

Creating Custom Visuals within Power BI

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Please install Power BI and download the workshop file if you haven't already!

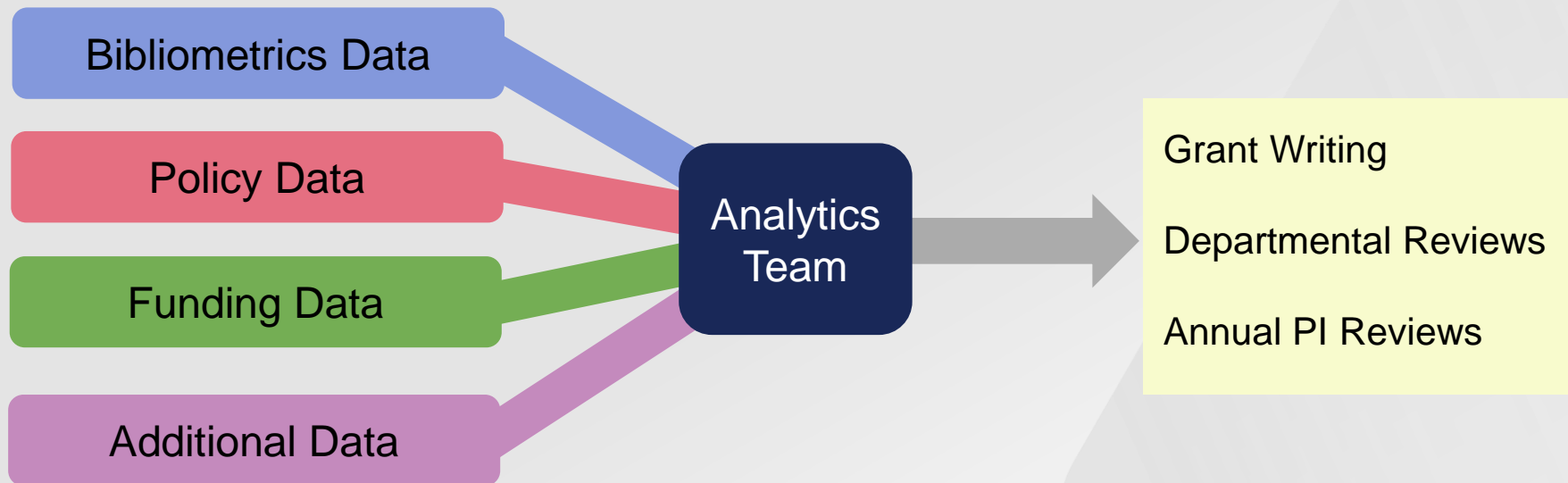
12:00 – 1:20	Lunch & Posters
1:20 – 1:40	<i>An Analysis of Undeclared Artificial Intelligence and the Communication Practices of Academic Journals</i> , Miles Kenyon, University of Toronto
1:40 – 2:00	<i>The Great Convergence: Where GenAI, Expertise, Fundraising Connect</i> , Dieyun Song, Northwestern University
2:00 – 2:40	<i>Creating Custom Visuals within Power BI</i> , Brian Wu, University Health Network **Download Power BI and this file to follow along.

Presentation Outline

-  Research Analytics at UHN
-  The Utility of PowerBI
-  Introduction to Deneb
-  Workshop Portion!

Research Analytics at UHN

Support decision making across UHN



The Power of Power BI

Power BI is a visualization software that is used by data professionals to create dashboards and reports.



Integrates data from different sources (SharePoint, Excel, etc.)



