



Tamara Munzner

Visualization: From Pixels to Insight

March 3, 2007
UBC CS TechTrek

Computer Graphics

- create or manipulate images with computer
 - movies, games, photorealistic simulation



Computer Graphics

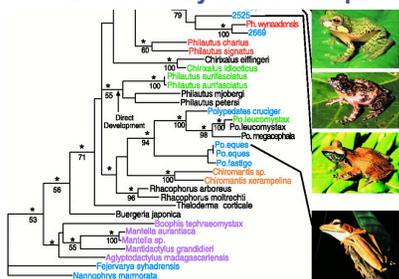
- create or manipulate images with computer
 - movies, games, photorealistic simulation
 - but wait, there's more!



Visualization

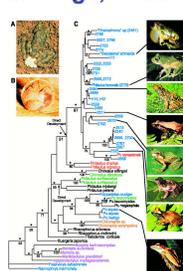
- using interactive computer graphics to help people understand information better
 - substitute visual perception for cognition
 - make the computer do the hard work
- some ways we've used it so far
 - untangling biology
 - seeing what we speak
 - finding who's who in the movies
 - playing with math

Evolutionary Relationships



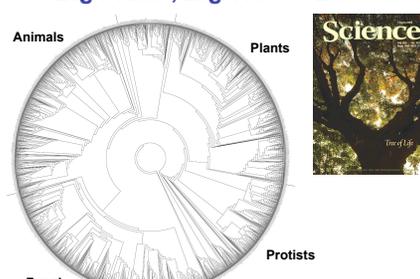
M Meegaskumbura et al. Science 298:379 (2002) 5

Small Frogs, Small Blue



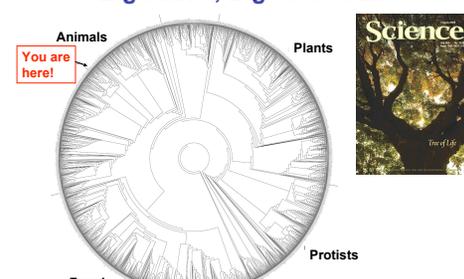
M Meegaskumbura et al. Science 298:379 (2002) 6

Big Planet, Big Tree of Life



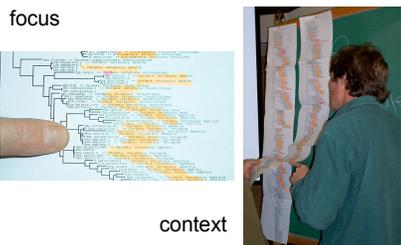
David Hillis, Science 300:1687 (2003) 7

Big Planet, Big Tree of Life



David Hillis, Science 300:1687 (2003) 8

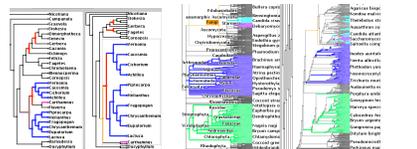
The Old Way...



9

The New Way: TreeJuxtaposer

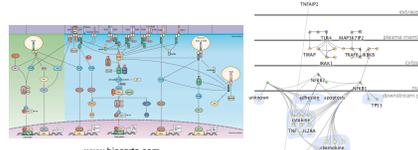
- side-by-side comparison of evolutionary trees
 - stretch and squish to navigate
- demo at <http://olduvai.sf.net/tj>



more info at www.cs.ubc.ca/labs/imager/tr/2003/tj 10

Protein-Gene Pathways: Cerebral

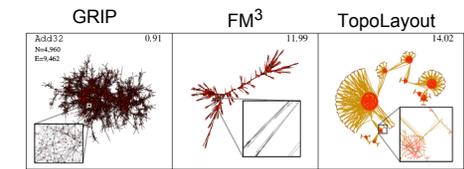
- pathway-style diagrams familiar to biologists
 - automatically place items with minimal clutter
- demo at <http://www.pathogenomics.ca/cerebral/>



more info at www.cs.ubc.ca/labs/imager/tr/2007/barskya_cerebral_appnote 11

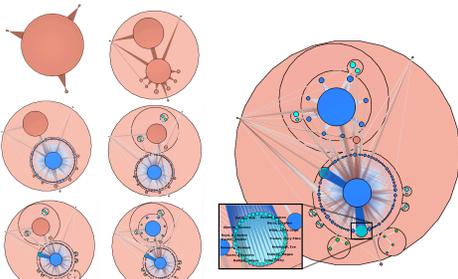
Untangling the Ball of Yarn: TopoLayout

- breaking it up into the right pieces
 - using the right tool for the job to draw each piece



more info at www.cs.ubc.ca/labs/imager/tr/2006/Archambault_TopologyLayout_TVCG 12

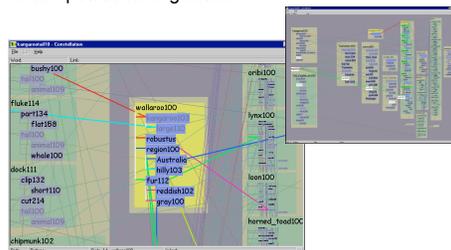
Who's Who in the Movies: Grouse



more info soon at www.cs.ubc.ca/labs/imager/tr/2007/Archambault_Grouse 13

Seeing What We Speak: Constellation

- computational linguistics



more info at graphics.stanford.edu/papers/const 14

Mapping Out Math: Movies

- topology and geometry

The Shape of Space



more at www.geom.uiuc.edu/video/sos

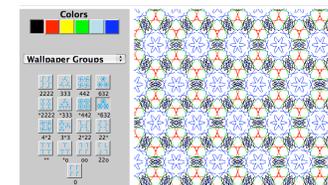
Outside In



more at www.geom.uiuc.edu/docs/outreach/oi 15

Symmetries of Space

- play with patterns to learn underlying principles
 - demo at <http://www.scienceu.com/geometry/hands-on/kali/kali.html>



more info at www.scienceu.com/geometry/articles/tiling 16

Yet More Information

- pictures, videos, software, papers, talks
 - <http://www.cs.ubc.ca/~tmm>
- these talk slides
 - <http://www.cs.ubc.ca/~tmm/talks/techtrek07>