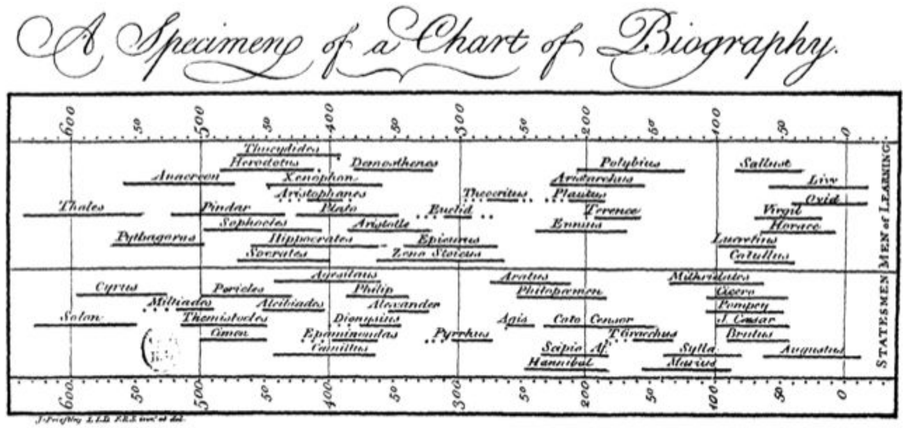
Information Visualization

Temporal Data

Dr. David Koop

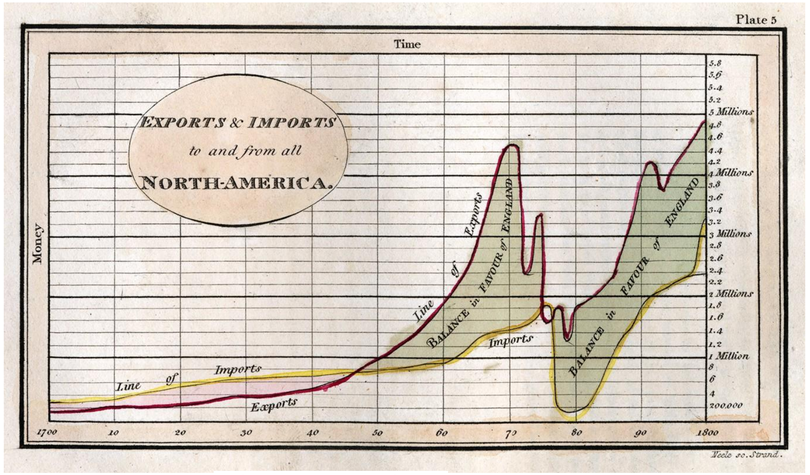
Temporal Data



Events

Trajectories

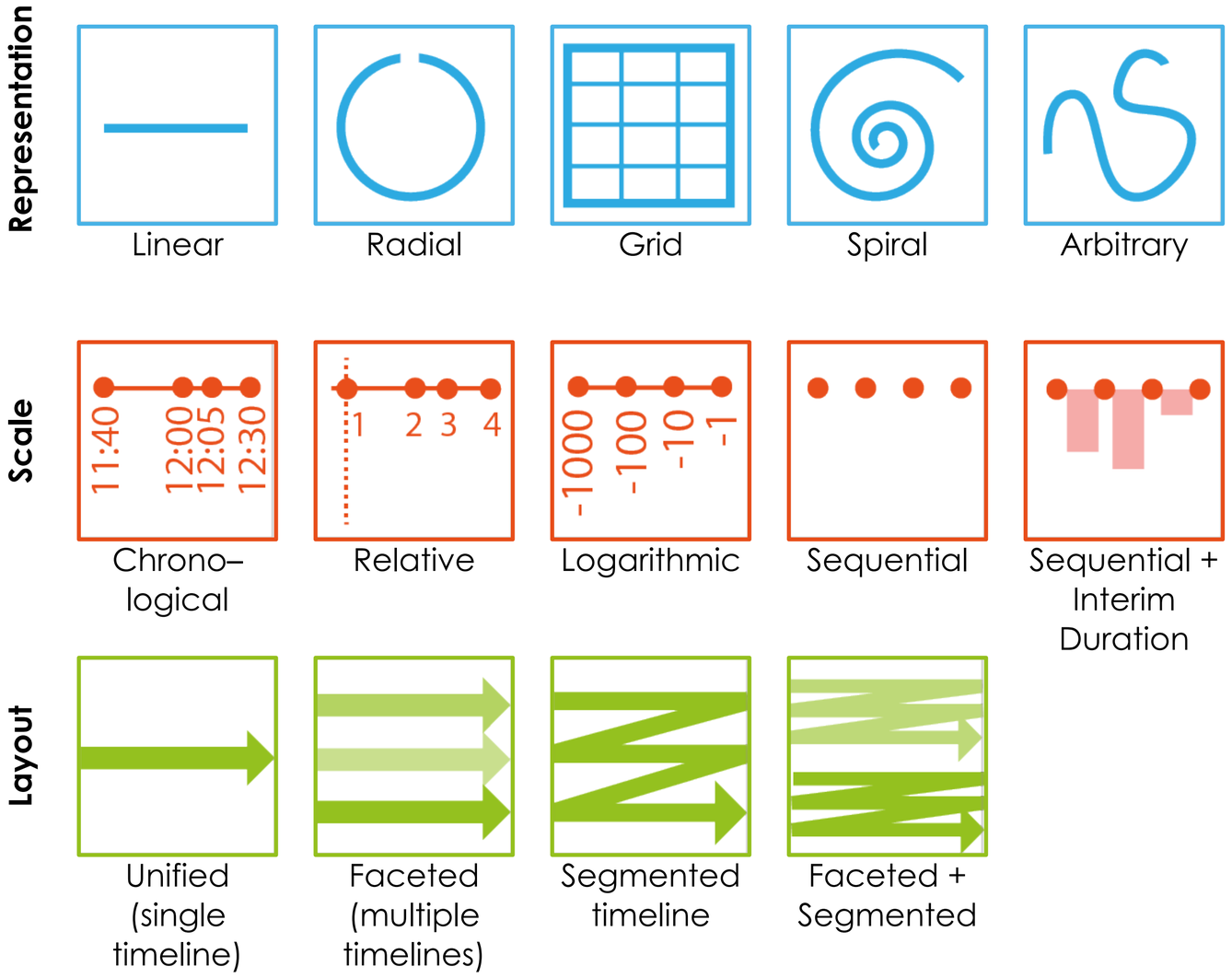
Calendar



Time series

[B. Bach]

