University of British Columbia
Department of Computer Science

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

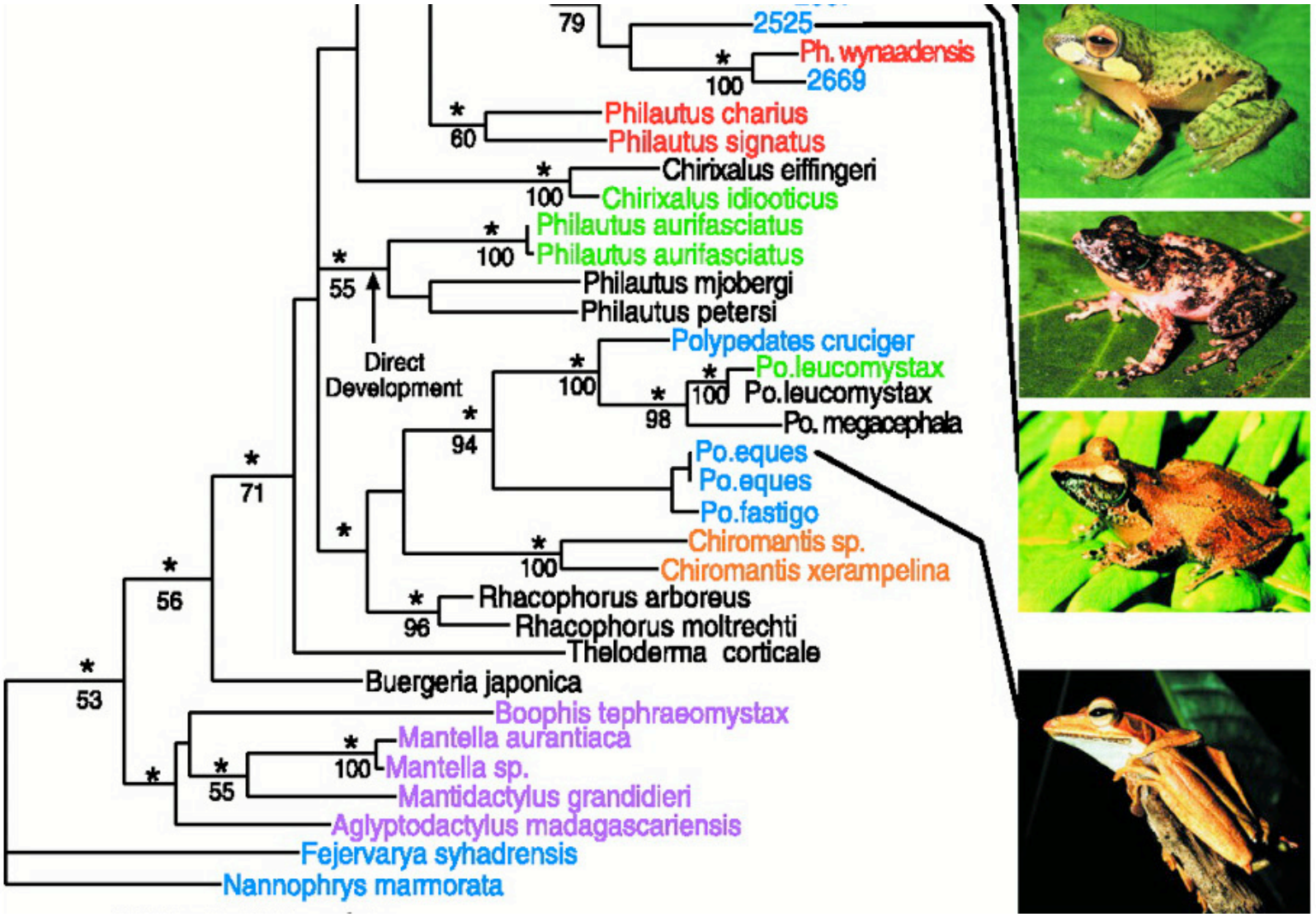
Computer Graphics

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

Visualization

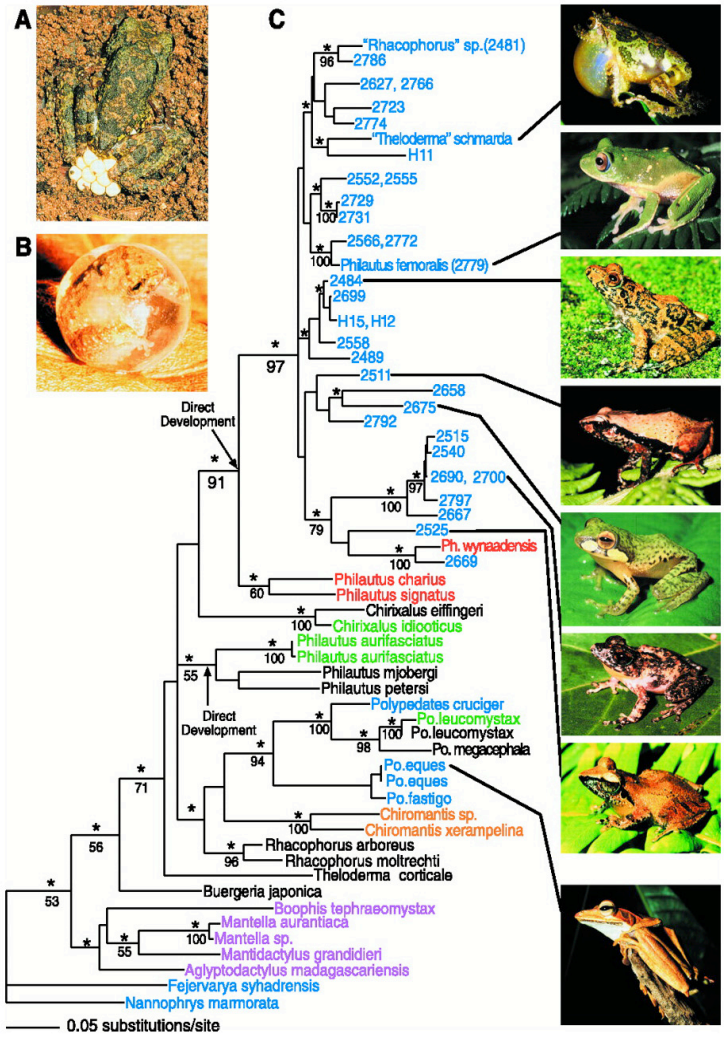
- using interactive computer graphics to help people understand information better
  - substitute visual perception for cognition
  - make the computer do the hard work
- some ways we've used it so far
  - untangling biology
  - seeing what we speak
  - finding who's who in the movies
  - playing with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

Evolutionary Relationships



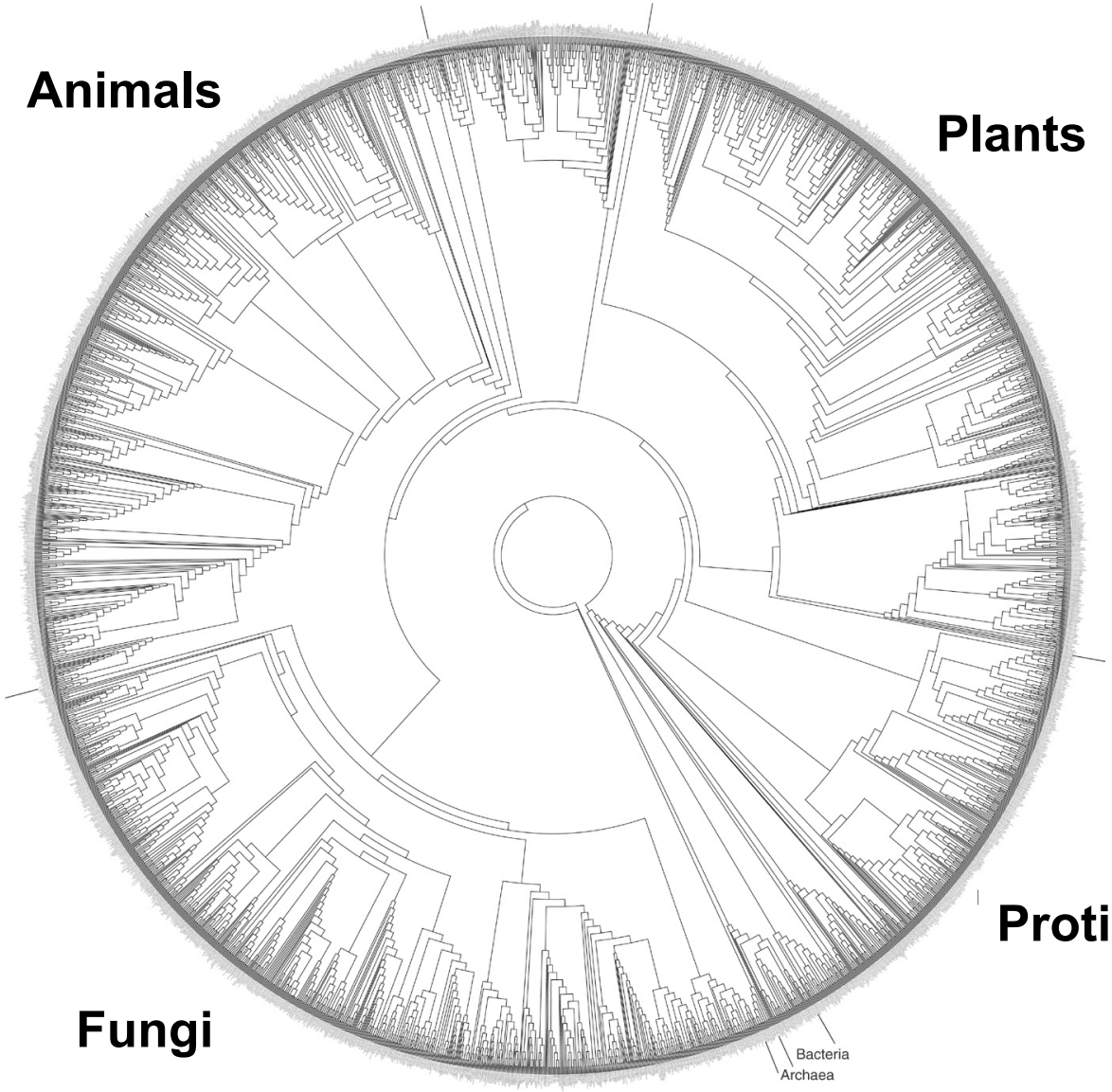
M Meegaskumbura et al., Science 298:379 (2002)

