

BME 315 Biomechanics

Laboratory 1, *Review of a Journal Article*

§1 Purpose.

This 'laboratory' has two aims: to provide an opportunity to explore a branch of biomechanics of interest to the student, and to provide practice in critically evaluating written material. When you write your own reports, it is wise to use the skills gained in this practice to critically evaluate your own work prior to submission.

§2 Format of a journal article.

Journal articles have the following general format. The same format is to be used for laboratory reports in this course, and a similar format is commonly used in the preparation of industrial reports. For links to writing guides, and for more details on format, please see the class web site. Articles for *Science* or *Nature*, intended for a general scientific audience, avoid subheadings and are succinct.

Abstract. The abstract summarizes the basic accomplishments of the study.

(i) **Introduction.** The introduction places the work in perspective. It cites motivation, background, and the objectives.

(ii) **Procedure (or Methods).**

The purpose of this section is to describe the method: how the experiment, analysis, or modeling was done.

(iii) **Results and discussion.** In this section (sometimes given as two sections), the findings of the study are clearly presented, discussed and compared with prior work.

(iv) **Conclusions.** This section should be clear and concise. Conclusions should refer back to the objectives.

(v) **References.** Reference any articles, books, or manuals used in the cited in the report or article.

(vi) **Appendices.** Details which would unduly interrupt the flow of the paper may be placed in an appendix.

§3 Task for this report: articles for evaluation

Evaluate two articles and compare them as follows. The first is on gecko foot adhesion. To obtain it, go to the top left navigation bar in the class web site. Click on links for body and organ biomechanics to get the lower left navigation bar. Download the pdf file for gecko foot adhesion. The second article is of your choosing. If possible, choose a topic of interest to you, but it must have biomechanics content.

Organize your report in the same way as a standard article: in the Abstract section, compare the article abstracts, etc.

§4 Evaluation.

§4.1 Synopsis

In your own words, summarize the findings of each article. In your summary, indicate the following. (i) What do the authors report? What did they do? (ii) Why did they do it? What was their motivation. (iii) How did they do it? Summarize their approach. (iv) What are their conclusions?

§4.2 Comparison

Compare and contrast the two articles on the basis of the following.

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| (i) Clarity of presentation. | (ii) How interesting was the problem chosen? |
| (iii) Pictures and diagrams. | (iv) English usage; writing style. |
| (v) Graphs. | (vi) Overall impression of the work |

In your comparison, evaluate and critically examine each part of the paper. As for the abstract, it must stand alone, independent of the rest of the paper. Can you understand what was done, why it was done, and what is its relevance? If there is difficulty in understanding, try to discriminate whether you think it is due to a limitation in your background or a limitation in the quality of the writing. As for the introduction, does the manuscript present a clear picture of the status of the field of endeavor under discussion? As for the methods, consider whether the approach used, e. g. human, animal, cultured cells, is appropriate to test the hypothesis, if any. If it is a population study, were there any biases which might skew the results? If the study requires statistical inference, are the tools chosen appropriate? As for the results, do the authors present the data in an objective form? Do they make it clear the distinction between results and their interpretation? Are the graphs clear and easy to read without extensive reference to the text? As for the discussion, is the interpretation reasonable? Do the authors attempt to extract too much from the data given? Finally, what did you find interesting or uninteresting about the articles? If you were to explore the subject in more detail, what would you do? What further knowledge would you wish to acquire to explore the subject?

§4.3 Summary

Which article did you think was better? Summarize your arguments.

How do you plan to avoid the weaknesses you have found here in your future work?