Timeline Design Space

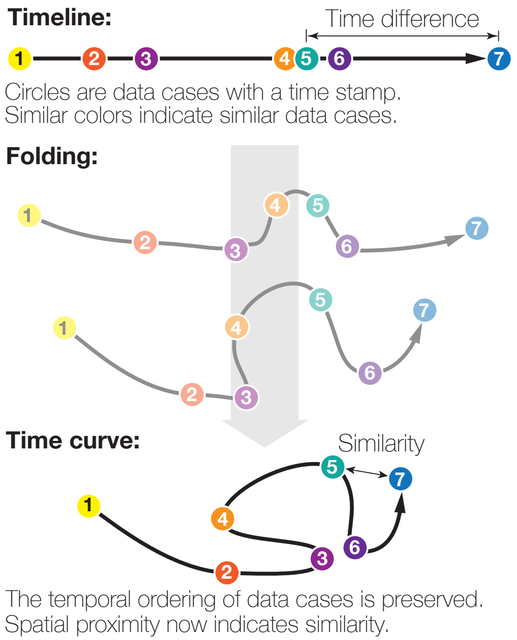


[M. Brehmer et al.]

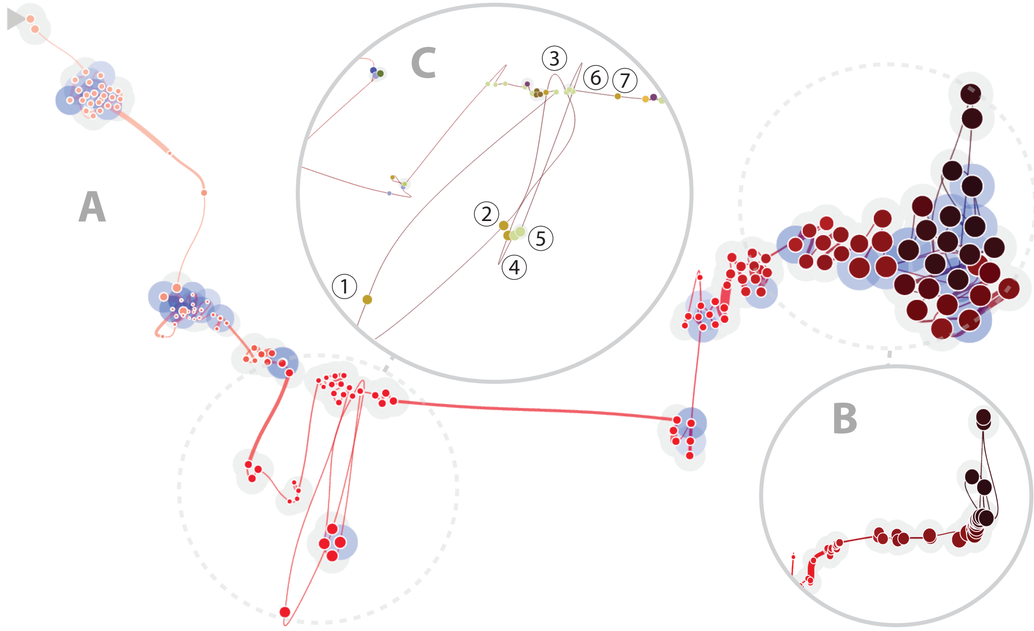
Time Curves

Time Curves: Folding Time to Visualize Patterns of Temporal Evolution in Data

Benjamin Bach, Conglei Shi, Nicolas Heulot, Tara Madhyastha, Tom Grabowski, Pierre Dragicevic

