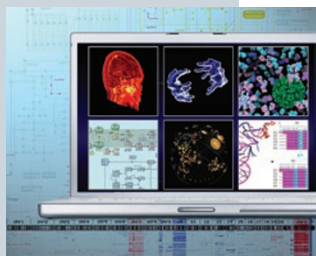


Supplement on visualizing biological data



The cover image shows a range of data visualizations currently used by life scientists. Source images come from figures in the *Nature Methods* supplement “Visualizing biological data” and from *Nature Cell Biology* and *Nature Biotechnology*. Cover design by Seán O’Donoghue and Bang Wong. Supplement Foreword p193

Biology is a visually grounded scientific discipline—from the way data is collected and analyzed to the manner in which the results are communicated to others. Visualization methods have advanced greatly from the hand-drawn pictures found in scientific publications before the twentieth century and now rely almost exclusively on computer-based visualization tools. But the similarity of modern computer-generated phylogenetic trees to their ancestral hand-drawn evolutionary trees illustrates the challenges involved in developing novel visualization methods that present information in a self-evident way and yet can handle the demands placed on them by modern methods of data generation.

The exponentially increasing amount of scientific data is taxing the abilities of scientists to make sense of it all and communicate it to others in a concise and meaningful way. Although the computers that facilitate this data deluge also help handle it, it is critical that scientists be able to participate intimately in the analysis steps using qualitative and quantitative abstractions of the underlying data.

This supplement describes data visualization methods and tools and how these methods are adapting to the challenges accompanying modern biology. A Commentary introduces the topic and summarizes the general challenges. Five Reviews describe the visualization approaches and software tools that biologists use for, respectively, data visualization of genomes, alignments and phylogenies, image-based data, macromolecular structures and systems biology data.

Each review highlights a recommended fraction of the available tools. Because these tools can be very specialized and the writers themselves are developers of some of the tools, there is little comparative assessment. Instead, the reviews focus more on the challenges and methods behind the tools. The tools themselves, ranging from simple stand-alone software to complex integrated software packages, are conveniently listed in tables within each review, and links are provided so that readers may easily access the tools and evaluate which ones best meet their specific needs.

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