



# Scalable method for exploring phylogenetic placement uncertainty with custom visualizations using *treeio* and *ggtree*

Meijun Chen<sup>1,2#</sup>, Xiao Luo<sup>1#</sup>, Shuangbin Xu<sup>1#</sup>, Lin Li<sup>1</sup>, Junrui Li<sup>1</sup>, Zijing Xie<sup>1</sup>, Qianwen Wang<sup>1</sup>, Yufan Liao<sup>1</sup>, Bingdong Liu<sup>1,3</sup>, Wenquan Liang<sup>2</sup>, Ke Mo<sup>4,5</sup>, Qiong Song<sup>5</sup>, Xia Chen<sup>6,7\*</sup>, Tommy Tsan-Yuk Lam<sup>8,9\*</sup>, Guangchuang Yu<sup>1\*</sup>

<sup>1</sup>Department of Bioinformatics, School of Basic Medical Sciences, Southern Medical University, Guangzhou, 510515, China



Meijun Chen, Xiao Luo, Shuangbin Xu, Lin Li, Junrui Li, Zijing Xie, Qianwen Wang, Yufan Liao, Bingdong Liu, Wenquan Liang, Ke Mo, Qiong Song, Xia Chen, Tommy Tsan-Yuk Lam, Guangchuang Yu. 2025. Scalable method for exploring phylogenetic placement uncertainty with custom visualizations using *treeio* and *ggtree*. *iMeta* 3: e269.

