

Scalable Tree Comparison using Focus+Context with Guaranteed Visibility

InfoVis 2003 TreeJuxtaposer contest submission

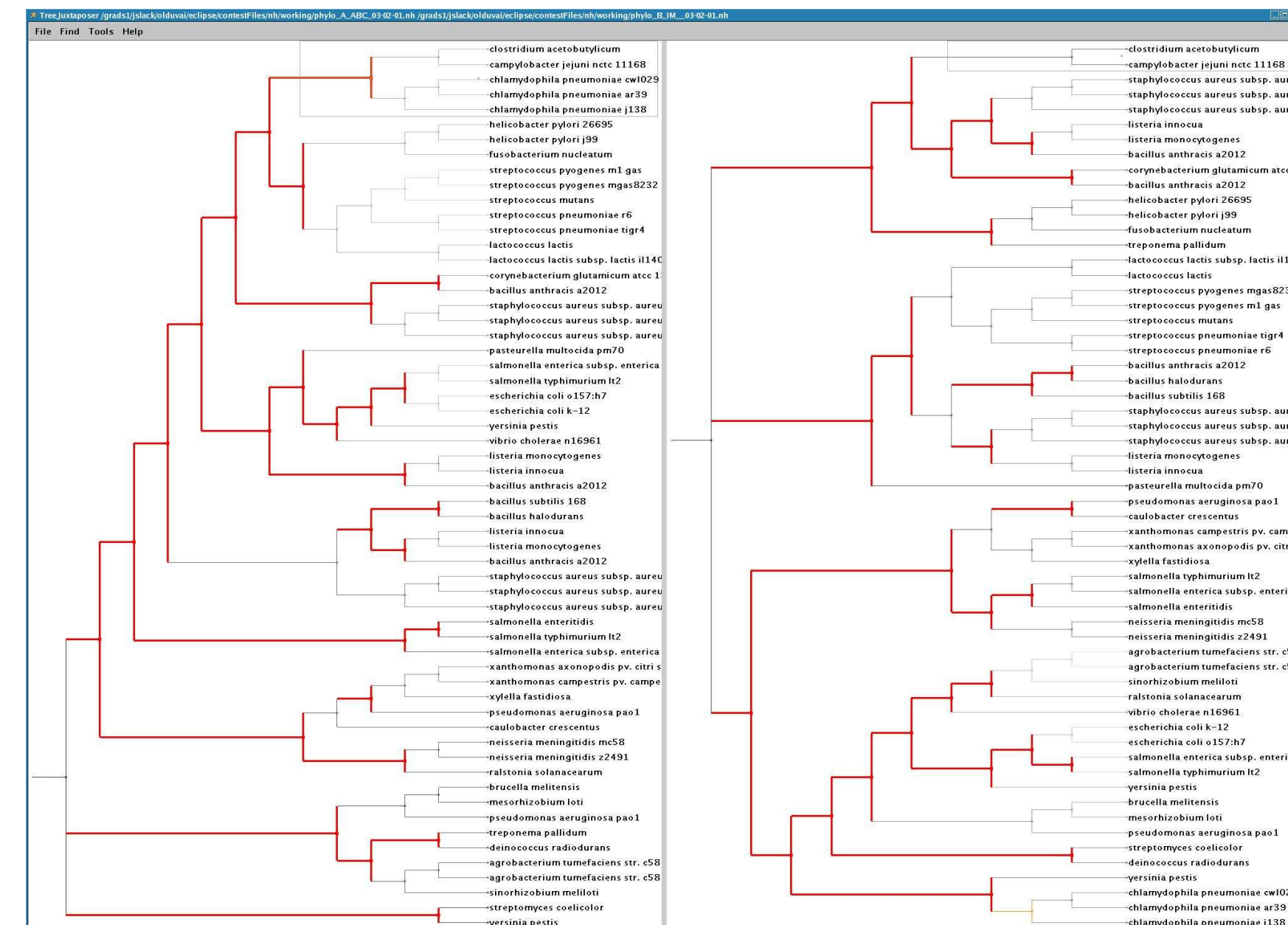
James Slack, Tamara Munzner (University of British Columbia),
François Guimbretière (University of Maryland)

