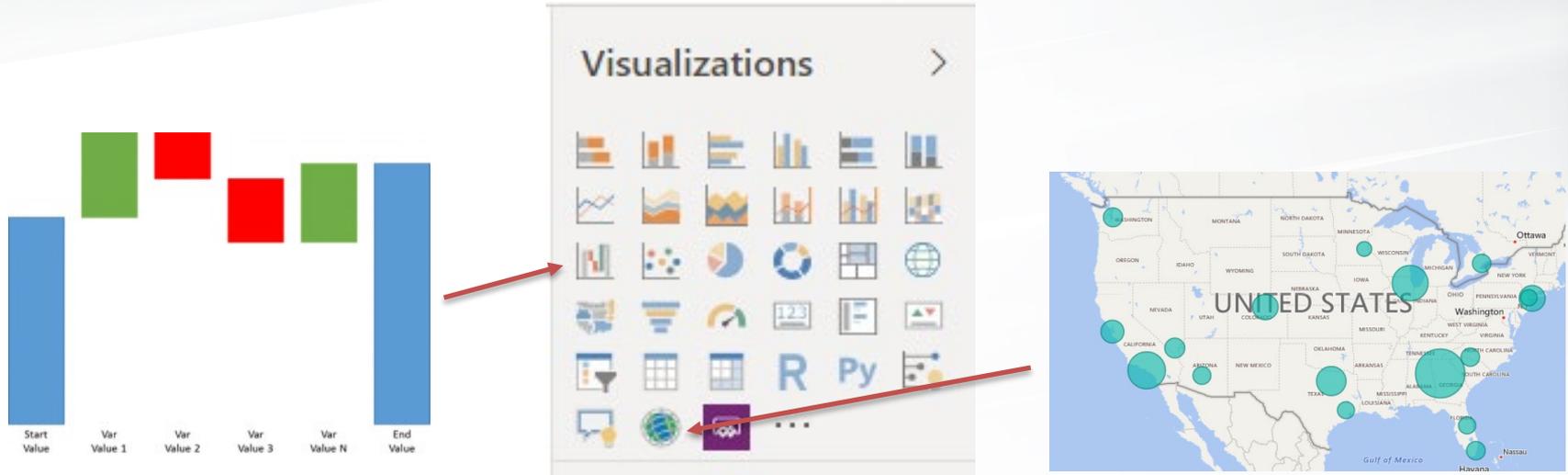
On the right side, there are three panes: Filters, Visualizations, and Fields. The Filters pane shows "Count of UnitID is (All)". The Visualizations pane shows a list of visualization types, with the "Table" icon circled in red. The Fields pane shows a list of fields, including "Data_Age" and "Data_Race/Sex".

At the bottom, there is a Python script editor with the following code:

```
Python script editor
1 # The following code to create a dataframe and remove duplicated rows is always executed and acts as a preamble for your script:
2
3 # dataset = pandas.DataFrame(UnitID)
4 # dataset = dataset.drop_duplicates()
5
6 # Paste or type your script code here:
```

The status bar at the bottom left shows "Page 1" and "PAGE 1 OF 1". The status bar at the bottom right shows "UPDATE AVAILABLE (CLICK TO DOWNLOAD)".

Visualizations



The Visualizations panel has buttons for the most commonly used items such as bar charts and line graphs, as well as more advanced visualizations like waterfall charts and geographic maps. You can also import custom visualizations from templates or from the Microsoft marketplace.