Small Frogs, Small Tree



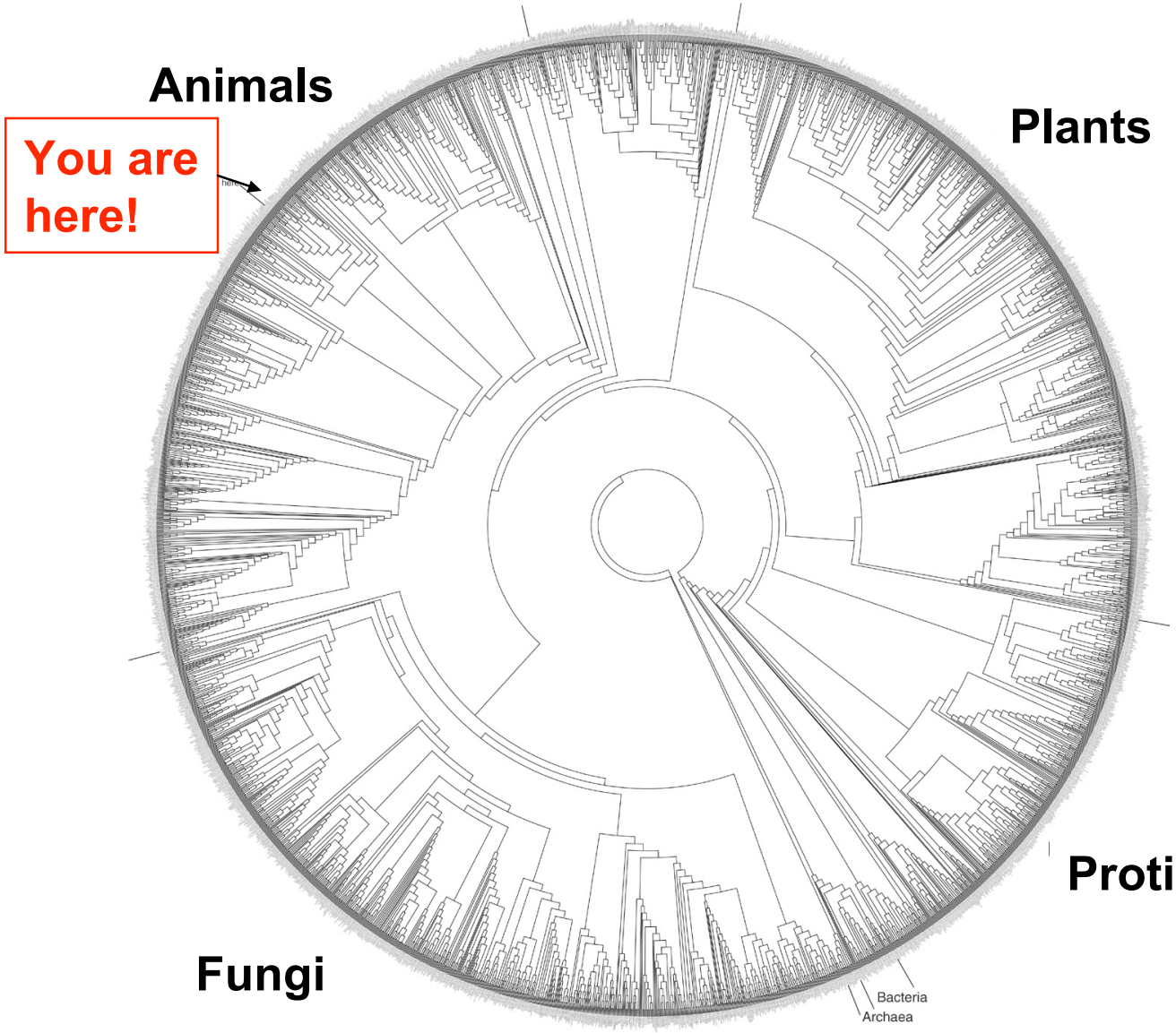
M Meegaskumbura et al., Science 298:379 (2002)

Big Planet, Big Tree of Life



David Hillis, Science 300:1687 (2003)

