Peer Review Framework for the *iGEM Proceedings Journal*

In General

First, thank you very much for your cooperation in sending in an article and agreeing to peer-review other manuscripts. This idea would be nothing without all the teams that put a lot of time and effort in!

Thank you!

Now, there is still quite a bit to do until you can hold the very first iGEM proceedings journal in your hands. The next step is the peer-review.

What is a peer-review?

Peer-reviews are used as a method for quality assurance. This is achieved by having reviewers, with expertise in the same field (peers), evaluate a work. This provides a form of accountability and assures a high standard for publications.

This guide aims to help you in writing your peer-review. It will guide you through each step in order to assess the quality of the manuscript and give the authors the best feedback to improve it.

A few things to keep in mind:

- **Be Positive!** Give positive feedback where it is deserved! But be strict if you need to as well.
- **Take your time!** Doing a proper review takes time and effort. Please make sure that you have enough time to give proper feedback about the article. The whole process should take ca. 5 hours per article.
- Write so everyone can easily understand you, even if they are not native English speakers. For example, avoid difficult words.
- Refer to the page and line numbers in the manuscript when giving feedback in this document. For grammar, punctuation and spelling mistakes, correct them in the original document and use the **'track changes'** function (Here is how: https://bit.ly/3gVAVSd).
- Actively insert comments in the original document and also take notes in this document and check the applicable boxes.

- When checking the boxes, put an X in the box that fits best :
  - [-] The authors can improve this aspect
  - [+] The authors did this aspect well
  - [++] The authors did this aspect exemplary
- **Be respectful!** - reviewers and authors are in the same team: Team Science! Your review will help the author to make his article even better, so be objective and constructive.

The peer-review will be conducted in an 'open system'. This means the reviewer and authors will not be anonymous and the revisions and comments will be openly accessible. This way acknowledgments can be given to the input and hard work of the reviewers. An open process also ensures that everyone is doing their very best and treatment will be fair and respectful. In addition to that, it creates a better learning experience for everyone that took part in this collaboration. For this to work every team should appoint 2 team members per article that will review the article. These Reviewers will be acknowledged by name. The 2 reviewers may disagree on certain parts as long as they describe what they disagree on and why. They will need to submit their evaluations in the same documents.

We suggest you do a **skim-read for your first read through** in order to get the bigger picture and answer the following questions:

The First Read-Through

What is the main point of this research? (2 sentences; max. 75 words)

The main point of this research is to provide a review of the different genes expressed in the organism *Synbodinium* to investigate how and why the bleaching process occurs. It starts with a detailed description of the symbiotic relationship that underpins successful coral growth, following by a detailed list of factors that contribute to coral death. This establishes the search for important genes which may be able to mitigate the effects of these damaging factors.

	-	+	++
The main question is addressed and relevant The main question (whether this can be a useful strategy for degrading polystyrene) has been addressed, and is relevant.			X

The main question is original and interesting Definitely.		X	
Easy to Read and well written? Extremely well written!			X
The conclusions are consistent with the evidence and arguments presented[1] Given that COVID-19 has caused teams to have reduced lab access, it is reasonable to have a less data produced.		X	
Table and figures add to the article and aid understanding No tables or figures		X	
The tables or figures are consistent and clear and the amount appropriate Definitely.			X
Is the experimental design precise and appropriate (no flaws)		X	
The data is sufficient and self-consistent[1] Given that COVID-19 has caused teams to have reduced lab access, it is reasonable to have written a review without data.		X	
Only important and useful data is added Definitely.		X	
Does the conclusion answer the main question ? Yes.		X	

After the initial read-trough create a **first short summary** of what the article is about and which major flaws you found. The questions that you should orientate yourself on are:

[1] Due to the momentary Covid-Situation, many teams might not have conclusive data or any data at all. This is understandable and absolutely ok. But make sure that they will end up with a conclusion, even if it is just an outlook or suggestions for future research.

- Is the paper's premise interesting and important?
- What are the main findings ?
- What problem did it aim to solve ?
- Are the methods used appropriate?
- Do the data support the conclusions?

Review text (100-250 words)

The paper's premise is definitely interesting, as it is looking to identify at the most basic level (of genes), which are the choices we can make to mitigate the coral bleaching. The main question (which genes could be the best target genes) has been addressed: it was clearly discussed in the discussion and concluded in the conclusion. Furthermore, it is definitely relevant, as coral reef bleaching is a real threat to precious ecoystems.

The main findings come from a literature review of different papers that discuss different genes that may play a central role in coral bleaching in *Symbiodinium*, and that therefore represent an opportunity for treatment.

The problem it aimed to solve is the rapid bleaching of coral reefs due to a multitude of factors, which are a precious ecosystem that should be protected.

The methods used were the compilation of relevant papers on a word document, followed by analysis from team members to conclude which genes may be the most important.

The conclusions that are made are strong, as the reasons why the genes were chosen as final candidates are thoroughly referenced.

The Second Read-Through - Overview

When reading through the article again you should judge the authors argument construction, language clarity and content.