<https://doi.org/10.1002/imt2.269>



# Introduction

## Phylogenetic Placement Data Exploraton & Visualization

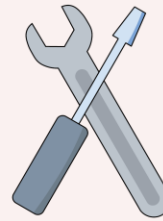
### Data Acquisition

#### Phylogenetic Placement



### Data Manupulation

*treeio*

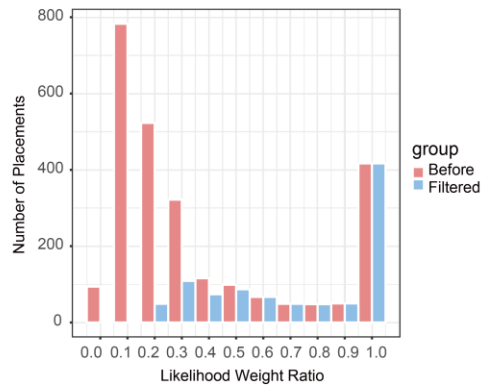


### Visualization

*ggtree*



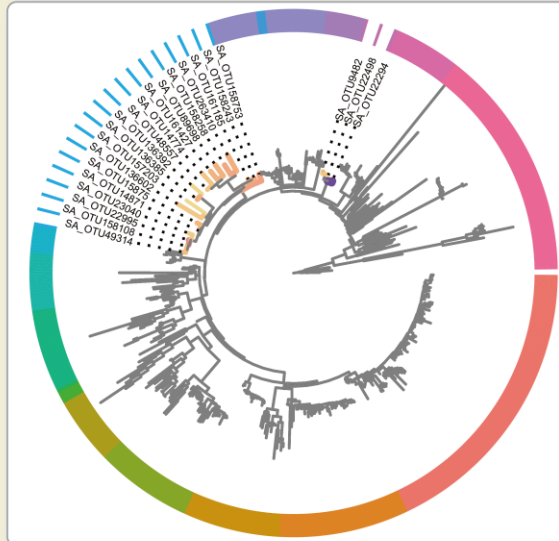
### Filtering and Overall Distribution



### Placement Uncertainty



### Merging and Visualization





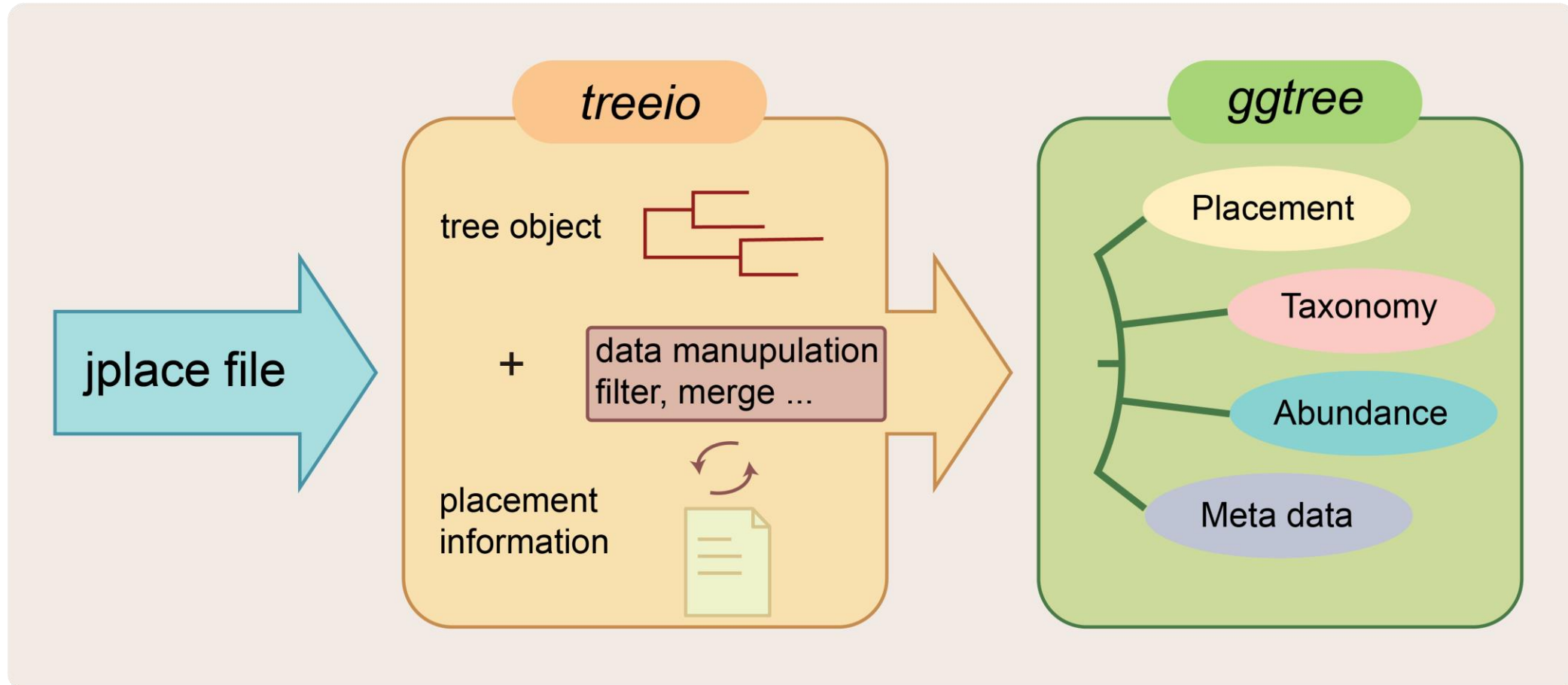
# Highlights

- 😊 The treeio and ggtree packages significantly improve the comprehensive parsing and visualization of phylogenetic placement data.
- 😊 Utilizing treeio and ggtree, researchers can perform a range of sophisticated analysis tasks, including filtering specific phylogenetic placements and assessing the confidence levels of different placement positions.
- 😊 The advanced features of these tools enhance the understanding of evolutionary connections within metagenomic datasets.



