Professional English Academic Writing - II

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General Structure of a Scientific Paper

- Title
- Abstract
- Introduction
- Methods & Innovations
- Results
- Discussion
- Acknowledgements
- References
- Title, key words and abstracts are used for electronic searches

Write in the following order:

- Figures and tables
- Methods, Results and Discussion
- Conclusions and Introduction
- Abstract and title

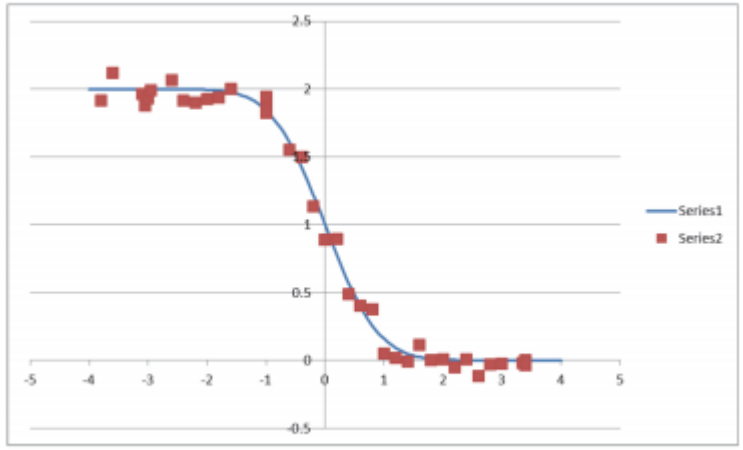
Before you writing the paper

You have to know:

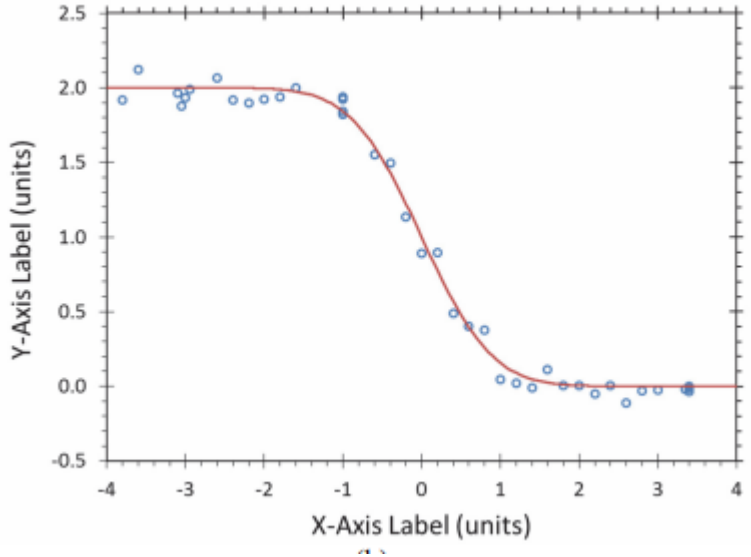
- Scope： Subject and Journal
- Novelty： something new to be worthy of publication
- Quality： Technical (with results) and presentation

Figures (legend)

- Remember that a piece of data has four parts: description, number, a unit, and sometimes, uncertainty estimate.
- Make the data stand out—do not let it get lost in a jumble of lines and labels. A quick glance should allow you to discriminate each data point from everything else on the graph.