<http://www.cs.ubc.ca/~tmm/papers/contest03>



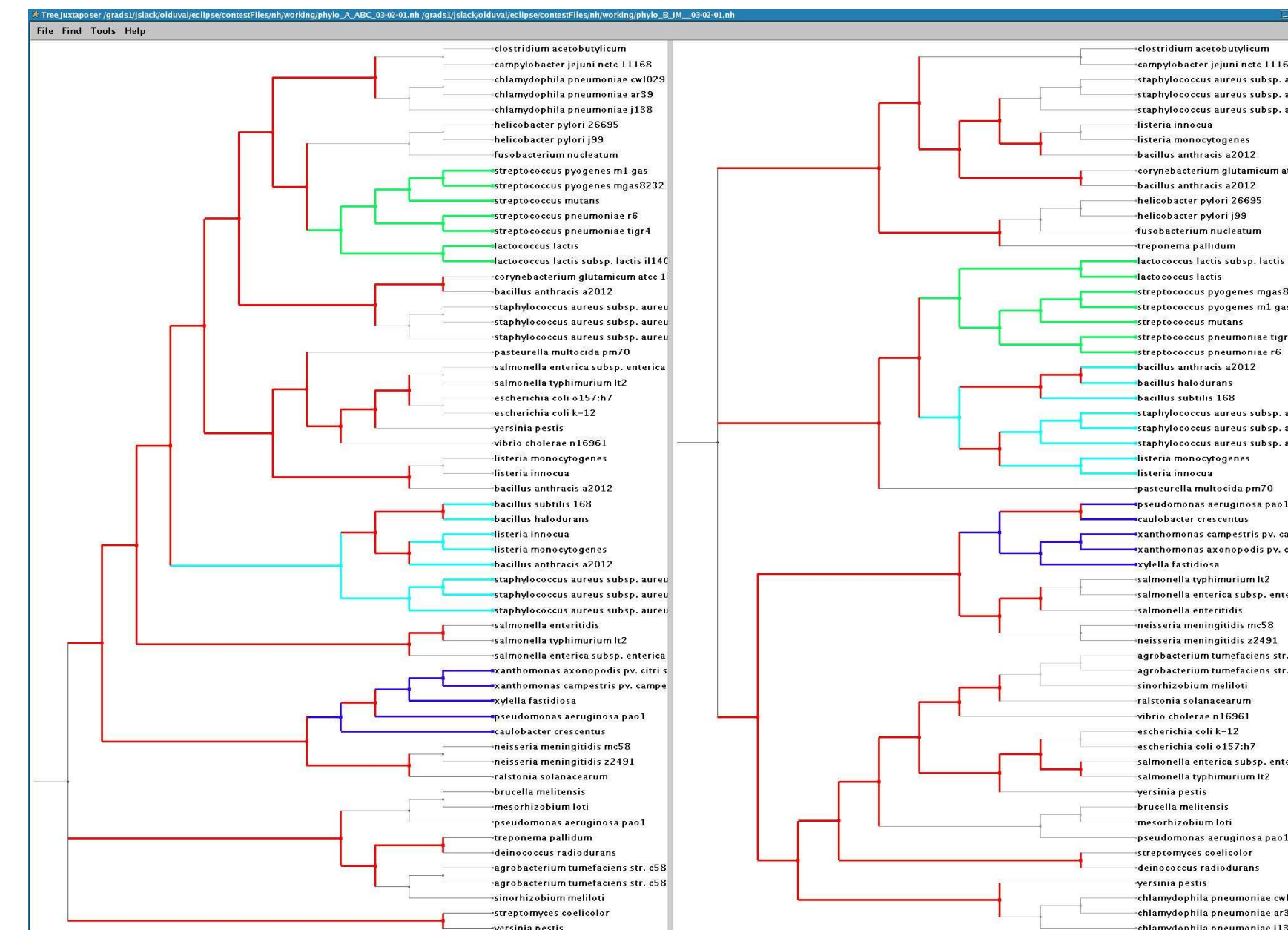
Phylogenetic Trees

- Differences marked automatically in red
 - Visually highlight exact points of topological change



