Preparing a manuscript for a peer-reviewed journal the FMDL way

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Abstract

This is like a conference abstract, but shorter. No use of acronymns allowed. Briefly (one sentence), motivate the manuscript. Then say what you did. Finally, summarize the main result, including salient numbers from data. This will be the last part of the paper you write just before final grammar check. This will be the **seventh** part of the paper you write.

1 Introduction

Read through the entire PDF. This will tell you in which order to write the paper with cardinal order defined in bold, large red letters. You also need to pay attention to the comments in the .tex file associated with this PDF.

This will be the **sixth** part of the paper you write.

Before you do anything here, you need to complete pre-writing:

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1. Decide what is the story. Decide what are the figures.
2. What are sections needed? What are the key citations?
3. **You have not written a word yet at this stage. Just a sketch of the article on a piece of paper.**
4. Figures. Use .eps for vector graphics. Use .tiff for scan data.
5. Shared Zotero collection. Add all the key citations. Generate a .bib file.
6. Go for a walk. Think about your competition.
7. Prepare a competition table. List relevant parameters. Add needed references to Zotero collection.
8. Scribble out a flowchart for the argument flow.
9. Decide what are competing/contradictory references that a reviewer will ask about. Add them to Zotero.
10. Go for another walk. Decide if you can address any of the weaknesses in the paper now and how much time it will take. If you can do these quickly, go back to the step on figures (add/modify).

The moment you complete the pre-writing process, clear a full day from all distractions (social media, email, phone, etc), and write the entire paper in 6 hours. This will take 2.5-3 hours if you are putting together a Letters type manuscript. Your actual numbers in practice will be about 15% higher than these estimates for your first paper, with the measure improving as you gain more experience.

If you have more than one actively writing co-author, you both need to first share the Zotero collection. Then, depending on your preference, you can open a document on Google Docs, and set up a Zoom call while you co-write parts of the paper together in full markup

simultaneously. Alternatively, you can push your part to GitHub and inform the other student/postdoc to do a git pull and proceed. If we are collaborating with a non-LaTeX using group, the Google Doc method might work better. The backup of using pandoc to convert back and forth always exists but that is more error prone.

First step in the paper is to proceed to the results section. Once you come back to this section do the following:

- Paragraph one should prove the importance of the topic of your study with citations to recent (last 3-5 years) literature, especially review articles.
- Pararaph two should clearly establish the need statement for the study by clearly defining the open problem that needs addressing.
- Paragraph three should very briefly tell the audience what you have done (abstract style) and which approach you have followed (if that is useful to include).

Once you have done the above, and also written up an abstract, it is now time to do the following:

1. Cutting: Prune your sentences to increase information density. Grammarly will also help, but the first part must be done by you.
2. Check for English[1, 2], and run it thoroughly through Grammarly.
3. Create a github repo. Under settings of the new repo, under notifications, add your email address, and mine. What this will do is that as soon as some changes are pushed, everyone gets notified. GitHub currently allows only two email addresses.
4. Commit the first verson and push.
5. We go back and forth. The more carefully you have written the first draft, the faster this process should go.

6. Format it for the target journal identified by both of us. At that point, send the draft out to all co-authors for comments. When a collaboration is involved, I will do this myself.

7. Run a Turnitin check - remember - no repositories.

2 Methods

This will be the **first** part of the paper you write.

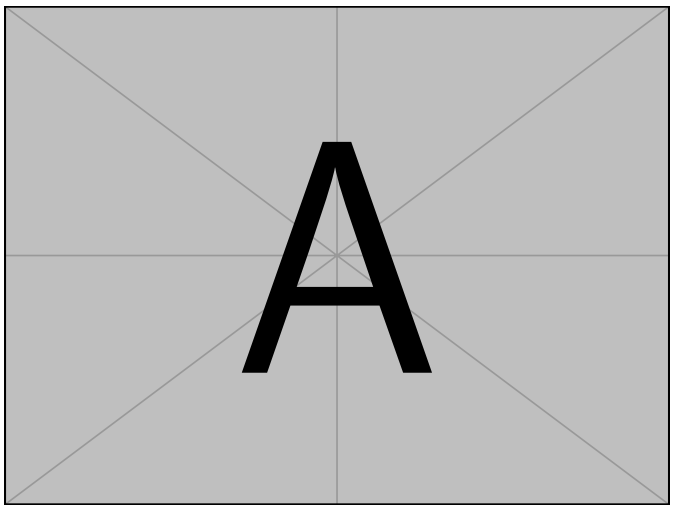
In this section, clearly describe how you did your work. Create subsections for materials analysis, device fabrication, device characterization etc. The description should tersely state (within parenthesis) what tools were used, along with OEM names. In case of software/computational work, you must clearly state the algorithm used, along with any software specialized tools. Do NOT mention LabVIEW, Matlab, Python, or any such general purpose tools - that looks amateurish. Any protocols used must be cited. Do not repeat yourself - if you have previously published with a given method, cite your previous work instead of writing everything again.