	-	+	+ +
• Is the text written in unambiguous language and understandable?		X	

• Any factual errors? No.			X
• Any invalid arguments? No		X	

	-	+	++
• Does the title fit into the article's topic?			X
• Does the Abstract sufficiently summarize the paper? Definitely.			X
• Do the Keywords fit into the Articles topic? Definitely.			X
• The Article has the correct length? Great length			X
• Are the paragraphs in the right sections ? Yes.			X

Try to judge the author's language and how well the text was written, for difficult text it is also important for the reviewer to do their part in understanding the text.

The Second Read-Through: Section by Section Guidance

1.Introduction

Does the introduction:

	-	+	+ +
• Explain the problem thoroughly? Definitely.			X
• Summarizes previous research on the topic? Contains more information of previous research on how atmospheric factors can cause bleaching rather than target genes that have been previously identified.	X		
• Highlights gaps in current understanding technologies and conflicts in available knowledge? Good detail on these topics		X	
• How original is the work in the topic area?		X	
• Does the introduction address the target audience properly? The introduction introduces the subject well to the reader.			X
• Is the research aim fully presented and introduced to in the introduction? Yes.		X	

Originality

It can be argued by the authors that new research is required because a topic is novel or hasn't been investigated recently and due to new developments in technology or research in other fields demands for reinvestigation. The research should be presented with recent reference. However, methodology and some research may rely on older research, in which case it is acceptable to reference older literature.

Aims

The introduction usually ends by presenting the aims of the research. However, the introduction should already present the main aspects and knowledge gaps in which the research aim should fit into

Review text – Introduction (100-250 words)

The introduction does very well to introduce the problem to the reader and emphasises the extent of coral bleaching. The references included are relevant and recent, and provide the reader with evidence for the point they are making. However, more detail could be added to previous research on target genes for this topic. For example, the gene name (if it is known), the date of discovery, etc. The research is original, reflecting

well on the team's ideas. The aim at the end of the introduction could be worded slightly more clearly.

2. Materials and Methods

The research presented should be reproducible and robust and follow "best practice" .

Is the research reproducible and robust?

	-	+	+ +
• Enough controls? N/A		X	
• High enough sample size? Roughly 40 papers were analysed			X
• Research was repeated if possible? N/A		X	
• Detailed protocol with step by step instructions on the research performed ? This was not included.	X		

Reproducible Methods

The method section should be written in a way to allow other researchers to reproduce the research and results. All equipment, reagents and sampling methods should be explained in a step by step way (if applicable).

Robust Methods

Robust Methods mean that sufficient reliable data was collected and full analysis was performed. This includes the use of sufficient sample size and controls where it is needed to confirm findings. Furthermore, the research must be unbiased.

Best Practice

	-	+	+ +

The research complies with health and safety standards		X	
The research complies with common ethical standards		X	

Review text - Material and Methods (150-350 words)

This section is provides the reader with some description of how the team conducted their research. However, the methods section of the paper could do with more detail for the literature review study. As mentioned above, the following details should be added to allow other researchers to potentially repeat the study to verify the results: All equipment (or literature search software) used and sampling methodology. None of these are included in the paper.

For the materials section, this could also be greatly improved. There was no mention of what equipment the team used. These are needed as it would allow other researchers to reproduce the results and see if they obtained similar results.

Another part that could be improved is proving that the research was unbiased. This could be done by mentioning what sampling methodology was used (e.g. random sampling).

3. Results and Discussion

The results should be presented coherently, what happened? How are the results? Things that were discovered or confirmed?:

	-	+	+ +
• Describes the data collected and their implications?		X	
• The content is critically analysed? (with statistical analysis where applicable)		X	
• The trends seen in the data are explained in the wider picture of the topic also by referencing previous research?		X	
• Presentation of future research and limitations? Only limitations need improving	X		

This section could be improved, as there is little detail on how future research could be directed and what limitations may be encountered.			

The Discussion should distil the information from the previous section and the data collected. The Authors should summarize the overall development of the topic in the context of the performed research. The "story" should be consistent and present research limitations and future research.

Review text Results and Discussion (200-350 words)

The team described multiple implications of the data they found through literature search. Each target gene that was mentioned was followed by a detailed description of what evidence was found by original authors, then followed by an analysis of how important this gene was for bleaching mitigation and why.

One major factor that could be improved is suggestions for further research. For further research, they have given one good suggestion in the conclusion. However, they could have elaborated more on how more studies could be done in this area.

Results were critically analysed, but no statistical analyses were used. In our opinion, statistical analyses were not required for this paper as the data presented from other papers was not exclusively quantitative, and data were not collected by the authors. Therefore, critical analysis of the data was sufficient.

One aspect of this section that could be improved is the fact that not many research limitations were included. This would be very helpful for guiding future research of this topic, and would also greatly help the authors to identify what the boundaries are in the field they have conducted their study in.

5. Information and data presentation: Images, Graphs and Data Tables

The data should be presented in an easy to understand way and visually wherever possible. Images and Illustrations should further the understanding of the text and fit into the overall article. Images and Illustrations should be of sufficient quality and graphs and data tables should be correctly labelled.

