INFOVIS 2003

Tree Comparison Contest: TreeJuxtaposer

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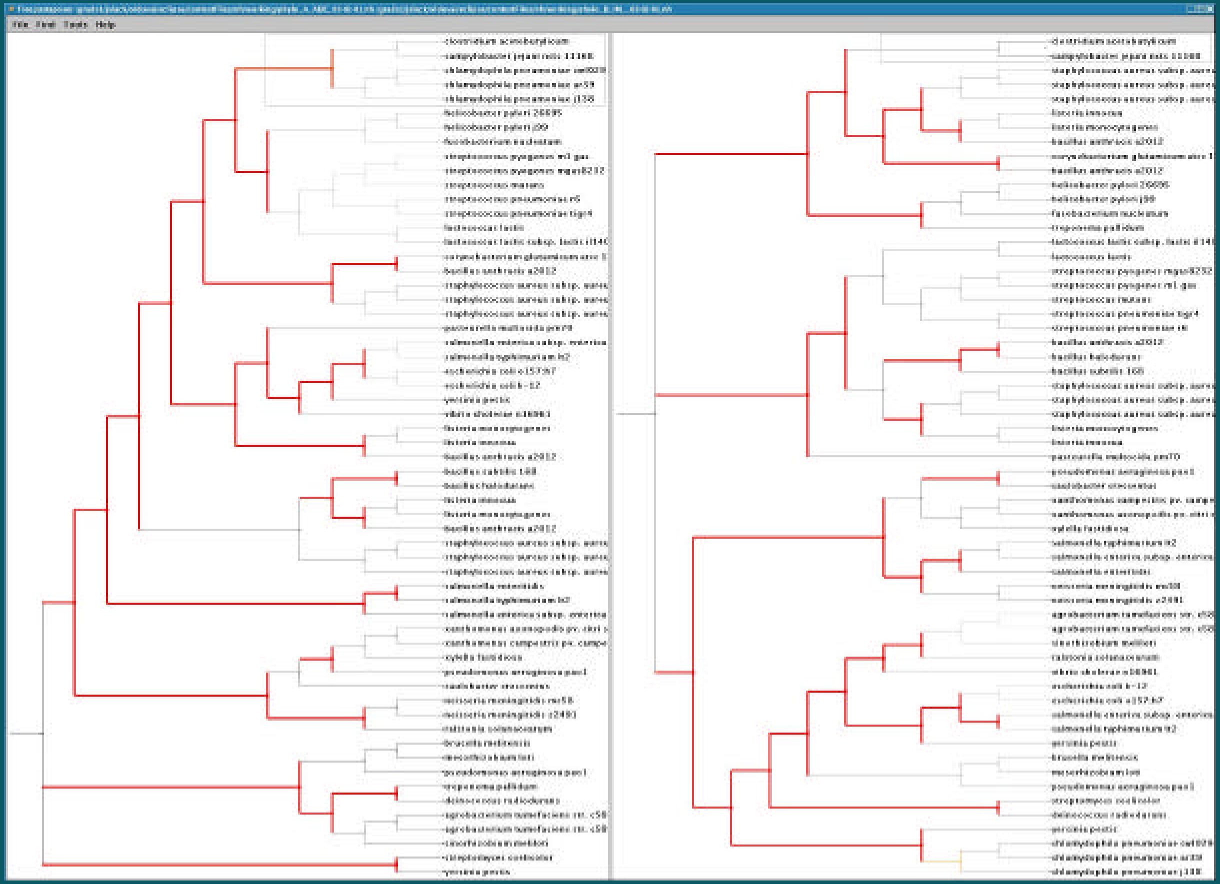
Phylogenetic Trees

