

# Manipulate Views

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# Manipulate a View

To select items within a view; navigate to a different view point; or change anything about it

## ➔ Navigate

### ➔ Change over Time



### ➔ Select



### ➔ Item Reduction

#### ➔ Zoom *Geometric or Semantic*



#### ➔ Pan/Translate



#### ➔ Constrained



### ➔ Attribute Reduction

#### ➔ Slice



#### ➔ Cut



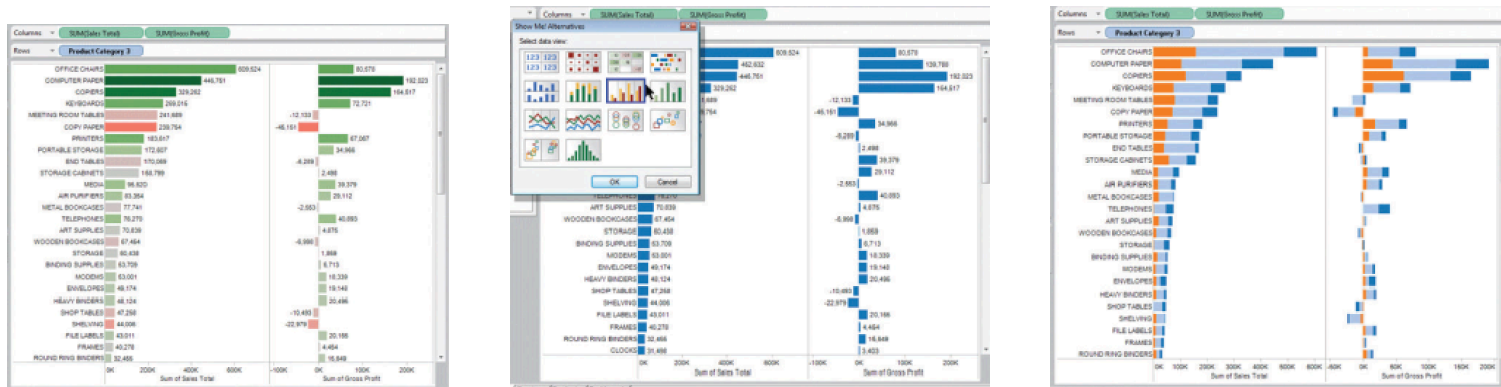
#### ➔ Project



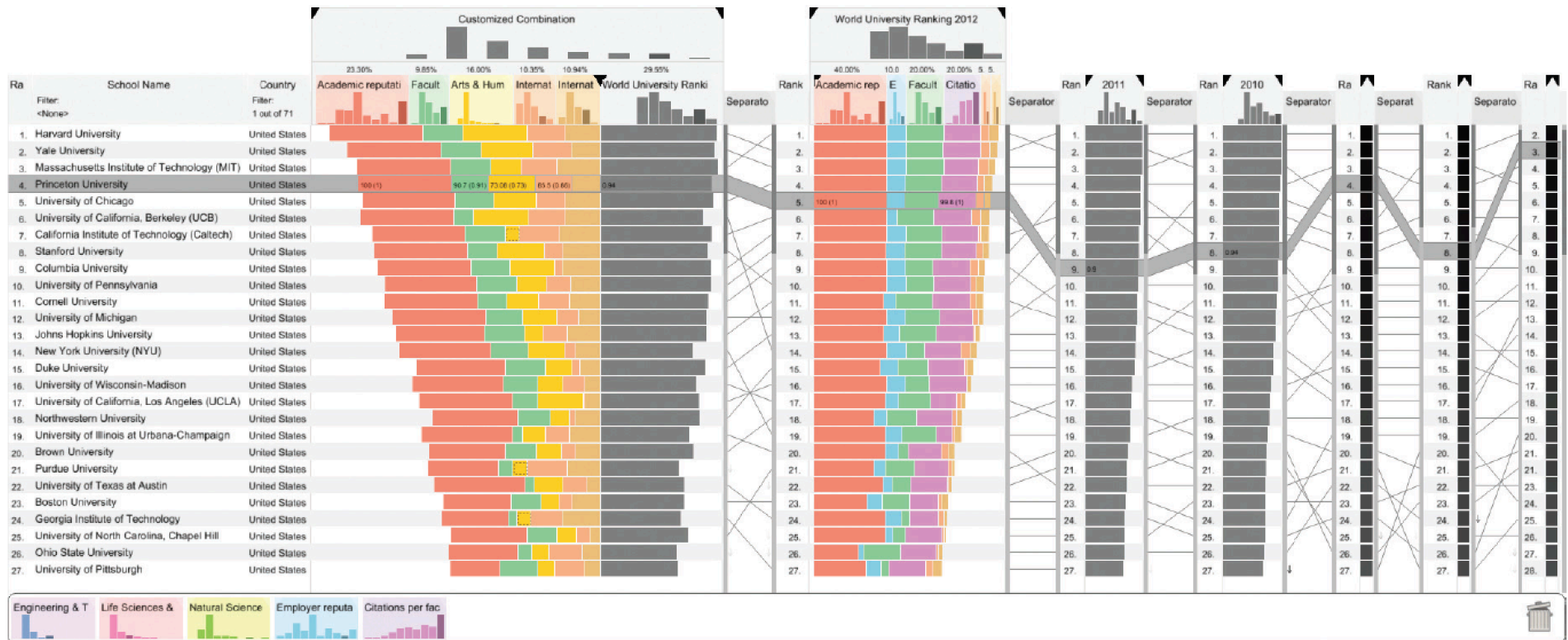
# Change a View Over Time

- Change the encoding (node-link to matrix layout, or the mark size), change the arrangement (for better pattern finding), change the order (sorting), change the viewpoint, change the attributes, change the aggregation level etc.