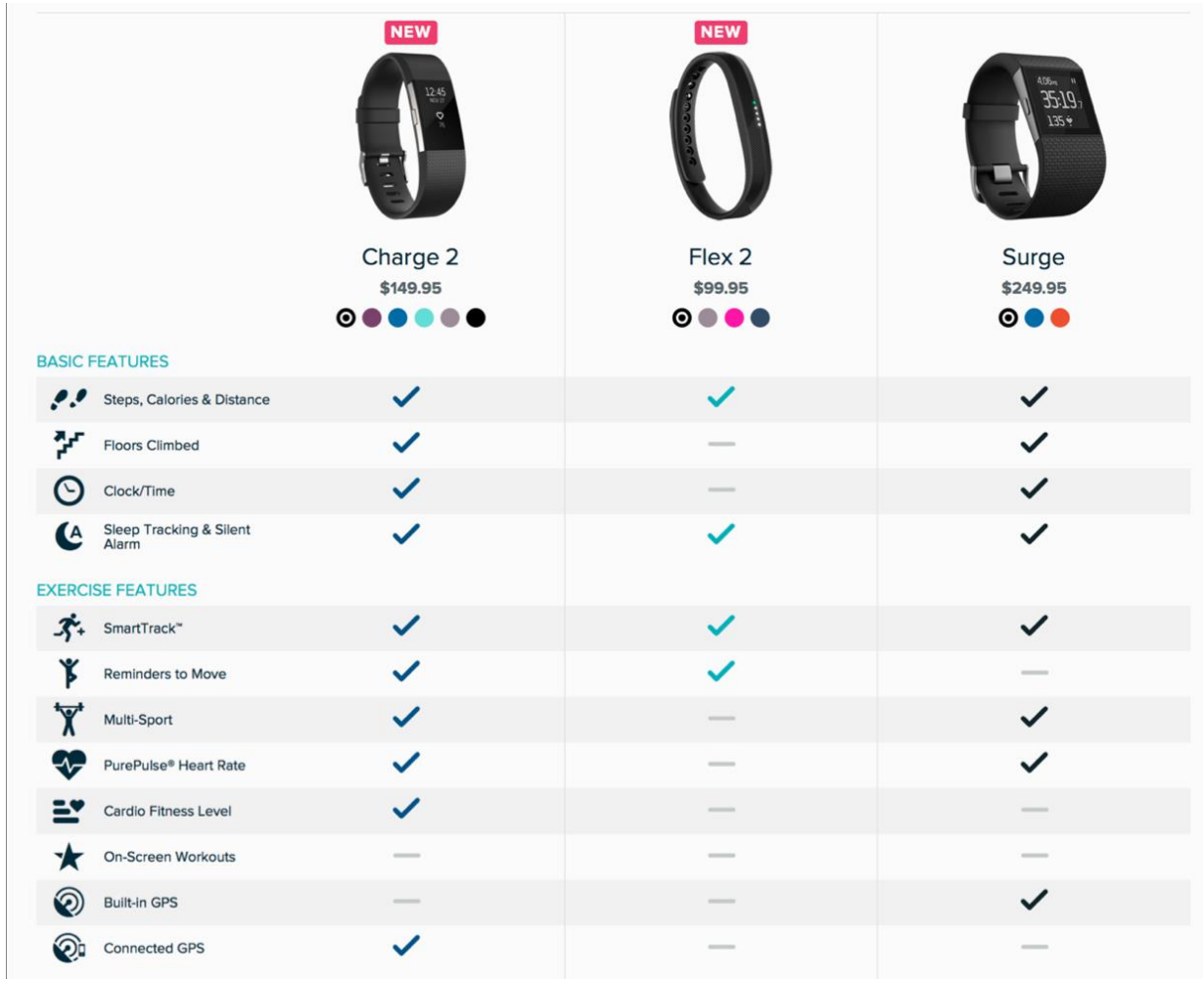


(a)



Tables

- Tables are best for looking up specific information or exact values, and graphs excel at displaying trends and making comparisons
- Baselines are important for making comparisons.



	NEW Charge 2 $149.95	NEW Flex 2 $99.95	Surge $249.95
BASIC FEATURES			
Steps, Calories & Distance	✓	✓	✓
Floors Climbed	✓	—	✓
Clock/Time	✓	—	✓
Sleep Tracking & Silent Alarm	✓	✓	✓
EXERCISE FEATURES			
SmartTrack™	✓	✓	✓
Reminders to Move	✓	✓	—
Multi-Sport	✓	—	✓
PurePulse® Heart Rate	✓	—	✓
Cardio Fitness Level	✓	—	—
On-Screen Workouts	—	—	—
Built-in GPS	—	—	✓
Connected GPS	✓	—	—

Scientific Language - Tenses

- **Present tense for known facts and hypotheses:**
  "The average life of a honey bee **is** 6 weeks"

- **Past tense for experiments you have conducted:**
  "All the honey bees **were** maintained in an environment with a consistent temperature of 23 degrees centigrade…"

- **Past tense when you describe the results of an experiment:**
  "The average life span of bees in our contained environment **was** 8 weeks…"

Methods

- Details, details, details - a knowledgeable reader should be able to reproduce the experiment.

- However, use references and Supplementary Materials for previously published procedures.
  - Do not repeat the details of established methods.
  - A general summary with reference is sufficient.

- No incomplete / incorrect descriptions.

Results

- Only representative results, essential for the Discussion, should be presented.
  - Show data of secondary importance in Supplementary Materials.

- Do not “hide” data in the hope of saving it for a later paper.
  - You may lose evidence to support your conclusion.

- Use sub-headings/common Figure-of-Merit (FoM) for comparison
  - Easier to review and read.

Discussion

- It is the most important section of your article.
  - Why your contribution is important
- Make the Discussion corresponding to the Results.
  - But do not reiterate the results
- You need to compare the published results with yours.
  - Do NOT ignore work in disagreement with yours – confront it and convince the reader that you are correct or better

Pitfalls

- Unspecific expressions such as “higher temperature”, “at a lower rate”.
  - **Quantitative descriptions are always preferred.**
- Sudden introduction of new terms or ideas
- Speculations on possible interpretations are allowed. But these should be rooted in fact, rather than imagination
- Check the organization, number and quality of illustrations, the logic and the justifications.