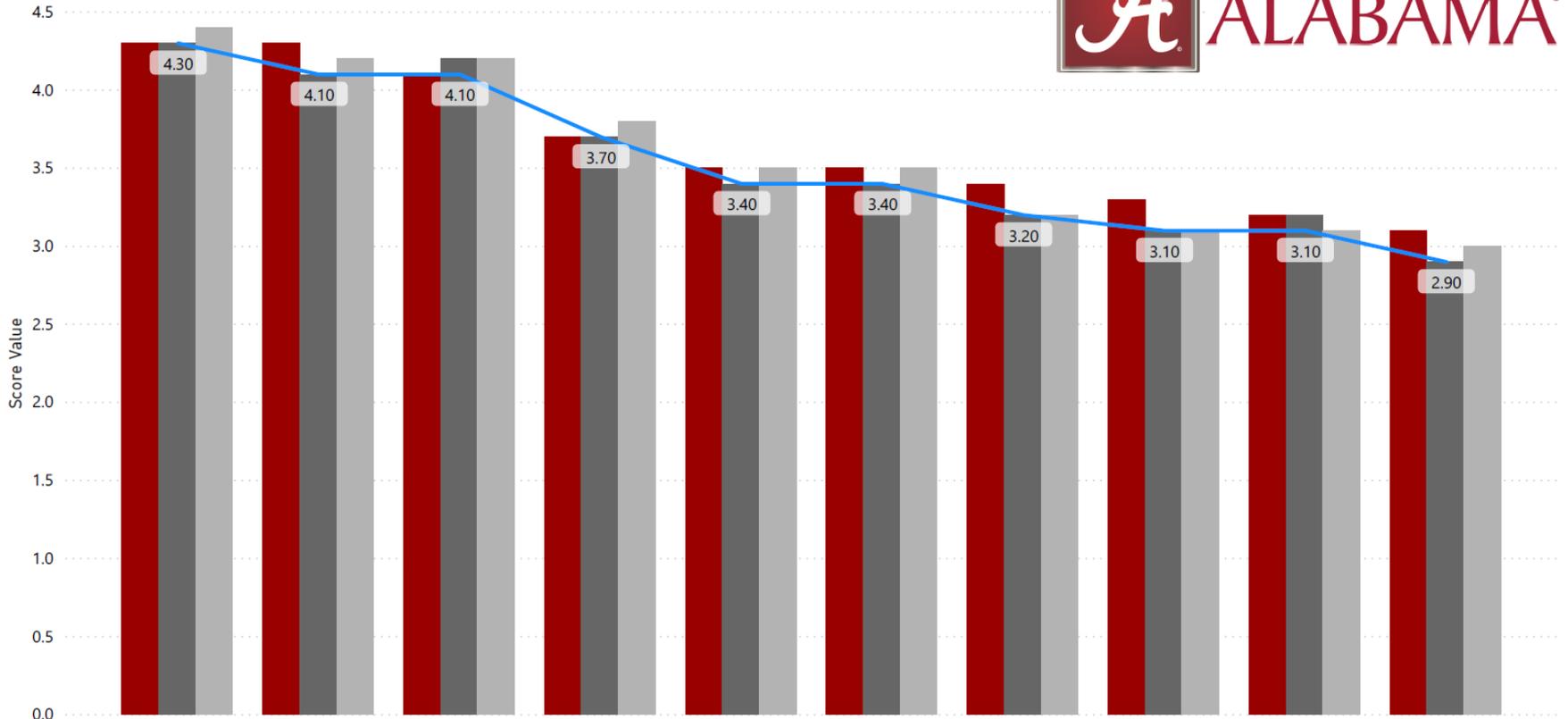
Line and Clustered Column Chart

Undergraduate Academic Reputation

● Dean ● President ● Provost ● Overall Peer Assessment Score



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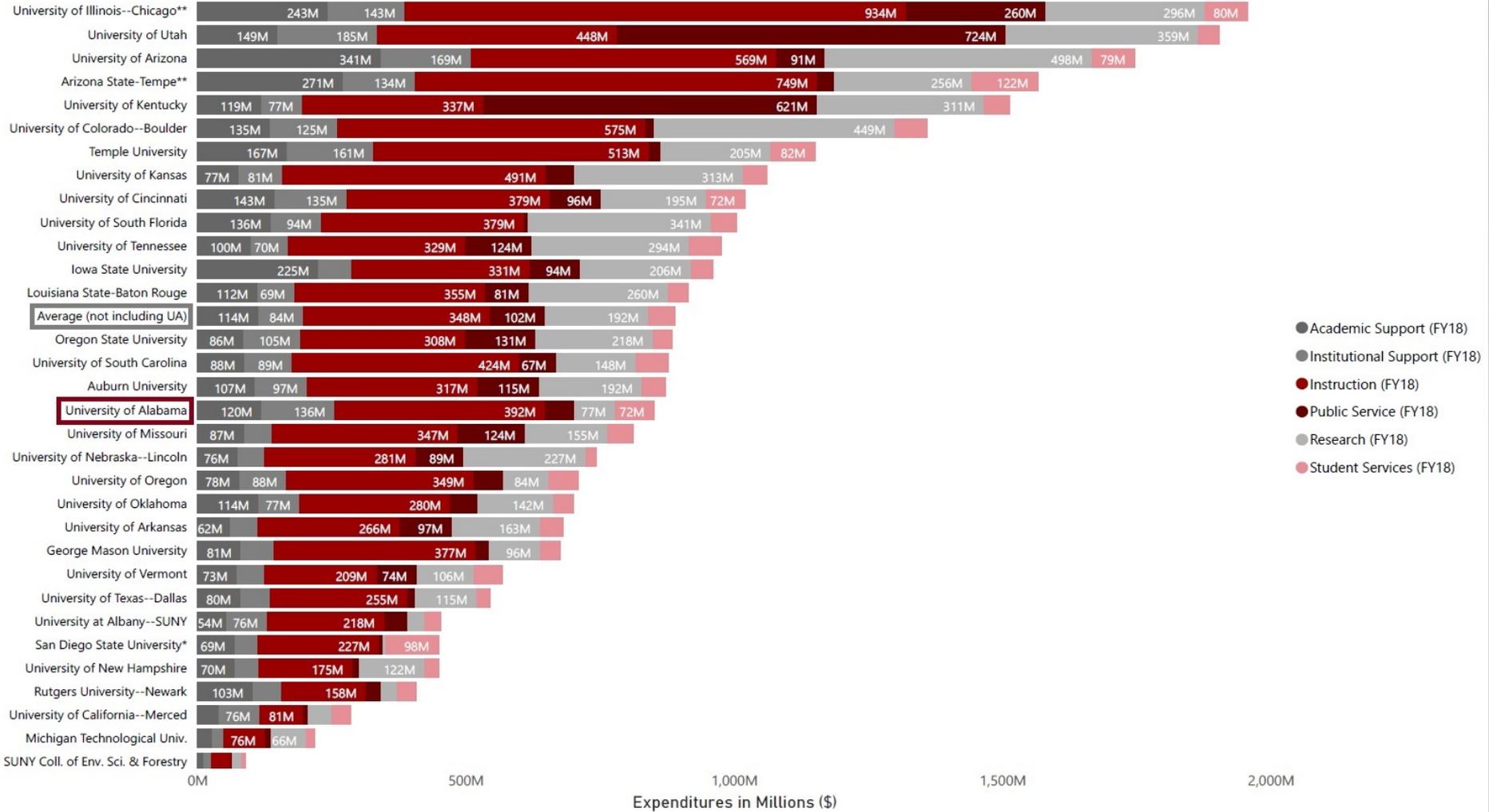


(Institution names hidden per Data Use Agreement)

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Stacked Horizontal Bar Chart

Categorical Expenditures for Fiscal Year 2018



Data Management

The image shows a screenshot of the Microsoft Power BI interface. On the left, the ribbon is visible with tabs for File, Home, View, Modeling, and Help. The Modeling tab is active, showing a group of icons for 'External data': Get Data, Recent Sources, Enter Data, Edit Queries, and Refresh. A red arrow points from the 'Get Data' icon to the 'Get Data' dialog box on the right. The dialog box has a search bar at the top and a list of data sources. The 'All' category is selected, showing a list of connectors including Excel, Text/CSV, XML, JSON, Folder, PDF, SharePoint folder, SQL Server database, Access database, SQL Server Analysis Services database, Oracle database, IBM Db2 database, IBM Informix database (Beta), IBM Netezza, MySQL database, and PostgreSQL database. At the bottom of the dialog, there are 'Certified Connectors' and 'Connect' and 'Cancel' buttons.

File Home View Modeling Help

Paste Cut Copy Format Painter Clipboard

Get Data Recent Sources Enter Data Edit Queries Refresh

External data

Get Data

All

- Excel
- Text/CSV
- XML
- JSON
- Folder
- PDF
- SharePoint folder
- SQL Server database
- Access database
- SQL Server Analysis Services database
- Oracle database
- IBM Db2 database
- IBM Informix database (Beta)
- IBM Netezza
- MySQL database
- PostgreSQL database

Certified Connectors

Connect Cancel

Data Management

Navigator

Display Options

- AL group enrollment by race-sex Fall 2018.xlsx...
- Data_3-5-2020 (1)

Data_3-5-2020 (1)

UnitID	Institution Name	Grand total men (EF2018A)
100812	Athens State University	
100858	Auburn University	
101189	Faulkner University	
101462	J. F. Drake State Community and Technical College	
102049	Samford University	

The data in the preview has been truncated due to size limits.

Load Transform Data Cancel

The “Transform Data” option opens the Power Query Editor.

You can edit your data at this point, or click “Load” to complete the import and open the Query Editor later if you need to.

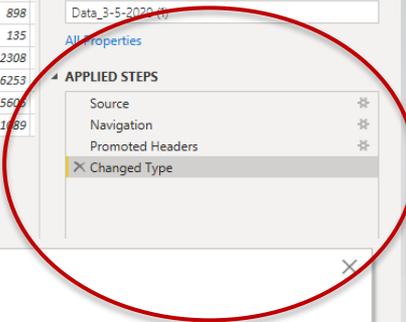
Power Query Editor

The screenshot shows the Power Query Editor interface. The main data table has columns: UnitID, Institution Name, Grand total men (EF2018A Full-time students Undergraduate...), and Grand total women (EF2018A Full-time students Undergradu...). A context menu is open over the 'Athens State University' cell in the 'Institution Name' column, with 'Replace Values...' selected. A 'Replace Values' dialog box is open, showing 'Athens State University' in the 'Value To Find' field and an empty 'Replace With' field. The 'APPLIED STEPS' pane on the right shows 'Changed Type' selected. A red circle highlights this pane. A red arrow points from the text 'Click for dropdown options' to the 'UnitID' column header. Another red arrow points from the text 'Right click cell to edit' to the 'Athens State University' cell.

UnitID	Institution Name	Grand total men (EF2018A Full-time students Undergraduate...)	Grand total women (EF2018A Full-time students Undergradu...)
1	Athens State University	356	849
2	Auburn University	11341	11119
3	Faulkner University	687	898
4	J. F. Drake State Community and Technical College	177	135
5	Samford University	1145	2308
6	The University of Alabama	13333	16253
7	Troy University	3556	5605
8	University of West Alabama	747	1189

Click for dropdown options

Right click cell to edit



Power Query Editor

ALAIR PBI Demo - Power Query Editor

File Home Transform Add Column View Help

Close & Apply Close New Source New Query Recent Sources Enter Data Data source settings Data Sources Manage Parameters Parameters Refresh Preview Query Properties Advanced Editor Manage Choose Columns Manage Columns Remove Columns Remove Rows Reduce Rows Sort Split Column Group By Data Type: Whole Number Use First Row as Headers Merge Queries Append Queries Combine Files Combine Replace Values Transform

Queries [2]
Data_3-5-2020
Data_3-5-2020 (1)

UnitID	Institution Name	Grand total men	Grand total women	American Indian or A...	American In
1	100812 Athens State University			2	
2	100858 Auburn University			41	
3	101189 Faulkner University			2	
4	101462 J. F. Drake State Community and Technical College			3	
5	102049 Samford University			1	
6	100751 The University of Alabama			40	
7	102368 Troy University			15	
8	101587 University of West Alabama			5	

Right click column for options

- Copy
- Remove
- Remove Other Columns
- Duplicate Column
- Add Column From Examples...
- Remove Duplicates
- Remove Errors
- Change Type
 - Decimal Number
 - Fixed decimal number
 - Whole Number
 - Percentage
 - Date/Time
 - Date
 - Time
 - Date/Time/Timezone
 - Duration
 - Text
 - True/False
 - Binary
 - Using Locale...
- Transform
 - Replace Values...
 - Replace Errors...
- Group By...
- Fill
- Unpivot Columns
- Unpivot Other Columns
- Unpivot Only Selected Columns
- Rename...
- Move
- Drill Down
- Add as New Query

Power Query Editor

A screenshot of the Power Query Editor interface. The main window displays a table with columns for 'Institution Name', 'Grand total men (EF2...', and 'Grand total women (...'. The 'Institution Name' column is selected, and a context menu is open. The 'Transform' option is highlighted, and its sub-menu is displayed, showing various text transformation options: lowercase, UPPERCASE, Capitalize Each Word, Trim, Clean, Length, JSON, and XML. These options are circled in red.

