Principles of Data Visualization

- Optimize the trade-off: Ease of interpretation vs. Maximum information
- Figures should be, as much as possible, interpretable without a written figure legend
- Should be aesthetically pleasing
  - *HOW* your data is presented affects how it is received
  - Flaws are distracting (e.g. misalignment, needlessly unbalanced, identical objects out of proportion, etc.)
  - Whenever possible, try to use colorblind-friendly color palettes
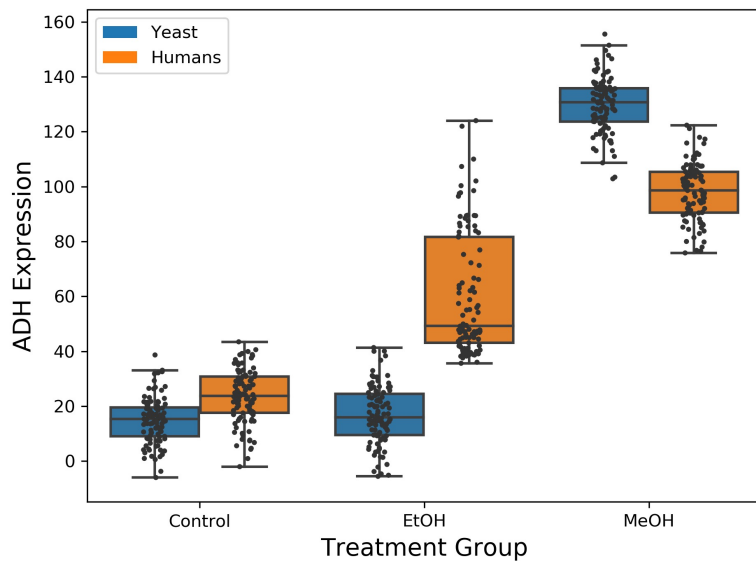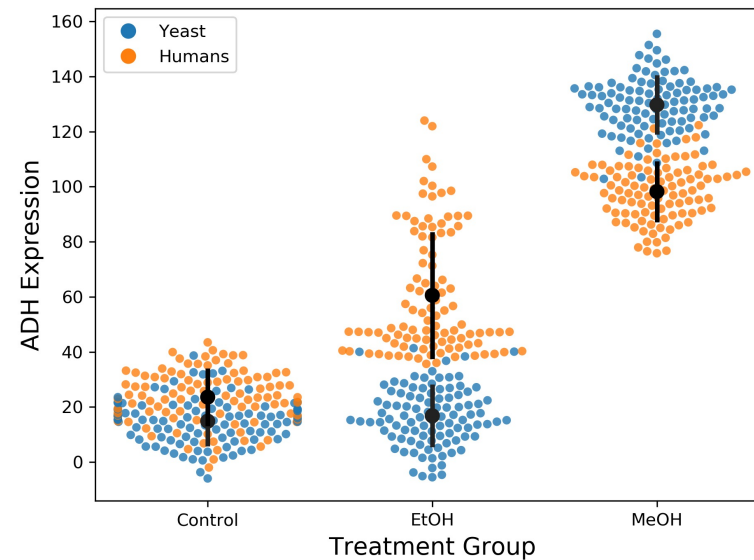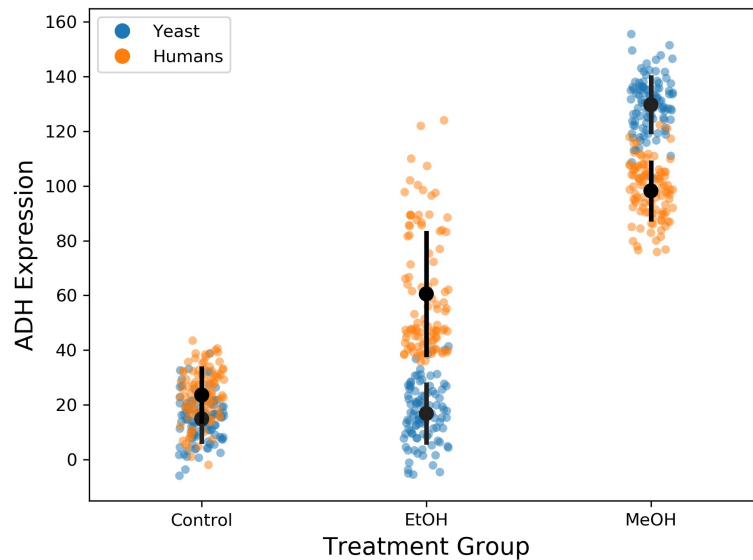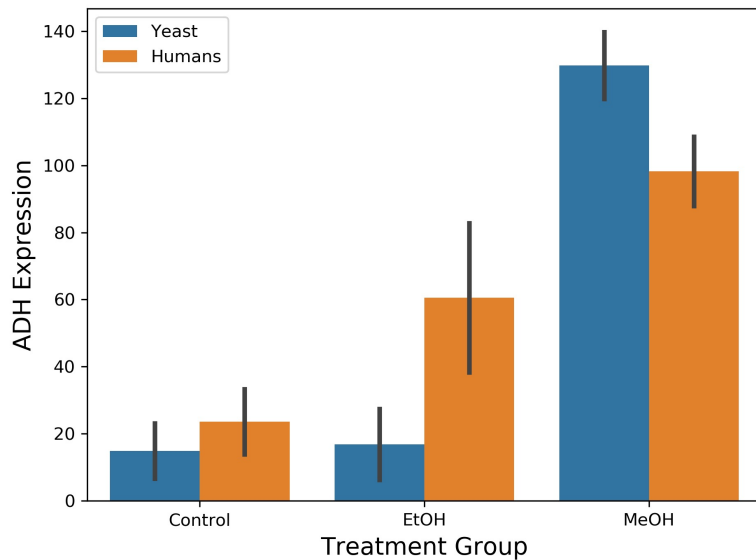 - Use color themes *across* figures within the same paper for a sense of coherence