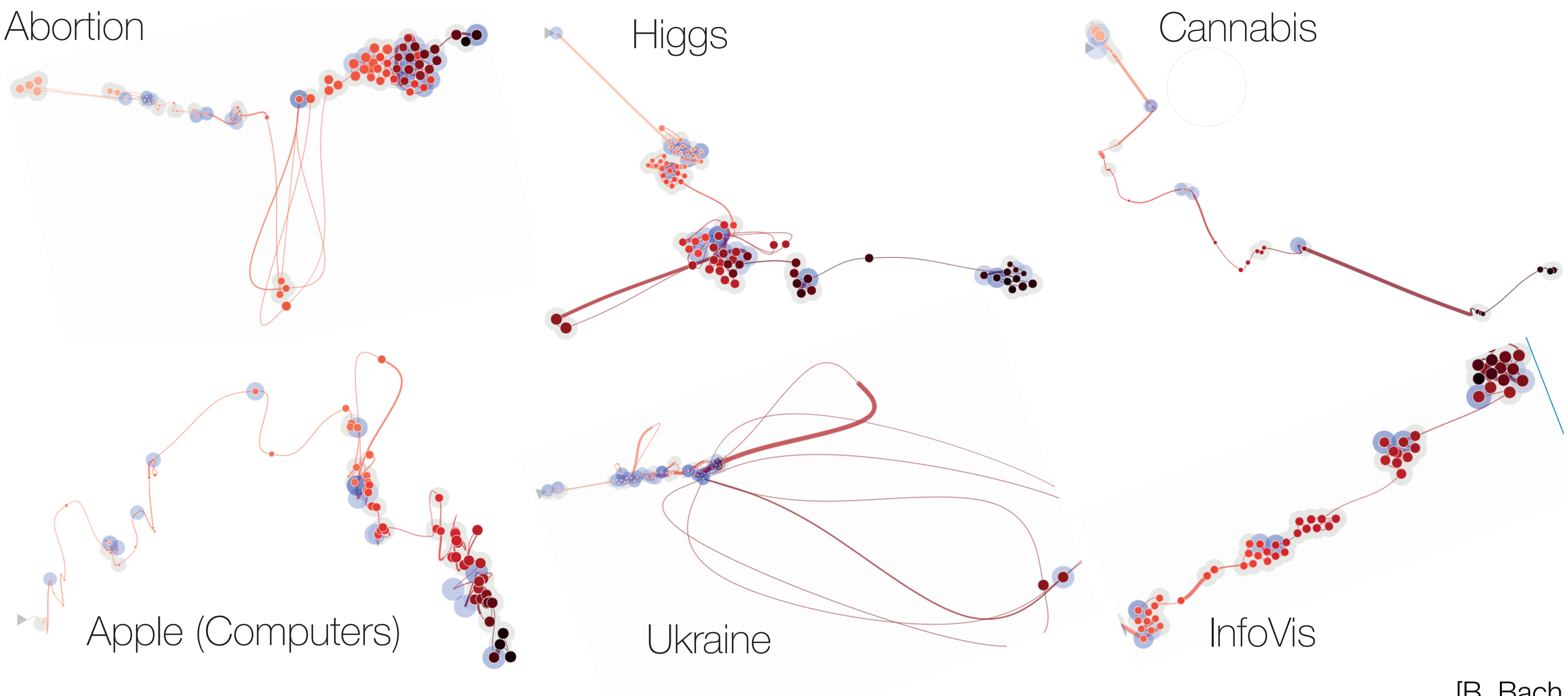


(a) Folding time



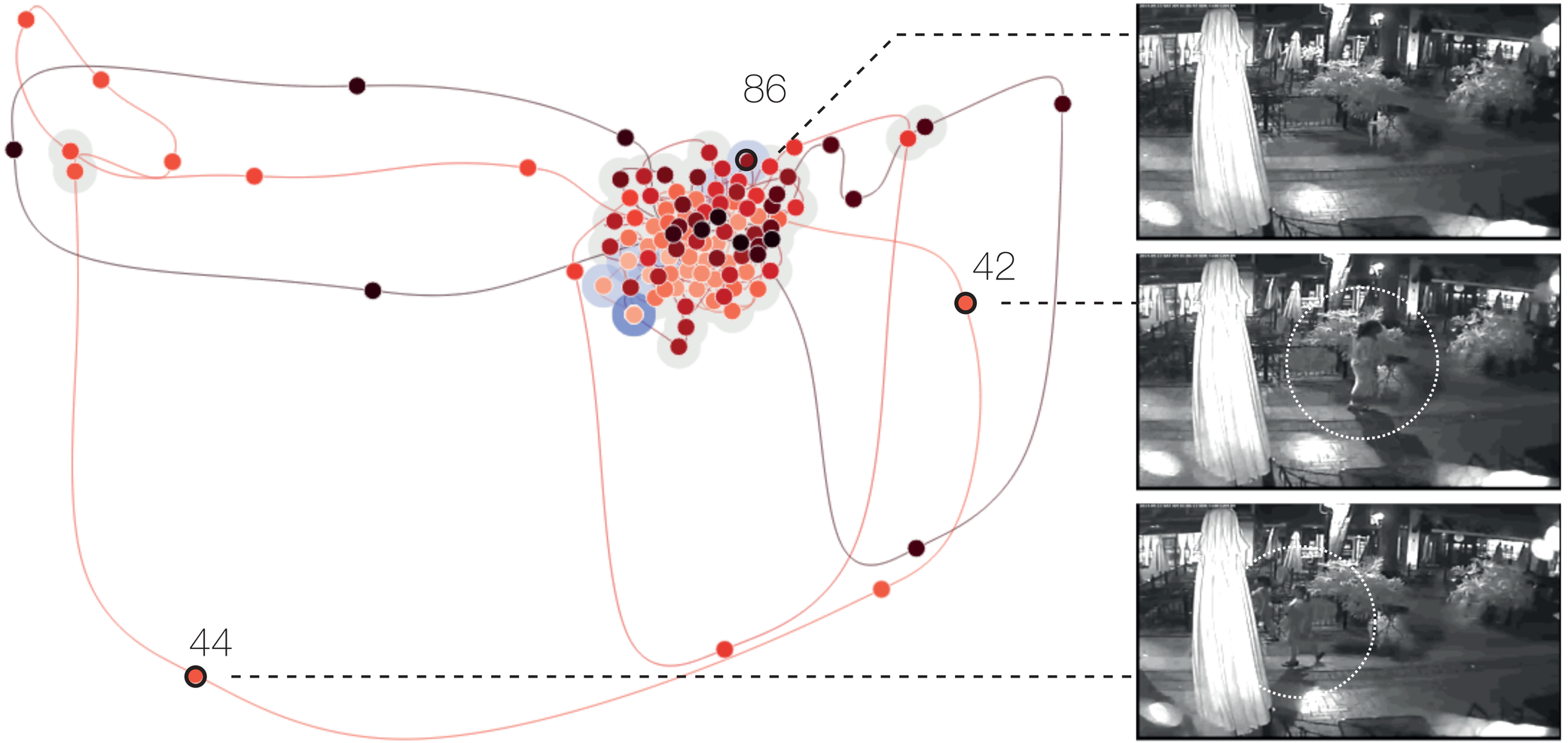
(b) History of the Wikipedia article on Palestine

Time Curves for Wikipedia



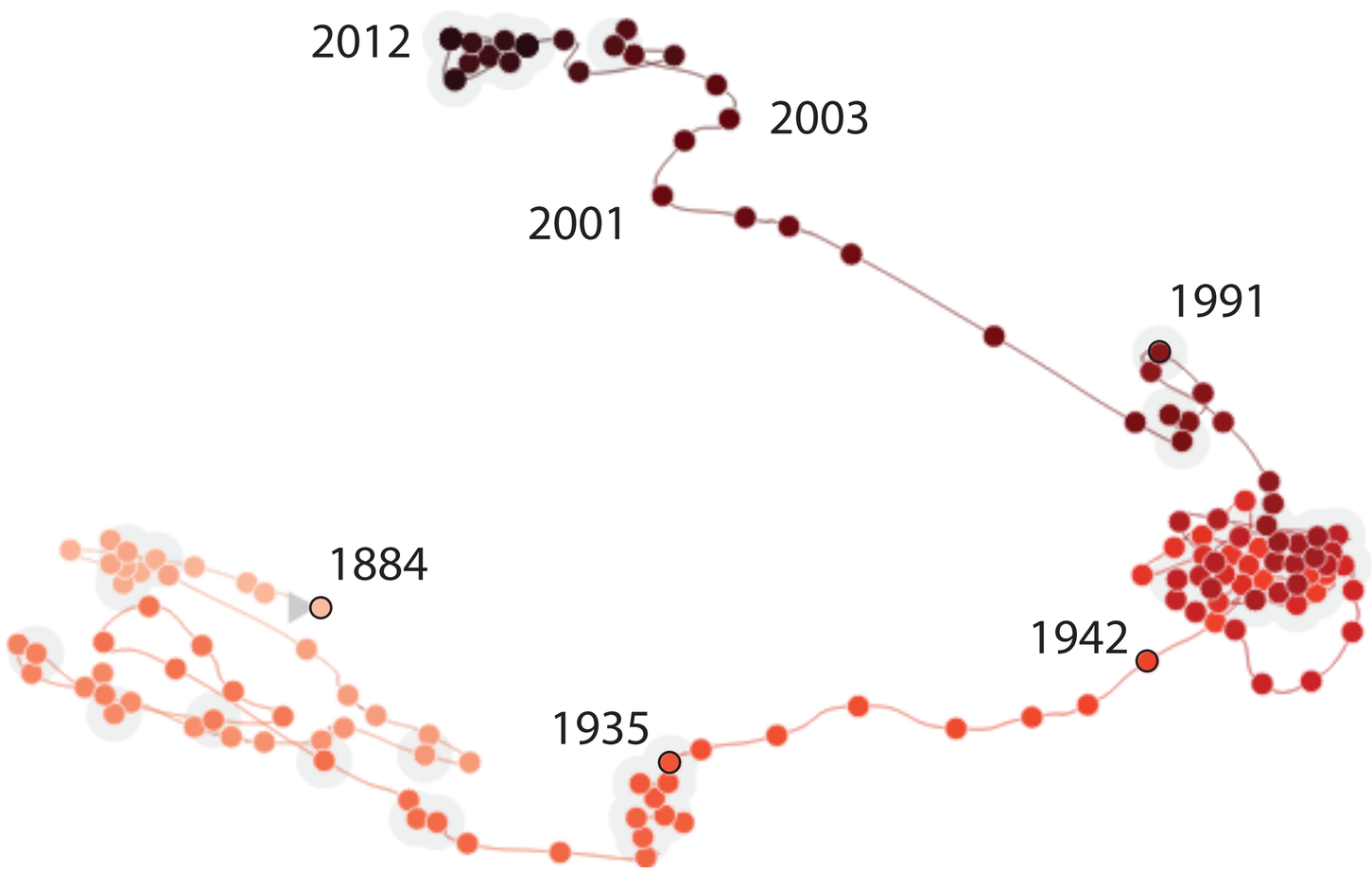
[B. Bach et al.]