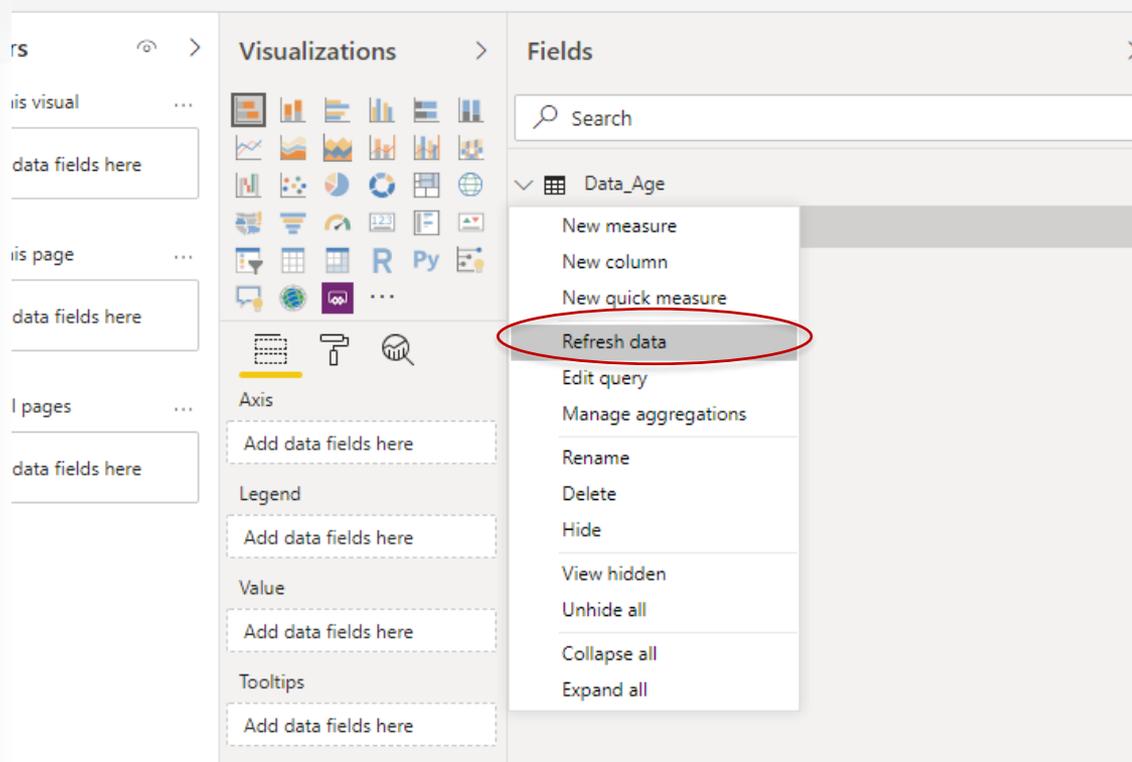
Institution Name	Grand total men (EF2...	Grand total women (...
tate University	356	
University	11341	11
University	687	
e State Community a	177	
University	1145	2
ersity of Alabama	13333	16
ersity	3556	5
y of West Alabama	747	1

A screenshot of the Power Query Editor interface. The main window displays a table with columns for 'total men (...', 'American Indian or A...', and 'American Indian or A...'. The 'total men (...' column is selected, and a context menu is open. The 'Transform' option is highlighted, and its sub-menu is displayed, showing various numeric transformation options: Round, Absolute Value, Factorial, Base-10 Logarithm, Natural Logarithm, Power, Square Root, and Text Transforms. The 'Text Transforms' sub-menu is also open, showing text transformation options: lowercase, UPPERCASE, Capitalize Each Word, Trim, Clean, and Length. These options are circled in red.

total men (...	American Indian or A...	American Indian or A...
2	15	
41	41	
2	2	
3	0	
1	4	
40	63	
15	29	
5	3	

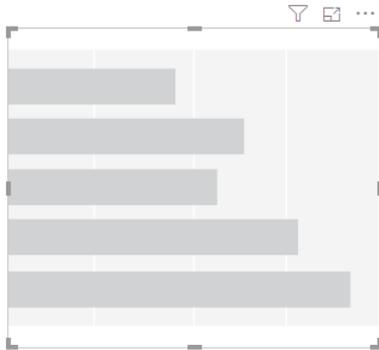
Transformation options are automatically different for text and numeric variables

Power Query Editor



You can also edit your data outside of PBI, then right click on the dataset and select “Refresh data”. As long as the path is still valid, any changes will update on your visualizations.

Visualizations

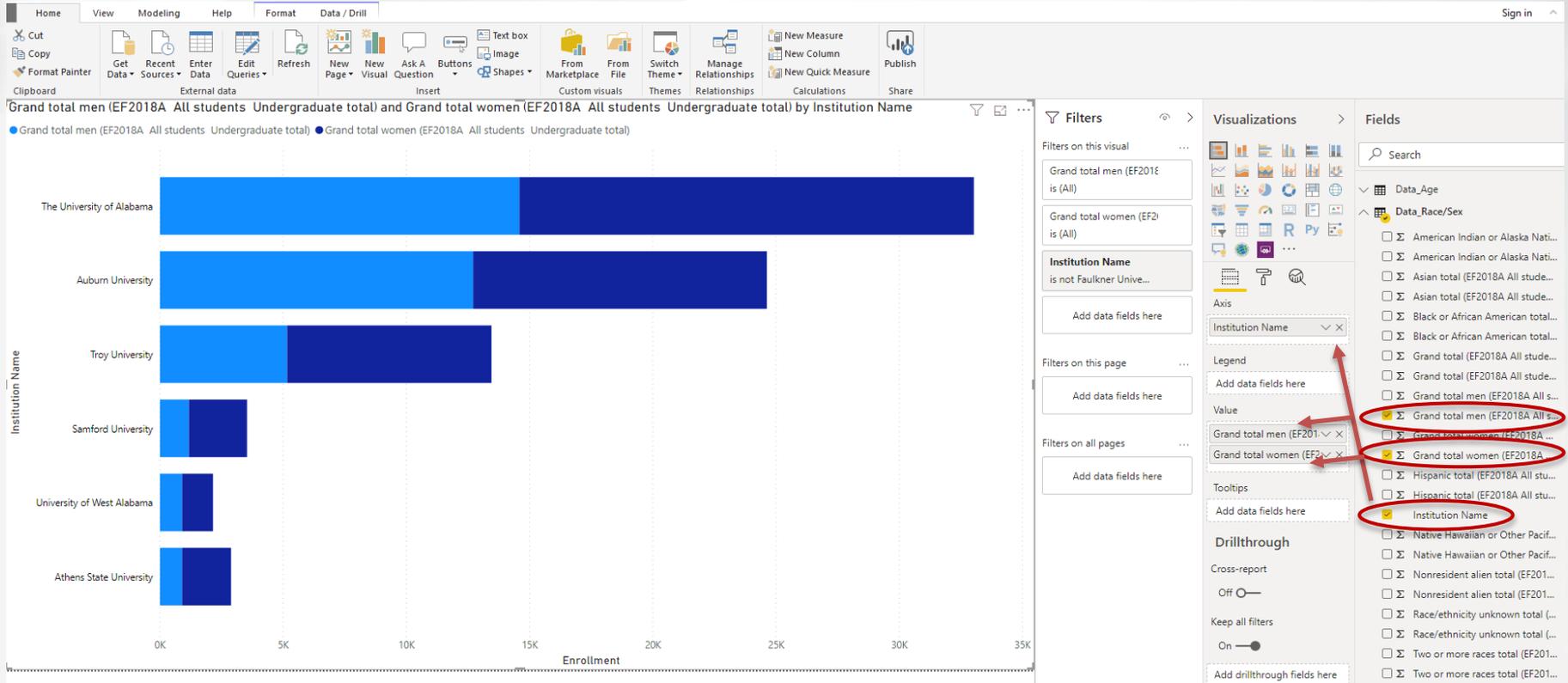


The screenshot shows the PBI interface with three main panes: Filters, Visualizations, and Fields. The Filters pane has three sections: 'Filters on this visual', 'Filters on this page', and 'Filters on all pages', each with an 'Add data fields here' button. The Visualizations pane has a grid of visualization icons, followed by sections for 'Axis', 'Legend', 'Value', 'Tooltips', 'Drillthrough', 'Cross-report', and 'Add drillthrough fields here'. The Fields pane has a search bar and a list of fields under 'Data_Age', including 'Grand total (EF2018B Graduate Age 18-19)' through 'UnitID'. A red arrow points from the 'Legend' section in the Visualizations pane to the 'Add data fields here' button in the Legend section.