- Become familiar with plotting multi-dimensional data
  - Know which techniques are most accurately judged by the human eye
- Don't limit yourself to traditional visualization techniques and graphs!

Methods of Plotting Categorical Data
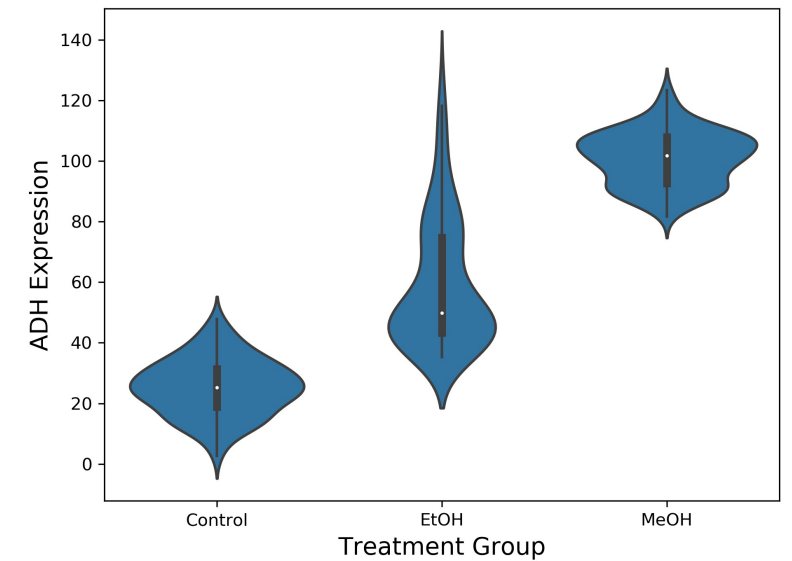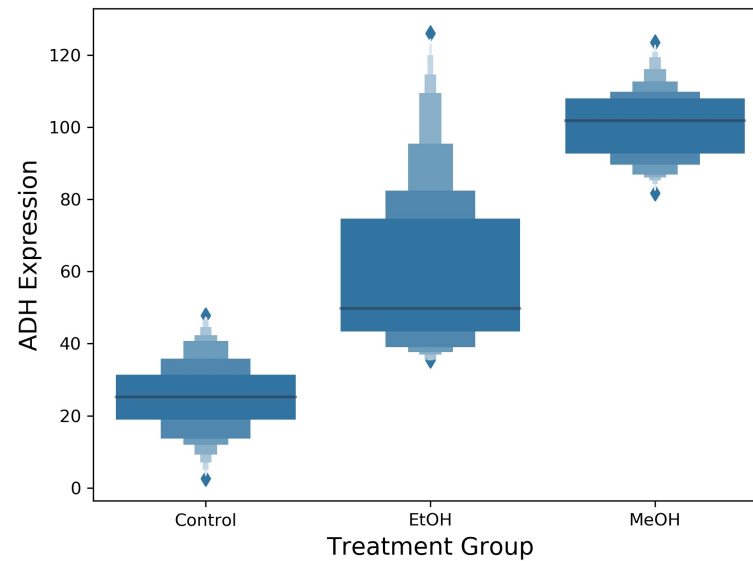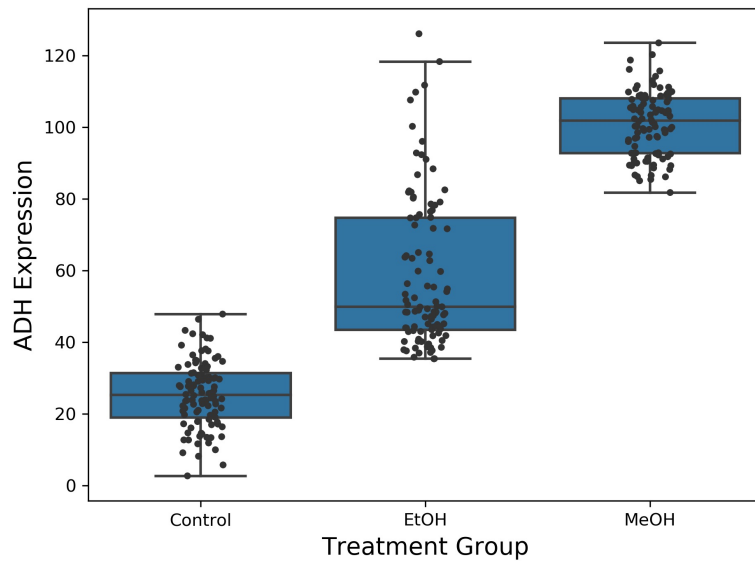