	-	+	++
• The data presented in the article support the paper's overall story? Yes.			X
• There is sufficient data. This includes an appropriate amount of data points with support the trends claimed by the authors.		X	

Yes			

Review text Information and data presentation (100-250 word)

There are no images, graphs or tables, so this section will be shorter than usual. However, the main point to make here is that the data presented in the article definitely supports the paper's overall story. This is because sound and extensive evidence is provided to support the conclusions they have made.

6. List of References

References should be accurate, trustworthy appropriate of the presented content. The references should be mostly recent and support the authors arguments with in-text citations.

	-	+	+ +
• Did they list the relevant literature, without missing an important paper, especially ones that would contradict them?		X	
• Are the references too excessive or too limited?		X	
• Did they use proper APA style referencing?	X		

Review text References and citations (100-250 words)

For the coral bleaching factors, they cited relevant literature to explain the problem. The topic is described at depth and in great detail with the most important papers. The amount This provides the reader with a solid grounding, and allows the reader to gain more insight into the most significant target genes later on when this is discussed. The references are the perfect level of extensive, as they are not too high of a number and provide the reader with more options if they want to research further.

The citations are not well formatted. This is because some citations contain the DOI link, which is not normally included in APA style referencing. The authors should remove these links in order to comply properly with the APA style of referencing.

7. Plagiarism

Authors should present the novel aspects of the research, this helps in the understanding of the paper and helps with questions over potential plagiarism. If you think an article has potentially been plagiarised please contact [msp-igem@maastrichtuniversity.nl]. We will also perform a check with an Anti-plagiarism software.

SUMMARY text (250-500 words)

- What is the strength of the manuscript?
- What are its weaknesses ?
- List the major and minor revisions that you recommend to be done (Just the keywords of things mentioned above)

Strengths:

The first strength of the paper is the introduction. The problem chosen is a very important and pressing problem for the world, and good references are used to emphasise this point. Furthermore, the topic is described at depth and in great detail. This provides the reader with a solid grounding and allows the reader to gain more insight into the most significant target genes later on when this is discussed.

The second strength of the paper is the discussion and conclusion sections. The implications of the data are well analysed in the discussion, and reasons are given as to why some results might have arisen the way they did. Comparisons are made between papers with conflicting conclusions, and reasoned judgments were made by the authors. The conclusion does well to make statements about the potential of this research, and where future research should be directed.

Weaknesses:

The first weakness is very minor, and just involves the fact that there are some spelling mistakes and sentences that could be made clearer. However, this should be easy to correct.

The second weakness is the research elaborations section. This section lacks relevant details about the sample size of the behavioural populations study, whether any repeats were conducted and descriptions of sampling methodologies. Furthermore, it does not contain a full protocol on how they conducted this study, making it difficult for another group of scientists to reproduce their results.

The third weakness is the research limitations. At the end of the results and findings section, there is little mention of limitations and how this affected their review study.

Minor revisions:
- Correct spelling mistakes (comments made in original paper)
- Improve sentences to make their meaning clearer (comments made in original paper)
- Correct the referencing style (remove DOI links from the references at the bottom.
- Add the impact of any research limitations and how this affects future research opportunities.
- Modify introduction to include slightly less detail about environmental factors and slightly more detail on the history of targeting genes to mitigate coral bleaching.

Major revisions:
- Improve the research elaborations (or methods) section. A full protocol of the literature search study should be included, along with the following details: sample size and descriptions of sampling methodologies

Verdict

	What is your verdict about the manuscript?
Accepted as is	
Accepted after revisions	This one
Major revisions necessary	

Reviewers (necessary, because it is an open system)

First Reviewer – Author name, qualifications, associated institute (if any) and email address.

Pedro Lovatt Garcia, BSc Biochemistry (3rd year), UCL, pedro.garcia.18@ucl.ac.uk

Second Reviewer – Author name, qualifications, associated institute (if any) and email address.

Stefan Hristov, BSc Biochemistry completed (now 1st year PhD), UCL, stefan.hristov.17@ucl.ac.uk

Last step

Please reread your peer review once more to make sure you filled everything in and that your peer review will help the other team to perfect their article for publishing.

Uploading

When the peer reviewers from your team have filled in this document and also added comments to the original article, please **upload the corrected original article and this peer review framework document with the comment:** "Hi, we are xxx and xxx and we reviewed xxxx this is the filled-in Peer review framework and the corrected article." You can use the team account for the upload or apply for a personal account on the website. In total you should upload 4 documents, 2 per article.

Make sure to **label the Peer review framework and the corrected article** correctly before uploading!

Corrected article: Team_name_Article_title_corrected_Draft_Reviewerteamname (word document)

Peer review framework: Peer_review_ Article_title_Reviewerteamname (word document or PDF)

Better instructions for the upload can be found in the Email and in the document labelled Upload instructions. **Please follow the instructions!**

Lastly, **thank you very much** for your cooperation in peer-reviewing other teams' manuscripts. This idea would be nothing without you who put a lot of time and effort in!