Tableau: change visual encoding

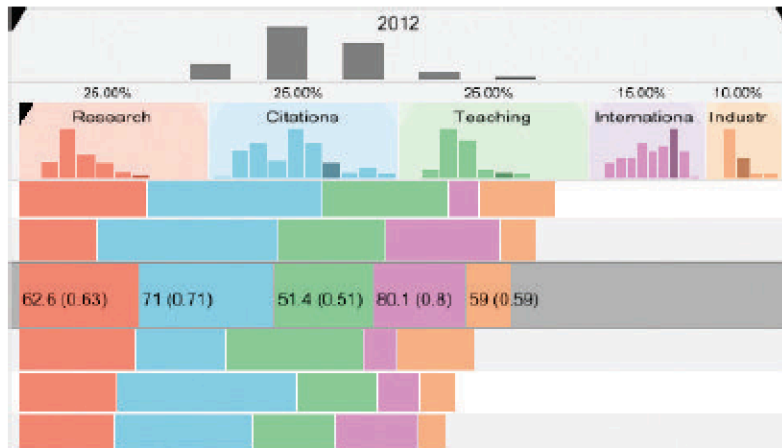


# Re-ordering and Re-alignment

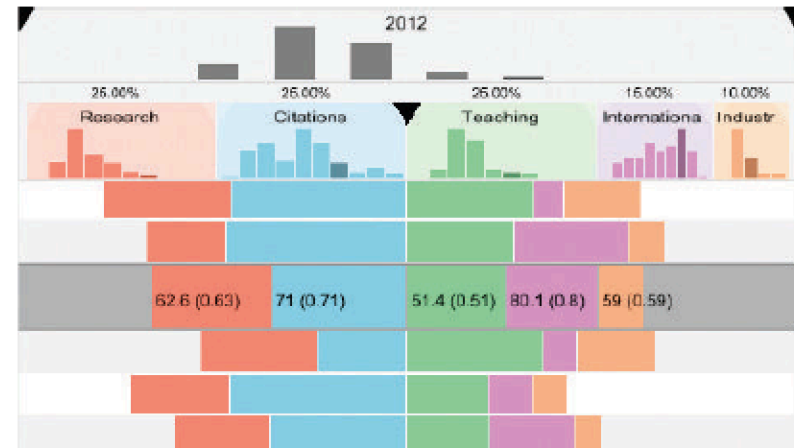


# Re-ordering and Re-alignment

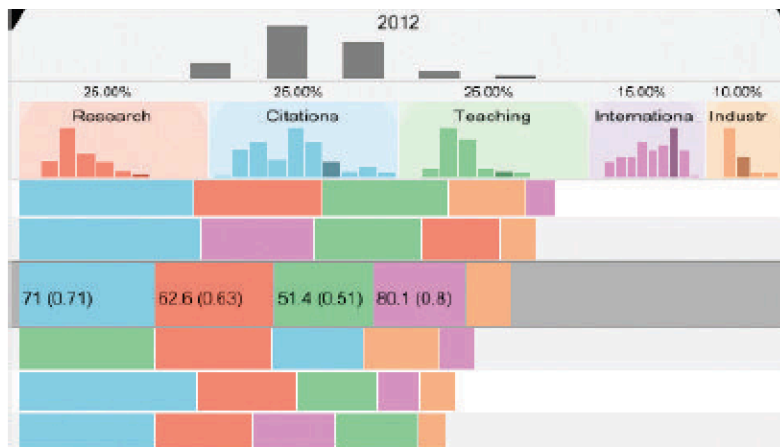
Stacked bars



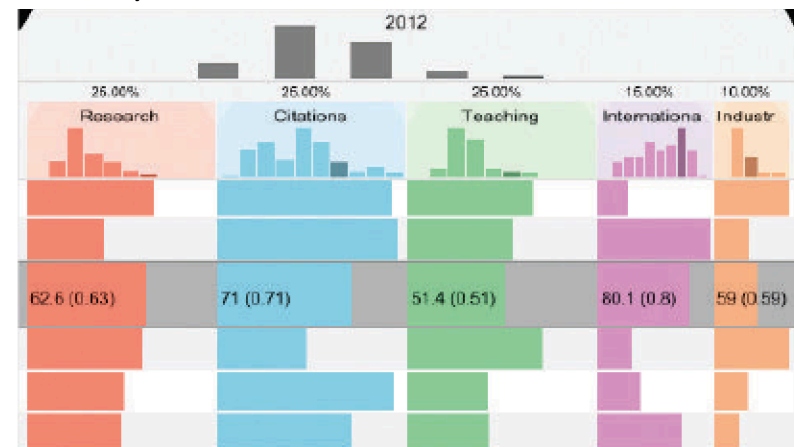
Diverging stacked bars



Sorted stacked bars: bars are sorted by length in each row

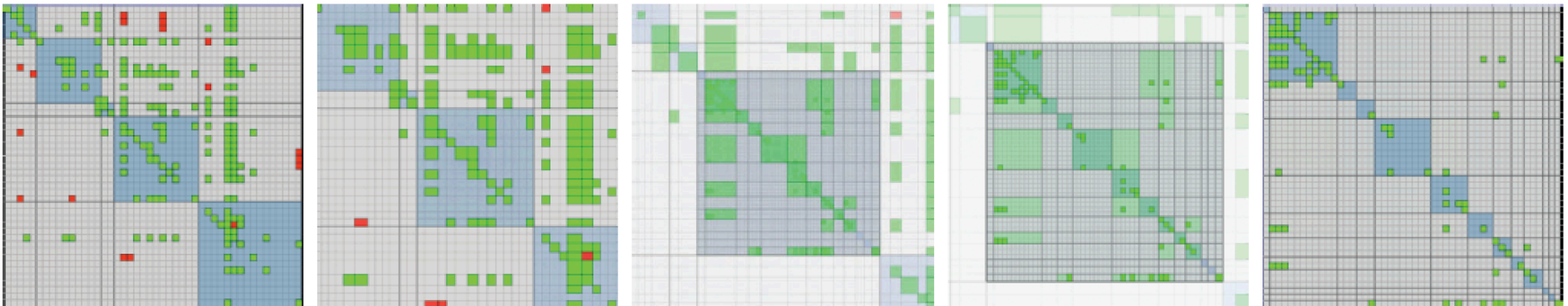


Display bars individually (small multiple views)



# Animated Transitions

- A series of frames are generated to smoothly transition from one state to another
- An alternative to jump cut
- Often used for navigation
- Help users maintain a sense of context



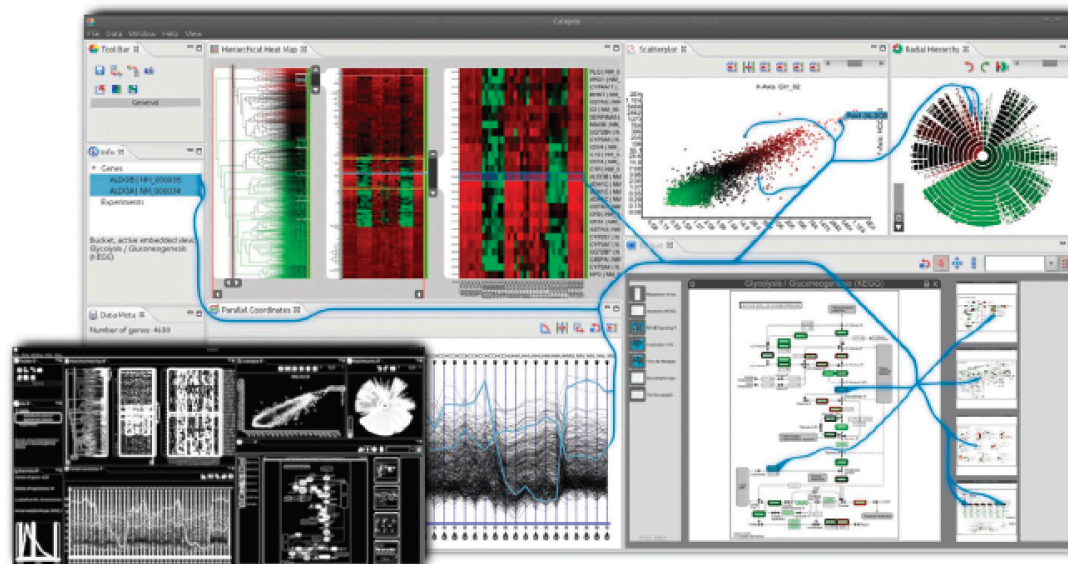
Transitions from one level of hierarchical level to the next