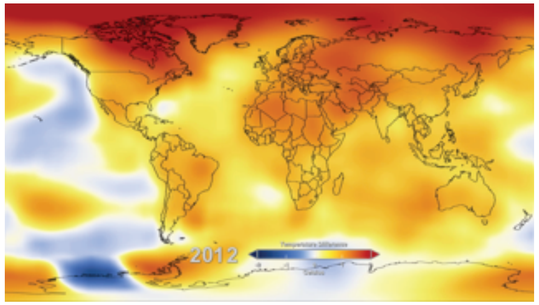
Time Curves for Video



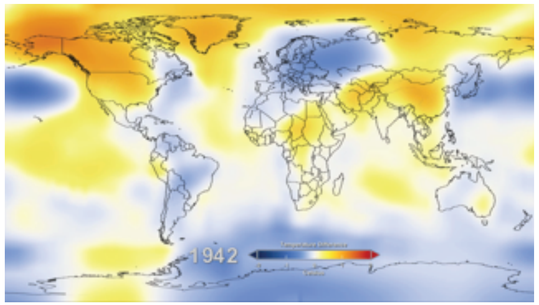
[B. Bach et al.]

Time Curves for Visualizations

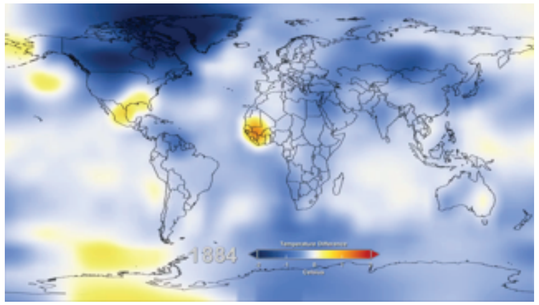




2012



1942

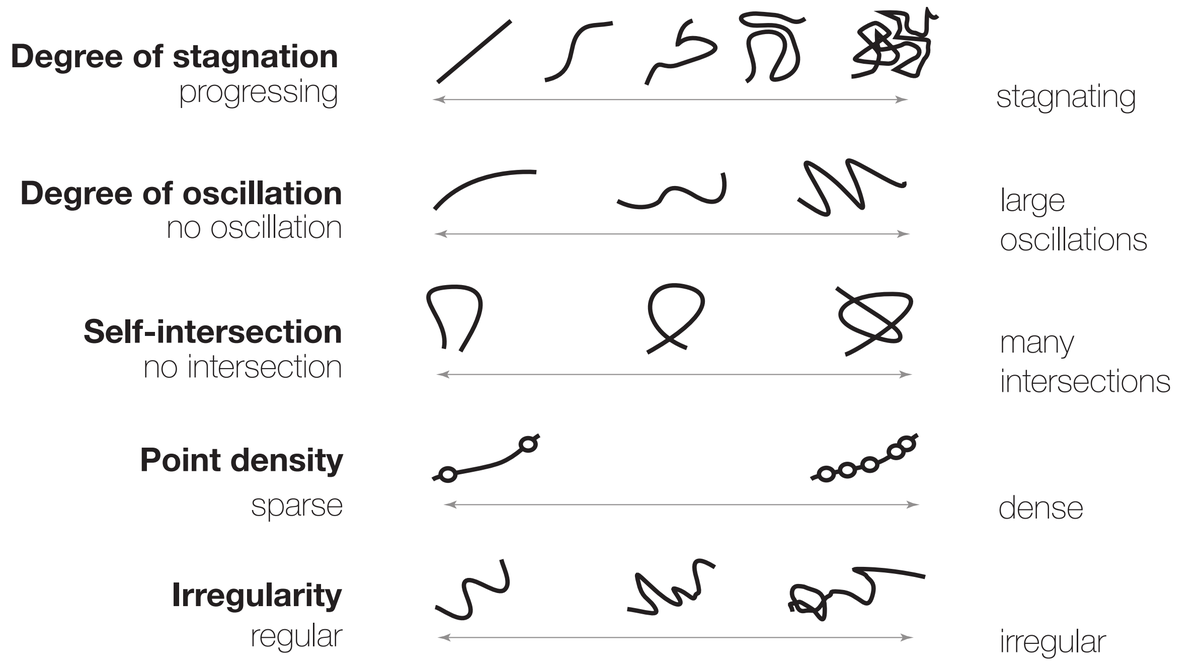


1884

[B. Bach et al.]