Easy Visuals



Interactive Insights



Big Data Handling



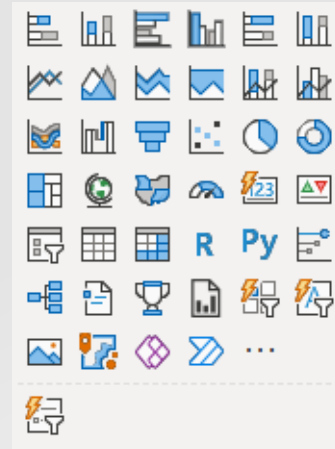
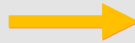
Advanced Analytics

Customization beyond Power BI: Deneb

PowerBI is limited to stock visuals and doesn't allow for precise customization

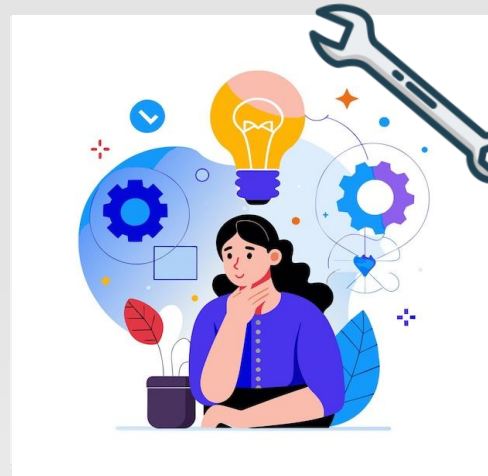
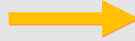


Power BI



Customization beyond Power BI: Deneb

PowerBI is limited to stock visuals and doesn't allow for precise customization



Disadvantages of Deneb

- Steep learning curve if you don't have front-end programming experience
- Sensitive to the limitations of JSON formatting

Deneb Background

Visuals are written in Vega or Vega-lite visualization grammar in JSON format

```
"data": {"name": "dataset"},
"bounds": "flush",
"spacing": 15,
"mark": {
  "type": "area",
  "fillOpacity": 0.7,
  "strokeOpacity": 1,
  "strokeWidth": 1,
  "interpolate": "monotone"
},
"resolve": {
  "scale": {"y": "independent"}
},
"width": 700,
"height": 80,
"encoding": {
```

One piece of “coding” to remember!

Parameters are defined like below:

“Parameter” : Value
 ↓ ↓
“Width” : 700

Thankfully, templates can be imported from online to save a large portion of the coding!

Workshop



5 minutes to install Power BI and open up the Power BI file!

Workshop Outline



Overview of the data



Workflow overview



Workflow demo



Walkthrough of Deneb Interface



Common Customization Options

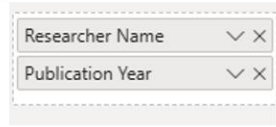
Overview of the data

^A ₁₂₃ Researcher ID	^A _C Researcher Name	¹ ₂₃ Paper ID	¹ ₂₃ Publication Year	² ₃ Citation %ile in Area	^A _C International Country Collaborator	^{1.2} Int. Country Long.	^{1.2} Int. Country. Lat.
	Reese	827	2021	38	Portugal	40.957	-7.9373
	Reese	824	2005	54	Peru	-12.664	-72.98
	Reese	832	2024	46	Peru	-12.664	-72.98
	Reese	817	2018	79	Australia	-24.578	133.582
	Reese	835	1984	80	Portugal	40.957	-7.9373
	Reese	821	1984	35	Brazil	-11.694	-48.978
	Reese	829	1980	44	Mexico	22.925	-101.68
	Reese	841	1992	66	Australia	-24.578	133.582
	Reese	822	2006	70	Mexico	22.925	-101.68

Template Workflow



ChatGPT



Find a Deneb Template that you like online

Ask a GenAI what variables/fields are needed for this template to work using a standardized prompt