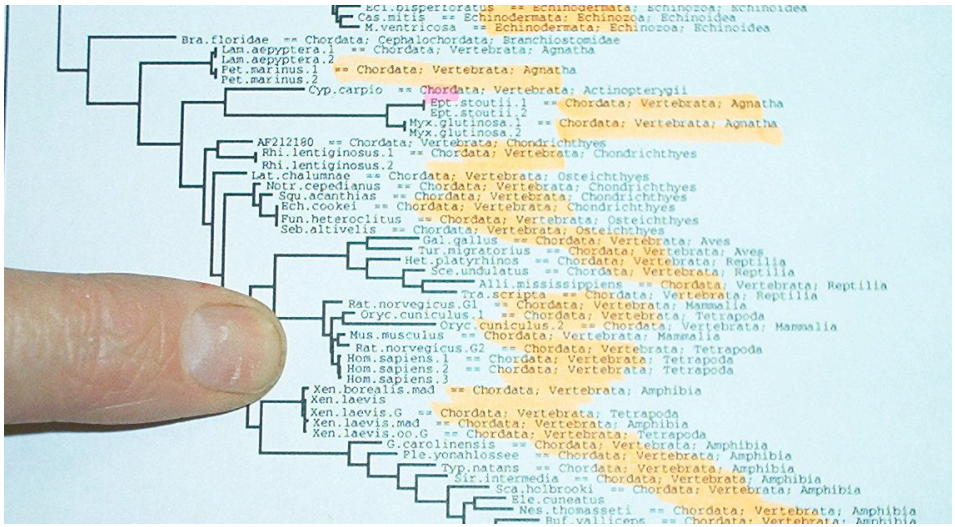
Big Planet, Big Tree of Life



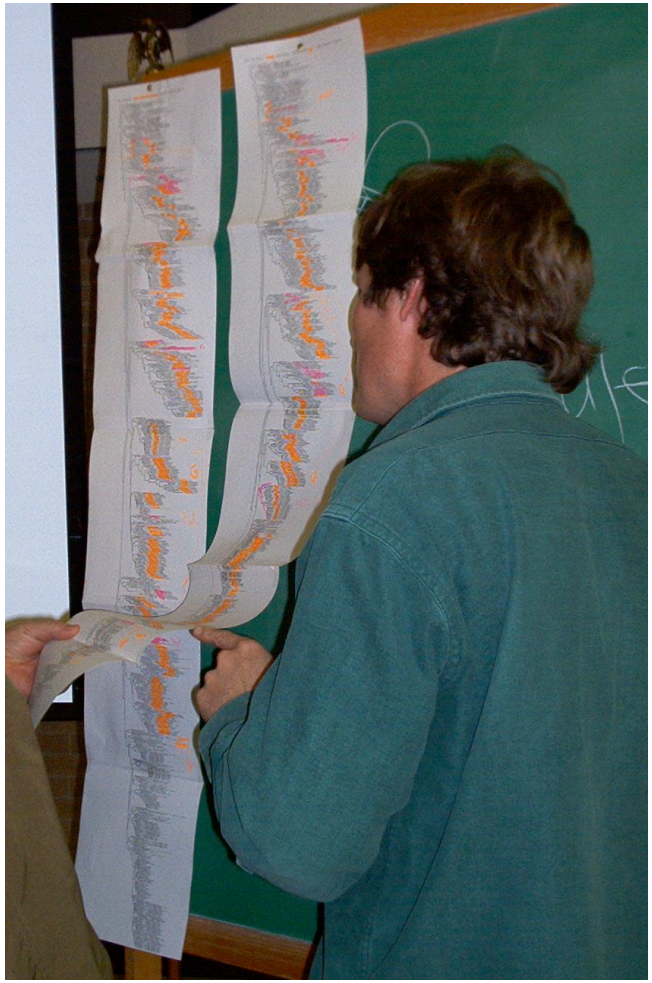
David Hillis, Science 300:1687 (2003)

The Old Way…

focus

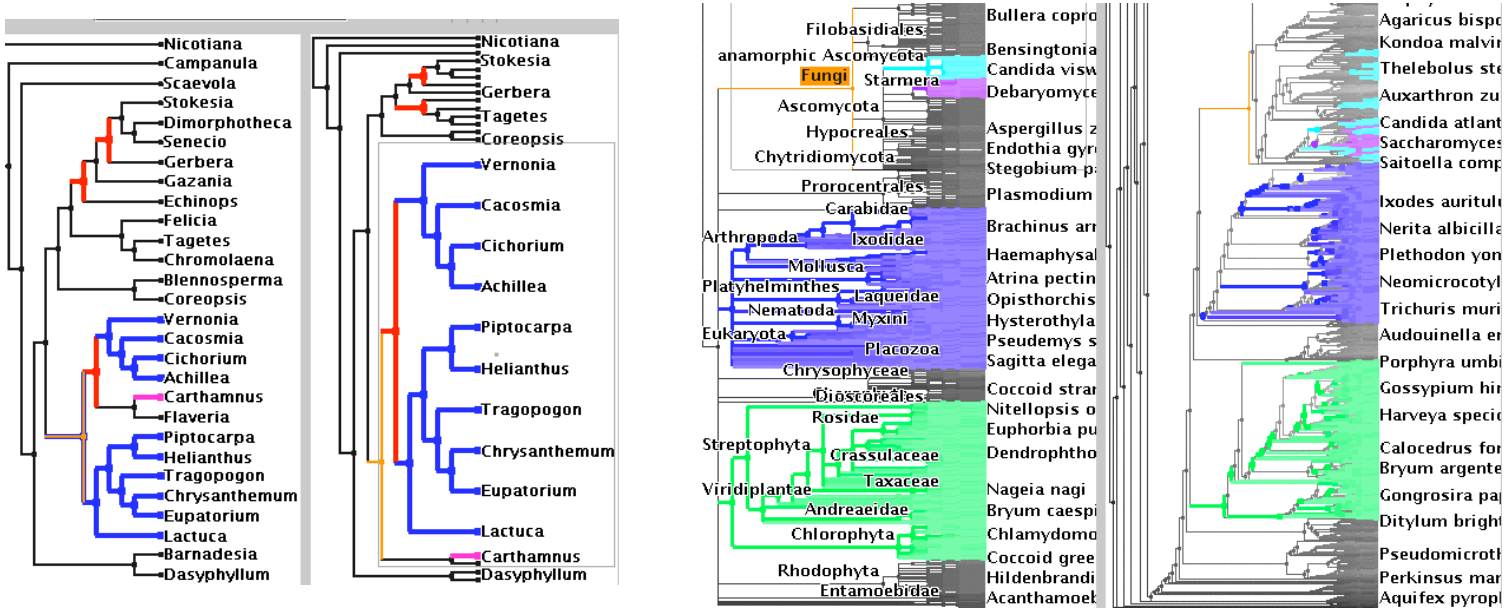


context



The New Way: TreeJuxtaposer

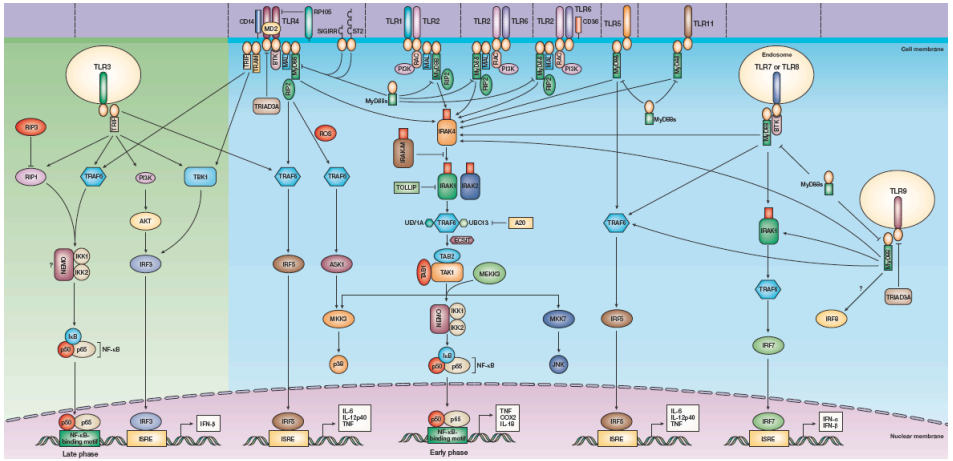
- side-by-side comparison of evolutionary trees
  - stretch and squish to navigate
- demo at http://olduvai.sf.net/tj