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



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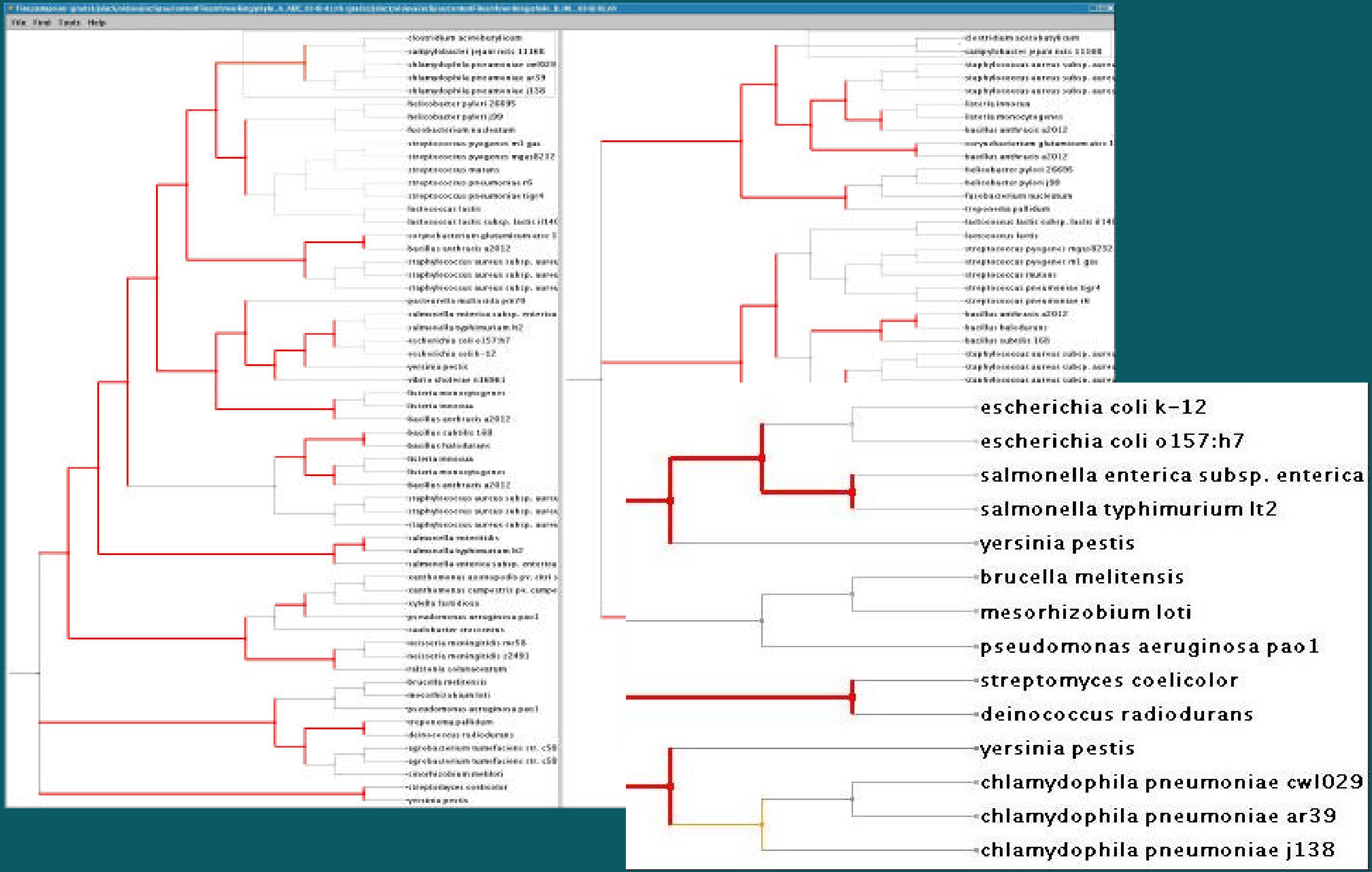
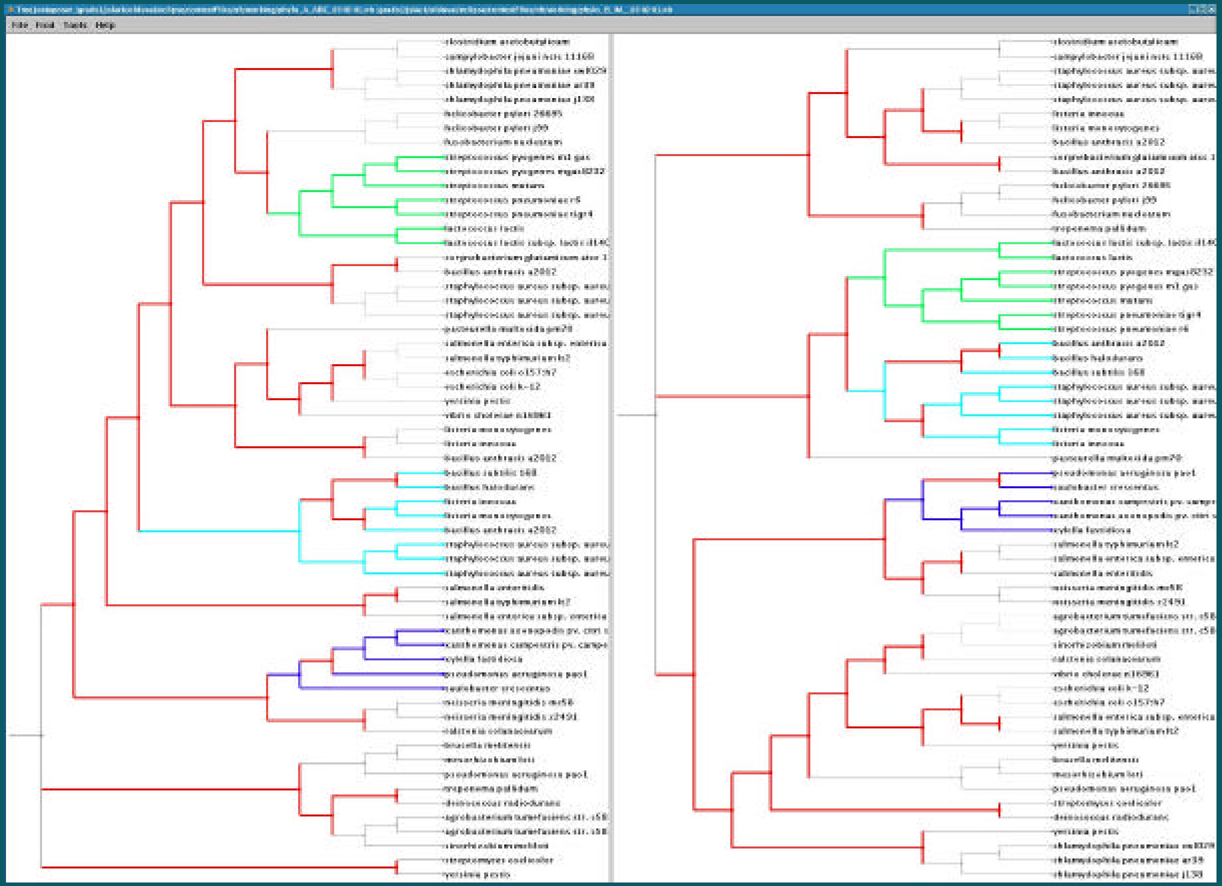