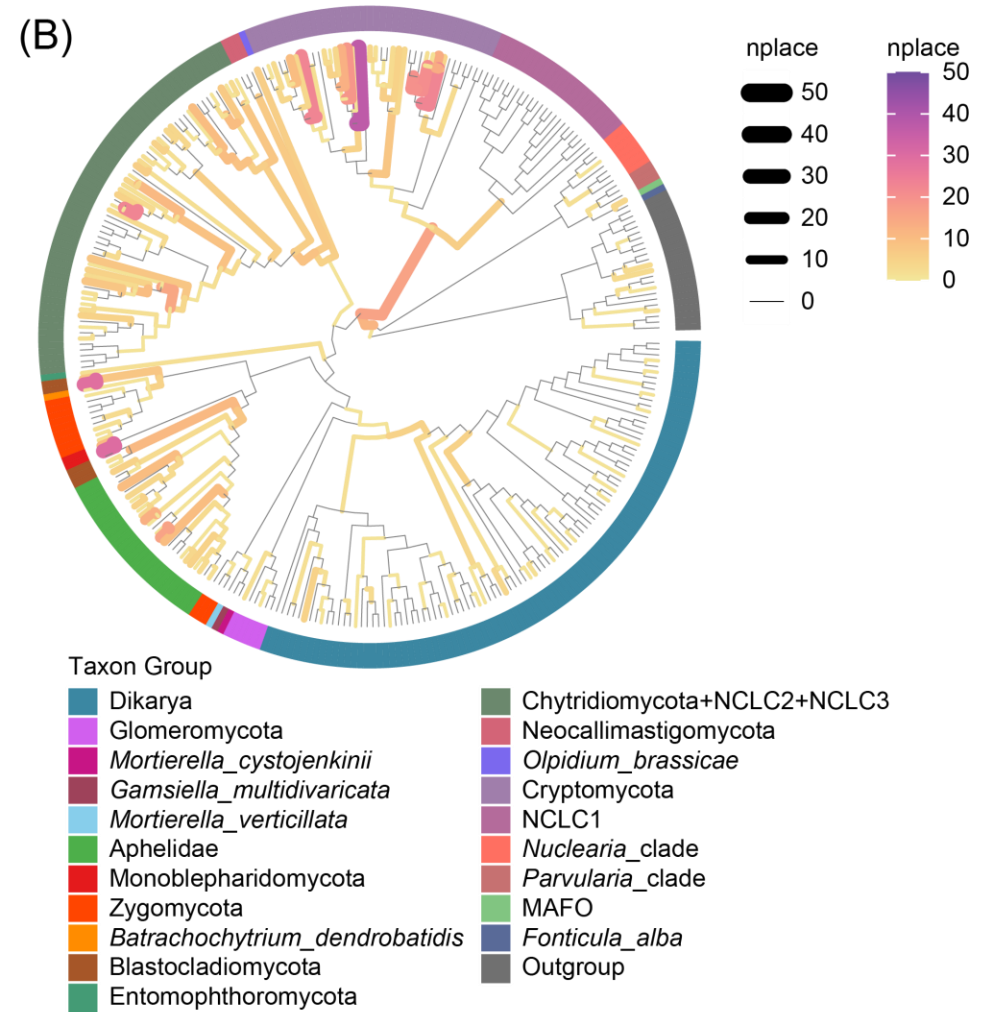
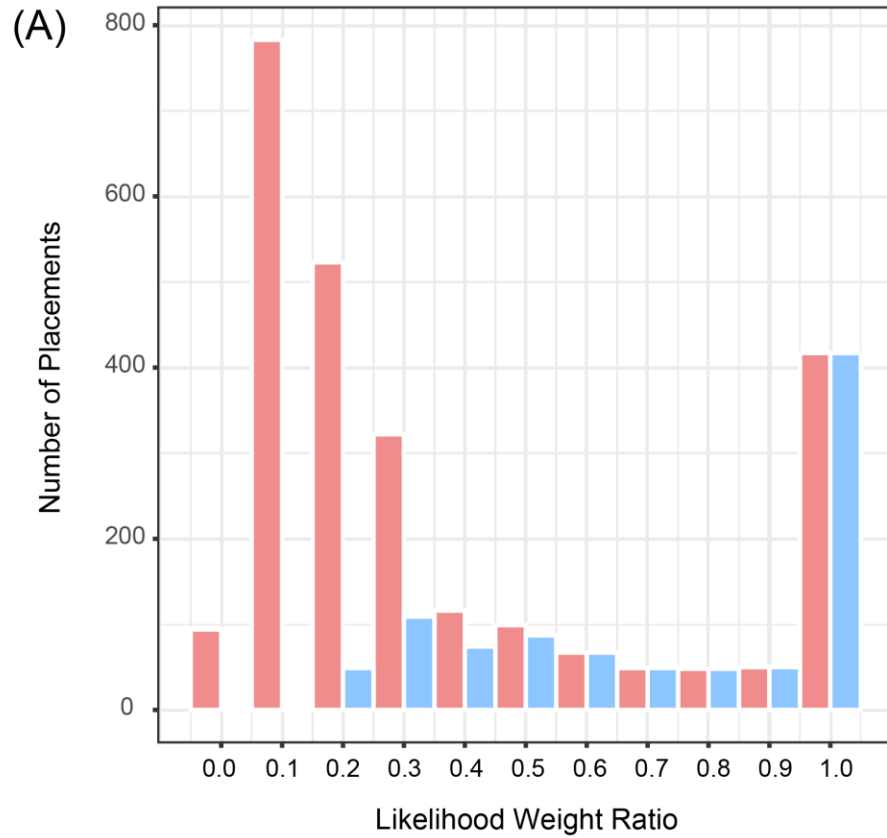
# Overview of Workflow