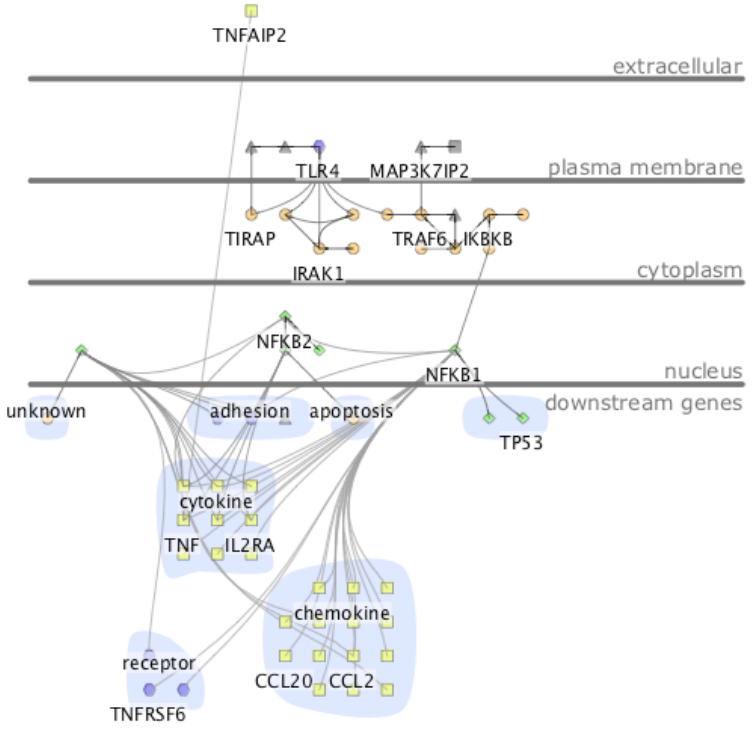
more info at www.cs.ubc.ca/labs/imager/tr/2003/tj