Conclusions

- **Tells how your work advances the field from the present state of knowledge!**

- Without clear Conclusions, reviewers and readers will find it difficult to judge the work, and whether or not it merits publication in the journal.

- Do NOT repeat the Abstract, or just list experimental results.
- Provide a clear scientific justification for your work.

Introduction - i

- Your chance to convince readers of the importance of your work.
- Describe the problem. Are there any existing solutions? What are their main limitations? And what do you hope to achieve?
- Provide a perspective consistent with the nature of the journal.

Introduction - ii

- Introduce the main scientific publications on which your work is based.
  - Cite a couple of original and important works, including recent review articles
  - Pros and cons → motivation

- Editors hate references irrelevant to the work, or inappropriate judgments on your own achievements.
  - They will think that you have no sense of purpose at all!

Pitfalls of Introduction

- Too wordy
  - Never use more words than necessary.
  - Do not turn this section into a history lesson. Readers loose interest.
- A mixed bag of introduction with results, discussion, and conclusion thrown in for good measure.
  - Always keep sections separate to ensure the manuscript flows logically from one section to the next.
- Oversell, not recommend to use “novel/first time/paradigm-changing”

Abstract

- Should stand alone! (Many readers won't click the paper if abstract is not attractive)
- Consider it the advertisement of your article. Should tell the prospective reader what you did and highlight the key findings.
  - Avoid using jargon and uncommon abbreviations.
- You must be accurate and specific!
  - Use words which reflect the precise meaning
- Follow word limitations (50-300 words)!!!

Abstract

Abstract

Deeper neural networks are more difficult to train. We present a residual learning framework to ease the training of networks that are substantially deeper than those used previously. We explicitly reformulate the layers as learning residual functions with reference to the layer inputs, instead of learning unreferenced functions. We provide comprehensive empirical evidence showing that these residual networks are easier to optimize, and can gain accuracy from considerably increased depth. On the ImageNet dataset we evaluate residual nets with a depth of up to 152 layers—8× deeper than VGG nets [41] but still having lower complexity. An ensemble of these residual nets achieves 3.57% error on the ImageNet test *set. This result won the 1st place on the ILSVRC 2015 classification task. We also present analysis on CIFAR-10 with 100 and 1000 layers.*

The depth of representations is of central importance for many visual recognition tasks. Solely due to our extremely deep representations, we obtain a 28% relative improvement on the COCO object detection dataset. Deep residual nets are foundations of our submissions to ILSVRC & COCO 2015 competitions[1]*, where we also won the 1st places on the tasks of ImageNet detection, ImageNet localization, COCO detection, and COCO segmentation.*

Title

- The opportunity to attract the reader's attention
  - Especially in conference
- Keep it informative and concise
  - Reviewers and editors would not like titles make no senses or fail to represent the subject matter adequately.
- Traditionally, technical jargon and abbreviations are not allowed.
- You include some performance data

Title Example

- Cited by 33548 since 2016

Deep Residual Learning for Image Recognition

Kaiming He Xiangyu Zhang Shaoqing Ren Jian Sun
Microsoft Research
{kahe, v-xiangz, v-shren, jiansun}@microsoft.com

- Cited by 51627 since 2012

ImageNet Classification with Deep Convolutional Neural Networks

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Title Example

IROS 2019 Best Paper Final list

- **Planning Reactive Manipulation in Dynamic Environments**
  Philipp Sebastian Schmitt, Florian Wirnshofer, Kai M. Wurm, Georg v. Wichert, Wolfram Burgard

- **Bounded-Error LQR-Trees**
  Barrett Ames, George Konidaris

- **Interaction-aware Decision Making with Adaptive Strategies under Merging Scenarios**
  Yeping Hu, Alireza Nakhaei, Masayoshi Tomizuka, Kikuo Fujimura

- **Bee+: A 95-mg Four-Winged Insect-Scale Flying Robot Driven by Twinned Unimorph Actuators**
  Xiufeng Yang, Ying Chen, Longlong Chang, Ariel, A Calderon, Nestor O Perez-Arancibia

Keywords

- These are the labels of your manuscript and critical to correct indexing and searching.
  - Shouldn’t be too broad or too narrow (think Google …)

- Use only those abbreviations that are firmly established in the field.
  - e.g. DNA

Acknowledgements

- **Recognize those who helped in the research (you want them to help again, don't you?)**