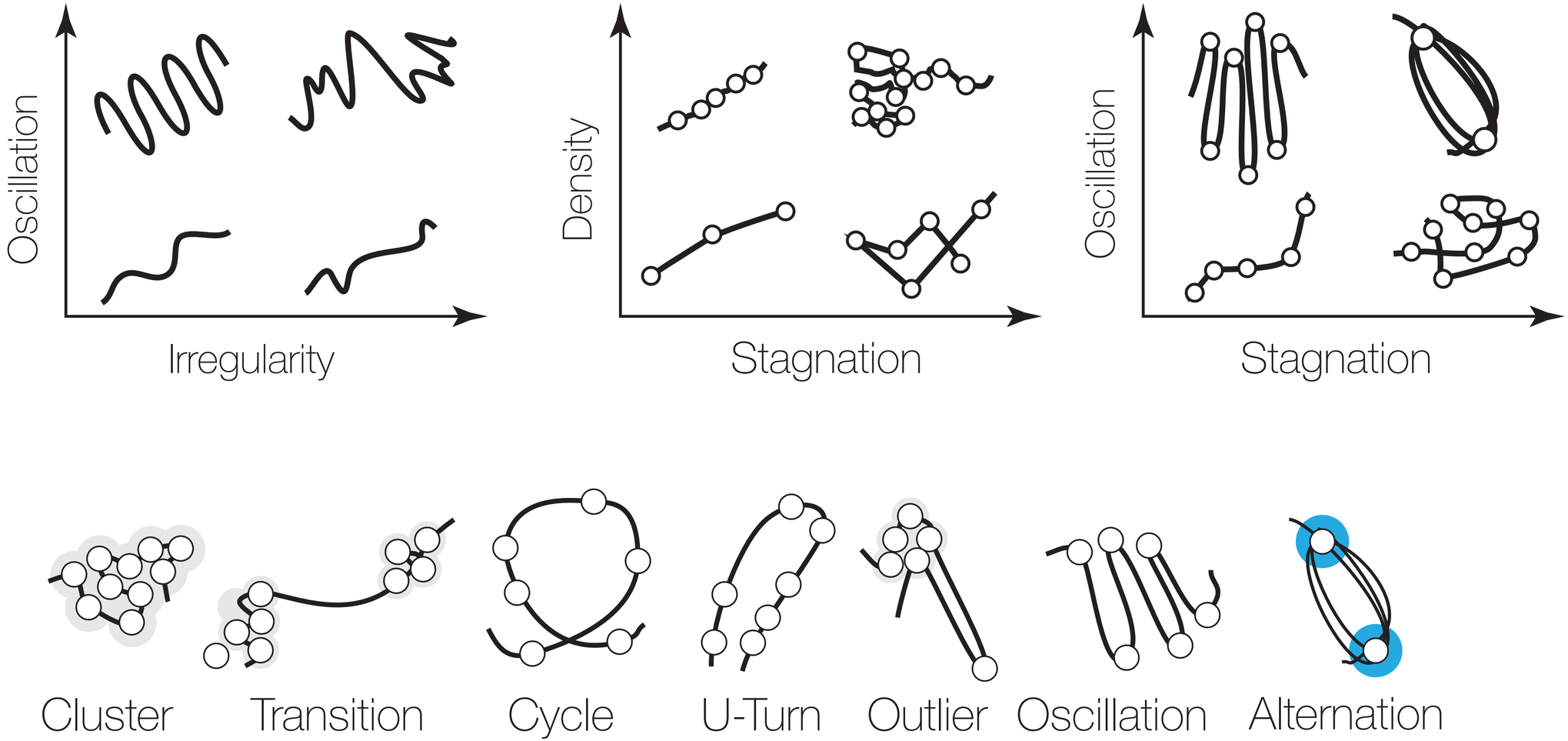
Time Curve Characteristics

- Show chronology and similarity at the same time
- Distances
  - Rank: order
  - Curvilinear: quantitative time
  - Spatial: similarity
- Use MDS



[B. Bach et al.]

Patterns



[B. Bach et al.]

Evaluation

- + Shows amount of change
- + Signatures can be useful
- + Can compare different curves
- - Details are often obscured
- - Projection leads to artifacts
- - Position only shows similarity
- - Chronology has no direction

[B. Bach et al.]

Survey Paper

- Due Tuesday, October 19
- Categorize references
- Tables to organize references
- Not all references will fit nicely into one categorization!
- Find themes in existing research
- Uncover unanswered research questions

Next Paper

When (ish) is My Bus? User-centered Visualizations of Uncertainty in Everyday, Mobile Predictive Systems

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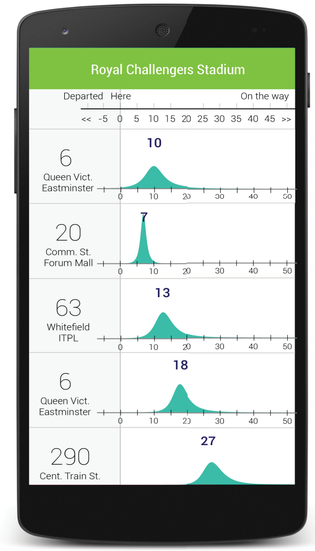
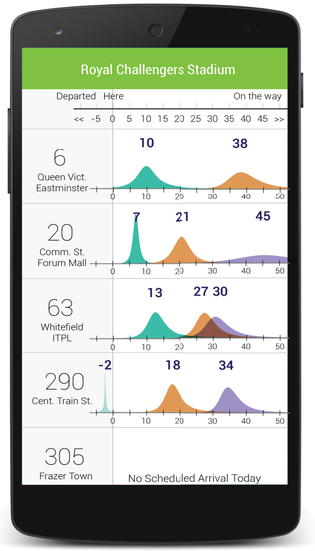
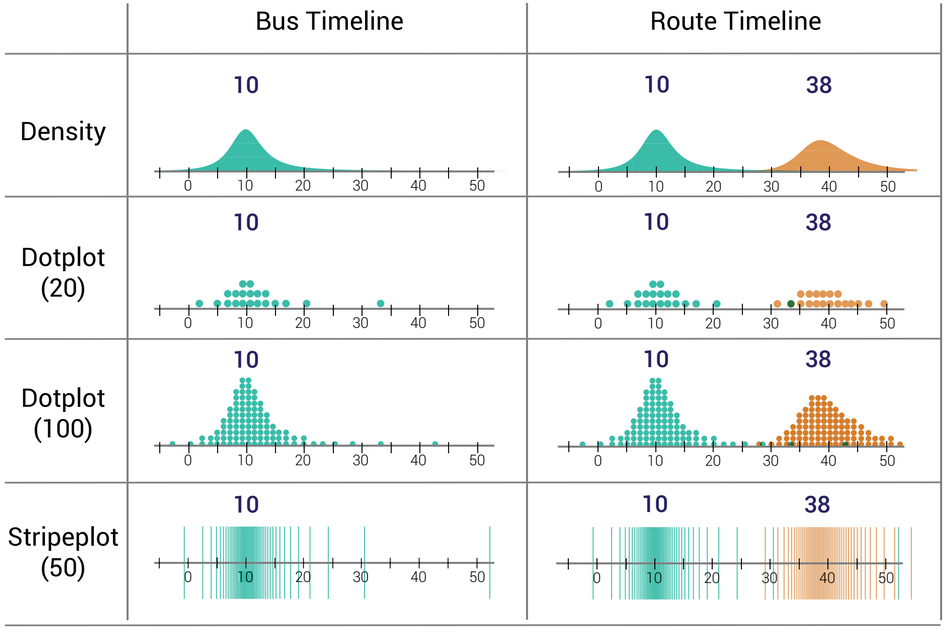
Bus Timeline