Protein-Gene Pathways: Cerebral

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



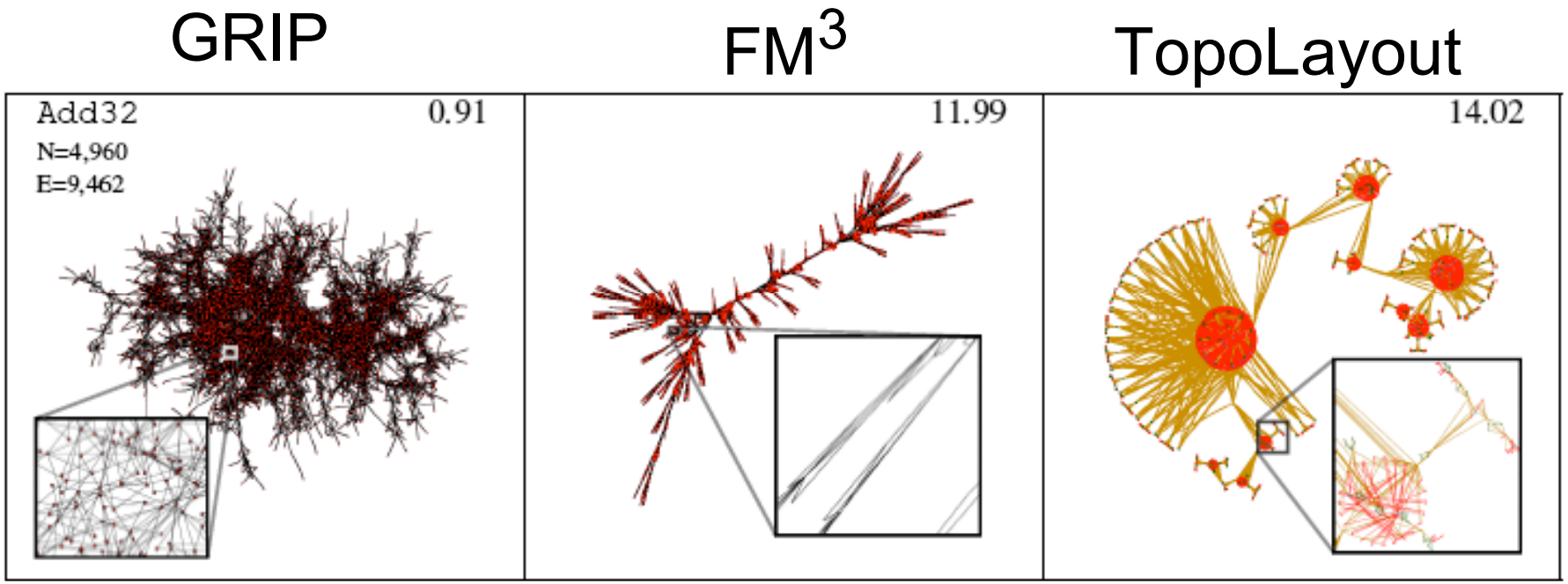
www.biocarta.com



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

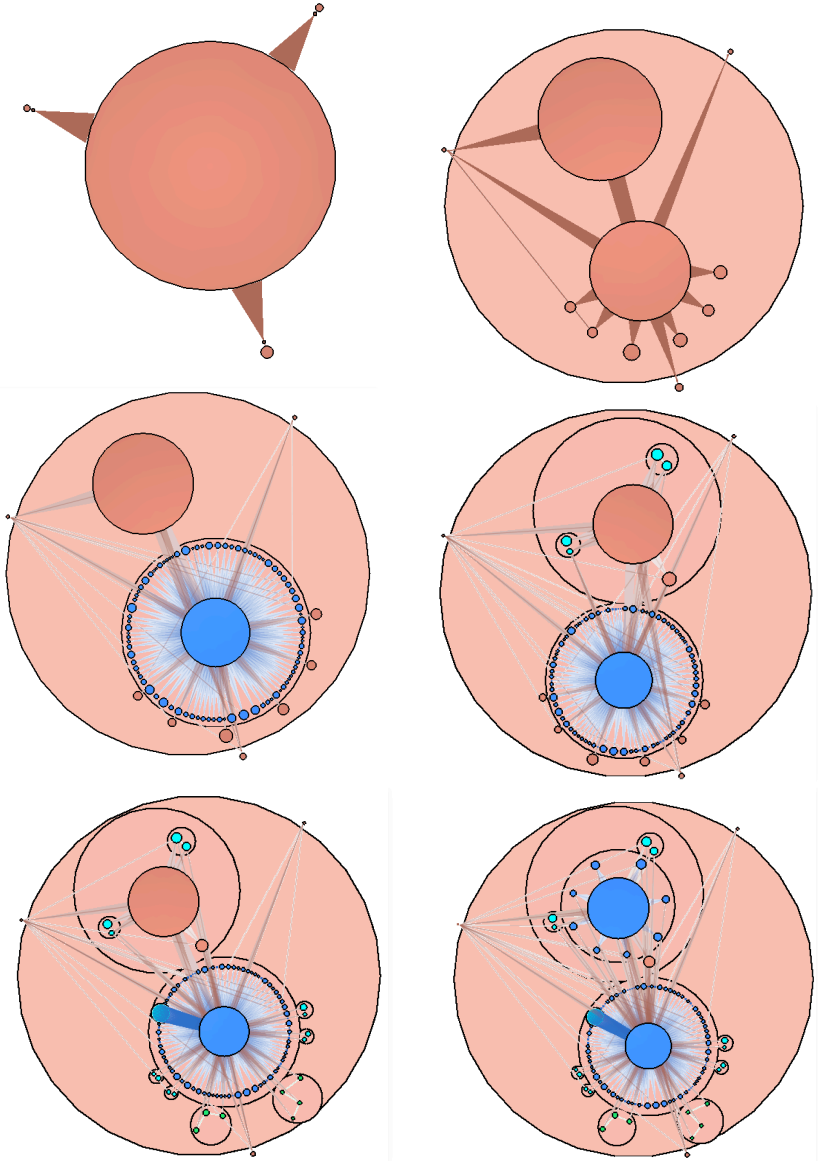
Untangling the Ball of Yarn: TopoLayout

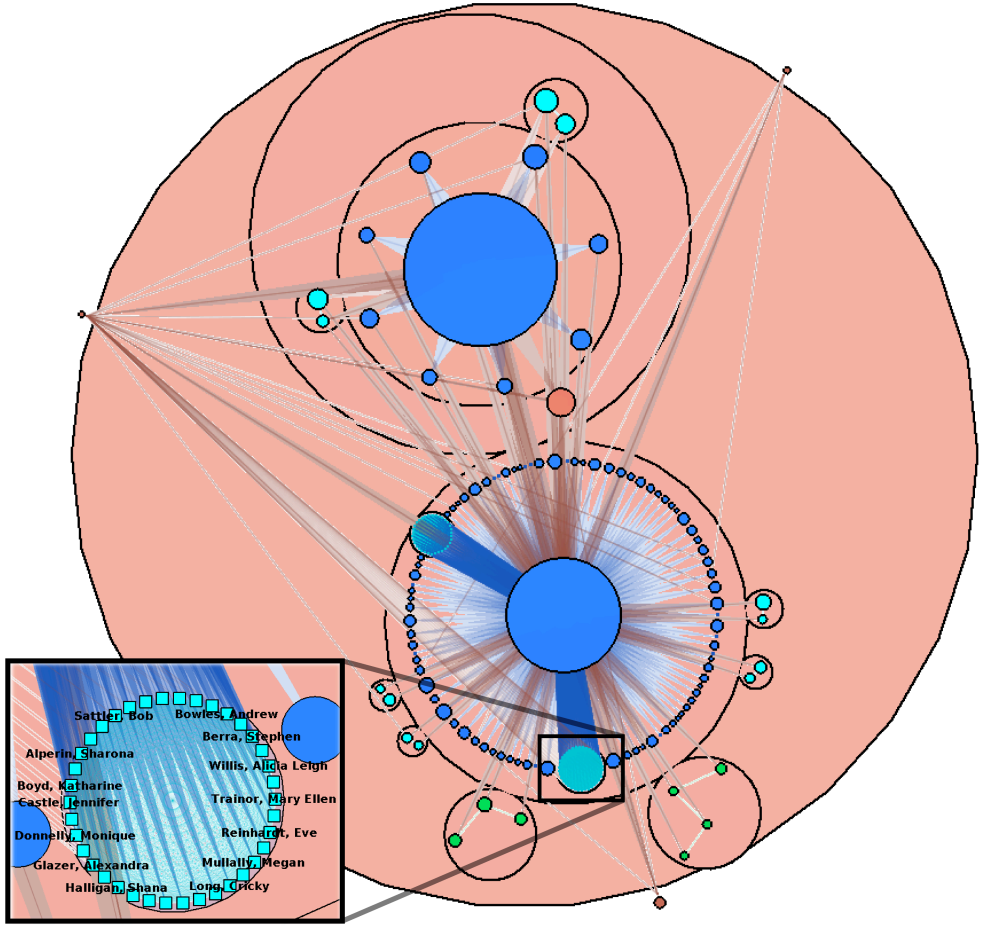
- breaking it up into the right pieces
- using the right tool for the job to draw each piece