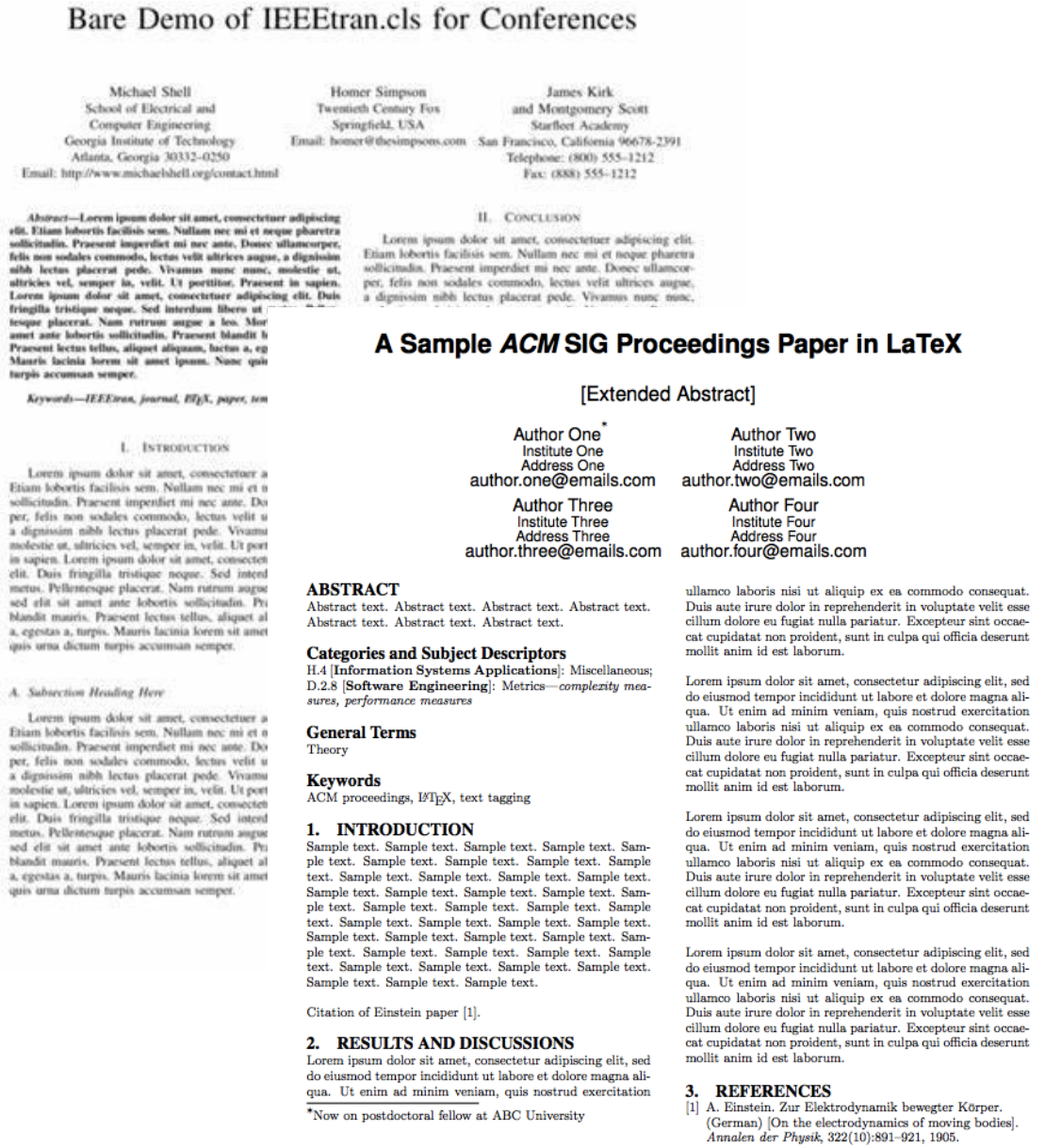
- Include individuals who have assisted you in your study:
  Advisors / Financial supporters / Proofreaders / Typists / Suppliers who may have given materials

References

- Cite the main scientific publications on which your work is based
- Do not inflate the manuscript with too many references – it doesn’t make it a better manuscript!
- Avoid excessive self-citations
- Avoid excessive citations of publications from the same region

Home work assignment

- First paper of you paper
  - Including title, author, abstract, key word, introduction and references
- The topic can be any common research progress in your field, but it need to be VERY elementary.
- Plz use the double column IEEE / ACM (sig) template (doc/latex)
- Due date: Dec 31, 2019.



Bare Demo of IEEEtran.cls for Conferences

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A Sample *ACM* SIG Proceedings Paper in LaTeX

[Extended Abstract]

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