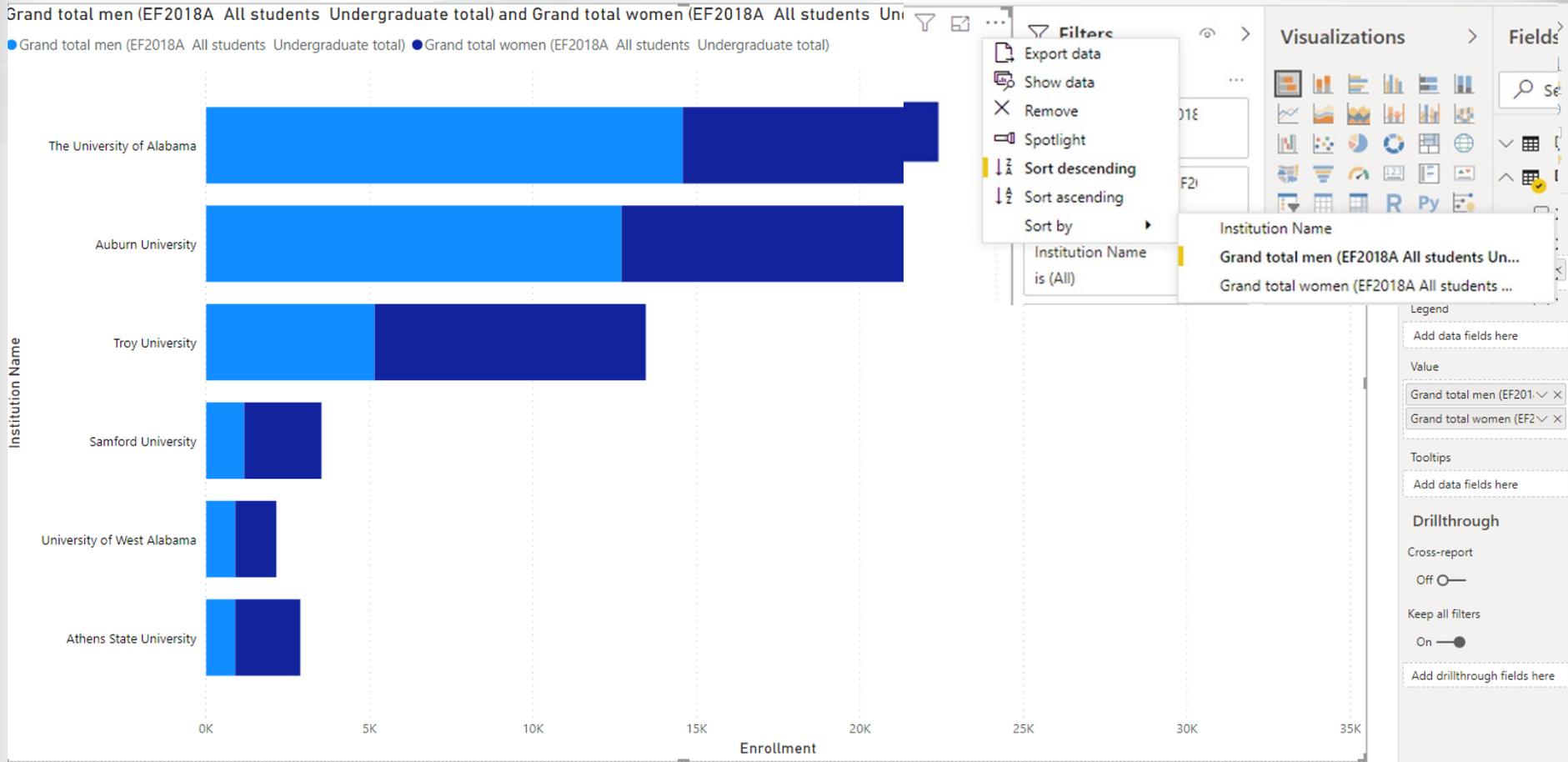
An empty dummy graph appears in your workspace when you choose a visualization.

Drag and drop variables from the Fields section onto the empty graph or into the appropriate section on the Visualizations pane. PBI will do nothing if you try to drop a variable into a section that requires another data type.