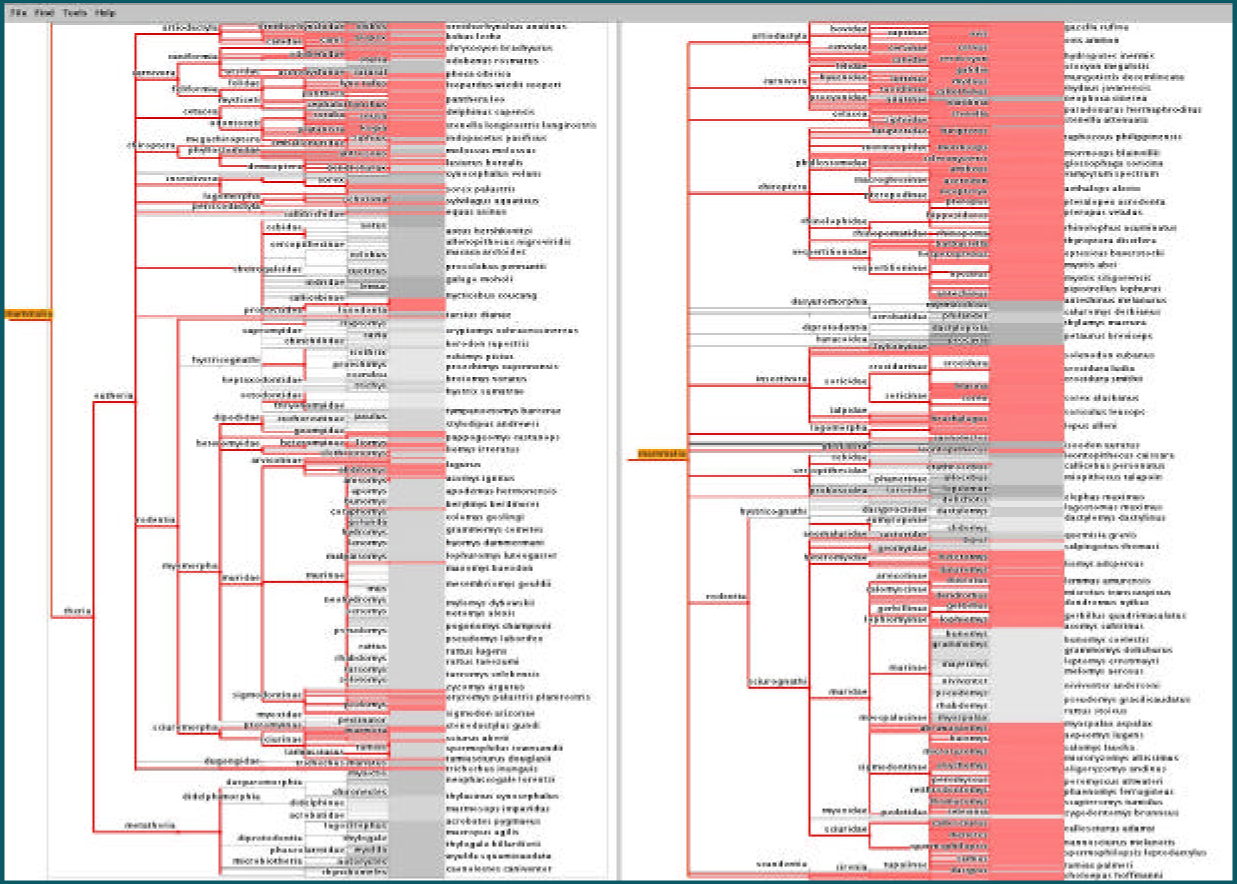
Phylogenetic Trees: Marking Subtrees

- 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