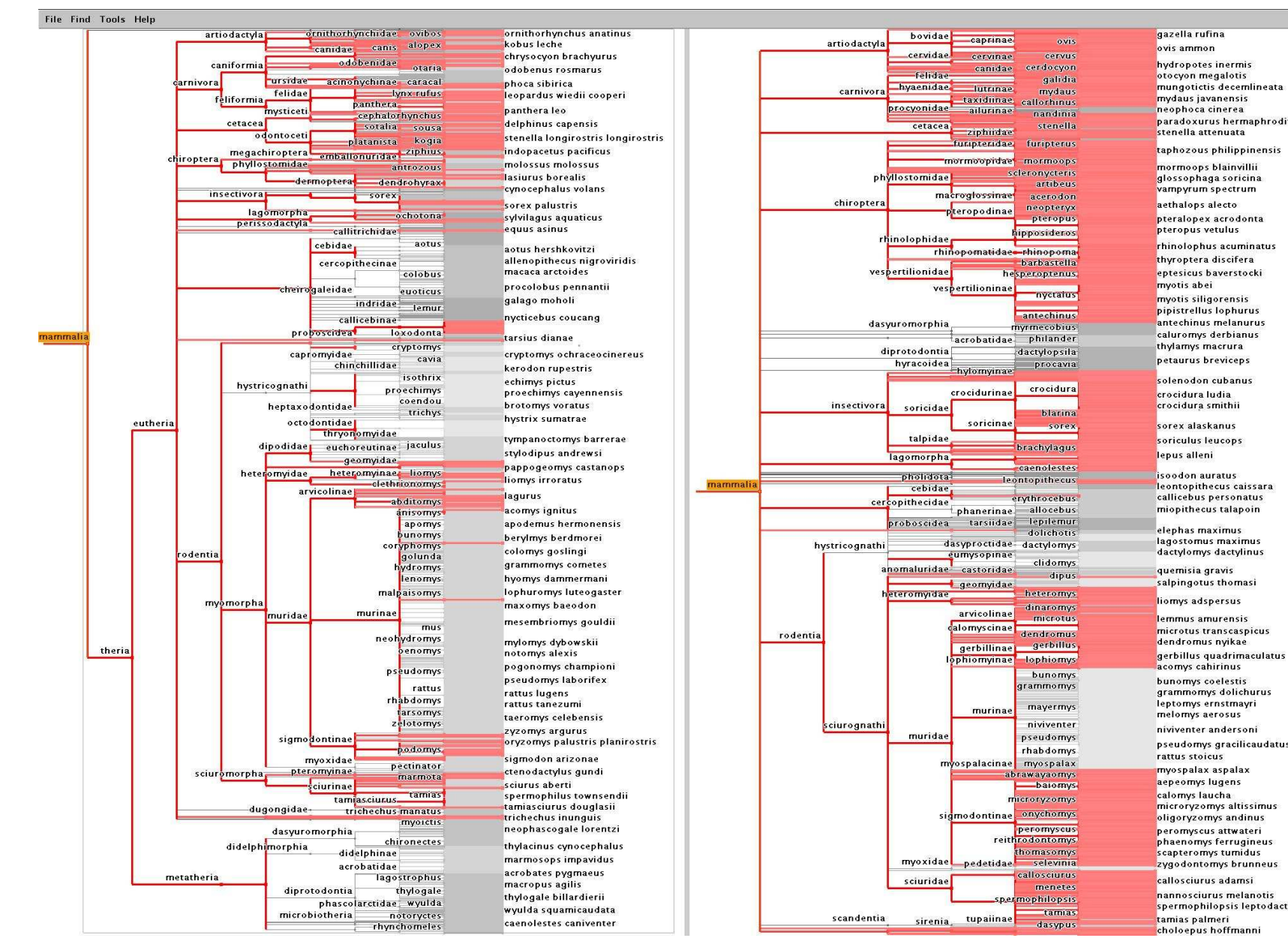
Phylogenetic Trees: Marking Subtrees

- Selected subtrees can be marked with colour
 - Coloured subtrees aid structural analysis