# Select Items

- Design Choices:
  - What kind: items, links, or attribute levels
  - How many different kinds: e.g. move click + mouse over + keyboard + touch screen + ....
  - How many items: only one in the final set (replace) or multiple (addition, deletion, clear)
  - Can be used for highlighting, etc.

# Highlighting

- Change the visual appearance of the selected items – easy to achieve visual popout
- Strategies: change
  - Color, add outlines, use motion (often is better), or add explicit links



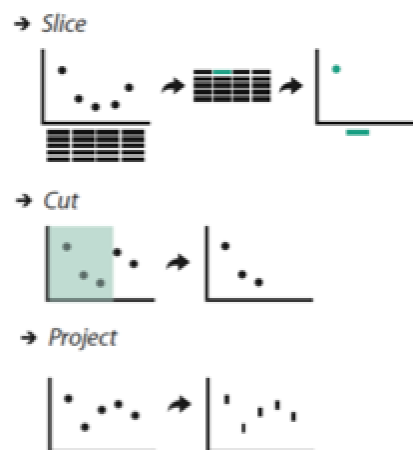


# Navigation

- Change the point of view
  - Reduce items: imagine a virtual camera
    - Zoom: move the camera closer to or far away from the plane
    - Pan: move the camera parallel to the plane
      - Translate: move the camera, up/down/sides
      - Rotate: spin the camera about its own axis