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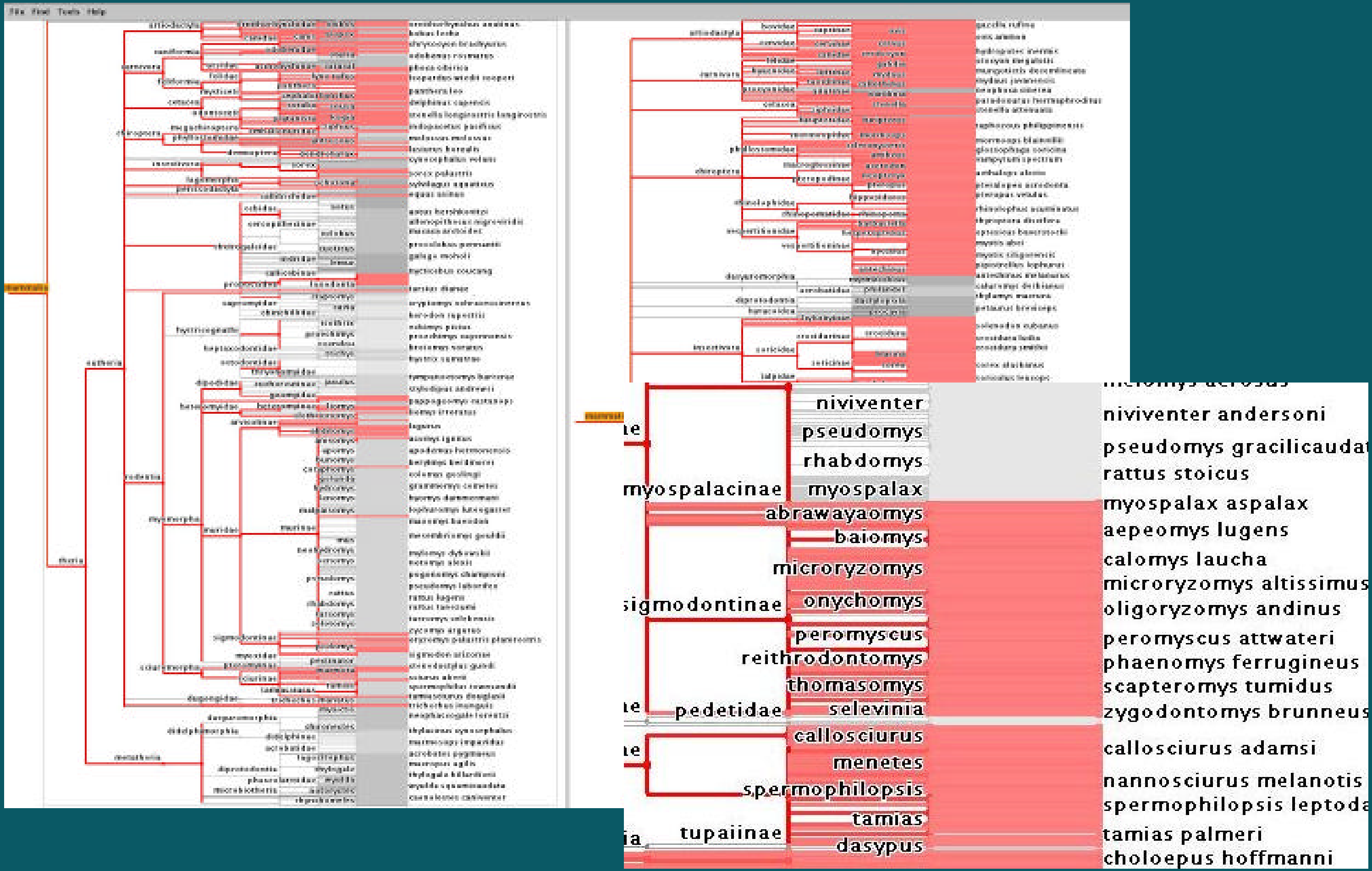
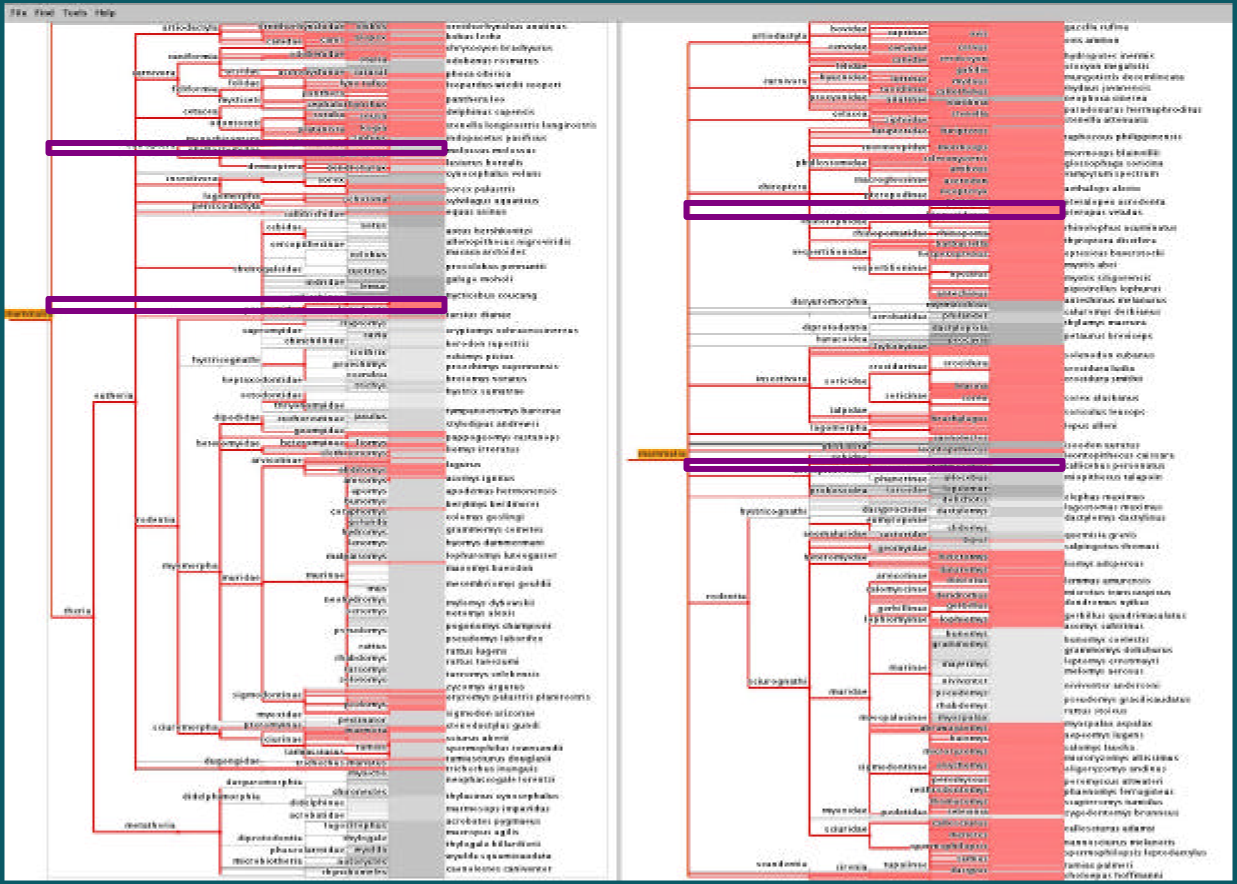