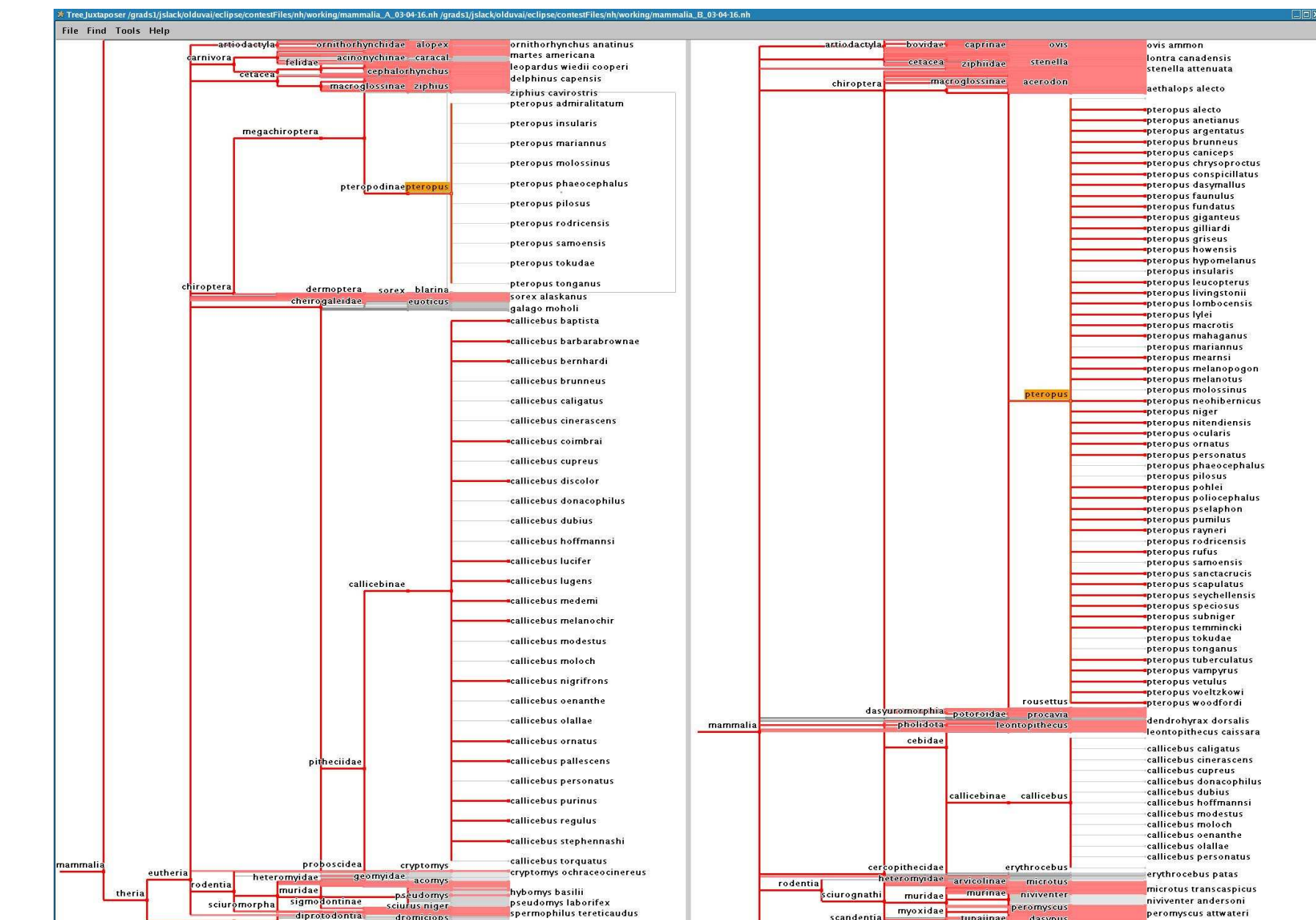
Classification Trees

- Mammalia subtree (6K nodes)
- Greedy label drawing algorithm, label not drawn if overlap