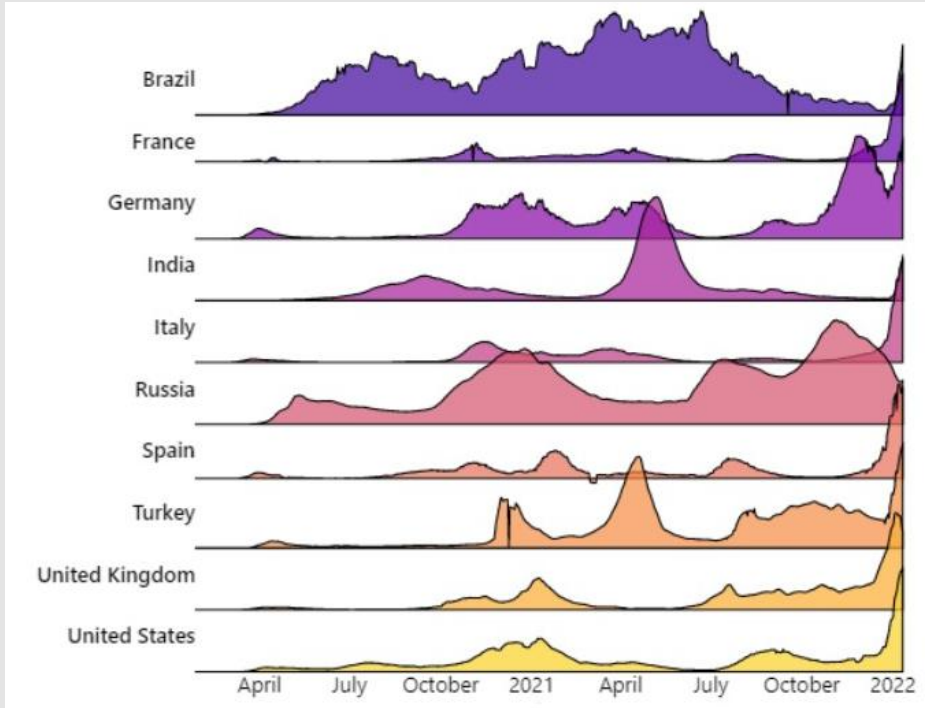
Open up PowerBI and create a new Deneb Visual

Import the fields you'd like to visualize, format, and rename them based on the GenAIs feedback

Select Vega or Vega-lite. Copy and paste the template into the Deneb specification and run

Make modifications as necessary

1. Find a Deneb Template Online



We will be using this template to plot the number of publications over time for 5 researchers

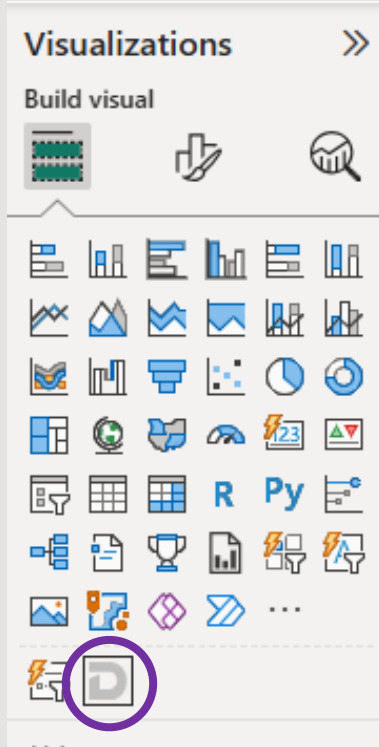
[Template Link](#)

2. Use a standardized prompt to ask the GenAI how to map the variables in the script to the variables in your dataset

I want to create a visual off of a template in PowerBI using Deneb. If I'm using the attached code below. What variables will I need to import into my Deneb visual and what should they be named as?