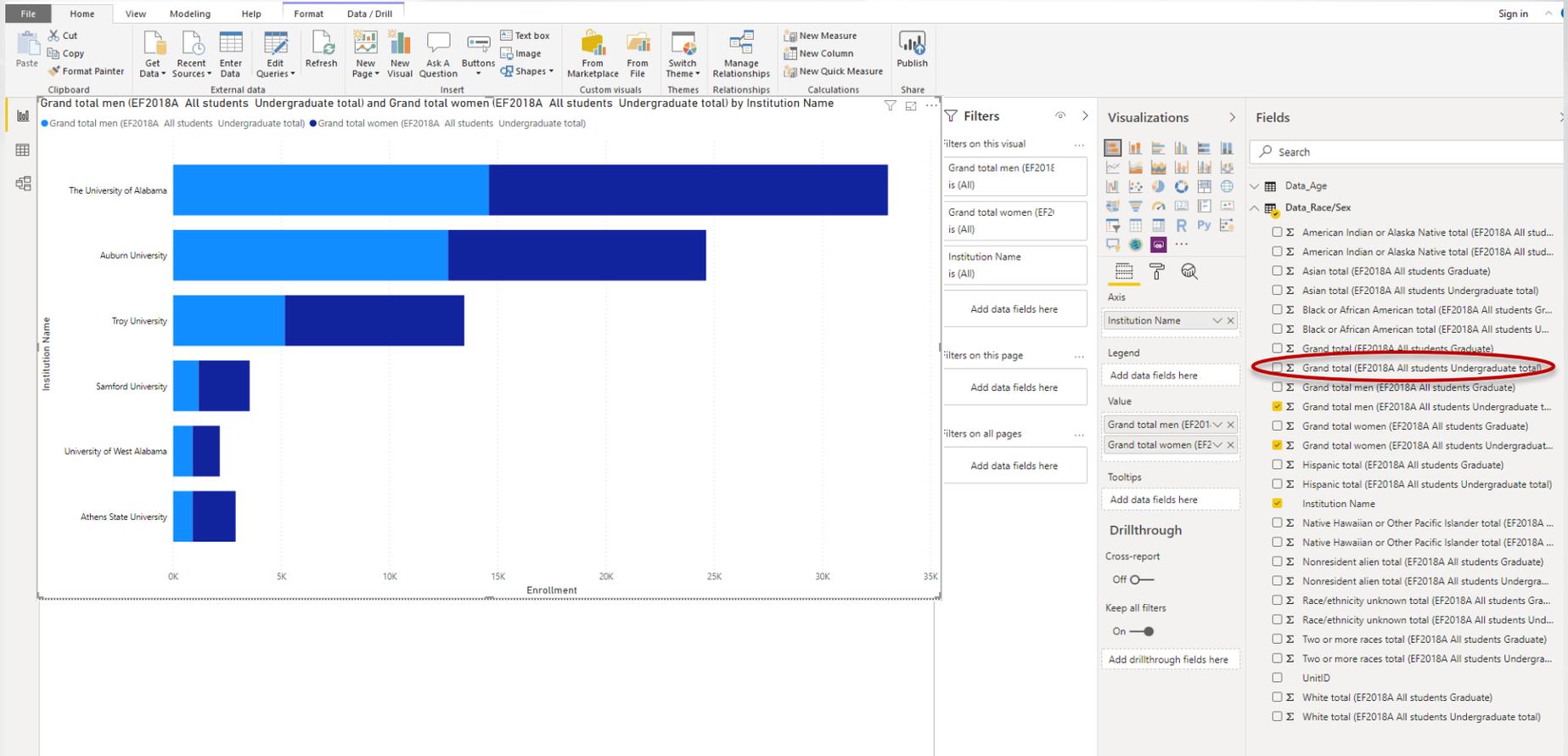
Visualizations



Visualizations



Visualizations

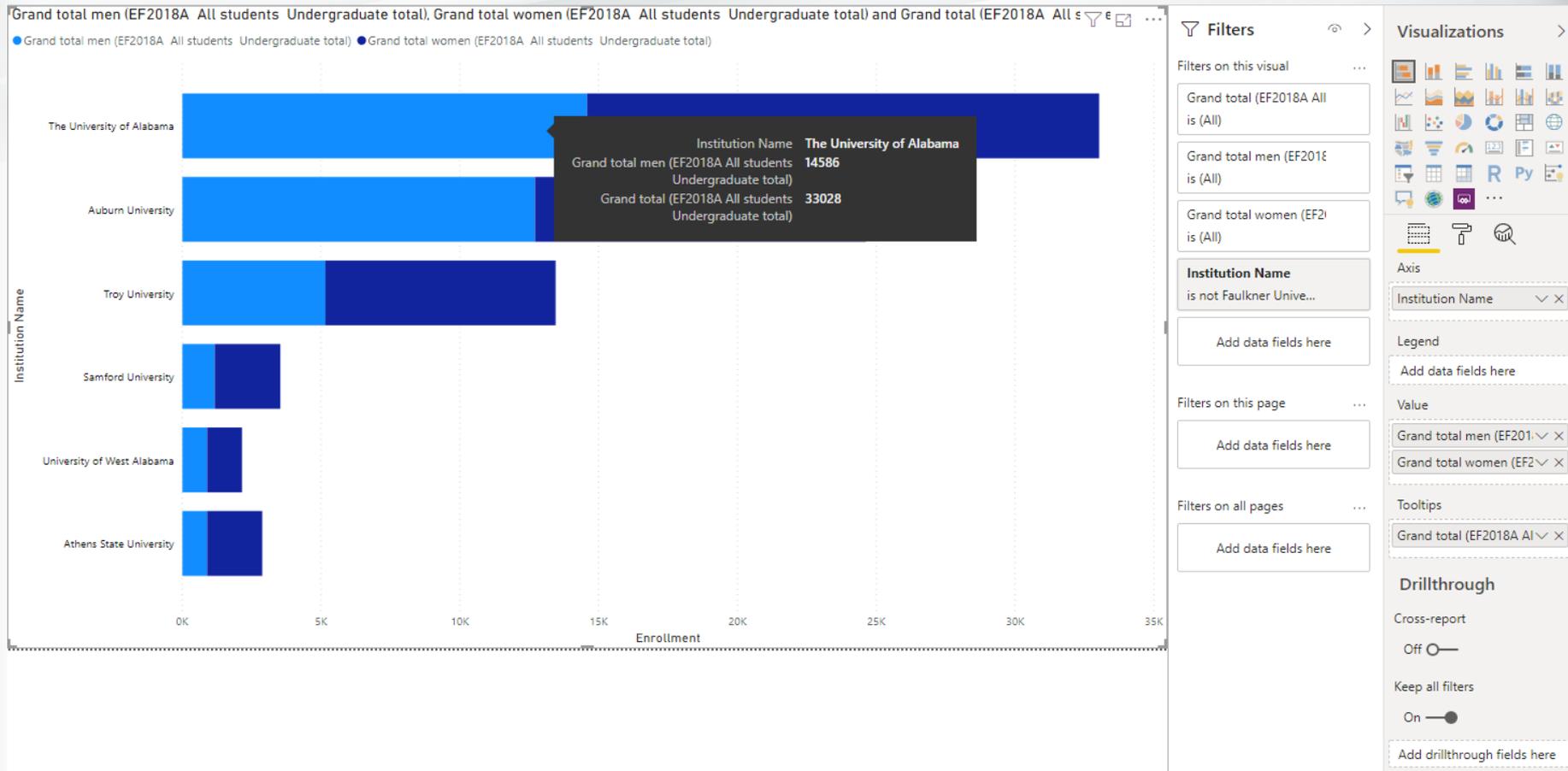


Visualizations

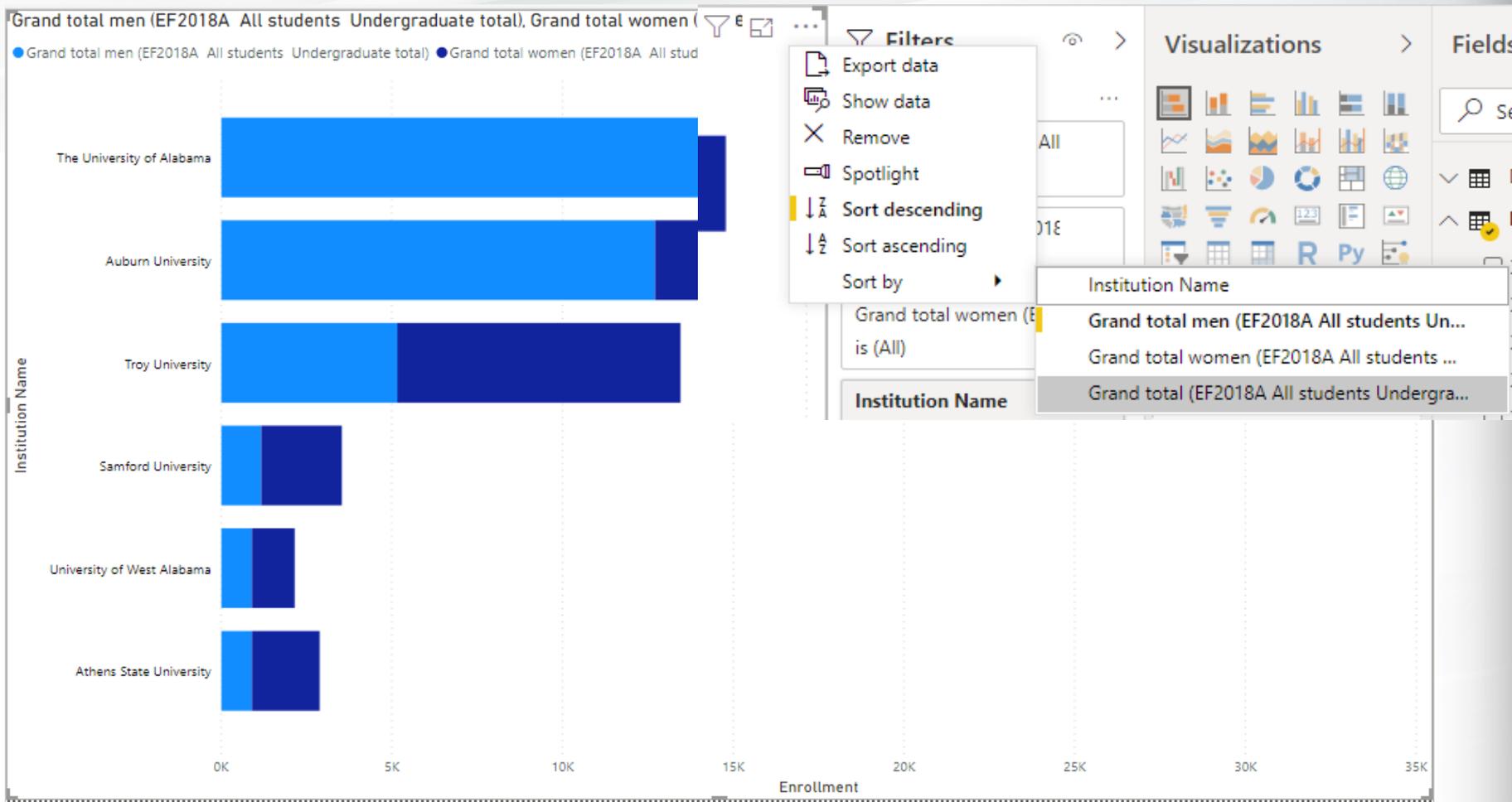
The screenshot displays a data visualization tool interface with three main panels: Filters, Visualizations, and Fields.

- Filters Panel:** Contains three filter sections: "Filters on this visual" (Grand total men (EF2018 All students Undergraduate total) is (All), Grand total women (EF2018 All students Undergraduate total) is (All), Institution Name is (All)), "Filters on this page" (Add data fields here), and "Filters on all pages" (Add data fields here).
- Visualizations Panel:** Shows visualization icons at the top. Below, it has sections for Axis (Institution Name), Legend (Add data fields here), Value (Grand total men (EF2018 All students Undergraduate total), Grand total women (EF2018 All students Undergraduate total)), Tooltips (Add data fields here), Drillthrough, Cross-report (Off), and Keep all filters (On).
- Fields Panel:** Contains a search bar and a list of fields under "Data_Race/Sex". A red circle highlights the field "Grand total (EF2018 All students Undergraduate total)". A red arrow points from this field to the "Value" section in the Visualizations panel.