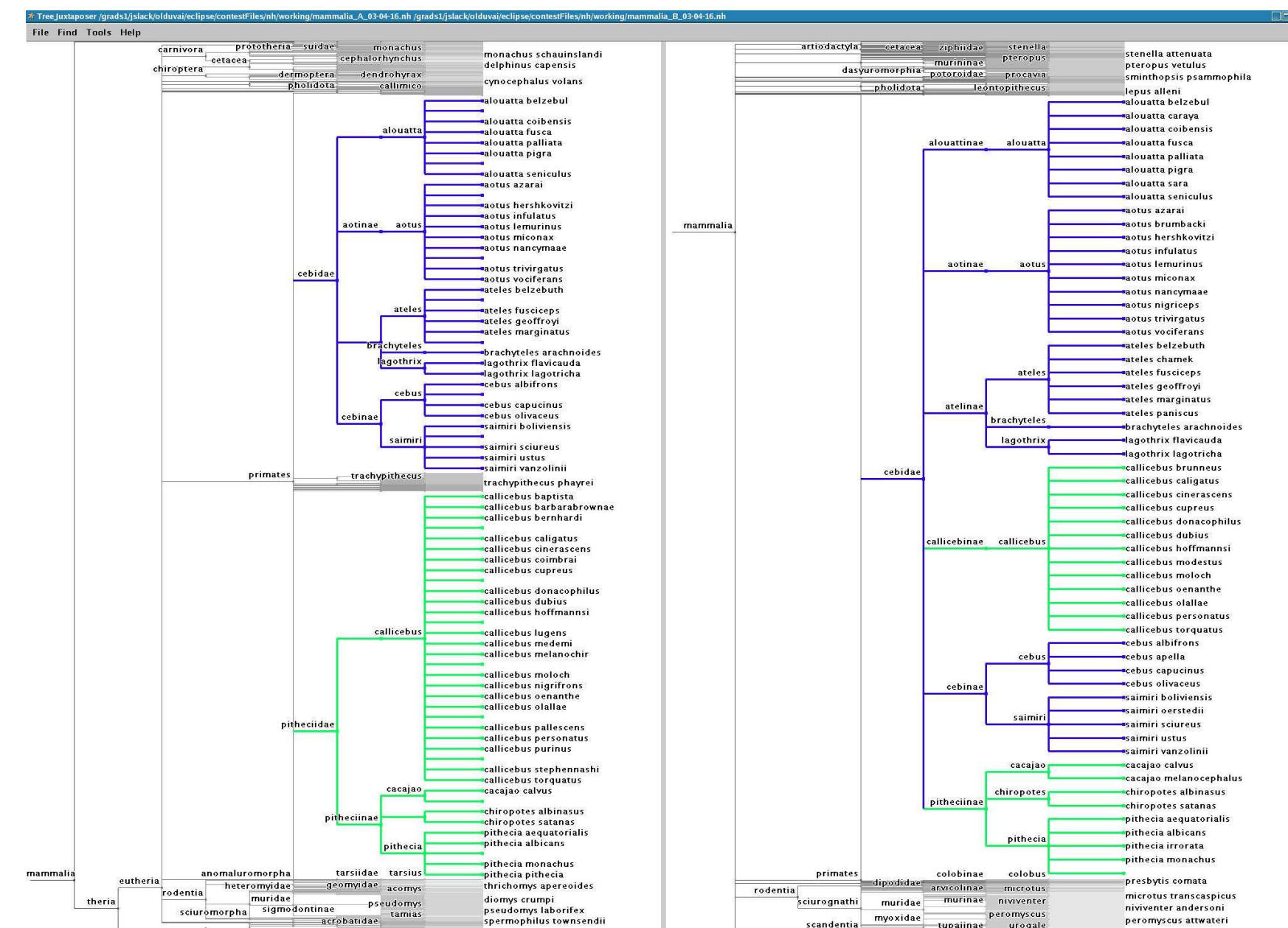
Classification Trees

- Subtrees can be stretched (rubber sheet)
- Rest of tree compressed, remains in view (tacked borders)