## – Reduce attributes

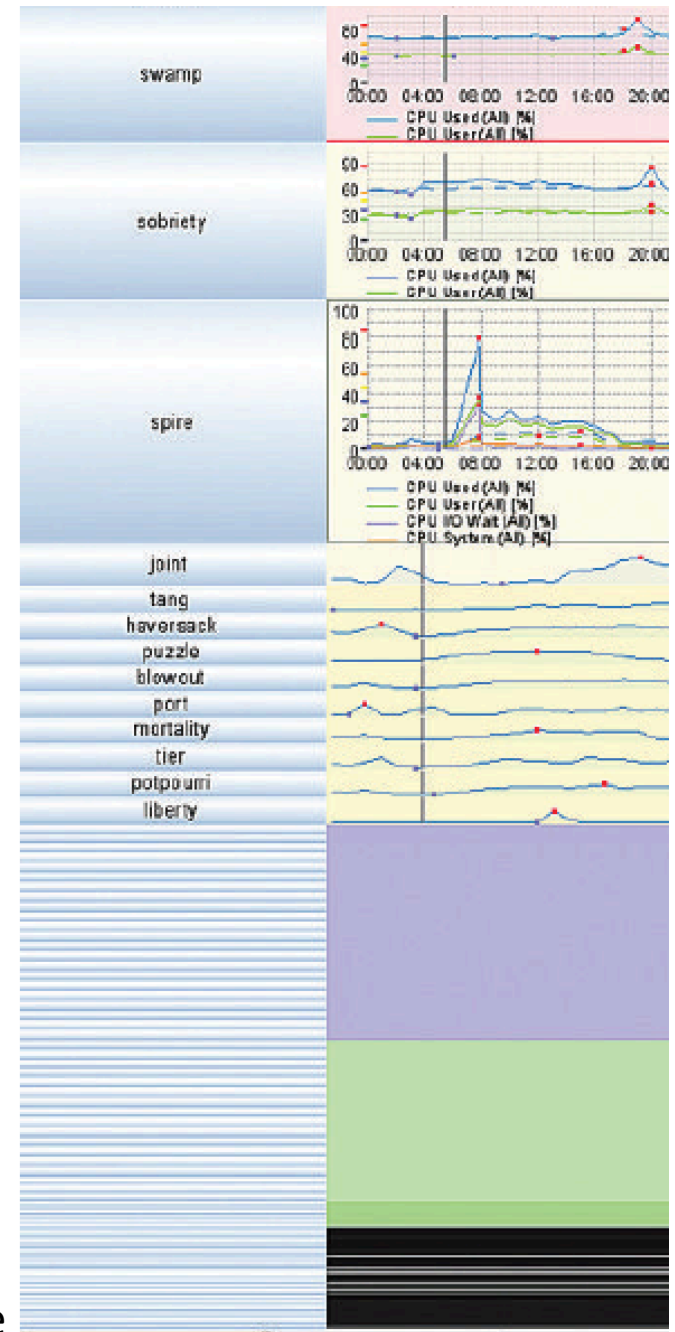
- Slice
- Cut
- Project



# Zooming

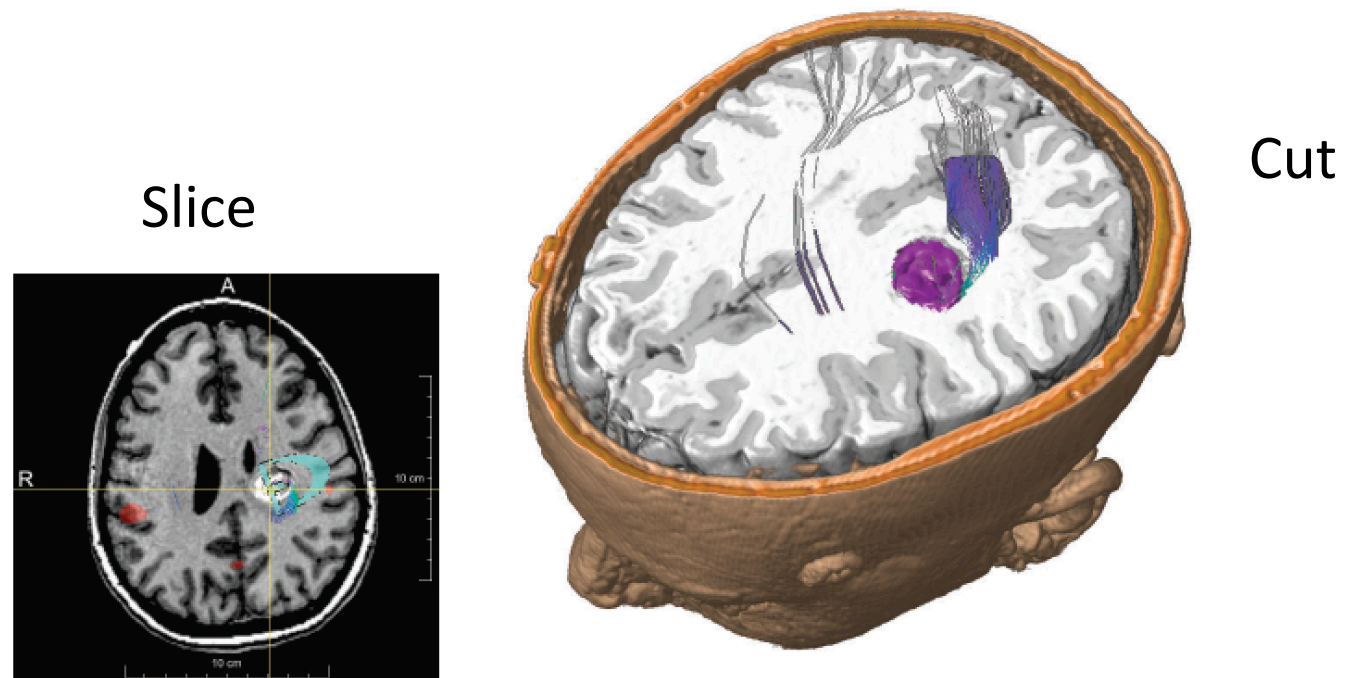
- Geometric zooming
  - Corresponding to our real world experience of moving an object closer to our eyes
    - Make objects larger or show more details
- Semantic zooming
  - The representation of objects change according to the available screen size
    - As we zoom in to a file in a visualization:
      - Name of file -> title of the document -> outline of the document -> full text

Semantic zooming of system performance



# Navigate to Reduce Attributes

- Slice: Display data that match with a chosen value in an selected attribute or dimension
- Cut: only display data on one side of a plane



# Navigate to Reduce Attributes

- Project: transform data from its original dimensions to a lower dimensional space
  - Project 3D world to a 2D image plane
- Data along one or multiple dimensions are lost or aggregated