Visualizations



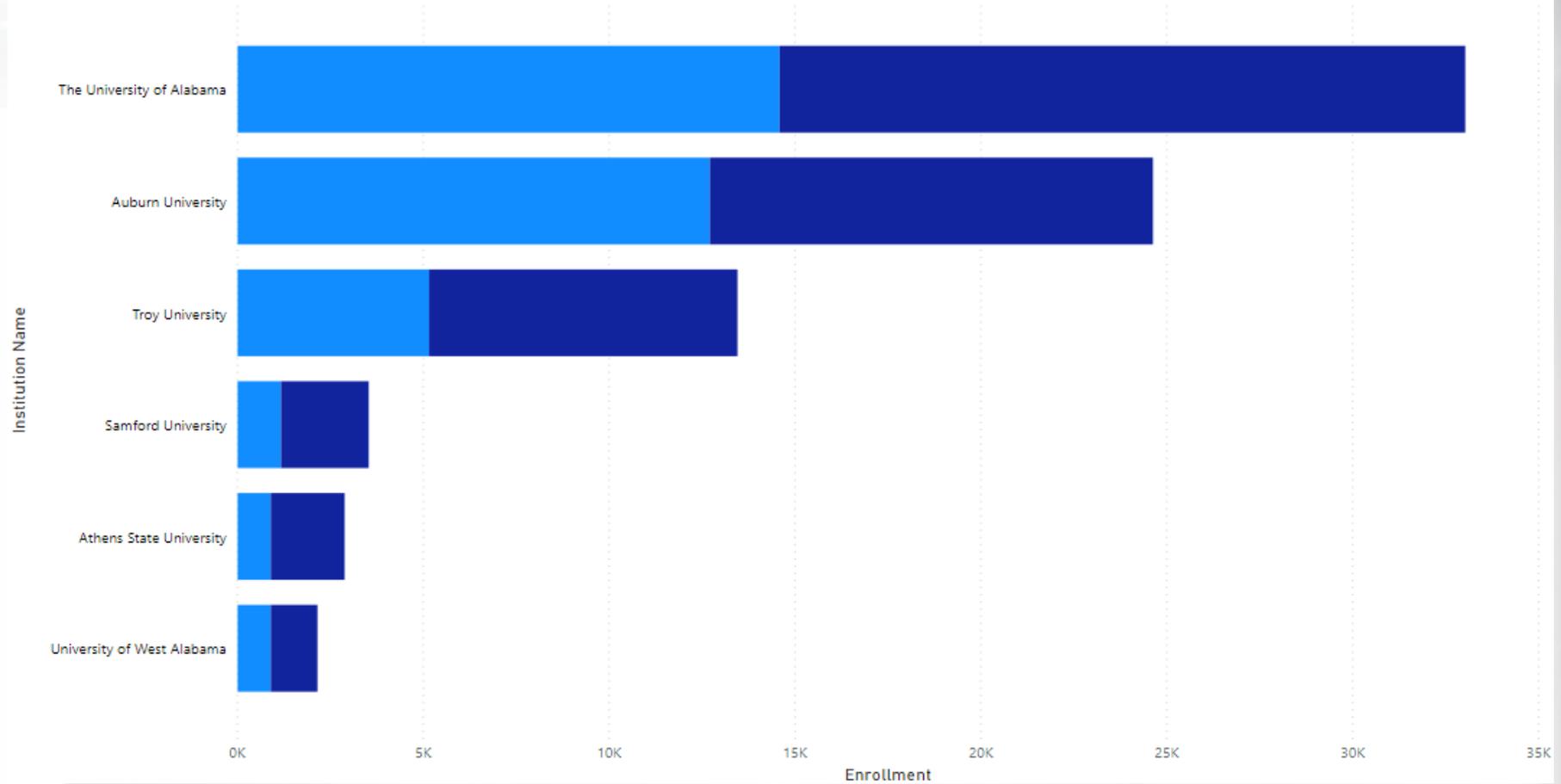
Visualizations



Visualizations

Grand total men (EF2018A All students Undergraduate total), Grand total women (EF2018A All students Undergraduate total) and Grand total (EF2018A All students Undergraduate total)   ...

● Grand total men (EF2018A All students Undergraduate total) ● Grand total women (EF2018A All students Undergraduate total)



Visualizations

Visualizations >



Format



Axis

Institution Name

Legend

Add data fields here

Value

Grand total men (EF2018A All students Undergraduate total)

Grand total women (EF2018A All students Undergraduate total)

Tooltips

Grand total (EF2018A All students Undergraduate total)



Search

General

Legend

Y axis

X axis

Data colors

Data labels

Plot area

Title

Background

Lock aspect

Border

Tooltip

Visual header

Visualizations

The image shows a settings interface for a visualization tool, divided into two panes. The left pane contains general chart settings, and the right pane contains title-specific settings. A red arrow points from the 'X axis' toggle in the left pane to the 'Title' toggle in the right pane.

Left Pane Settings:

- Search: [Search]
- X axis: On
- Data colors: []
- Data labels: Off
- Plot area: []
- Title: On
- Title text: Fall 2018 Enrollment by Sex
- Word wrap: Off
- Font color: [Black]
- Background color: [White]
- Alignment: [Left]
- Text size: 14 pt
- Font family: DIN

Right Pane Settings:

- Color: [Black]
- Text size: 9 pt
- Font family: Segoe UI
- Display units: Auto
- Value decimal places: Auto
- Title: On
- Style: Show title only
- Title color: [Black]
- Axis title: Enrollment
- Title text size: 12 pt

Revert to default

Visualizations

☰ 🔧 🔍

🔍 Search

∨ General

∨ Legend On

∧ Y axis On

Position
Left

Color
■

Text size
9 pt

Font family
Segoe UI

Minimum category width
20

Maximum size
25 %

Inner padding
20 %

Title
On

Visualizations

The image shows a configuration menu for a visualization. At the top, there are three icons: a grid, a hand, and a magnifying glass. Below them is a search bar with the text "Search". The menu is organized into sections: "General", "Legend", "Y axis", and "X axis", each with a dropdown arrow and a toggle switch set to "On". The "Data colors" section is expanded, showing a dropdown menu with a blue square. Below this, there are two more dropdown menus, one labeled "Grand total" and another partially visible "Grand tota". A color picker is open, displaying a grid of "Theme colors" and "Recent colors". The "Custom color" section is active, showing a color wheel and a text input field with the hex code "#12239E". A "Revert to default" button is at the bottom of the color picker. To the right of the color picker is a large, vibrant rainbow gradient square. Below the gradient square is a text input field with the hex code "#12239E" and a "Back" button.

Visualizations

^ Data colors

Grand total men (EF2018A All students Undergraduate total)

Grand total women (EF2018A All students Undergraduate total)



Revert to default

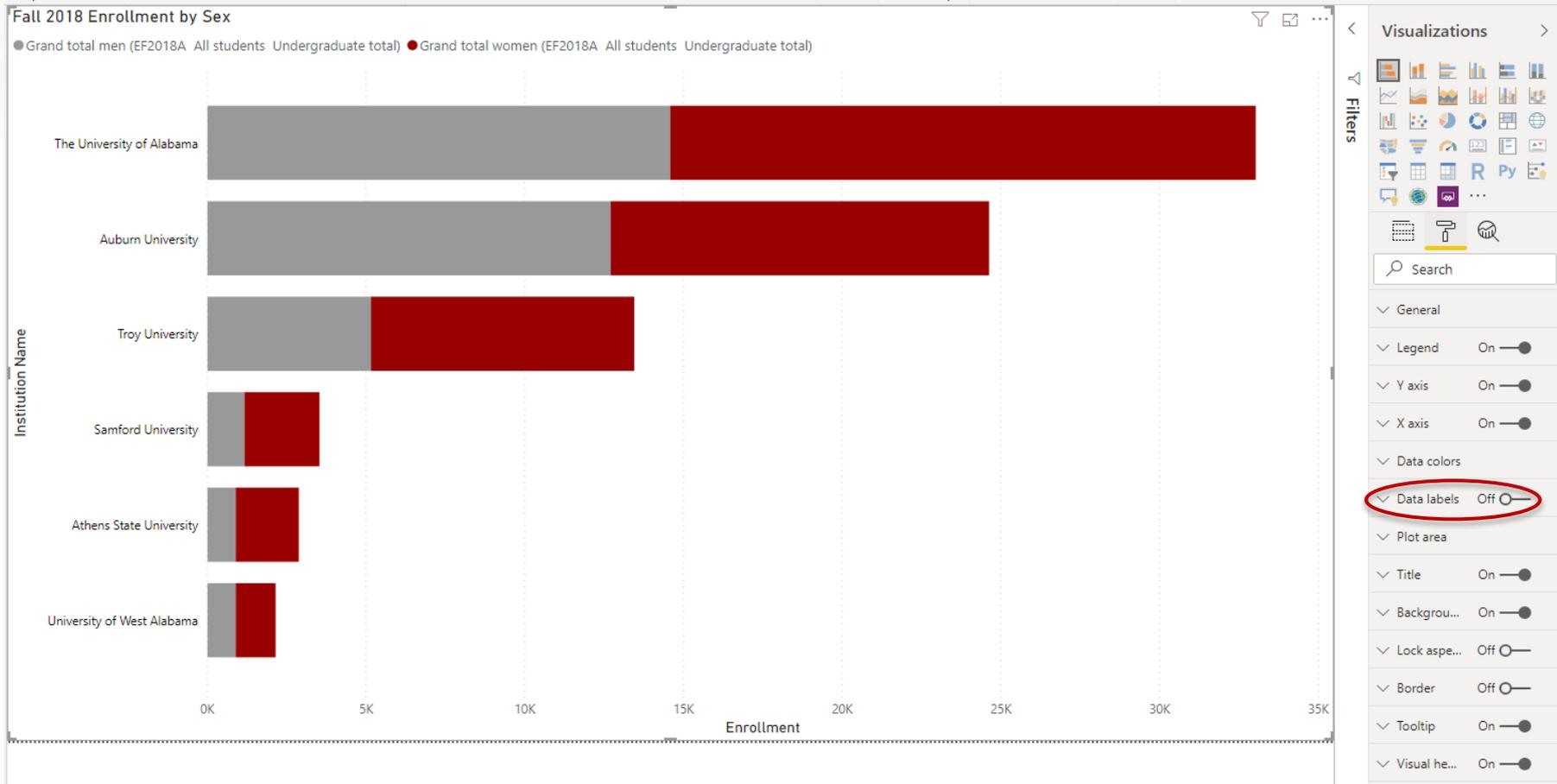
Off

On

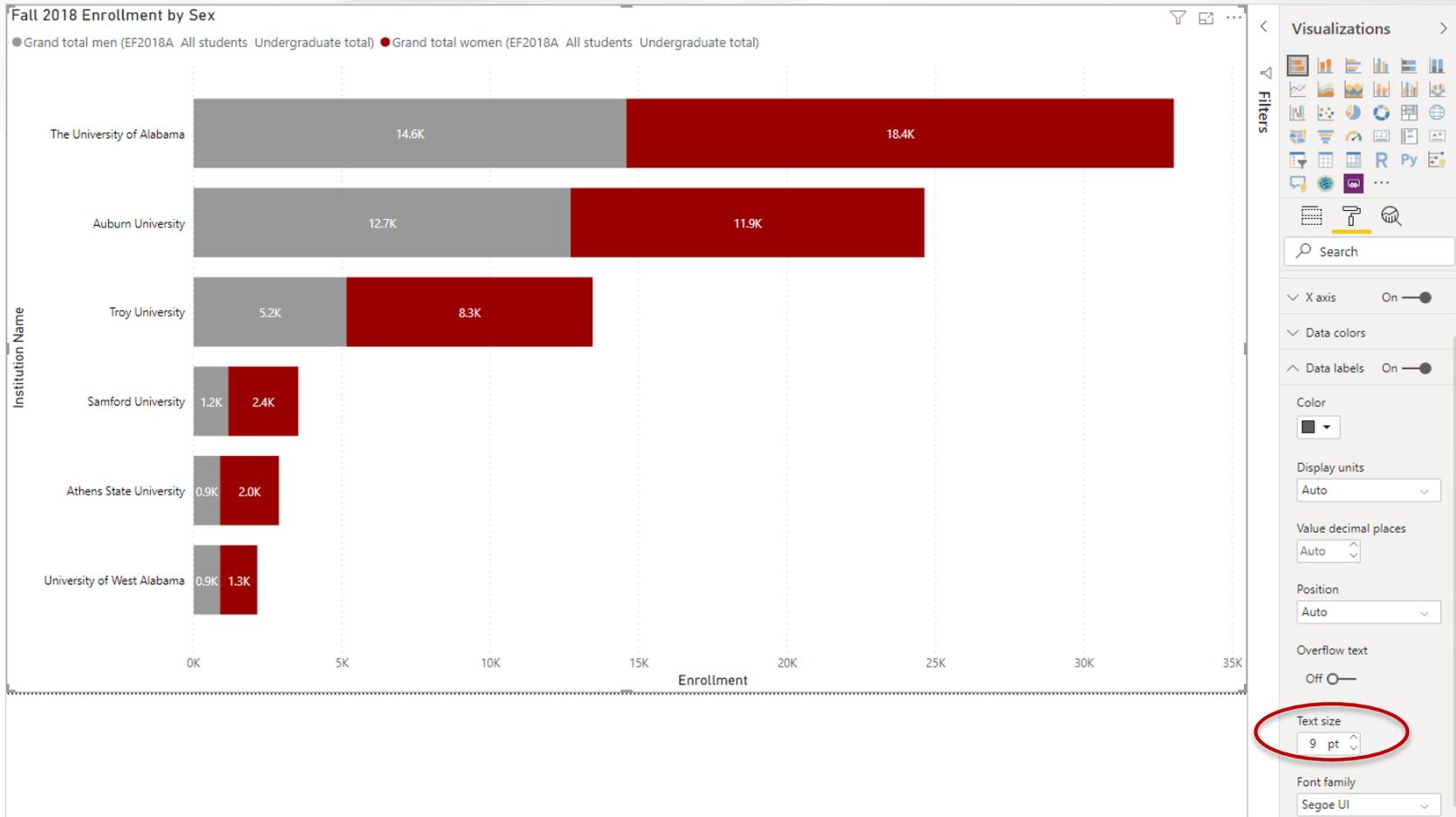
On

990000 | Back

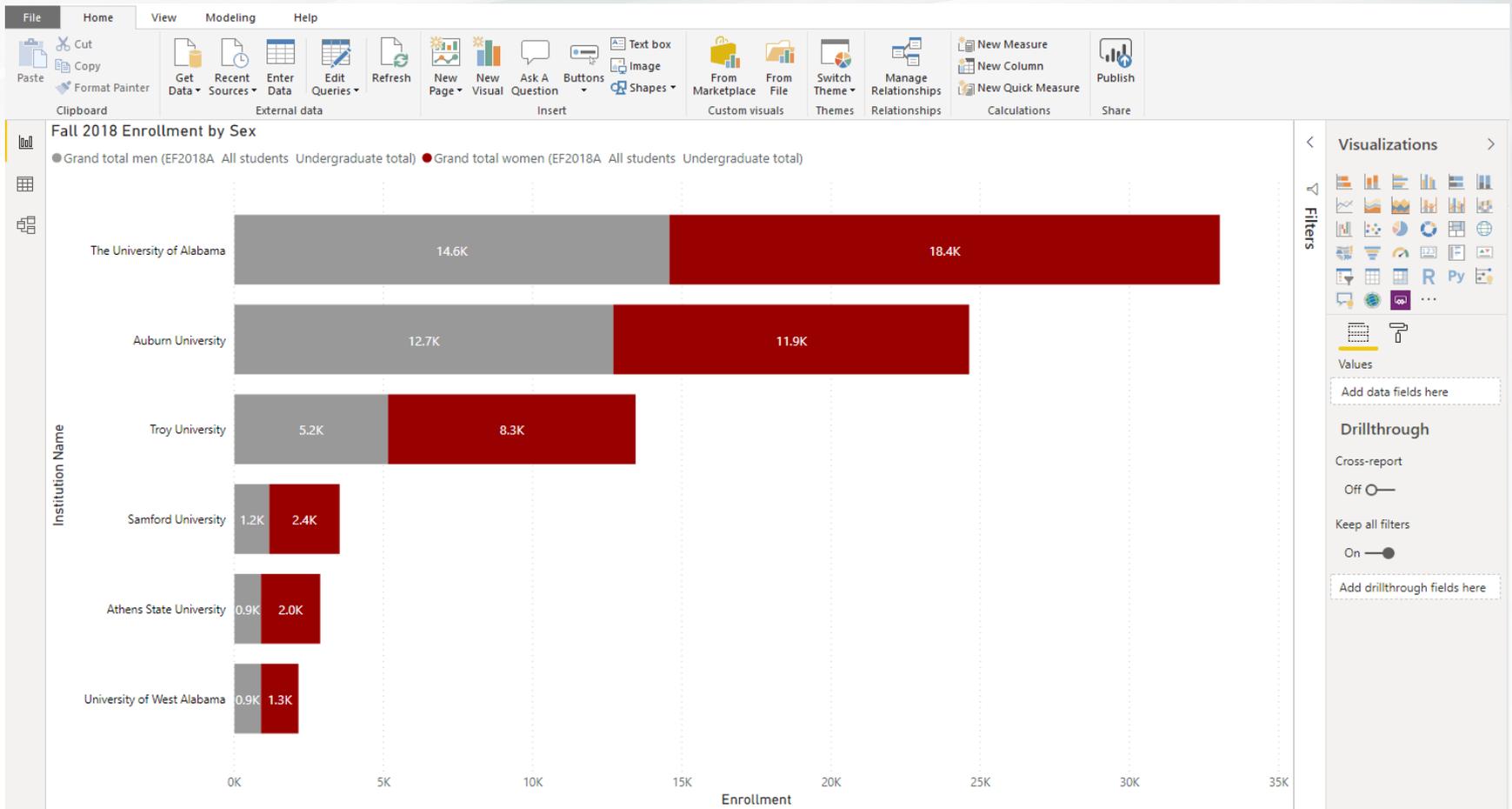
Visualizations



Visualizations



Visualizations



Visualizations

The screenshot displays the Power BI Desktop interface. On the left, the 'File' menu is open, showing options like 'New', 'Open', 'Save', 'Export to PDF', and 'Exit'. The 'Recent items' list includes several .pbix files. The main workspace shows a bar chart with red bars. A dialog box titled 'Export to PDF' is overlaid on the chart, with the message 'Generating a PDF of your report ...' and a 'Cancel' button. The top ribbon shows various visualization and data manipulation options.