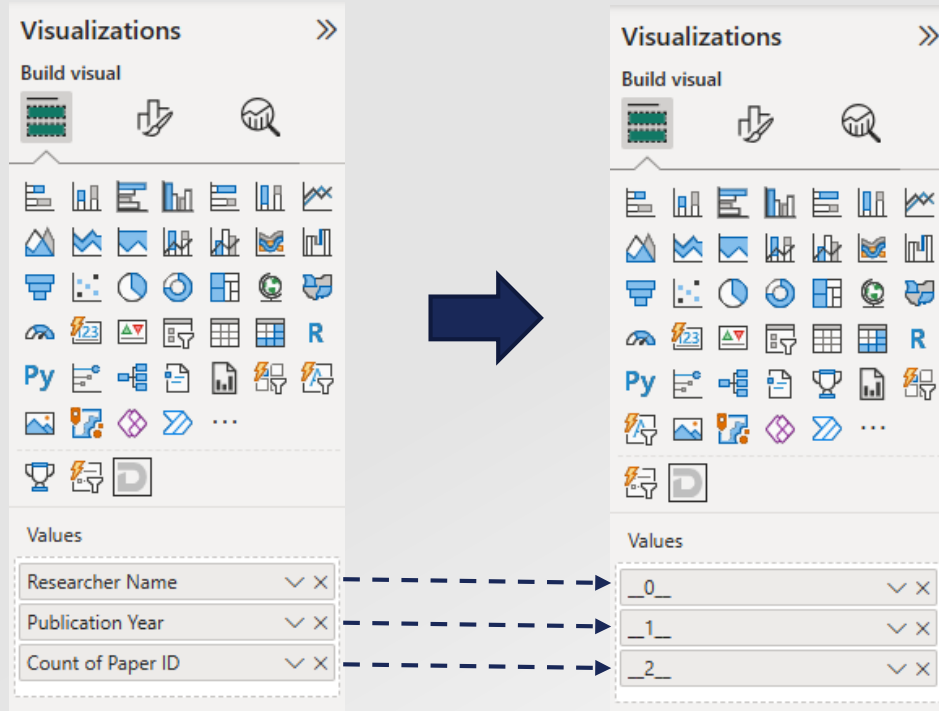
Pasted Deneb Code

3. Open up Power BI and create a new Deneb Visual

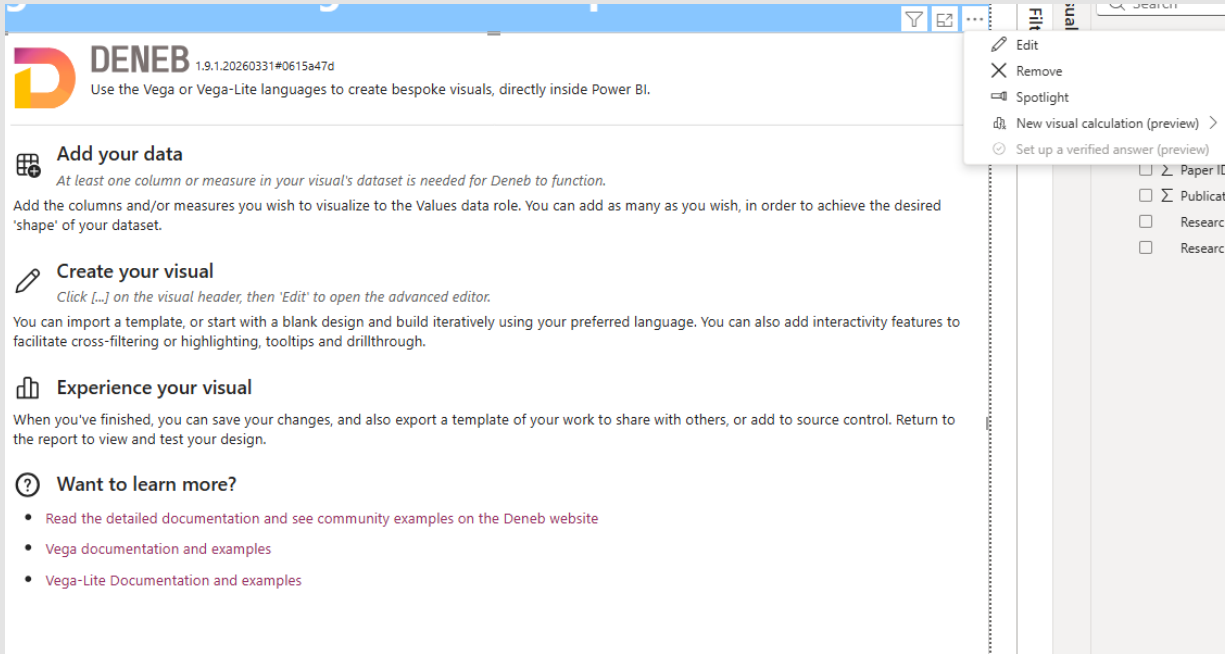


Note. If you're not using the Power BI file I provided, you'll have to import Deneb from the Power BI store

4. Import the data fields and format/rename them based on the GenAIs feedback



5a. Go to the editor



The screenshot shows the Deneb editor interface. At the top left, the Deneb logo is displayed with the version number 1.9.1.20260331#0615a47d and the text "Use the Vega or Vega-Lite languages to create bespoke visuals, directly inside Power BI." Below this, there are three main sections: "Add your data", "Create your visual", and "Experience your visual". A context menu is open over the top right corner of the interface, showing options: "Edit", "Remove", "Spotlight", "New visual calculation (preview)", and "Set up a verified answer (preview)".