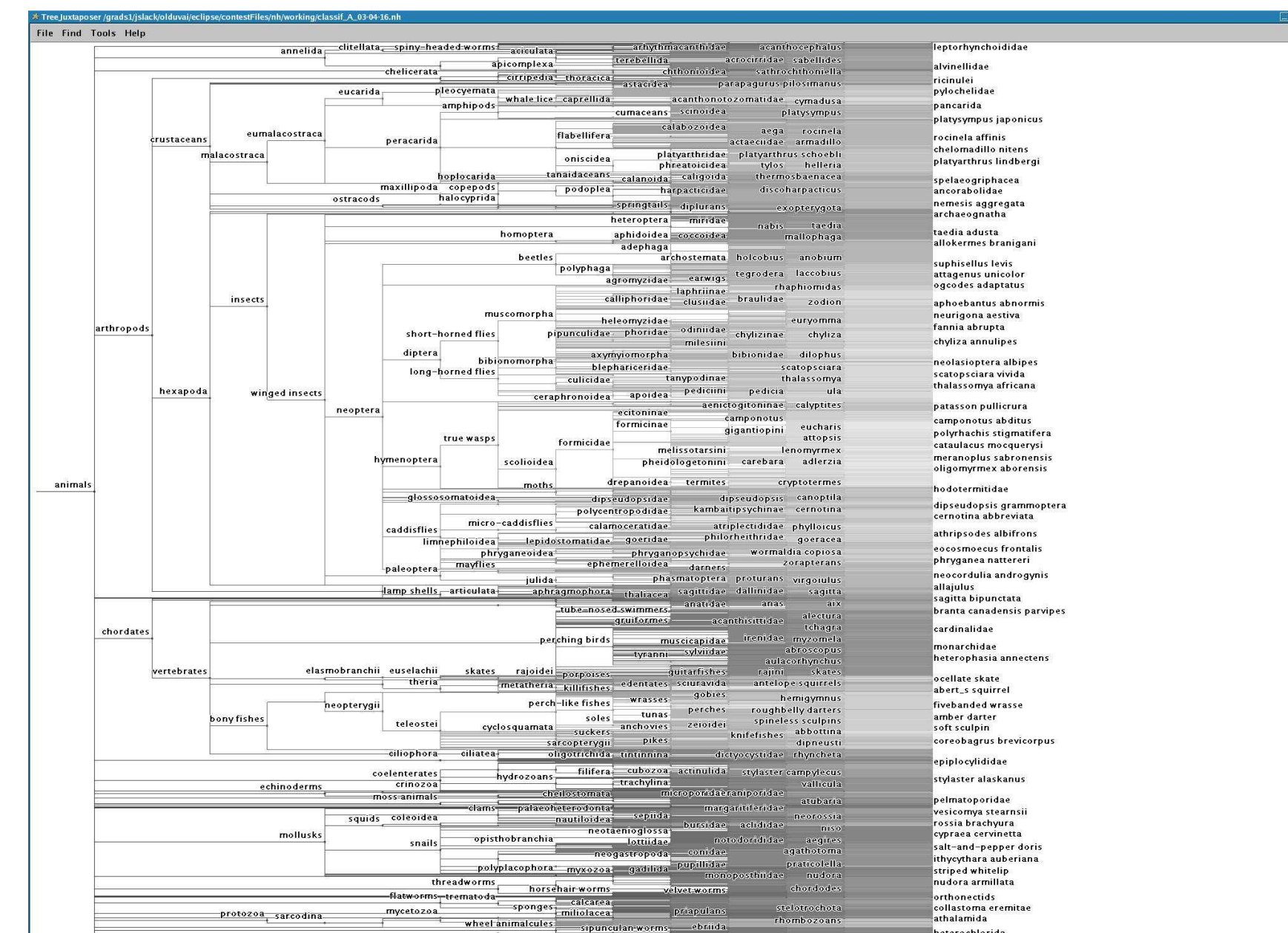
Classification Tree Node Movement

- Select subtree, preprocessed set of best nodes selected
 - Forest may result, precalculation in $O(n \log^2 n)$