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

Who's Who in the Movies: Grouse

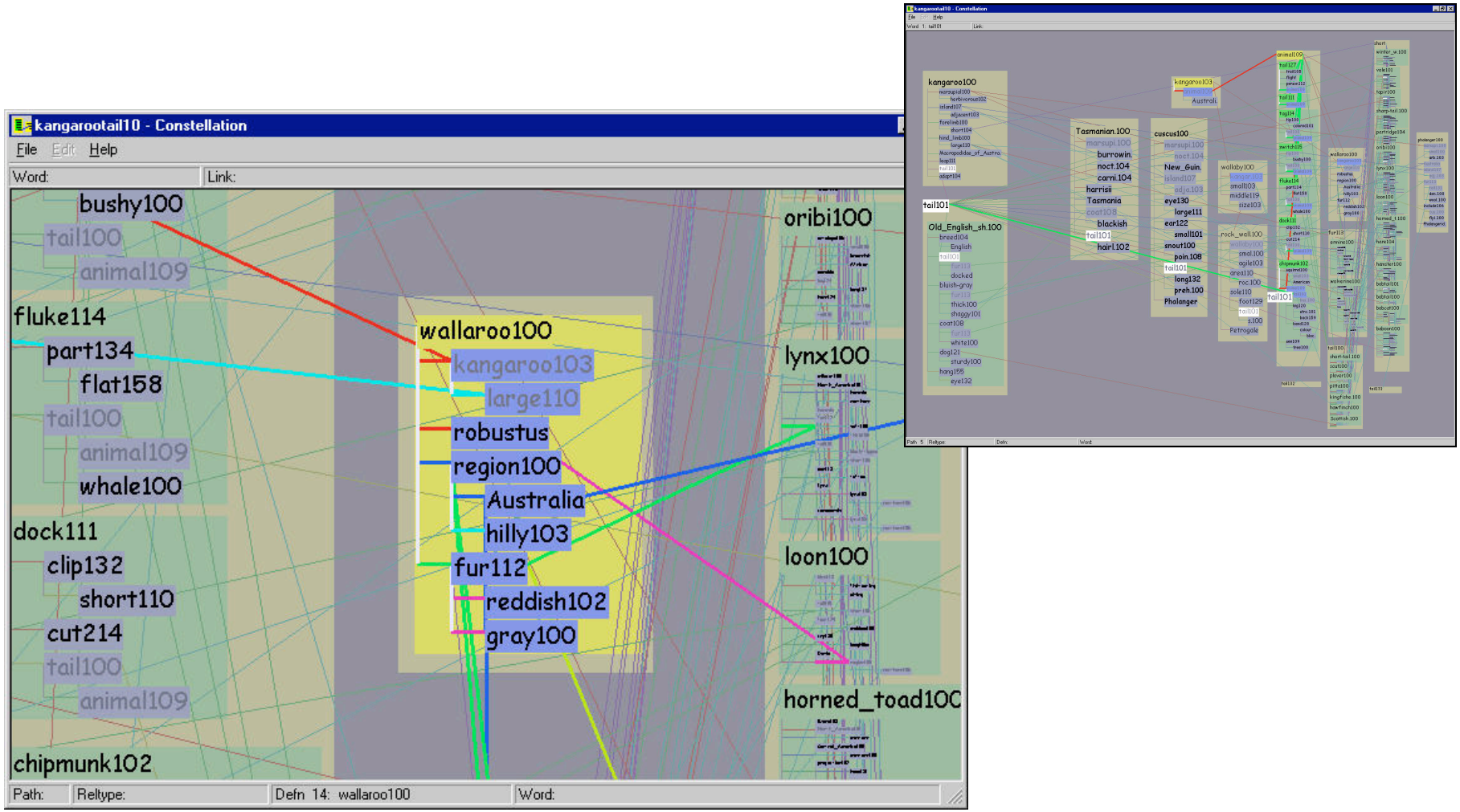




more info soon at www.cs.ubc.ca/labs/imager/tr/2007/Archambault_Grouse

Seeing What We Speak: Constellation

- computational linguistics

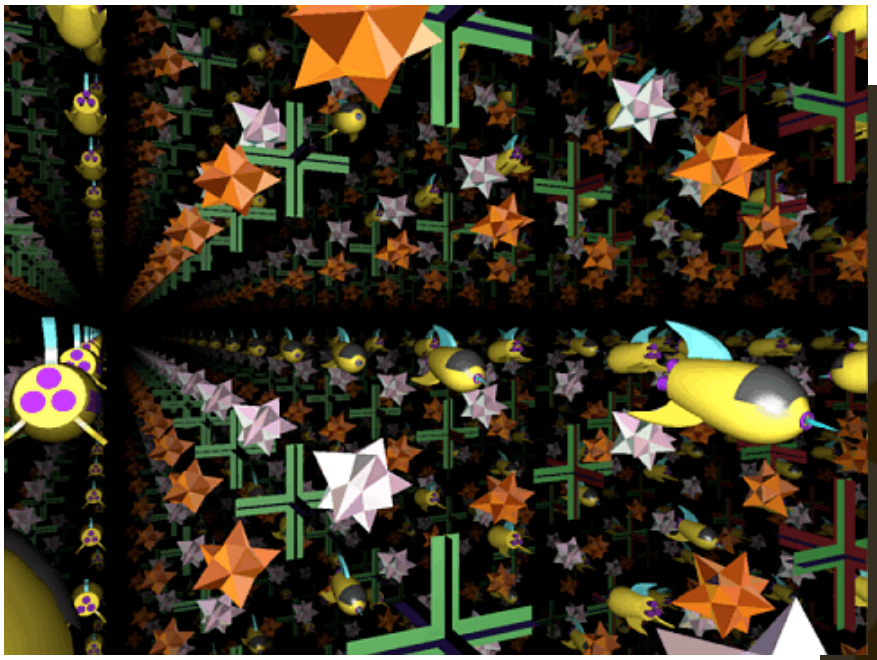


more info at graphics.stanford.edu/papers/const

Mapping Out Math: Movies

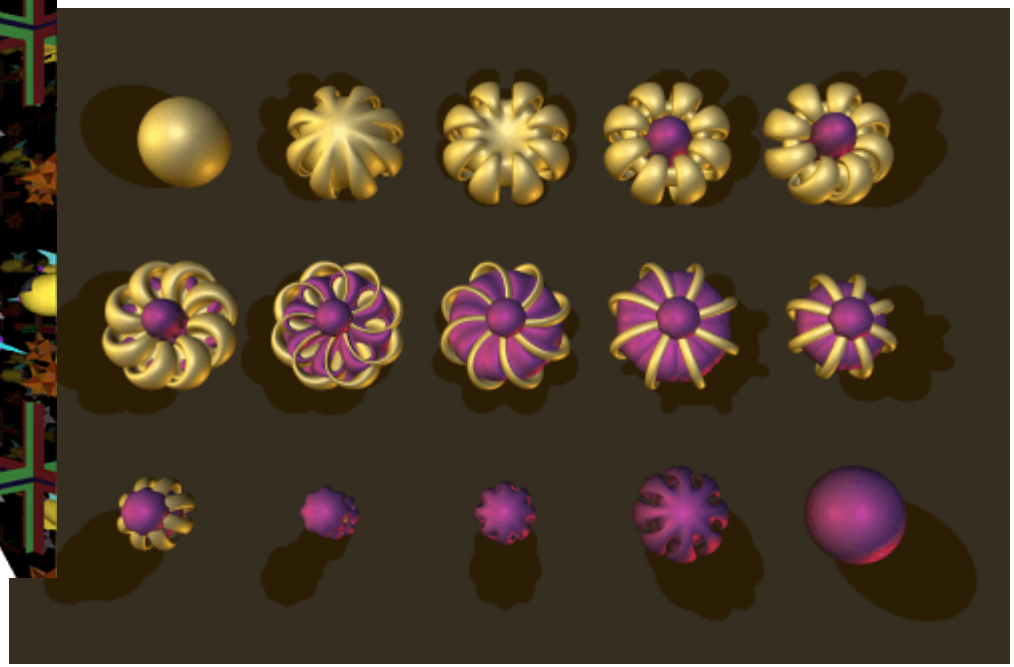