3 Results

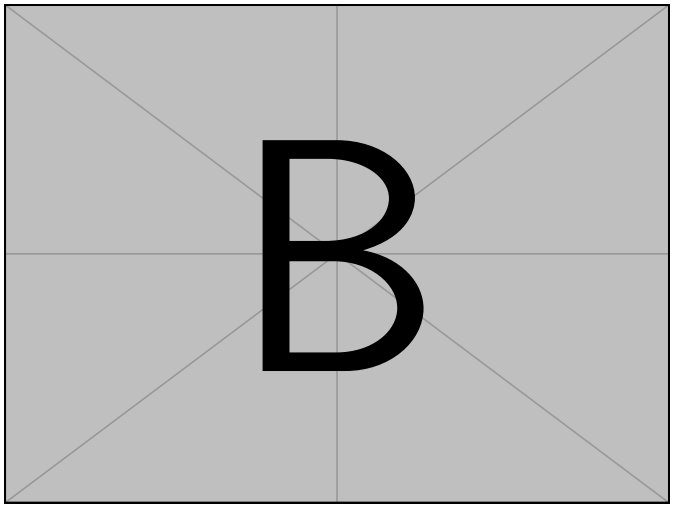
This will be the **second** part of the paper you write.

First insert figures (Fig. (1)) and tables. Make sure that your figures use appropriate colors, fonts, etc. [3]. Your sentences describing your data scientifically must appear in text, and must never use reference to figures or tables except inside parenthesis. Why? When we talk to each other, we do not speak out references, we speak out ideas. In that sense, cross references and citations are "underspeak" that are present in citations, or in parenthesis. This has the additional merit of saving you writing space.

The label in Fig. (1) is an example of a cross-reference. You **never** use absolute references



(a) Measured capacitance as a function of area.



(b) C(f) for different biases.

Figure 1: (a) Use clear images, preferably in .eps form for anything other than scan data, and (b) .png form for scan data. The width of the figure is chosen to be 88mm since that is the typical width of a journal column in two-column format. Your figures must be clear to read easily at this size. If your figure is too wide to fit in this width, you can use the figure* environment, but that is done only in very rare cases where the figure is really complex.

in a document (like `Fig.~1`). The reason for this ought to be obvious - while you author a text, things can move around, and you do not want to keep track of what moves where. LaTeX is supposed to take care of that - not you. You can make mistakes, and mistakes can be costly.

An equation can be similarly labelled:

$$E^2 = p^2c^2 + m_0^2c^4 \tag{1}$$

Not all equations need labels like Eq. (1) of course:

$$\begin{aligned} E &= h\nu \\ &\equiv \frac{hc}{\lambda} \end{aligned} \tag{2}$$

In labeling (and referencing equations), be conservative. Label only those specific (and few) equations that you are actually going to use. Remember - any text can be made to look more inaccessible by involving more math. You should not show all steps in a paper, just the important ones that help you make your point. Needless to add, all your analytical calculations should be cross-checked with Maxima or Mathematica before it gets on your manuscript draft. No, you need to do that now. A neat trick in Mathematica is the use of `TeXForm[]` function to output LaTeX formatted code for the math. This may save you a lot of time, and transcription errors.

Tables can be similarly cross-referenced as shown in Table 1.

Table 1: An example table

x	Thickness	Composition: EDX and (XPS)		
	(nm)	K/A	Na/A	Nb/A
0.3	62 ± 4	0.365 ±2% (0.3375)	0.634 ±2% (0.6624)	1.036 ±2% (1.028)
0.5	70 ± 2	0.510 ±2% (0.5091)	0.489 ±2% (0.4910)	0.937 ±2% (1.037)
0.7	68 ± 2	0.718 ±2% (0.7682)	0.281 ±2% (0.2317)	0.928 ±2% (1.153)

4 Discussion

This will be the **fourth** part of the paper you write. I have intentionally split it up because even in cases when this is not a separate section in your manuscript, you should write it after a break (writing acknowledgments) - there is a difference between a) what the data are, and b) what your data mean, in light of literature.

This section is often combined with Sec. (3). Sometimes, it is important to have it separate, especially when a fair bit of data analysis and interpretation is involved, and you need to place the discussion of the results in context of the existing literature. Whether to split or not is a personal choice, but is largely driven by how much do your results need to be compared and/or contrasted with literature. Very often, a comparison table between this work, and other studies will be placed here.

This is also the place where you should criticize certain shortcomings of your own work. It is important to put that here to disarm overly critical reviewers.