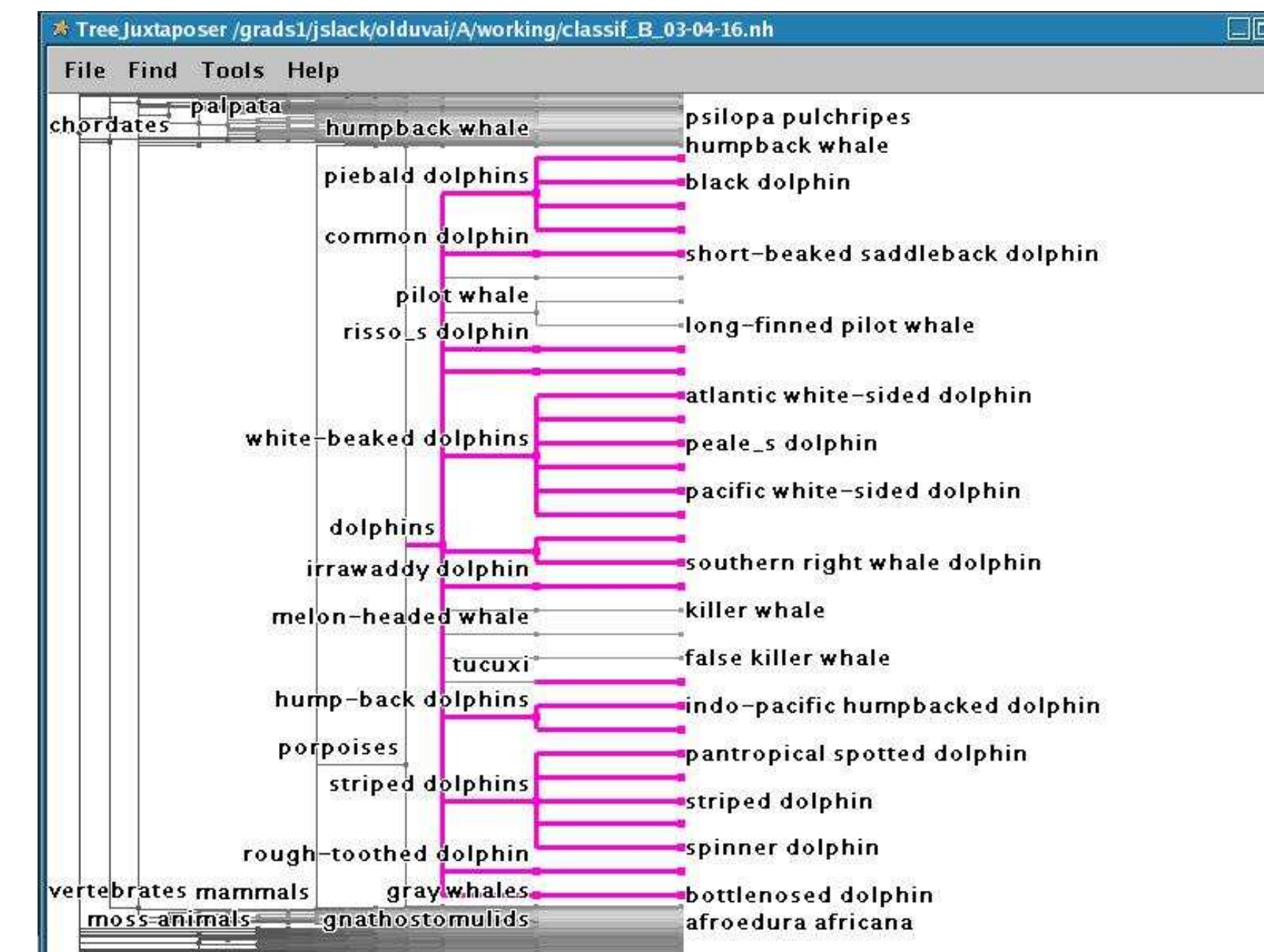
Classification Tree Browsing

- Scalability: interactive browsing with 198K nodes
- Nodes initially given equal vertical screen space