- topology and geometry

The Shape of Space



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

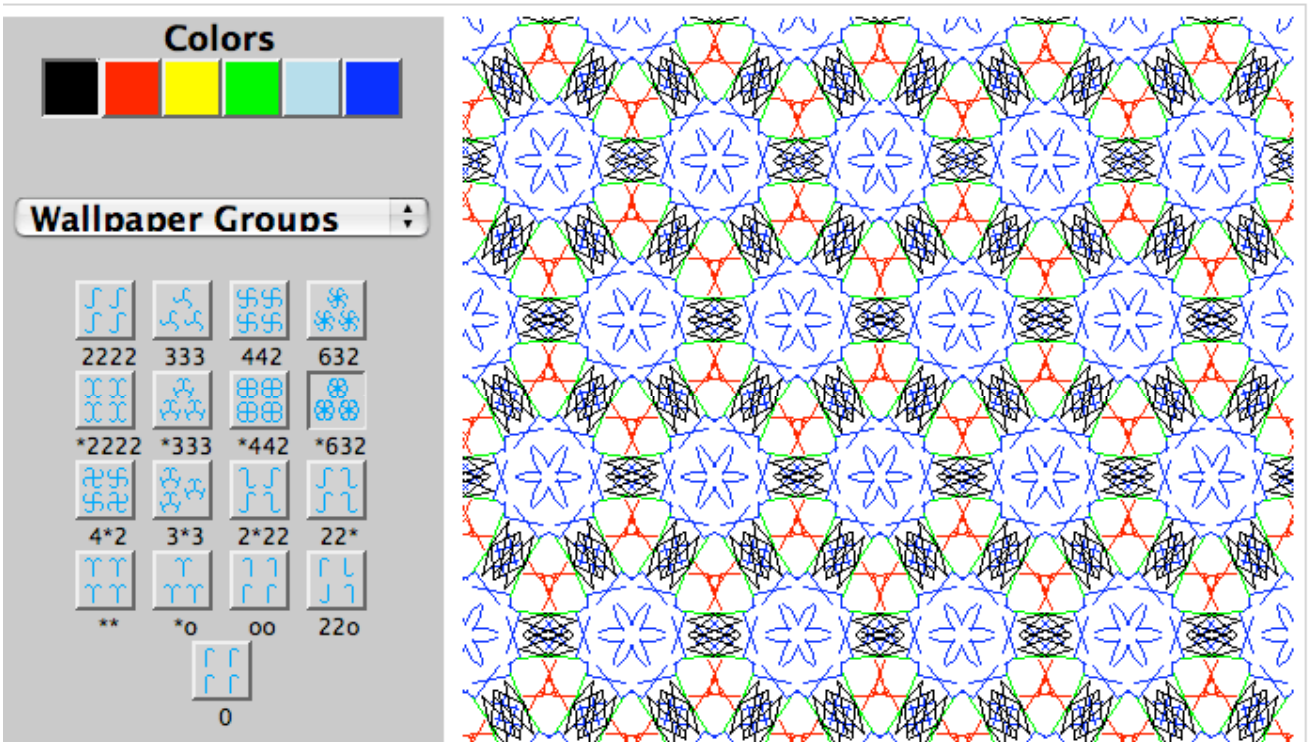
Outside In



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

Symmetries of Space

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



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

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