4.1 Naming things

There is an underlying philosophy to the way we do manuscripts in the lab - regardless of what it is, the name of the repo (already addressed in the README file), file, section, figure file, label to a figure, label to an equation, label to a table, etc. **must reflect the contents of whatever is being referenced or named**. Hopefully, Table (2) will serve as a useful rolodex - it is not complete, but it is strongly indicative.

Table 2: Naming things. Mandatory parts of the string in the name/label are in blue color. DOCNAME refers to the usage in the README file of this repo.

Entity	**Purpose of the entity**	**Good usage**	**Examples of poor choices**
Label to an equation	To label an equation so that it can be used in a cross-reference	eqn:energyofparticle	Eq12, importantequation
Label to a figure	To label a figure so that it can be used in a cross-reference	fig:JVdata	Fig1
Label to a table	To label a table so that it can be used in a cross-reference	tbl:ratio	Table1, reallyimportantsummary
Label to a section	To label a section in the document so that it can be used in a cross-reference	sec:discussion	Sec1

Name of a figure file	To name a figure file that can be subsequently called in includegraphics markup	JVdata.eps	Fig1b.eps, firstfigure.eps
Name of the bibliography file	To name the .bib file that you will be using in this document	DOCNAME.bib	references.bib

Needless to add, you need to pick labels that reflect the contents of the object being referenced.

Notice some ground rules for labeling: sec for sections, fig for figures, tbl for tables. This convention, that I follow in my documents, helps distinguish between the objects that are being referenced. It is for your own benefit of course.

It should be quite obvious why we follow the naming convention the way we do. If you choose to violate instructions provided in this document and the overall repo, please do us both the favor of not publishing. I do not care how good your science is, but if you cannot be bothered to use rational, common sense-based, **consistent and systematic** methods to communicate your science, you: a) are not a good scientist, and b) your communicated science will not make an impact anywhere. Good scientists are systematic, cautious, thorough, sceptical, thoughtful, and organized in a manner that makes machines look human by comparison. Yes, OCD is an occupational hazard in our business. Careful people show care and forethought in everything they can.

5 Conclusions

This will be the **fifth** part of the paper you write. This serves as a precis of your discussion, but in terms of more pithy statements, and you should highlight what the results

mean for the field. This is also the place where you talk about future work.

Data availability

Authors will make data available upon reasonable request.

Acknowledgments

This will be the **third** part of the paper you write. Immediately after you write about results, it should be easy to remember who helped you get those results.

FA and TA (PhD fellowships) and PS (postdoc fellowship) acknowledge support from Ministry of Human Resource & Development (MHRD). SA acknowledges support from University Grants Commission. CP acknowledges partial support from grant XYZ from Department of Science & Technology. PS and MS acknowledges support from grant ABC from Department of Science & Technology. All authors acknowledge facility access to Central Research Facility (CRF) and Nanoscale Research Facility (NRF, NNetra program) at IIT Delhi. Authors acknowledge technical assistance from Mr. Did Occasional Measurements/Process Runs of CRF.

Statement of contributions

FA fabricated the devices. FA and TA characterized devices. SA and PS synthesized active semiconductor materials. SA, TA, and PS carried out XPS measurements. FA, SA, TA, and PS carried out data reduction. FA, SA, PS, CP and MS carried out technical discussions. FA, SA, CP and MS wrote the manuscript.

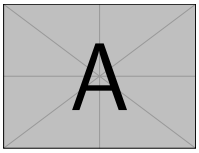
In terms of CRediT (Contributor Roles Taxonomy): a) Conceptualization: FA, CP and MS, b) Data curation: FA, SA, TA, and PS, c) Formal analysis: FA and PS, d) Funding acquisition: CP and MS, e) Investigation: FA, SA, TA, and PS, f) Methodology: PS, CP and MS, g) Project administration: PS, CP and MS, h) Resources: CP and MS, i) Software:

FA, SA and PS, j) Supervision: PS, CP and MS, k) Validation: FA and TA, l) Visualization: FA, SA, TA, and PS, m) Writing - original draft: FA and SA, n) Writing - review & editing: FA, CP and MS.

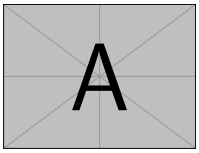
Conflicts of Interest

Authors FA, TA, PS and MS declare competing interest in the form of an Indian patent application (2021345678).

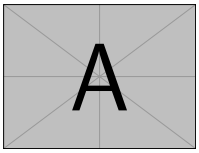
Author Bios



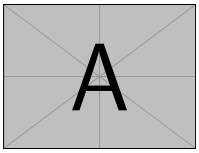
FA is a new author when it comes to writing papers. He/she is slowly learning and will get much better with time.