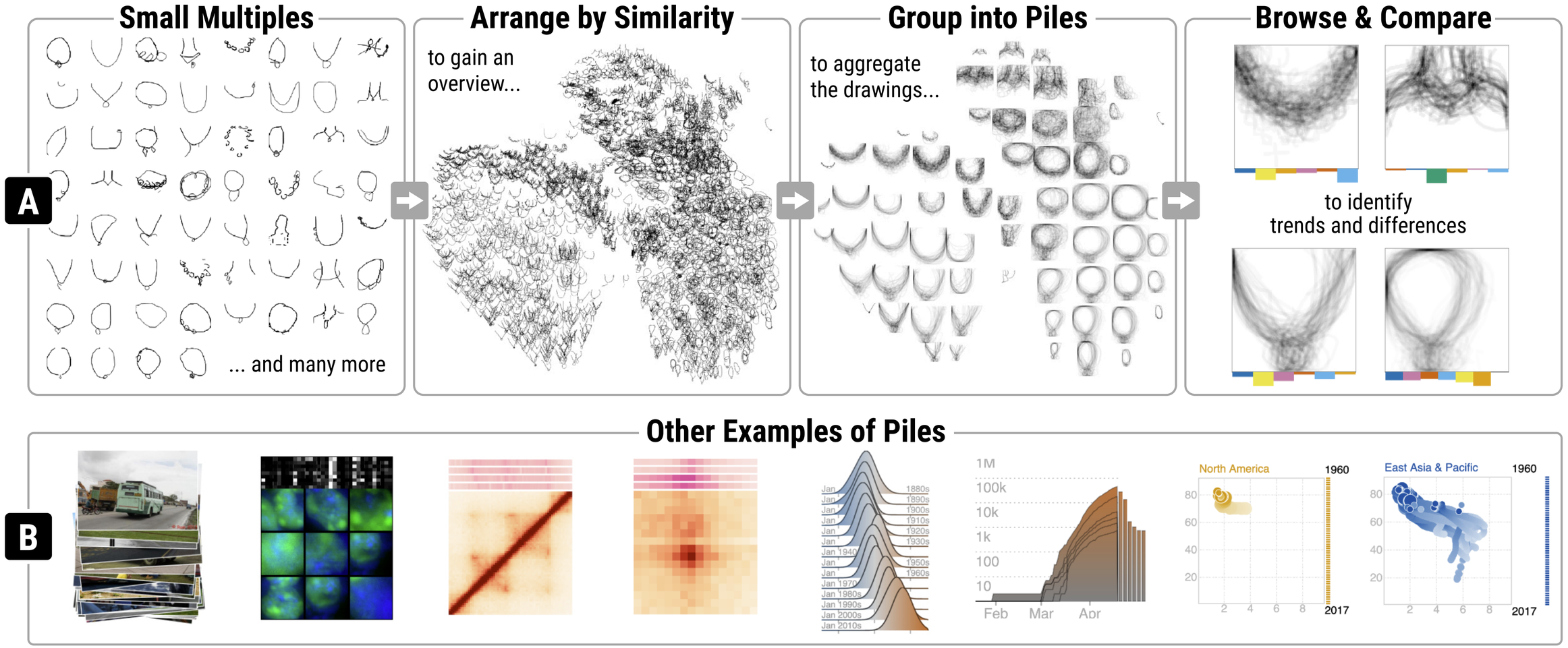
Route Timeline





Progress Reports

Visual Piling



[F. Lekschas et al., 2020]

Visual Piling Goals/Tasks

T1 **Grouping:** *manually* or *automatically* sort items into piles.

T2 **Arrangement:** position items and piles relative to each other in an *orderly*, *randomized*, *gridded*, or *unconstrained* layout.

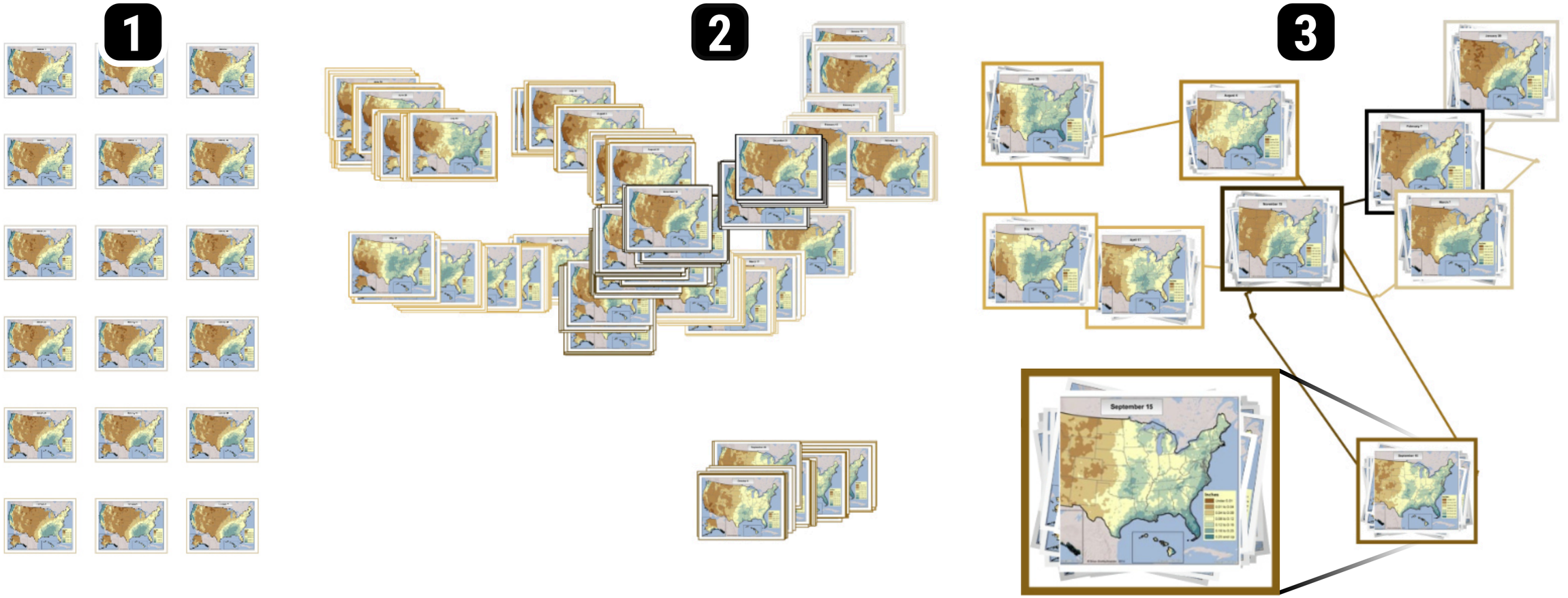
T3 **Previewing:** identify and locate items on a pile using *in-place*, *gallery*, *foreshortened*, *combining*, and *indicating* previews.