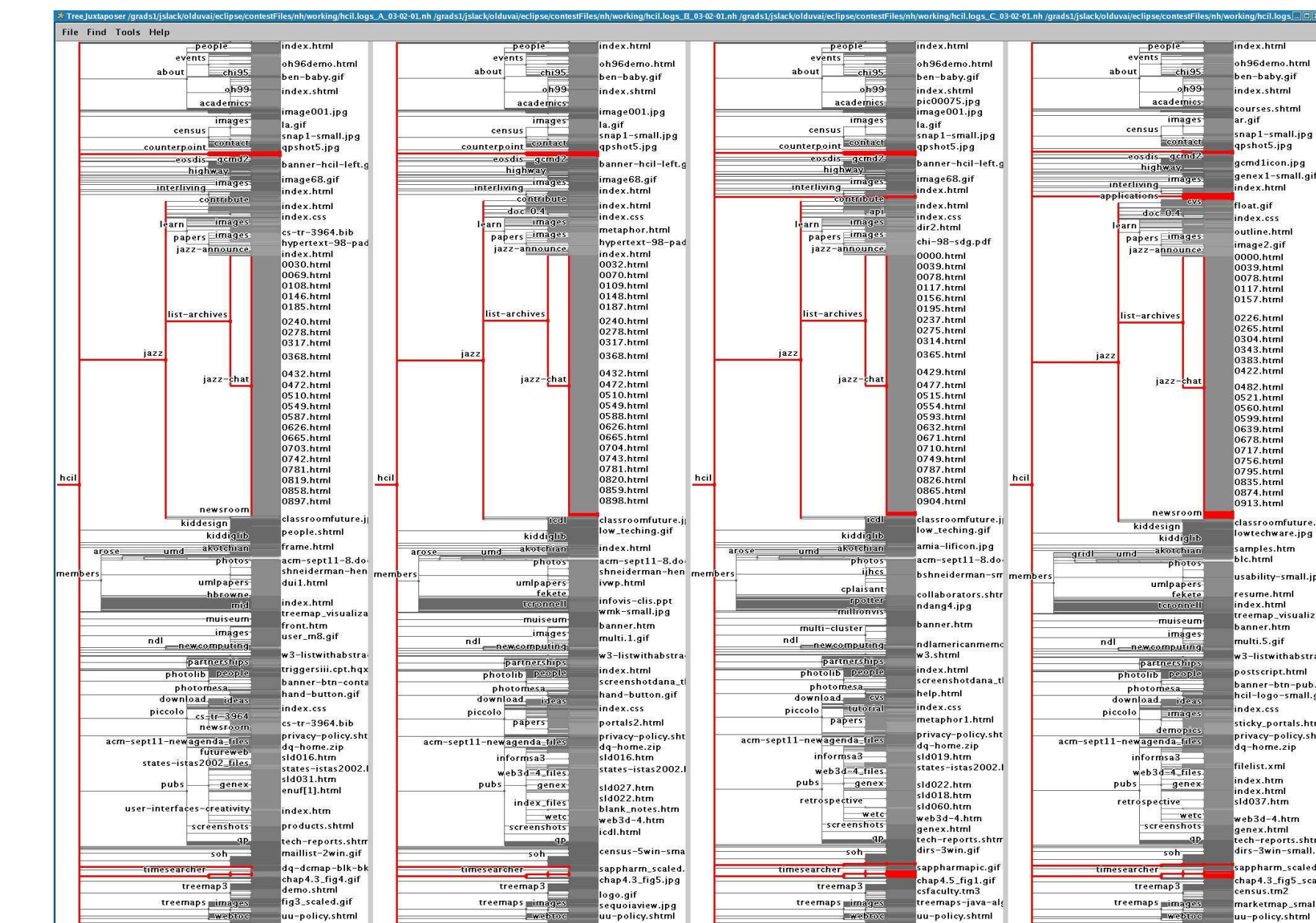
Classification Tree Search

- Search for node with the find panel
 - Results relayed instantly as marked nodes



File System Trees

- 4-way comparison of hcil subtree (3700 nodes)
 - Sparse differences are guaranteed to be visible



Weaknesses

- Attributes for nodes not handled
- Trees can not be edited
 - Topology is static
 - Node name is static
 - No filtering
- No undo/playback functionality
- Large memory footprint
 - Unable to load two 200K node trees for comparison

Strengths

- Guaranteed Visibility of marked groups
 - Global overview to start, stretch to details
 - Focus+context (rubber sheet, tacked borders)
- Scalability
 - 4 way comparable: up to 75K nodes per tree
 - 2 way comparable: up to 140K nodes per tree
 - Single tree interactively browsing: up to 550K nodes
- Progressive rendering
 - Draw important animation updates first

Strengths

- Difference computation automated, preprocessed
 - Visually highlight exact points of topological change
- Interactive search
 - Real-time visual feedback displayed in context during search
- Linked functionality
 - Highlighting: mouse-over reveals best node
 - Marking: subtree on A represented on B
 - Navigating: stretch trees simultaneously

Further Information

- TreeJuxtaposer: Scalable Tree Comparison using Focus+Context with Guaranteed Visibility
 - Tamara Munzner, François Guimbretière, Serdar Tasiran, Li Zhang, Yunhong Zhou, SIGGRAPH 2003