File

Recent items

- 1 ALAIR PBI Demo.pbix
- 2 USNW Peer Group Graduation Rate.pbix
- 3 USNW Select Peer Group.pbix
- 4 USNW Select Peer Group Expenditures.pbix
- 5 Enrollment Changes.pbix
- 6 USNW Power BI test.pbix
- 7 USNW All Schools Class Size & Faculty Degrees...
- 8 USNW Select Group Class Size & Faculty Degre...
- 9 USNW Select Group Class Size & Faculty Degre...

Export to PDF

Generating a PDF of your report ...

Cancel

Filters

Filters on this page

Add data fields here

Filters on all pages

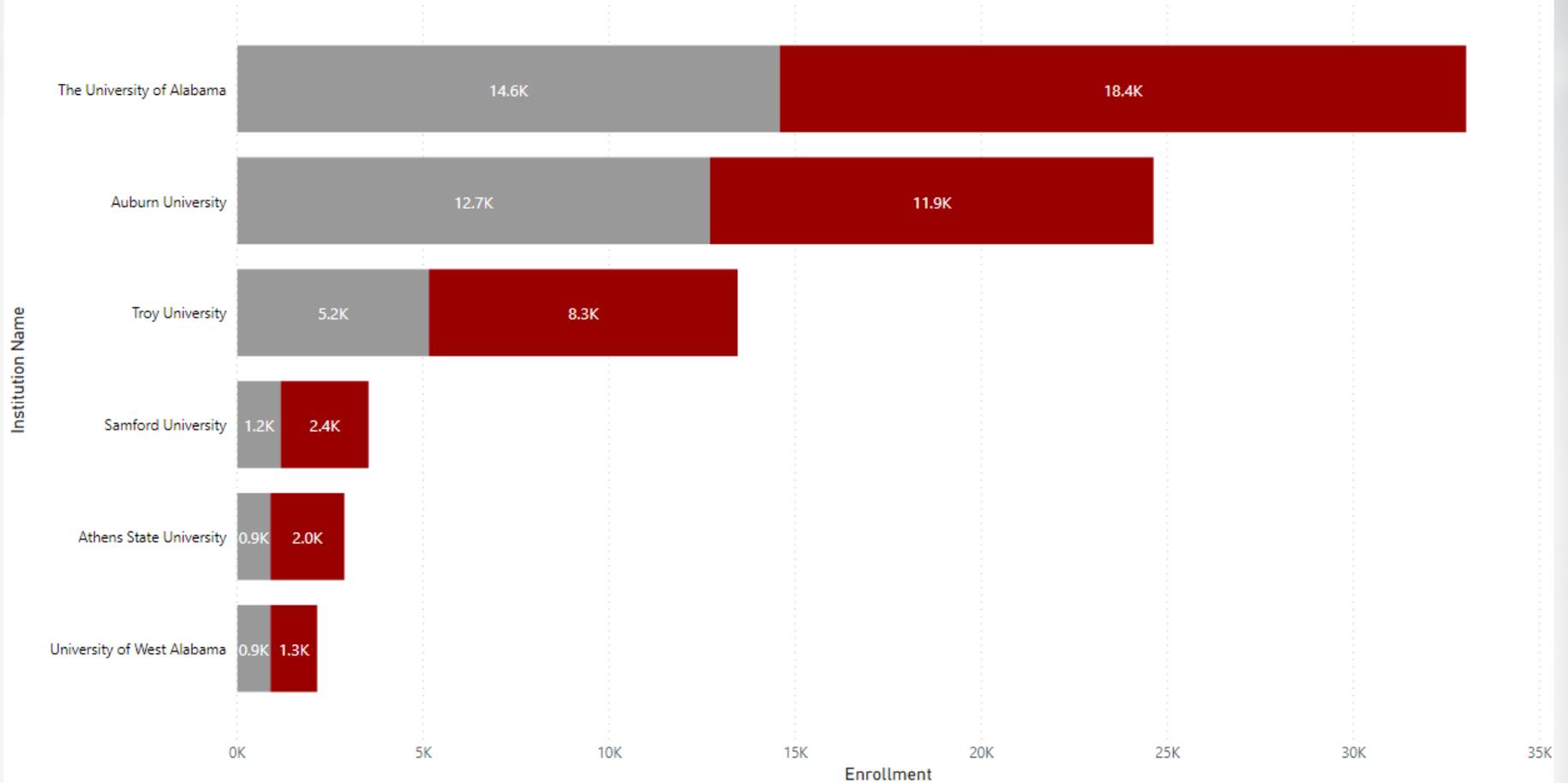
Add data fields here

Enrollment

All done!

Fall 2018 Enrollment by Sex

● Grand total men (EF2018A All students Undergraduate total) ● Grand total women (EF2018A All students Undergraduate total)



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- Power BI Service
 - Power BI Premium (~\$5,000/month)
 - Online cloud-based Software as a Service
- Power BI Mobile Apps
 - Viewer for Windows, iOS, and Android devices

Power BI Desktop

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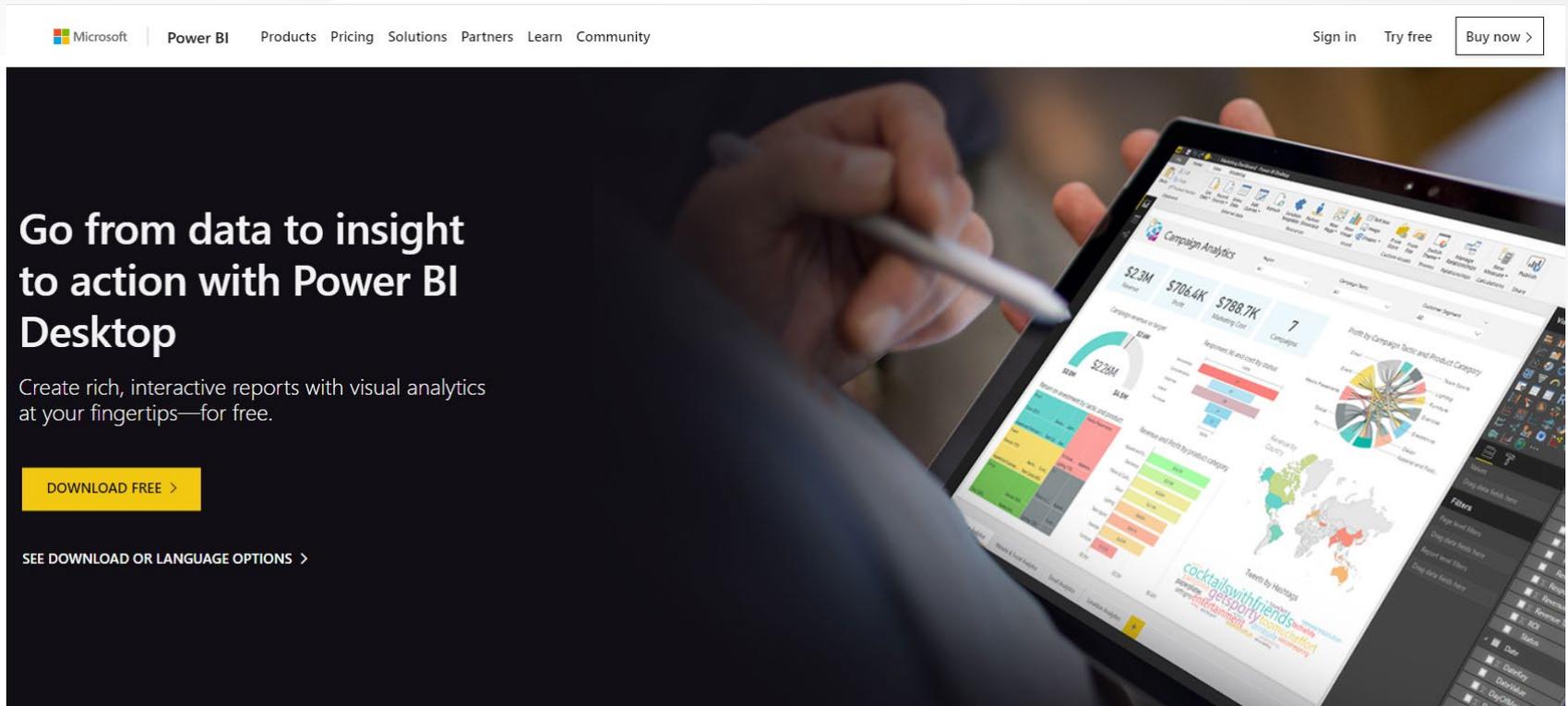
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