Classification Trees

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



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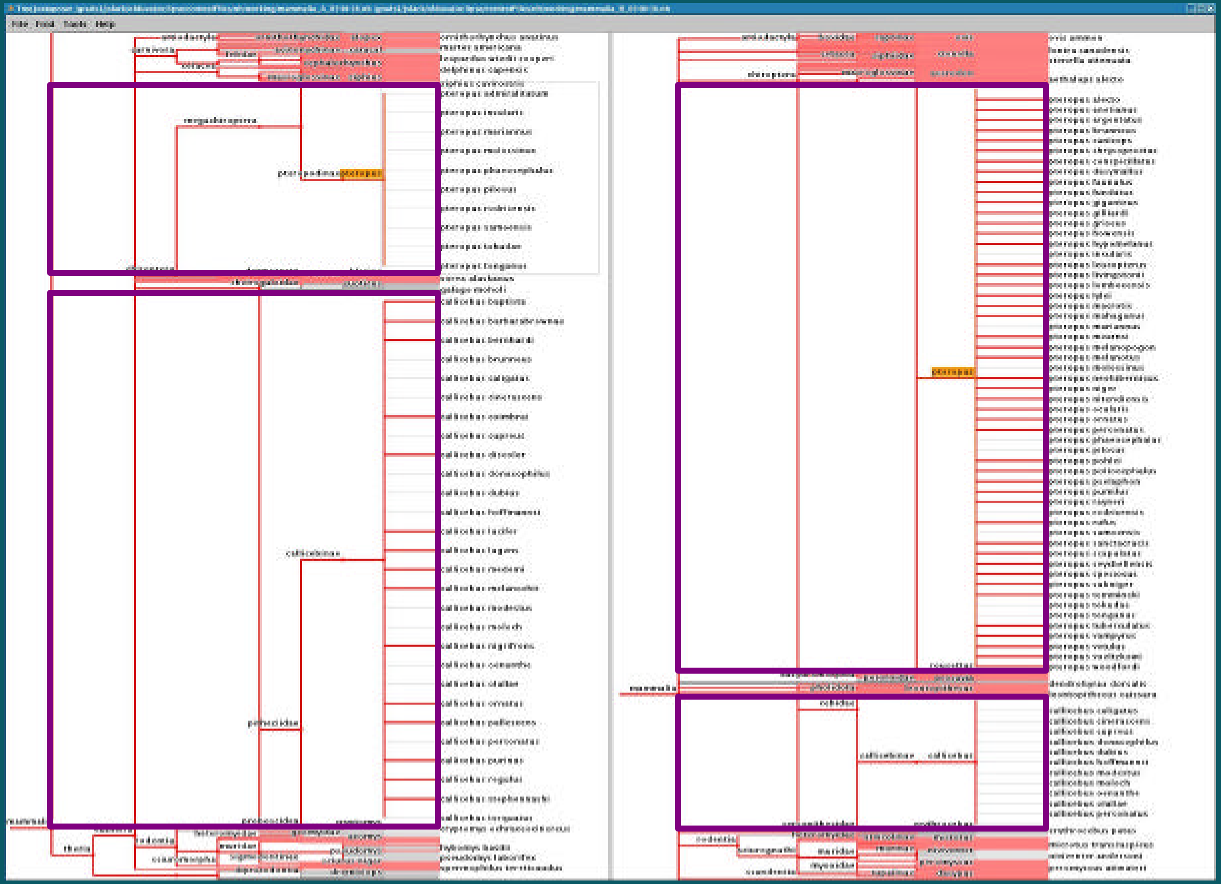
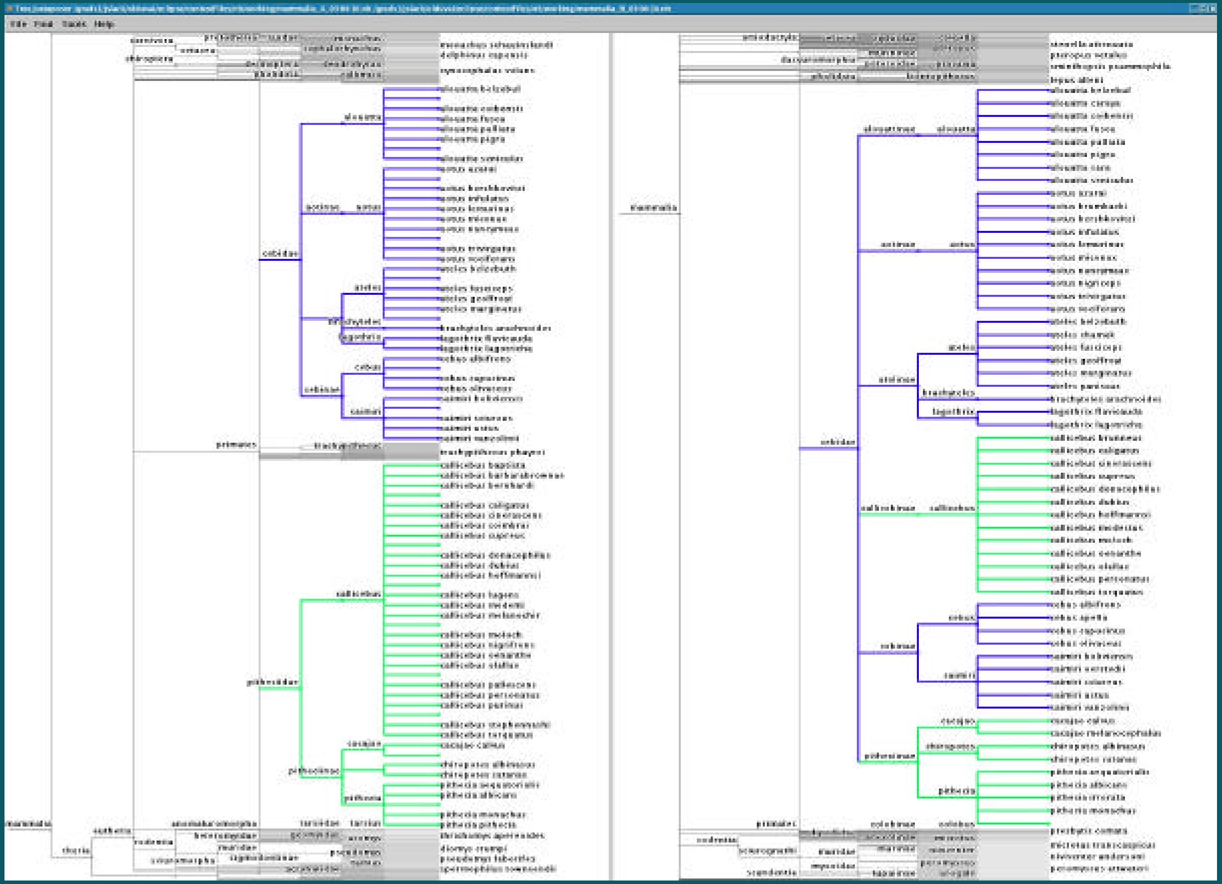