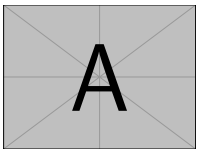
SA is also a new author when it comes to writing papers. He/she is slowly learning and will get much better with time.



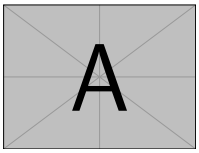
TA is a somewhat seasoned author when it comes to writing papers. He/she is much than when he/she started.



PS is quite experienced in writing papers. He/she is into teaching younger researchers in how to write a paper.



CP is our honored colleague, without whose help this work would have never seen the light of the day. He/she is quite busy advising his/her own research group.



Madhusudan Singh graduated at the top of his 5-year Integrated M. Sc. Physics class at IIT Kanpur in 1999 with minors in electrical engineering, and computer science. He earned his M. S. degrees in EE and in Mathematics in 2003 and Ph. D. (EE) in 2005 in transport in III-V nitride heterojunctions. After postdoctoral work at MIT in organic optoelectronics, he joined Arizona State University, where he developed printing technologies as a research scientist at the Flexible Display Center. After work on chalcogenide-based flexible electronics at the University of Texas at Dallas, and as an editor at Wiley, he joined the faculty of the Department of Electrical Engineering at IIT Delhi in 2013. His academic service has involved serving as a panel / proposal /application reviewer for the US National Science Foundation (NSF) and the US Department of Energy (DoE), Indian Science & Engineering Research Board (SERB), Indo-US Science and Technology Forum (IUSSTF), as associate editor of Advanced Functional Materials, in addition to reviewing for several journals, and as editor for special issues for IEEE and IoP. His research interests lie in solution-processed and printed device fabrication methods, flexible electronics, materials and surface chemistry, low cost photovoltaics, solid-state lighting sources, and sensors and detectors.

References

[1] R. W. Burchfield. *The New Fowler's Modern English Usage*. Revised Third. Oxford University Press, 1998.

[2] William Strunk and E. B White. *The elements of style*. New York: Longman, 2000.

[3] James McNames. "An Effective Color Scale for Simultaneous Color and Gray-Scale Publications". In: *IEEE Signal Processing Magazine* 23.1 (Jan. 2006), pp. 82–96.

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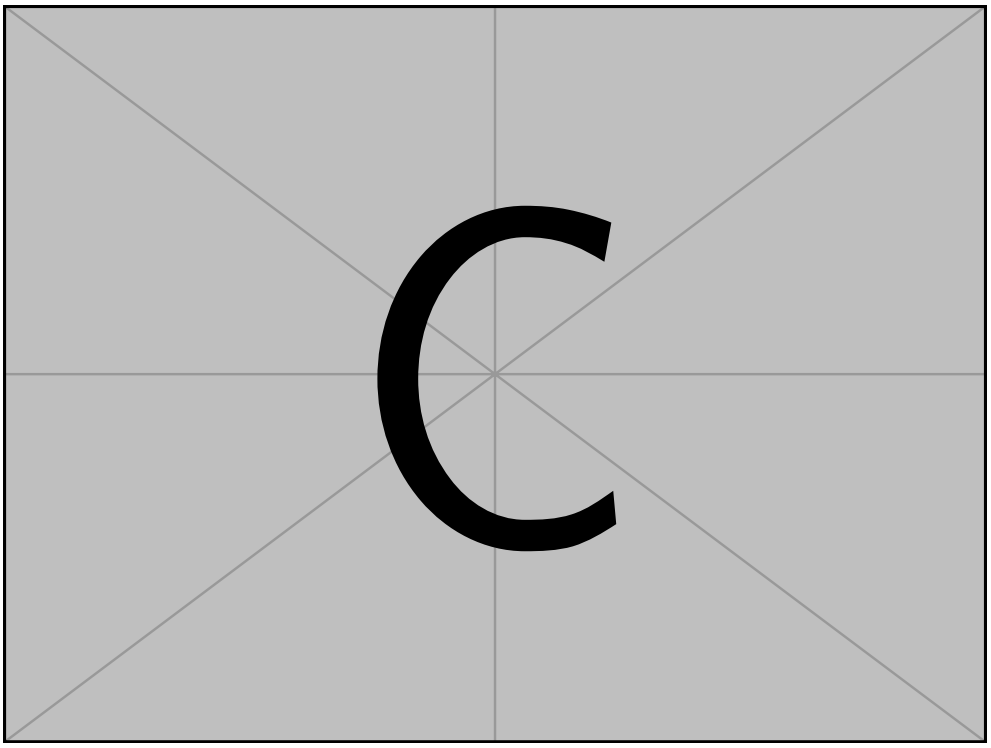

A no more than a 30-words long sentence that summarizes what you did in this paper, written for the benefit of a technically-literate layperson.