Team 00: My Project Title

Joseph Timothy Foley
School of Science and Engineering
Reykjavík University
101 Reykjavík, Iceland
foley AT RU.IS

2nd Þórður Ægir Össurson
dept. name of organization (of Aff.)
name of organization (of Aff.)
City, Country
email address

3rd Given Name Surname
dept. name of organization (of Aff.)
name of organization (of Aff.)
City, Country
email address

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City, Country
email address

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dept. name of organization (of Aff.)
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City, Country
email address

Abstract—**Beal recommends that you consolidate the whole paper into 5 sentences in 250 words or preferably less:**
1) **There is a problem with these real effects or this situation.**
2) **Here is a general approach to fixing it.**
3) **We now present this particular step.**
4) **In particular, we did these very specific things.**
5) **Success is confirmed by this quantitative result.**

Remember that an abstract often gets separated from the report: *do Not Use Symbols, Special Characters, Footnotes, or Math in Paper Title or Abstract!*

Index Terms—**component, formatting, style, styling, insert**

INSTRUCTIONS

For LaTeX help, you should first consult Kopka and Daly's book [1]. Before you start anything else, put your names in the top and add the team number in the title. Sections that do not have numbers are provided for instructional use and should be removed before the paper is submitted. You should start by picking if this will be an IMRAD or Design paper, then delete the other set of sections. Before submitting, it is highly recommended to do a spell-check and a grammar check such as http://grammarly.com. Pasting in the LaTeX source code into Grammarly has worked well for the instructor. We highly recommend using a reference manager like JabRef or Zotero to export a BibTeX file instead of managing the `references.bib` by hand. You can easily remove the extra instructions in the appendix

ACADEMIC HONESTY

If any part of your report is plagiarized (from another group, the internet, or anywhere else) or your references are not properly cited, you will receive a grade of zero on the entire assignment. This is in compliance with Reykjavík University's Code of Ethics at http://en.ru.is/the-university/ru-code-of-ethics/[1]. See also "Study and Examination rules" at http://en.ru.is/studies/study--and-examination-rules/[2] and "Reglur um verkefnavinnu" at http://www.ru.is/namid/reglur/hugverk.

[1] See Item 8 and General Rules on Study and Examinations
[2] Article 4.5

For your reference, here is a link to guidelines defining plagiarism and discussing how to avoid it (from the University of Oxford):

https://www.ox.ac.uk/students/academic/guidance/skills/plagiarism?wssl=1

IMRAD PAPER

This set of sections if for if you are following the IMRAD format. Delete the "Design Paper" headings if you have chosen this format.

I. INTRODUCTION

Etablish context for the report. Include background on the main scientific concept(s) and citations

State the objective(s) for the lab or concept. Why did you perform the experiment? Why did you investigate this issue

A. Subsection Heading Here

Subsection text here.

1) Subsubsection Heading Here: Subsection text here.

II. METHODS AND MATERIALS

Describe how you performed the lab. Note any deviations from what you were supposed to do. Use full sentences (tell a narrative story). Provide enough detail such that people with similar experience as you could repeat the experiment.

III. RESULTS

Create tables, plots, or drawings ("visual aids") to present your data. Describe your visual aids in full sentences.

What was your testing strategy? What kinds of tests were performed? Be very specific. How did your system perform? Make sure that there is a table/list indicating your system's quantitative performance. As a simple example, refer to Table I

NOTE: Figures and Tables need to be properly formatted and referenced in the text. Number figures/tables consecutively, include captions, and refer to the figures/tables in the text e.g. Figure 1. Equations need to be numbered consecutively as well. Equations need to have each of their variables defined

TABLE I
HAPPY FUN BALL TEST RESULTS

Feature	Trials	Explanation
Ball rolls down 30° slope	10/10	
Ball rolls up 10 stairs	2/10	Motor failed
Ball stays inflated for 24 hours	10/10	
Ball floats in water for 24 hours	10/10	

TABLE II
FIRST LEVEL FR-DP MAPPING. [5]

ID	Functional Requirement	Design Parameter
1	Contain product	Main weldment
2	Move product	Support system
3	Discharge product	Discharge system
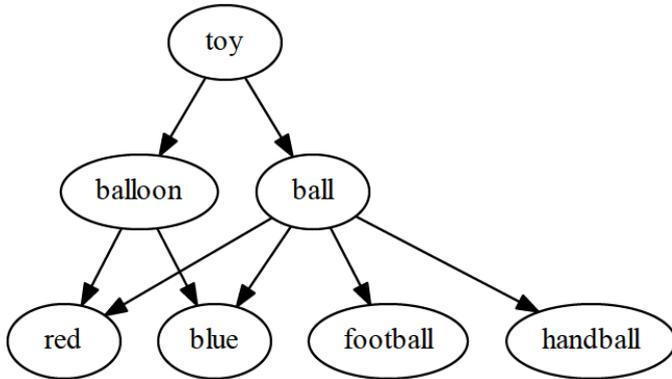
Fig. 1. Modular Dependency Diagram of "Toy" object

when they are first used or redefined. If you need to refer to particular places in the document, use numbered references. When you put a label command

As an example of an equation, in Equation (1) is the relationship between angular frequency and hertz:

$$f = \frac{1}{T} = \frac{1}{2\pi\omega} \tag{1}$$

where f is frequency in Hz, T is period in s, and ω is angular frequency in $\mathrm{rad\,s^{-1}}$.

