

Jury Member Report – Doctor of Philosophy thesis.


Name of Candidate: Song Guo

PhD Program: Life Sciences

Title of Thesis: Using RNA expression as a quantitative molecular phenotype to study human and vertebrate evolution

Supervisor: Professor Philipp Khaitovich

Name of the Reviewer: Georgii A. Bazykin

<p>I confirm the absence of any conflict of interest</p> 	<p>Date: 11-15-2021</p>
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The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevance of the topic of dissertation work to its actual content
- The relevance of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art
- The relevance of the obtained results to applications (if applicable)
- The quality of publications

The summary of issues to be addressed before/during the thesis defense

The work addresses the transcriptomic landscape in three dimensions: evolutionary (by comparing different individuals or species), developmental (by comparing different developmental stages) and tissue-specific (by comparing different tissues). Such holistic analysis has led to new insights, allowing to set questions that could not be addressed with smaller-scale comparisons.

The introduction and literature review are comprehensive and thorough, providing a nice overview of the field. The current questions of the field are clearly outlined, and methodological challenges are discussed, such as matching developmental stages between species. In the main text, the results are described comprehensively and are robust, and the methods are adequate. The methods developed by the authors for the tasks at hand, e.g. using the Needleman-Wunsch algorithm for alignment of developmental stages, are clever and appropriate (and the resulting alignment may in fact be used outside the scope of this work).

The work is published in several good papers which are already attracting citations. While most of the work was done in large collaborations, the contribution of Ms. Guo is clearly outlined.

I have a few comments and questions. The quality of the thesis does not depend on them, and they can be addressed either before or at the defense.

1. In Fig. 2 caption, the content of panel B is not explained; is it the same as in A?
2. The discussion of Fig. 5 seems to indicate that the panel B is somehow different from the remaining panels; is this really implied? I am not sure how to interpret the differences.
3. Generally, the descriptions of the figures are not always clear. For example, the fig. 17 caption refers to "factors listed on the x-axis" while this axis is in fact not signed.

Provisional Recommendation

I recommend that the candidate should defend the thesis by means of a formal thesis defense

I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report

The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense