

## **Description of Additional Supplementary Files**

File name: Supplementary Data 1

Description: The list of 15 phylogenomic datasets examined in this study.

File name: Supplementary Data 2

Description: Summary of irreproducibility among 15 studies using 2 threads per node on CHTC cluster at the University of Wisconsin-Madison.

File name: Supplementary Data 3

Description: Summary of irreproducibility among 15 studies using 2 threads per node on ACCRE cluster at Vanderbilt University.

File name: Supplementary Data 4

Description: Summary of effects of computing resources on irreproducibility of phylogenies among three representative studies.

File name: Supplementary Data 5

Description: Summary of gene tree estimation errors between irreproducible phylogenies and reproducible phylogenies using simulated data.