DENEb 1.9.1.20260331#0615a47d
Use the Vega or Vega-Lite languages to create bespoke visuals, directly inside Power BI.

Add your data
At least one column or measure in your visual's dataset is needed for Deneb to function.
Add the columns and/or measures you wish to visualize to the Values data role. You can add as many as you wish, in order to achieve the desired 'shape' of your dataset.

Create your visual
Click [...] on the visual header, then 'Edit' to open the advanced editor.
You can import a template, or start with a blank design and build iteratively using your preferred language. You can also add interactivity features to facilitate cross-filtering or highlighting, tooltips and drillthrough.

Experience your visual
When you've finished, you can save your changes, and also export a template of your work to share with others, or add to source control. Return to the report to view and test your design.

Want to learn more?

- [Read the detailed documentation and see community examples on the Deneb website](#)
- [Vega documentation and examples](#)
- [Vega-Lite Documentation and examples](#)

First, click the ellipses at the top right and then click edit

5b. Select Vega or Vega-Lite based on your template

In our example, we are using Vega-Lite

Create or import new specification

A specification allows you to create a new design using either Vega or Vega-Lite. You can import an existing template, or create a new Vega-Lite or Vega specification.

Create using...

- Existing template
- Vega-Lite
- Vega

Select your Vega-Lite template

- [empty]
- [empty (with Power BI theming)]
- Simple bar chart
- Interactive bar chart

[empty] by Deneb

Bare-minimum Vega-Lite template, with data-binding pre-populated. Has no additional configuration for styling.

There are no placeholders for this visual. Click the Create button to begin editing the resulting specification.

Create **Close**

5c. Paste the template code in the specification and run



```
1 {
2   "data": {
3     "name": "dataset"
4   },
5   "layer": []
6 }
```

Vega-Lite 6.4.1 Ln 1 Col 1



```
1 {
2   "$schema": "https://vega.github.io/schema/vega-lite/v5.json",
3   "usermeta": {
4     "deneb": {
5       "build": "1.1.0.0",
6       "metaVersion": 1,
7       "provider": "vegaLite",
8       "providerVersion": "5.2.0"
9     },
10    "interactivity": {
11      "tooltip": true,
12      "contextMenu": true,
13      "selection": false,
14      "dataPointLimit": 50
15    },
16    "information": {
17      "name": "Joy Plot Independent Scales",
18      "description": "[No Description Provided]",
19      "author": "Kerry Kolosko",
20      "uuid": "a54446b9-27dd-4587-b1f8-436e7566c141",
21      "generated": "2022-02-05T08:05:33.362Z"
22    },
23    "dataset": [
24      {
25        "key": "_0_",
26        "name": "category",
27        "description": "",
28        "type": "text",
29        "kind": "column"
30      },
31      {
32        "key": "_1_",
33        "name": "date",
34        "description": "",
35        "type": "dateTime",
36        "kind": "column"
37      },
38      {
39        "key": "_2_",
```

Vega-Lite 6.4.1 Ln 142 Col 2

6. Make modifications as necessary

a. To change the x axis to year and rename the x axis

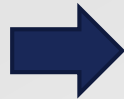
```
"encoding": {  
  "x": {  
    "title": "__1__",  
    "field": "__1__",  
    "type": "temporal"  
  },  
}
```



```
"encoding": {  
  "x": {  
    "title": "Publication Year",  
    "field": "__1__",  
    "type": "nominal",  
    "axis": {  
      "labelPadding": -50  
    }  
  },  
}
```

b. To modify the visual to take up more space if needed

```
"width": 400,  
"height": 20,
```



```
"width": 700,  
"height": 80,
```

Admire your new Deneb Visual!

