

# Tools Seminar

## Week 9 - Visualization

Hongzheng Chen

Mar 23, 2020

- 1 Overview
- 2 Matplotlib
- 3 Draw.io
- 4 TikZ
- 5 Summary

## 1

## Overview

# Visualization\*

Visualization is used to **gain or show insights through data**

- Information visualization
  - not only statistical charts; various visualization forms help to show multi-attributes, topological structure, and complex relationships
  - actually it is a sub-topic of human-computer interaction (HCI) with top-tier conference [CHI](#)
  - good visualizations help your paper to be accepted!
- Scientific visualization
  - a sub-topic of CG
  - emphasizing on realistic renderings of volumes, surfaces, illumination sources, etc.

We will focus on information visualization

---

\*Ref: [https:](https://shellywhen.github.io/Visualization/Outline-Visualization.html#slide=3)

[//shellywhen.github.io/Visualization/Outline-Visualization.html#slide=3](https://shellywhen.github.io/Visualization/Outline-Visualization.html#slide=3)

# Catalog of Information visualization

- Tables
- Bar charts
- Flow charts
- Functions
- Graphs / Networks
- Time series
- Text
- Geo-spacial
- ...

# Tables

The most commonly seen data type

	Col 1	Col 2	Col 3
Row 1			
Row 2			
Row 3			

Tools: Excel, [Tableau](#),  $\text{\LaTeX}$

# Bar Charts

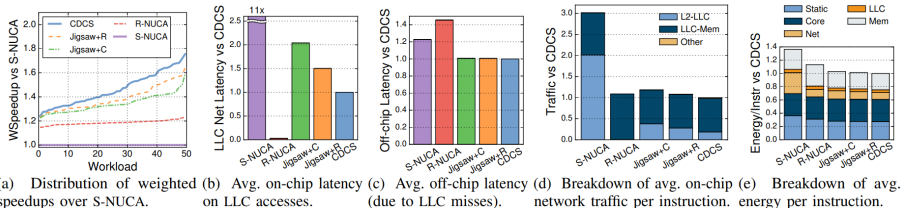


Fig source: Nathan Beckmann, Po-An Tsai, Daniel Sanchez, *Scaling Distributed Cache Hierarchies through Computation and Data Co-Scheduling*, HPCA, 2015

Tools: [Matplotlib](#), [Plotly](#)

\* Pay attention to the figures when you read papers. There exists lots of details!

# Flow charts

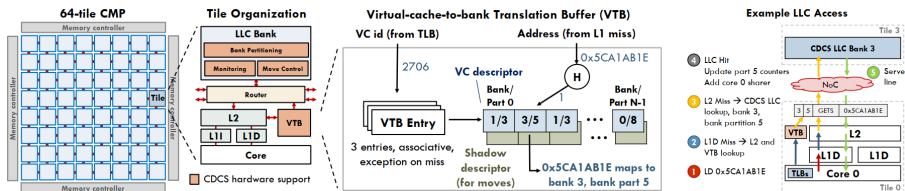
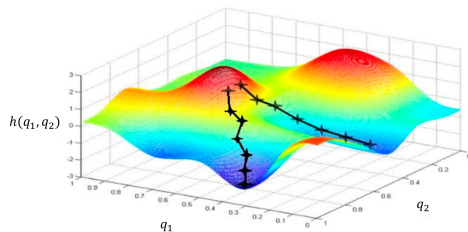
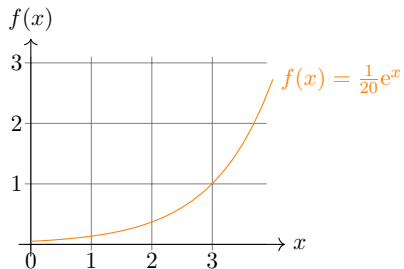


Fig source: Nathan Beckmann, Po-An Tsai, Daniel Sanchez, *Scaling Distributed Cache Hierarchies through Computation and Data Co-Scheduling*, HPCA, 2015

Tools: [Microsoft Visio](#) (enterprise version), [draw.io](#)



# Functions (2D & 3D)



Tools: [Matplotlib](#), [Mathematica](#),  $\text{\LaTeX}$  [TikZ](#)

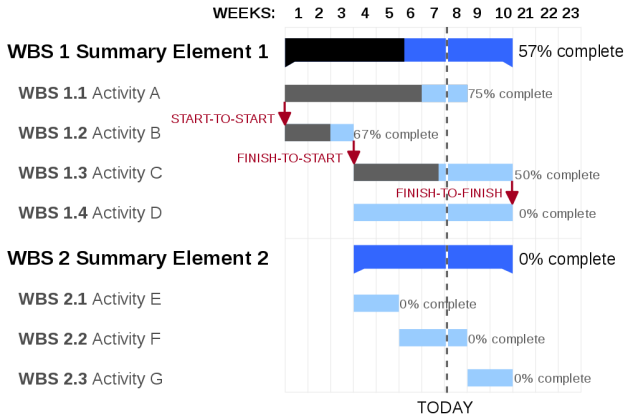
# Graphs/Networks



Fig source: <https://digi.uga.edu/network-graphs/>

- Node-link diagram, tree map, bubble chart
- Tools: [networkx](#),  $\text{\LaTeX}$  [Tikzcd](#),  $\text{\LaTeX}$  [forest](#), [Plotly](#)

# Time Series



- Line graph / Bar charts
- Gantt Chart
- Heat Map: Check your [Github](#) contribution (

## Text



Tools: [WordCloud](#), [Wordle](#), ...

2

# Matplotlib

# Matplotlib

**Matplotlib:** A Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms

```
pip install matplotlib
```

- Use Anaconda to install since the figure will pop out as a graphical window
- If you use WSL, you need to install graphical support
- **Highly recommend** to use Jupyter Notebook no matter which OS you use

\* See `matplotlib.ipynb` for demos

3

Draw.io

4

TikZ



5

# Summary

# Summary

- Overview
- Matplotlib
- Draw.io
- TikZ