On Guidelines for Writing a Technical Paper

Writing an effective technical paper is not easy. A good rule of thumb is to write as if your paper will be read by a person who knows about the field in general but does not already know what you did. Before you write a technical paper read some technical papers that have been written in the format of the paper you plan to use. In addition to the science, pay attention to the writing style and format.

Abstract: An abstract is a succinct (one paragraph) summary of the entire paper. The abstract should briefly describe the question posed in the paper, the methods used to answer this question the results obtained, and the conclusions. It should be possible to determine the major points of a paper by reading the abstract. Although it is located at the beginning of the paper, it is easiest to write the abstract after the paper is completed.

Introduction: The Introduction should (i) describe the question tested by the experiments described in the paper, (ii) explain why this is an interesting or important question, (iii) describe the approach used in sufficient detail that a reader who is not familiar with the technique will understand what was done and why, and (iv) very briefly mention the conclusion of the paper.

Literature Survey (Materials and Methods): The Materials and Methods section should succinctly describe what was actually done. It should include description of the techniques used so someone could figure out what experiments were actually done. The details of a published protocol do not need to be reproduced in the text but an appropriate reference should be cited – e.g., simply indicate “were done as described by Hughes et al. (4)” Any changes from the published protocol should be described. It is not appropriate to indicate volumes of solutions added – instead indicate the relevant information about the experiment such as final concentrations used, etc.

Results: Begin each paragraph with an opening sentence that tells the reader what question is being tested in the experiments described in that paragraph. Write the opening sentence in bold font for emphasis. (Sometimes a complete sentence is used and sometimes a short phrase is used-- either style is OK but the style should be used consistently throughout the manuscript.) Any results that include multiple data points that are critical for the reader to evaluate the experiment should be shown in tables or figures. However, the results should be summarized in accompanying text. When referring to a particular table or figure, they should be capitalized (e.g., Table 1, Figure 6, etc.) The text of the Results section should be succinct but should provide the reader with a summary of the results of each table or figure.
Not all results deserve a separate table or figure. As a rule of thumb, if there are only a few numerical results or a simple conclusion describe the results in the text instead of in a table or figure.

Your paper should focus on what worked, not things that did not work (unless they didn’t work for reasons that are interesting and provide biological insights).

**Tables and Figures:** All tables and figures should be put into a contextual framework in the corresponding text. A table of strains used should be mentioned in the Materials and Methods section, a table of results should be summarized in the Results section, a figure showing a biosynthetic pathway should be described in the Discussion section, etc. Tables and figures should present information in a format that is easily evaluated by the reader. A good rule of thumb is that it should be possible to figure out the meaning of a Table or Figure without referring to the text. Tables and figures should typically summarize results, not present large amounts of raw data. When possible, the results should provide some way of evaluating the reproducibility or statistical significance of any numbers presented.

Tables should be sequentially numbered. Each table should have a title (shown above the table) that describes the point of the table. For example, “Table 1. Bacterial strains and plasmids used in this study.” If necessary to interpret the table, specific descriptions about what a result represents or how the results were obtained can be described in a legend below the table.

Figures should be sequentially numbered. Each figure should have a title (shown below the table) that describes the point of the table. For example, “Figure 1. Isolation of MudJ insertion mutants.” If necessary to interpret the figure, specific descriptions about what a result represents or how the results were obtained can be described immediately following the title.

Tables and figures may be printed on separate pages that follow the Reference section. Alternatively, the tables and figures may be integrated into the paper if you are using a page layout program. However, if they are integrated into the paper make sure that there is not a page break in the middle of a table or figure. Do not wrap text around the outside of tables and figures – if the results are important enough to show as a table or figure they should stand out on the page, not be buried in text.

**Conclusion & Future Scope:** Do not simply restate the results — explain your conclusions and interpretations of the Results section. How did your results compare with the expected results? What further predictions can be gleaned from the results?
**Citations:** It is essential to credit published papers for work mentioned in your manuscript. There are a variety of ways of citing references in the text – the style used depends upon the policy of the journal. In text citations should refer to reference list. Do not rewrite title of references in text.

**Reference lists:** Like citations, a variety of reference formats are used by different journals. For an example of a commonly used example, see “Instructions to authors” on ASM web site (http://jb.asm.org/misc/ifora.shtml) or examples from published manuscripts.

**SOME USEFUL RESOURCES:**

Instructions to Authors, J. Bacteriol.[http://jb.asm.org/misc/ifora.shtml]

Word usage in technical writing [http://www.ag.iastate.edu/aginfo/checklist.html]

Dangling modifiers [http://owl.english.purdue.edu/handouts/grammar/g_dangmod.html]