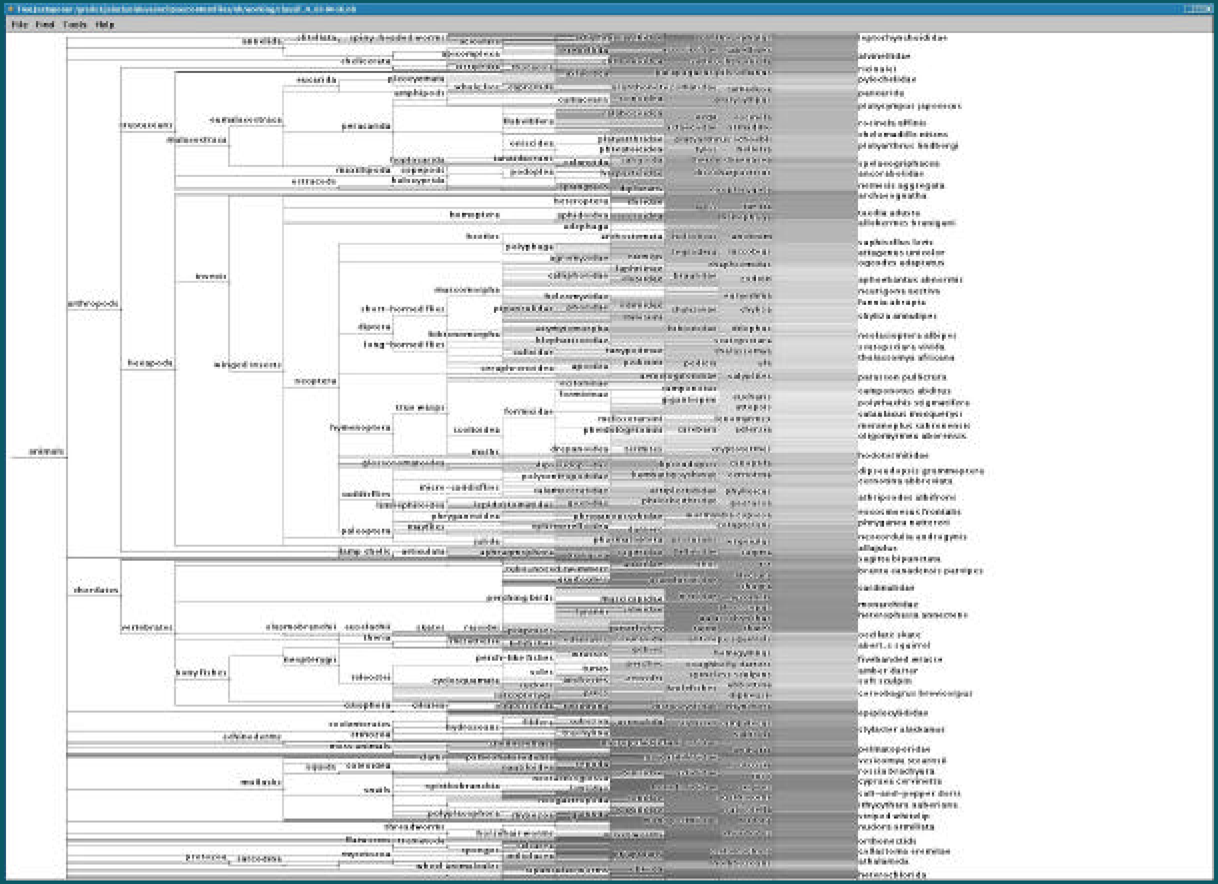
Classification Tree Node Movement

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



Classification Tree Browsing

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



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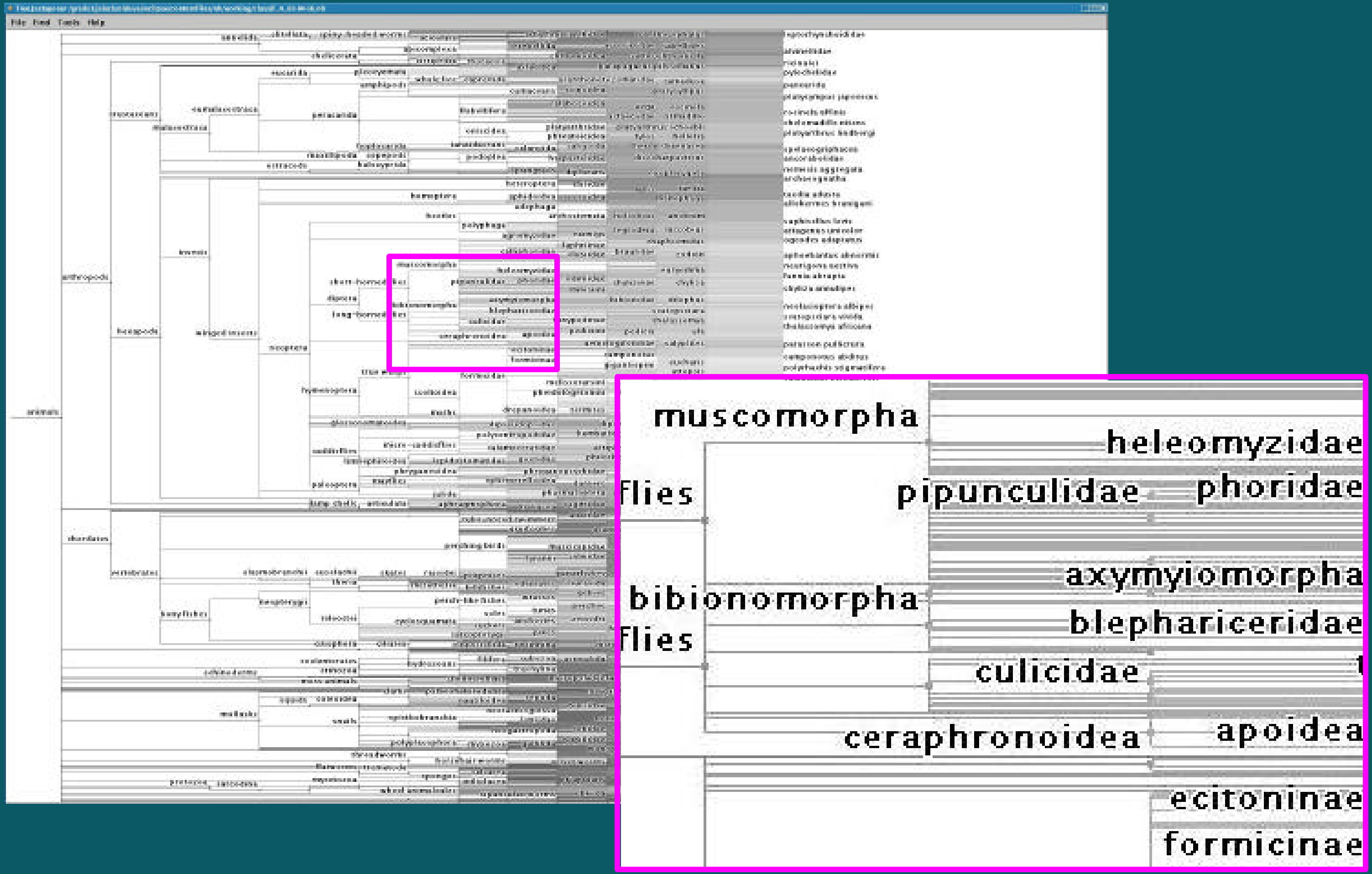


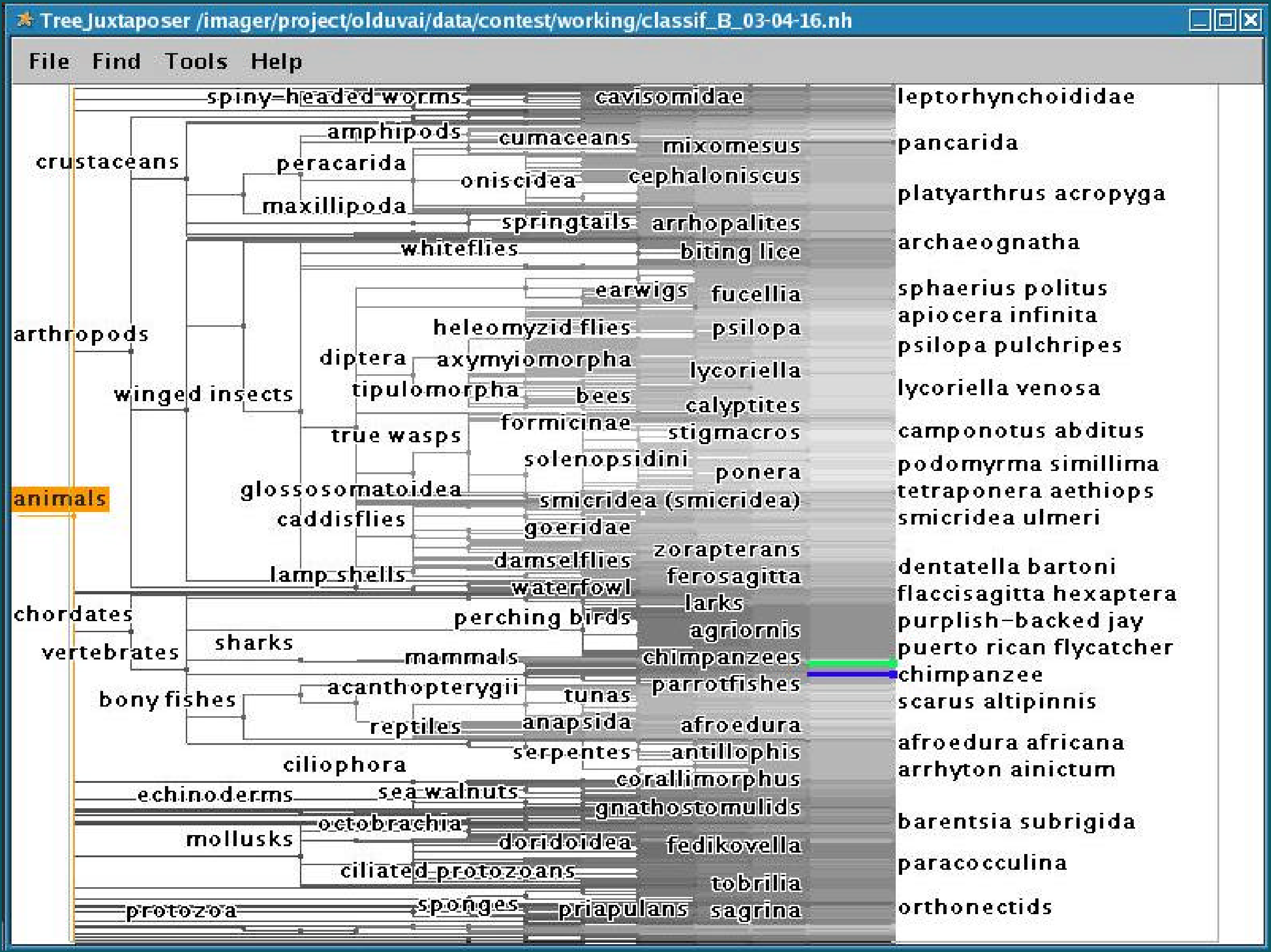
Classification Tree Browsing: Video 1

- Mouse browsing: spatial highlighting
- Keyboard browsing: topological highlighting
- cousin.mov (0:23)

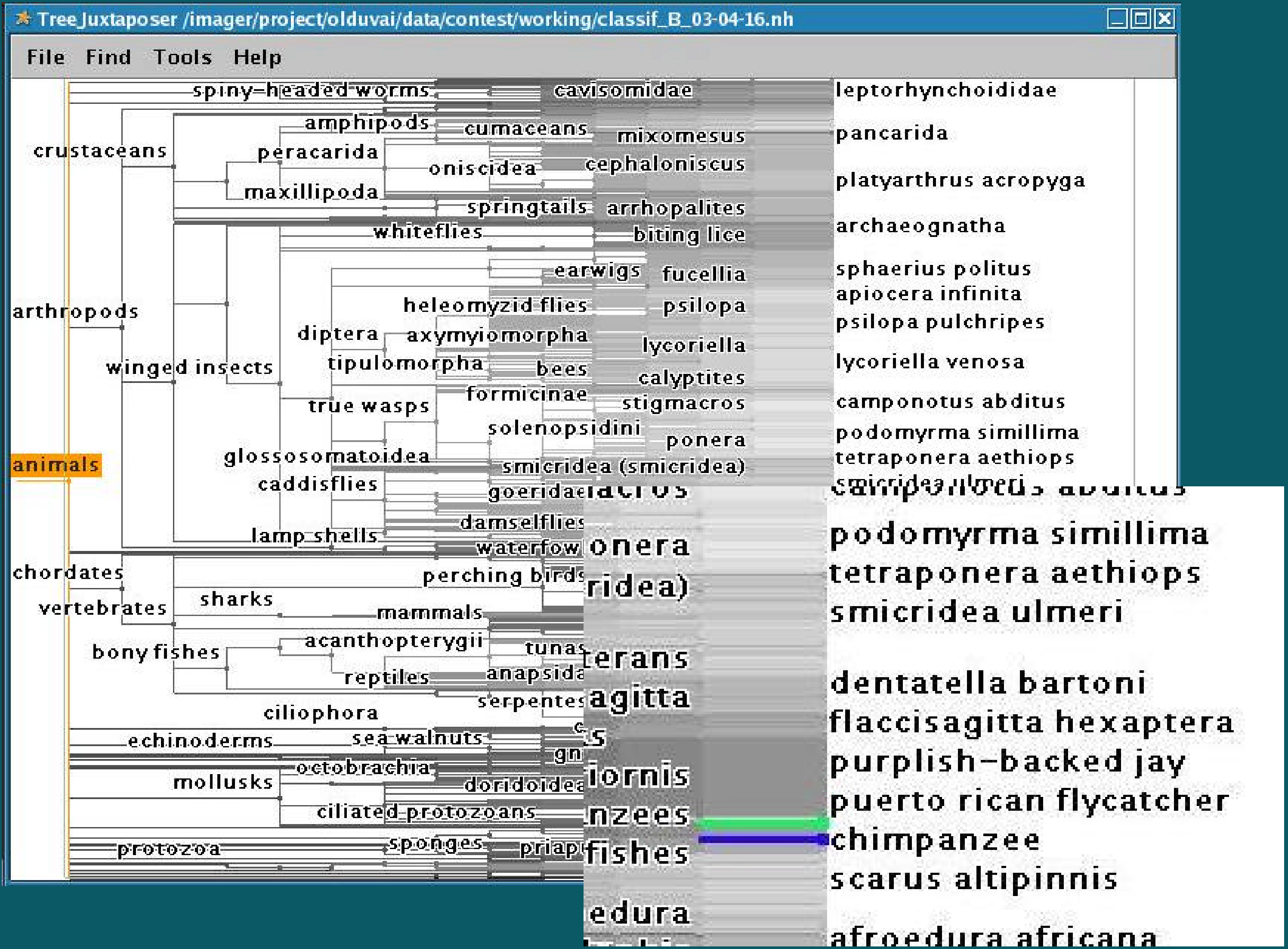
Classification Tree Browsing: Video 2

- Stretch subtrees with resize boxes using mouse
  - Browse to leaf nodes with mouse highlighting
- Traverse children of “mammal” to find ancestor
  - Arrow keys browse through topology
  - Resize ancestor with keyboard command, fine selection
- Progressive rendering for smooth animation
- browsing.mov (1:30)