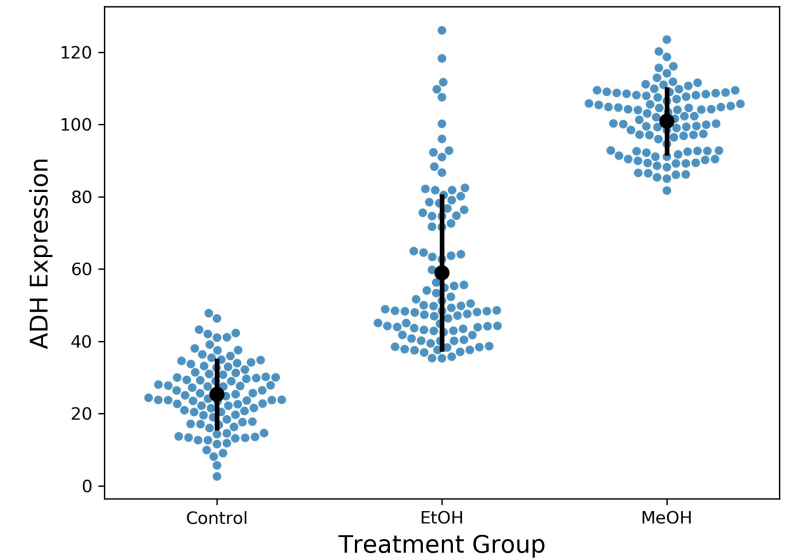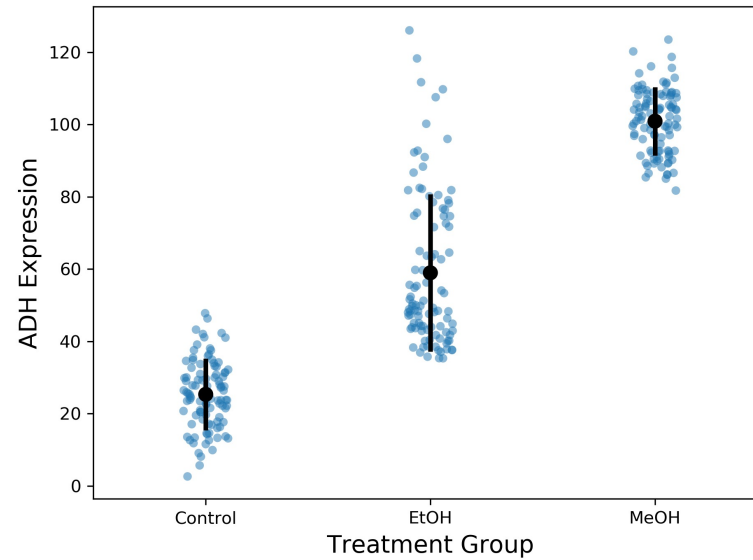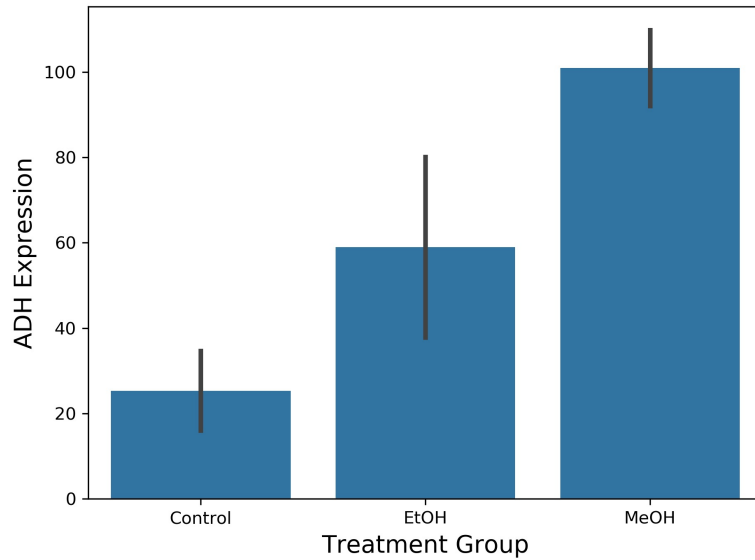
Adding a Dimension
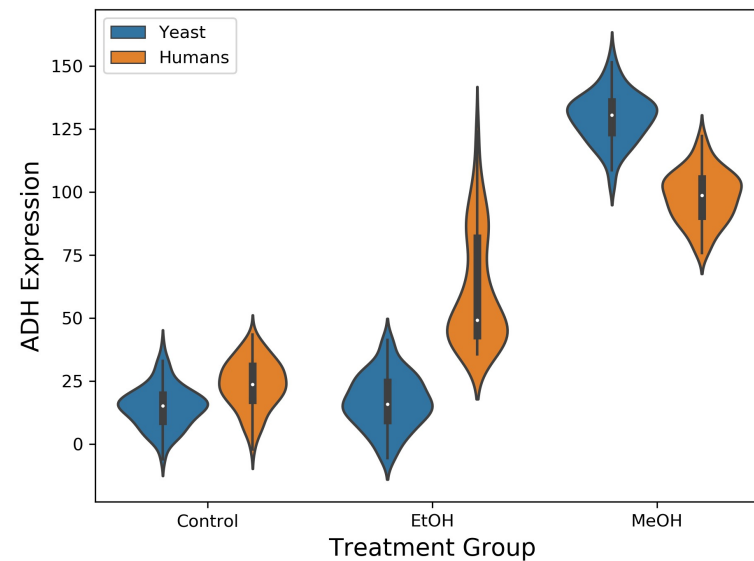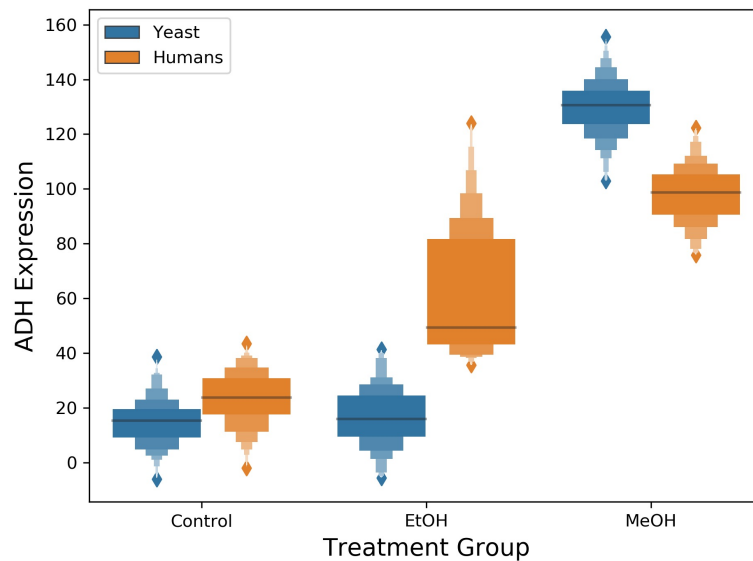
Compressing and Expanding Multi-Dimensional Data

Guiding questions:
- What is the essential message you are trying to convey?