T4 **Browsing:** search, explore, and navigate within and between piles through *in-place*, *dispersive*, *layered*, and *hierarchical* browsing.

T5 **Aggregation:** summarize a pile into a *synthesized*, *representative*, or *abstract* representation.

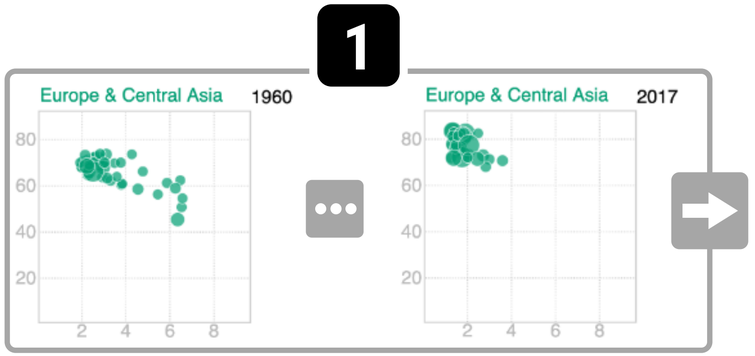
[F. Lekschas et al., 2020]

Precipitation Data

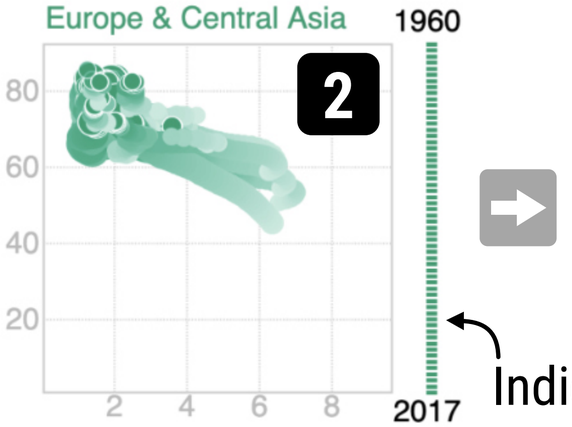


[F. Lekschas et al., 2020]

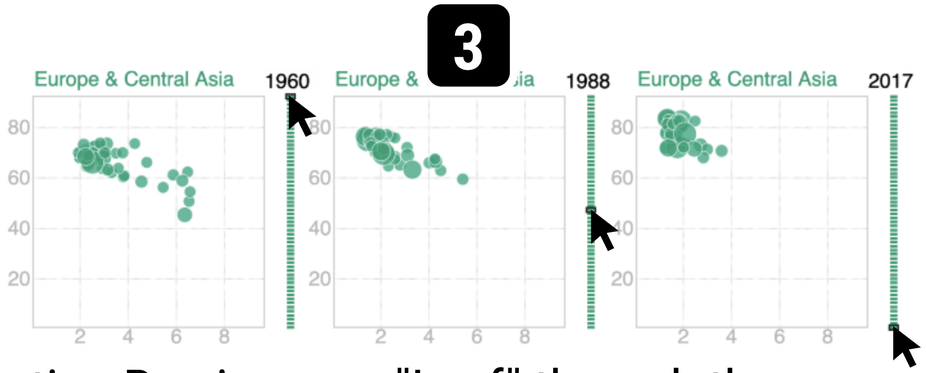
Gapminder Data



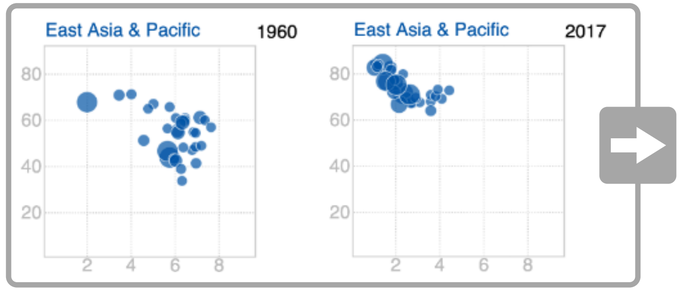
Pile up 1960 to 2017



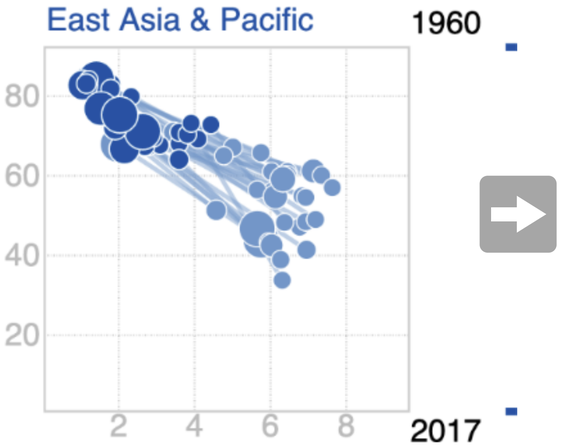
Indicating Previews

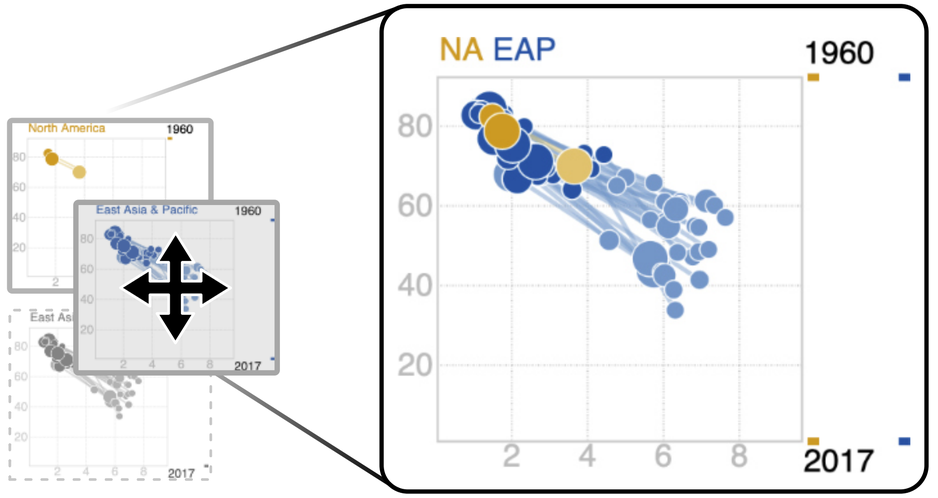


"Leaf" through the years



Pile up 1960 and 2017





[F. Lekschas et al., 2020]