Classification Tree Browsing: Video 2



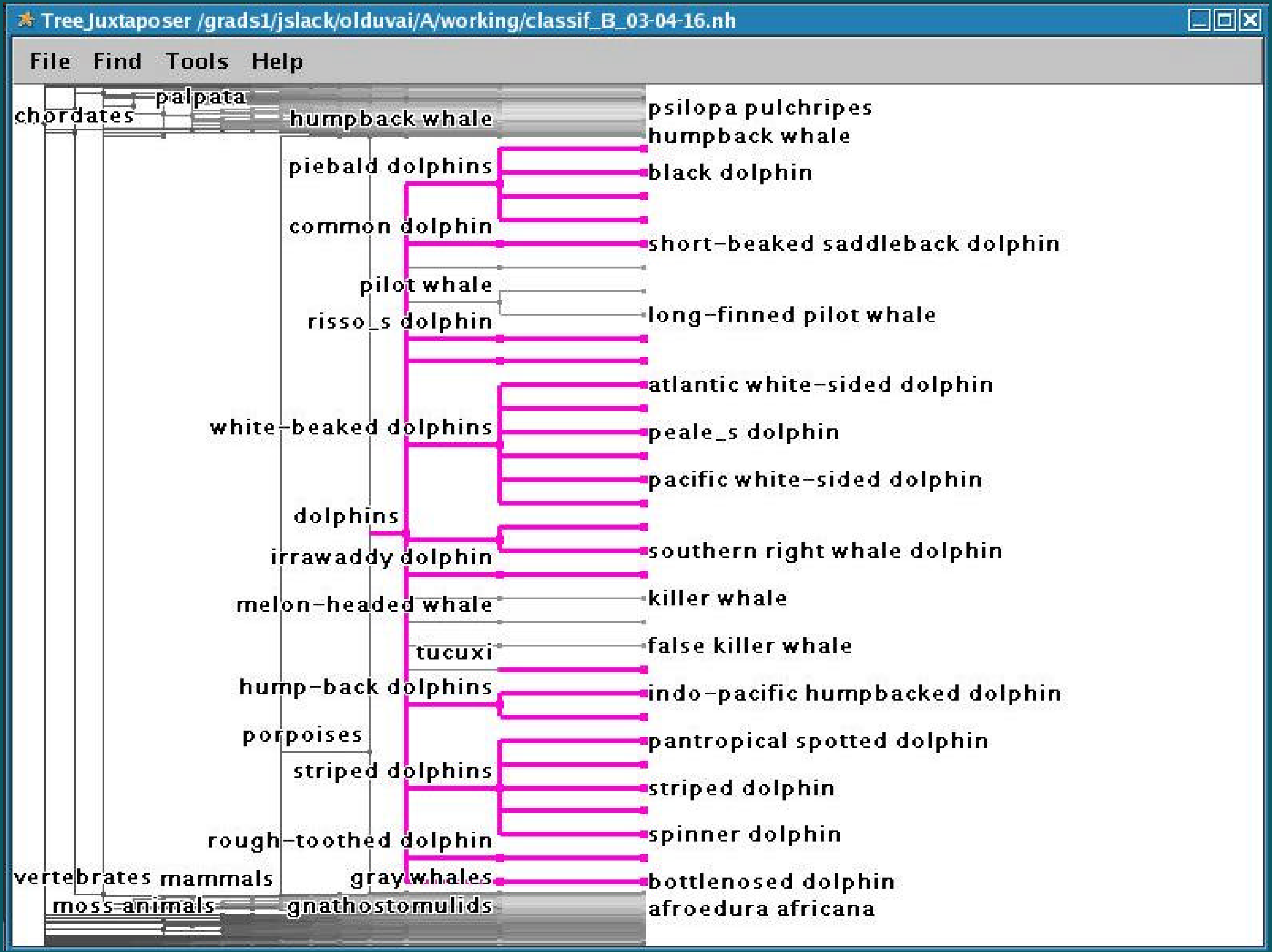
Classification Tree Browsing: Video 2



Classification Tree Search: Video 3

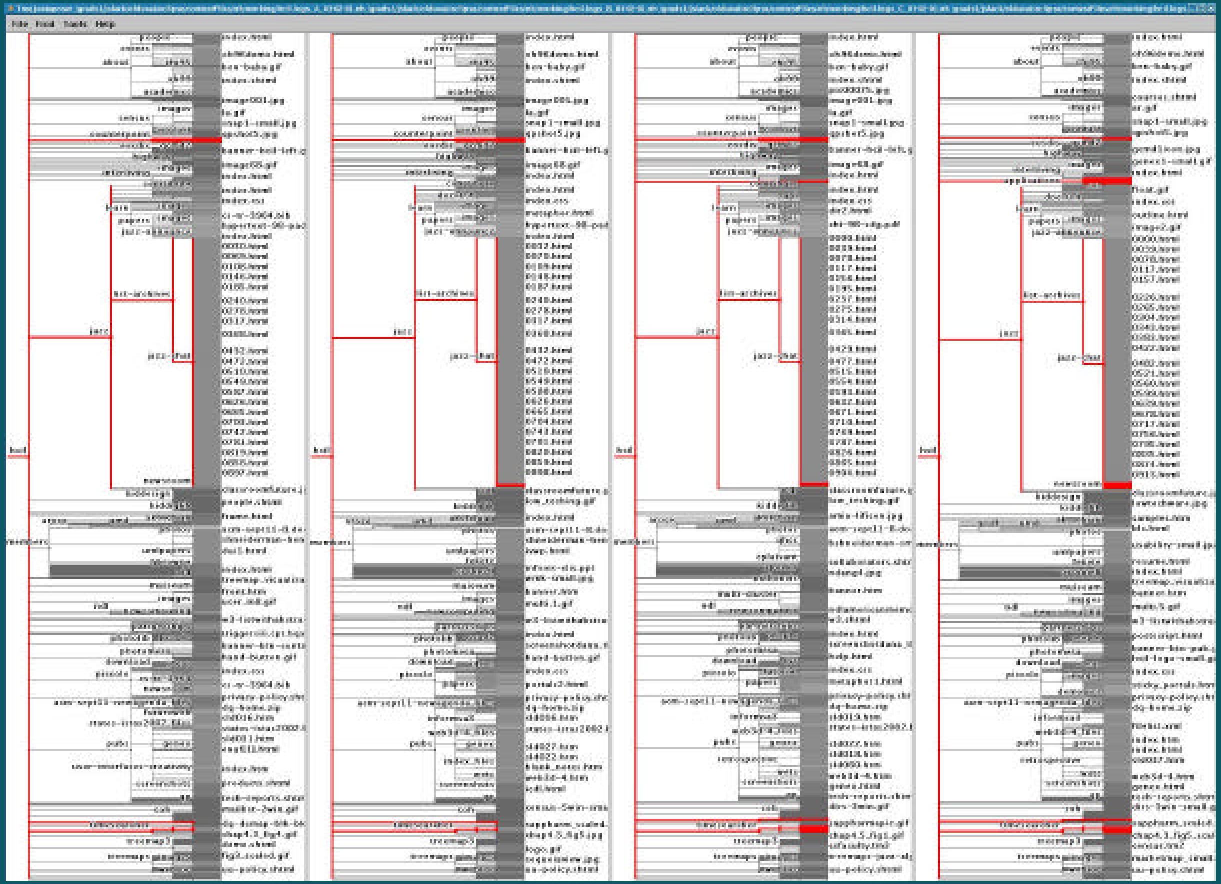
- Search for node with the find panel
  - Results relayed instantly as marked nodes
- dolphin.mov (0:57)

Classification Tree Search: Video 3



File System Trees

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



TreeJuxtaposer 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

TreeJuxtaposer 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

TreeJuxtaposer 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 corresponding nodes
  - Marking: is subtree on A best represented as a forest 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
- Entry: http://www.cs.ubc.ca/~tmm/papers/contest03
- Visit our interactive poster for demonstration