IV. DISCUSSION

Discuss what the results mean in the context of the concepts from the Introduction (Section I). Offer explanation for any unanticipated results.

V. CONCLUSION

Summarize main conclusions (details!). State if objectives were met. Put forth ideas for follow-up experiments

DESIGN PAPER

This set of sections is for if you are following the Design format. Delete the "IMRAD" headings if you have chosen this format.

VI. INTRODUCTION

What is the problem and who cares about it[3]? What do they need in terms of a solution? What needs are not being met? What is the history of this technology or concept?

[3]Effectively identifying the end-user and/or customer

VII. PRIOR ART

Search the internet and books to find out what people are currently doing in this area of research. How is the problem currently addressed? Who and what is trying to solve it, especially the current state of the art?

How do they compare to your general idea (preferably quantitatively)?

- E.g. You can't say something is cheaper unless you have estimated costs
- Avoid using the word "good" and "great"

VIII. DESIGN

Build a list of requirements. We suggest using Axiomatic Design developed by Nam P. Suh of MIT which uses Functional Requirements that start with a verb/action and are verifiable [2]–[4].

Then map these requirements to how they will be met. Axiomatic Design does this with a list of Design Parameters starting with a noun/quantity that is measurable. An example of this mapping can be found in Table II

Give more details on implementation.

IX. ANALYSIS

Use analytical tools (CAD, equations, simulations, or prototypes) to test if the design could plausibly solve the problems mentioned in the Introduction (Section VI) Put lots of graphics here! Put lots of Calculations and data! Give an explanation of how to interpret them

X. CONCLUSION

What are the important things to remember? Go through each goal/requirement stated and evaluate if they were met. Summarize the result and justify the conclusion. Does this result indicate if it is worth further investigation?
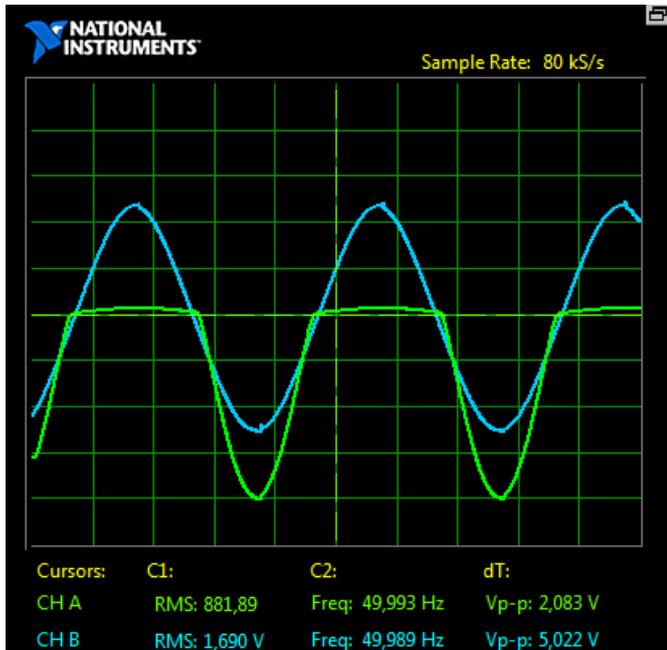
Fig. 2. Oscilloscope capture of the amplifier signal being rectified.

REFERENCES

[1] H. Kopka and P. W. Daly, *A Guide to LaTeX*, 3rd ed. Harlow, England: Addison-Wesley, 1999.

[2] N. P. Suh, *The Principles of Design*. Oxford University Press, 1990.

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[5] K. Gerhard and J. T. Foley, "Redesign of the Suretrack grader transfer bin using Axiomatic Design," in *Procedia CIRP, 10th International Conference on Axiomatic Design (ICAD)*, A. Liu, Ed., vol. 35, Procedia CIRP. Xi'an, China: Elsevier ScienceDirect, 2016, p. 6.

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[8] M. Shell, "How to use the IEEEtran bibtex style," Comprehensive Tex Archive Network, Tech. Rep., 2015. [Online]. Available: ftp://tug.ctan.org/pub/tex-archive/macros/latex/contrib/IEEEtran/bibtex/IEEEtran_bst_HOWTO.pdf

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[12] K. Elissa, "Title of paper if known," unpublished work.