StreamStory

[L. Stopar et al., 2019]

StreamStory Algorithm

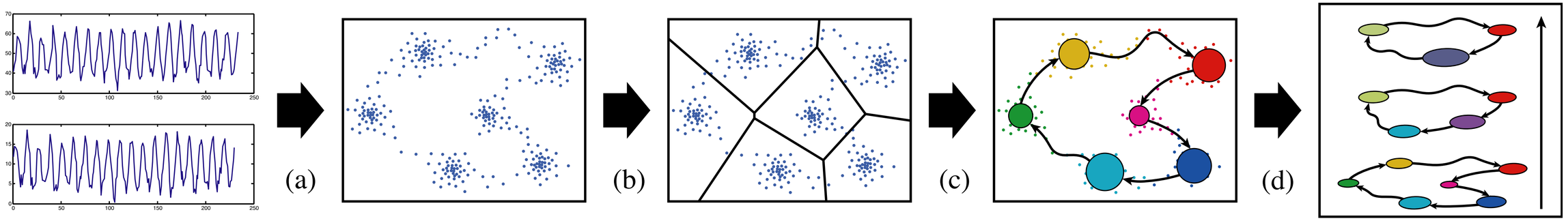
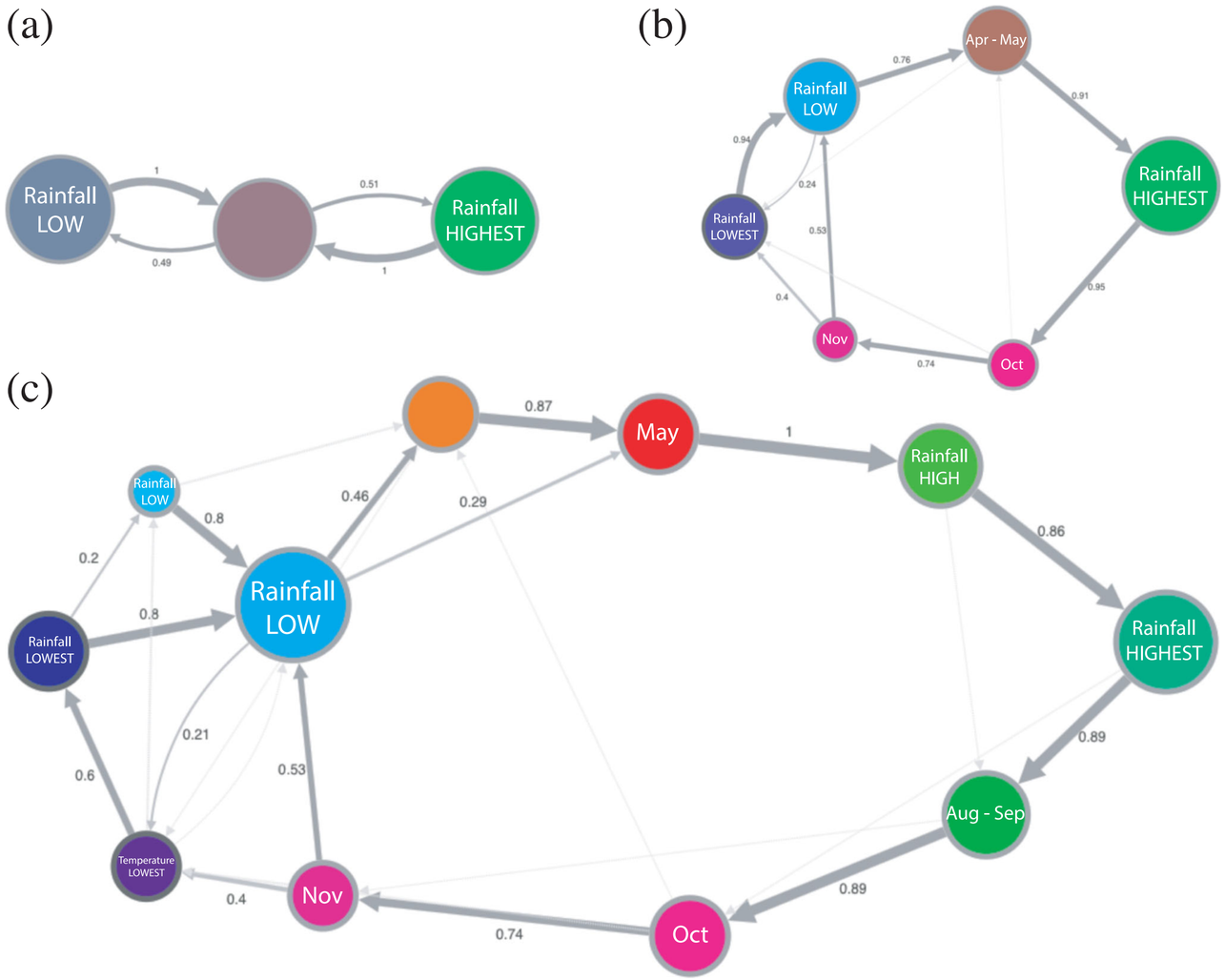


Fig. 2. Overview of the methodology. (a) The multivariate time series is first represented as a point cloud. As an example, we show two noisy approximately periodic signals mapped to points in 2D. (b) The states are constructed by partitioning the *ambient space* using a clustering algorithm. (c) Transitions are modeled by translating the partition into a Markov chain, with each state representing a partition cell. (d) Finally, the Markov chain model is simplified by iteratively aggregating states into a hierarchy, giving a multiscale view of the model.

[L. Stopar et al., 2019]

StreamStory at Different Scales



[L. Stopar et al., 2019]