The *treeio-ggtree* method supports placement filtration, uncertainty exploration, and customized visualization.





# Case 1: Parsing Phylogenetic Placement Data







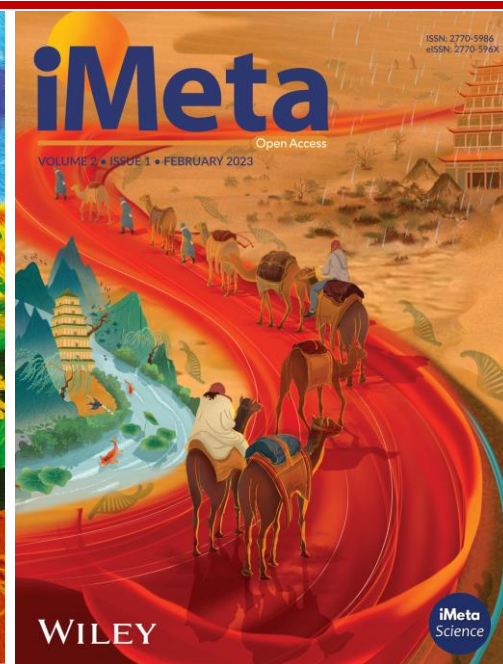


# Summary

- ❑ In this study, We demonstrated the effectiveness of this method using three datasets, showcasing placement uncertainty visualization capabilities.
- ❑ Our packages provide highly customizable visualization options, supporting various annotation patterns.
- ❑ Lab Website: <https://yulab-smu.top/>



Meijun Chen, Xiao Luo, Shuangbin Xu, Lin Li, Junrui Li, Zijing Xie, Qianwen Wang, Yufan Liao, Bingdong Liu, Wenquan Liang, Ke Mo, Qiong Song, Xia Chen, Tommy Tsan-Yuk Lam, Guangchuang Yu. 2025. Scalable method for exploring phylogenetic placement uncertainty with custom visualizations using treeio and ggtree. *iMeta* 3: e269.


<https://doi.org/10.1002/imt2.269>



“***iMeta***” is a Wiley partner journal launched by iMeta Science Society in 2022, first **impact factor (IF) 23.8 in 2024, ranking 2/161 in the microbiology**. It aims to publish innovative and high-quality papers with broad and diverse audiences. **Its scope is similar to *Nature Biotechnology, Nature Methods, Nature Microbiology, Nature Food, etc.*** Its unique features include video abstract, bilingual publication, and social media dissemination, with more than 600,000 followers. It has published 220+ papers and been cited for 5600+ times, and has been indexed by **SCIE / WOS, PubMed, Google Scholar, and Scopus**.

“***iMetaOmics***” is a sister journal of “***iMeta***” launched in 2024, with a **target IF>10, and its scope is similar to *Nature Communications, Microbiome, ISME J, Nucleic Acids Research, Briefings in Bioinformatics, etc.*** All contributes are welcome!

 Society: <http://www.imeta.science>  
 Publisher: <https://wileyonlinelibrary.com/journal/imeta>  
Submission: <https://wiley.atyponrex.com/journal/IMT2>  
<https://wiley.atyponrex.com/journal/IMO2>

 [office@imeta.science](mailto:office@imeta.science)  
[imetaomics@imeta.science](mailto:imetaomics@imeta.science)

 [Promotion Video](#)

 [iMetaScience](#)

 [iMetaScience](#)