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APPENDIX

Conference papers do not normally have an appendix. We put one in this case to differentiate the text guidelines from the original IEEE Sustainability template's instructions

Helpful resources for writing can be found at

- The Science of Scientific Writing: https://www.americanscientist.org/blog/the-long-view/the-science-of-scientific-writing
- Viginia Tech Engineering Communication Center: https://www.vtecc.eng.vt.edu/

This document is a model and instructions for LaTeX. Please observe the conference page limits.

A. Maintaining the Integrity of the Specifications

The IEEEtran class file is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin measures proportionally more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

Before you begin to format your paper, first write and save the content as a separate text file. Complete all content and organizational editing before formatting. Please note sections B–F below for more information on proofreading, spelling and grammar.

Keep your text and graphic files separate until after the text has been formatted and styled. Do not number text heads—LaTeX will do that for you.

B. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, ac, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

C. Units

- Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive".
- Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.
- Do not mix complete spellings and abbreviations of units: "Wb/m^2" or "webers per square meter", not "webers/m^2". Spell out units when they appear in text: ". . . a few henries", not ". . . a few H".
- Use a zero before decimal points: "0.25", not ".25". Use "cm^3", not "cc".)

D. Equations

Number equations consecutively. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Italicize Roman symbols

for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in:

$$a + b = \gamma \tag{2}$$

Be sure that the symbols in your equation have been defined before or immediately following the equation. Use "(2)", not "Eq. (2)" or "equation (2)", except at the beginning of a sentence: "Equation (2) is . . ."

E. LaTeX-Specific Advice

Please use "soft" (e.g., `\eqref{Eq}`) cross references instead of "hard" references (e.g., `(1)`). That will make it possible to combine sections, add equations, or change the order of figures or citations without having to go through the file line by line.

Please don't use the `{eqnarray}` equation environment. Use `{align}` or `{IEEEeqnarray}` instead. The `{eqnarray}` environment leaves unsightly spaces around relation symbols.

Please note that the `{subequations}` environment in LaTeX will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you've discovered a new method of counting.

BIBTeX does not work by magic. It doesn't get the bibliographic data from thin air but from .bib files. If you use BIBTeX to produce a bibliography you must send the .bib files.

LaTeX can't read your mind. If you assign the same label to a subsubsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

LaTeX does not have precognitive abilities. If you put a `\label` command before the command that updates the counter it's supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a `\label` command should not go before the caption of a figure or a table.

Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there won't be any anyway) and it might stop a wanted equation number in the surrounding equation.

F. Some Common Mistakes

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter "o".
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the

closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively".
- In your paper title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones "affect" and "effect", "complement" and "compliment", "discreet" and "discrete", "principal" and "principle".
- Do not confuse "imply" and "infer".
- The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the "et" in the Latin abbreviation "et al.".
- The abbreviation "i.e." means "that is", and the abbreviation "e.g." means "for example".

An excellent style manual for science writers is [7].

G. Authors and Affiliations

The class file is designed for, but not limited to, six authors. A minimum of one author is required for all conference articles. Author names should be listed starting from left to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

H. Identify the Headings

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is "Heading 5". Use "figure caption" for your Figure captions, and "table head" for your table title. Run-in heads, such as "Abstract", will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

I. Figures and Tables

a) Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them

in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation "Fig. 3", even at the beginning of a sentence.

TABLE III
TABLE TYPE STYLES

Table Head	Table Column Head		
	Table column subhead	Subhead	Subhead
copy	More table copy[a]		

[a]Sample of a Table footnote.

TABLE IV
EXAMPLE OF A BOOK-STYLE TABLE

X	Y
1	1
2	4
3	9

Fig. 3. Example of a figure caption. This is the RU logo.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write "Magnetization (A/m)" or "Magnetization {A[m(1)]}", not just "A/m". Do not label axes with a ratio of quantities and units. For example, write "Temperature (K)", not "Temperature/K".

ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression "one of us (R. B. G.) thanks . . .". Instead, try "R. B. G. thanks. . .". Put sponsor acknowledgments in the unnumbered footnote on the first page.

REFERENCES

A comprehensive guide to working with the IEEE citation style by Michael Shell can be found at the Comprehensive Tex Archive Network [8].

Please number citations consecutively within brackets [9]. The sentence punctuation follows the bracket [10]. Refer simply to the reference number, as in [11]—do not use "Ref. [11]" or "reference [11]" except at the beginning of a sentence: "Reference [11] was the first . . ."

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors' names; do not use "et al.". Papers that have not been published, even if they have been submitted for publication, should be cited as "unpublished" [12]. Papers that have been accepted for publication should be cited as "in press" [13]. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [14].

IEEE conference templates contain guidance text for composing and formatting conference papers. Please ensure that all template text is removed from your conference paper prior to submission to the conference. Failure to remove the template text from your paper may result in your paper not being published.