- How can that message be conveyed according to the Interpretability vs. Information tradeoff?
- Which combination of visual tricks can I use to optimize Interpretability vs. Information?
  (separate graphs, 2D or 3D, colors, heatmaps, marker types, etc.)

Protein Abundance

Size of dots indicates protein sample size
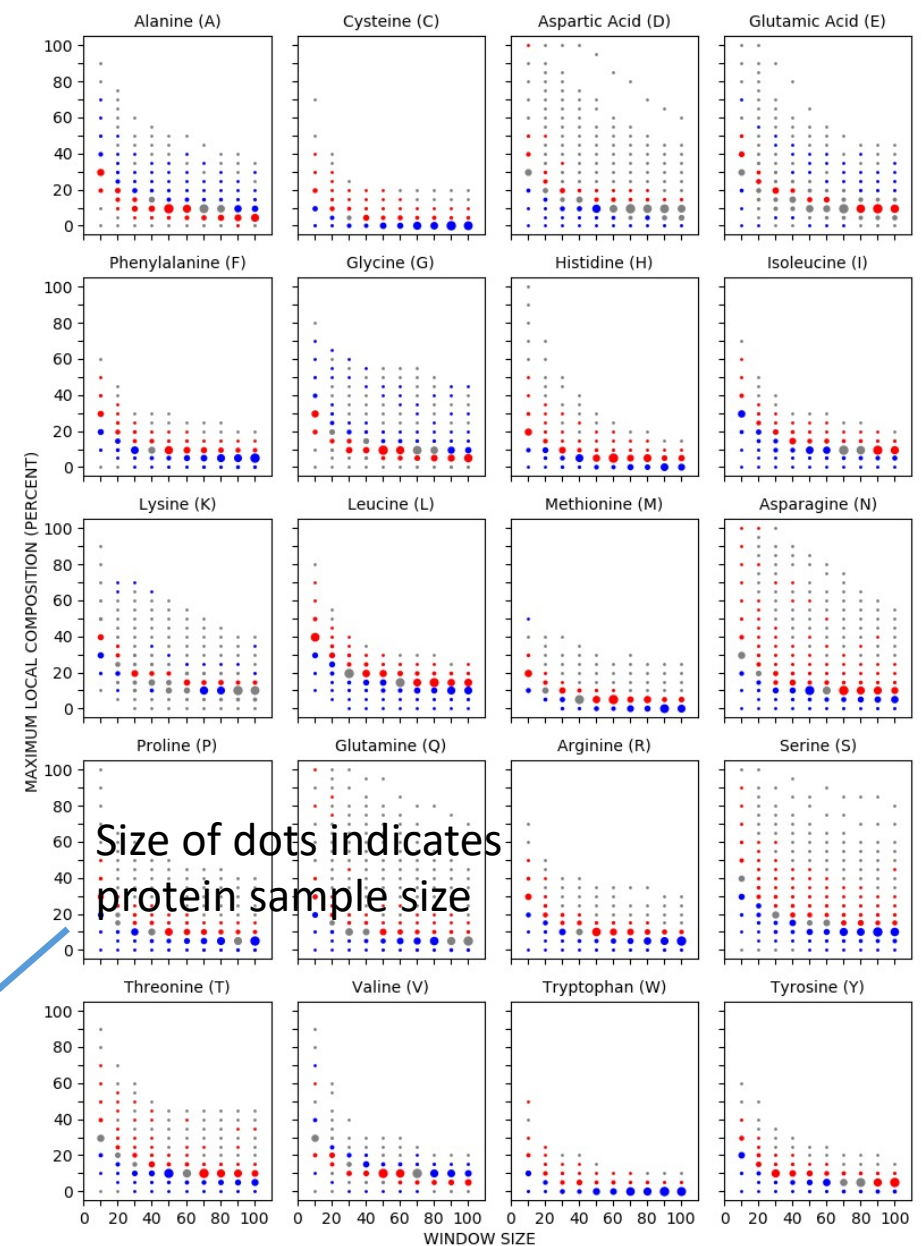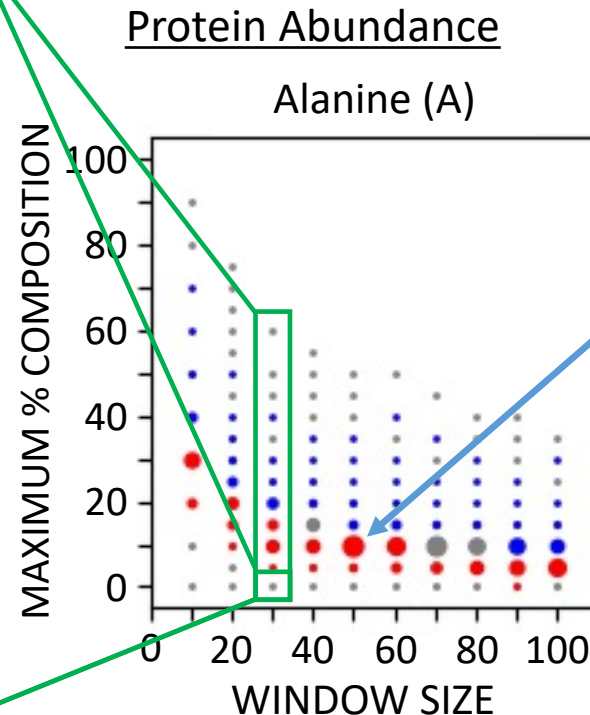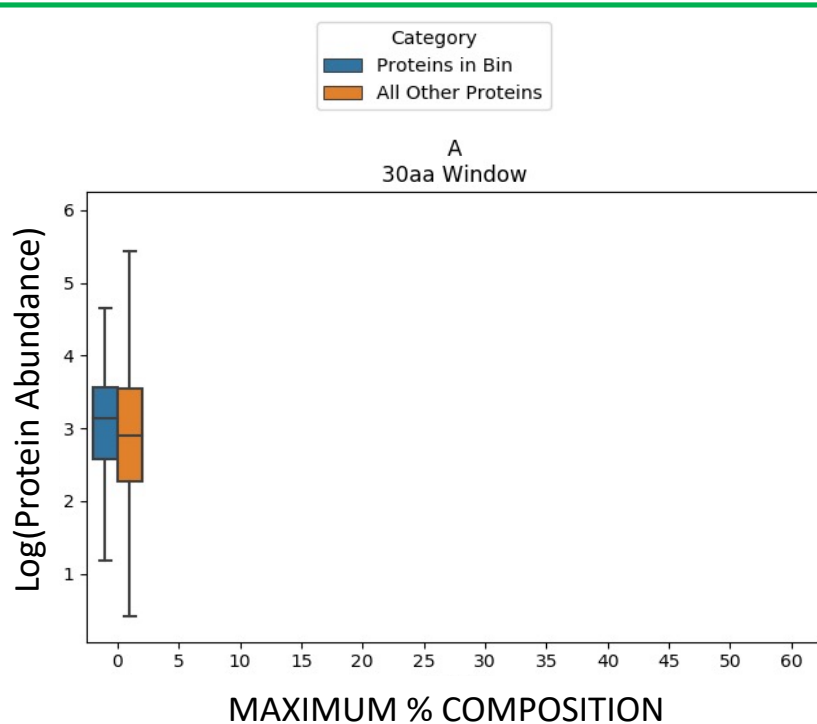
- 🔴 Significantly lower median value
- 🔵 Significantly higher median value
- ⚫ No significant difference

Adding a Time Dimension to Data Visualization – 4D Animated Figures