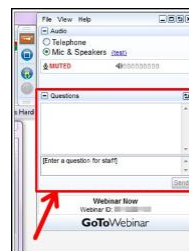


Have Questions?



Type them into questions box!

**“Why am I muted?”**

Don't worry. Everyone is muted except the presenter and host. Thank you and enjoy the show.

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Moderator: Joseph Fortunak, Howard University

[Register for Free!](#)

#### What You Will Learn

- Why off-line and in-line spectroscopy techniques decrease exposure and generation of hazardous waste
- How to shorten analysis time and enhance productivity
- How in-line analysis techniques greatly increase process knowledge

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Moderator: Celia Arnaud, C&EN

[Register for Free!](#)

#### What You Will Learn

- Essential skills and knowledge that students develop in (and only in) laboratory courses
- Strategies for building laboratory curricula that develop essential knowledge and skills
- Approaches for determining what students are gaining from laboratory experiences

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## Fundamentals of Effective Scientific Writing

# Manuscripts *and* Grants

Co-produced with ACS International

THIS ACS WEBINAR WILL BEGIN SHORTLY...

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### Fundamentals of Effective Scientific Writing: Manuscripts and Grants



**Professor Ashutosh Sharma**  
Secretary, DST, Govt. of India  
Editor, *ACS Applied Materials and Interfaces*



**Professor Dipankar Das Sarma**  
IISc Bangalore  
Editor, *ACS Energy Letters*



**Dr. Deeksha Gupta**  
Associate Director-India,  
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# Fundamentals of Effective Scientific Writing: Manuscripts and Grants



D. D. Sarma, Solid State and Structural Chemistry Unit,  
Indian Institute of Science, Bengaluru, INDIA



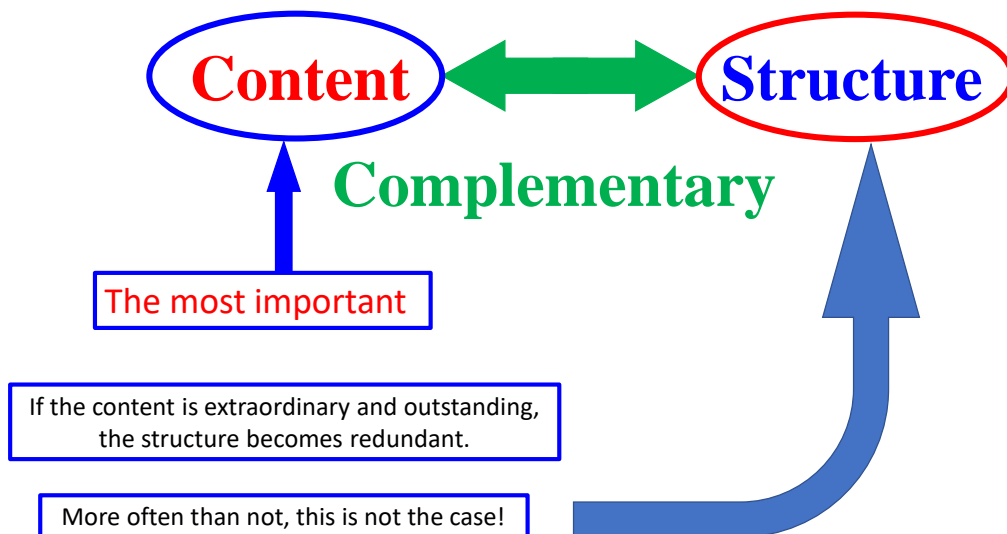
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## Just a few words on the content

You must be convinced of its **importance.**  
(Subjective)

If you are not, why tell it at all!

Why should anyone care to know about it.

Why should it be published or funded.

In order to be important, it has to be:  
nontrivial and new.

New but trivial → Not important

Nontrivial but old → Need not be told again

Let me give some examples:

$A_{0.1}B_{0.9}$  and  $A_{0.2}B_{0.8}$  known  
X-Y core-shell NC exists

Should I investigate a new compound  $A_{0.15}B_{0.85}$ ?  
Should I study X-Z core-shell NC?

Let us ask these questions to  
ourselves at this point!



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### Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



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#### Should I...

- A) Investigate a new compound  $A_{0.15}B_{0.85}$
- B) Study X-Z core-shell NC
- C) Both A and B
- D) None of the above
- E) Maybe



*\* If your answer differs greatly from the choices above tell us in the chat!*

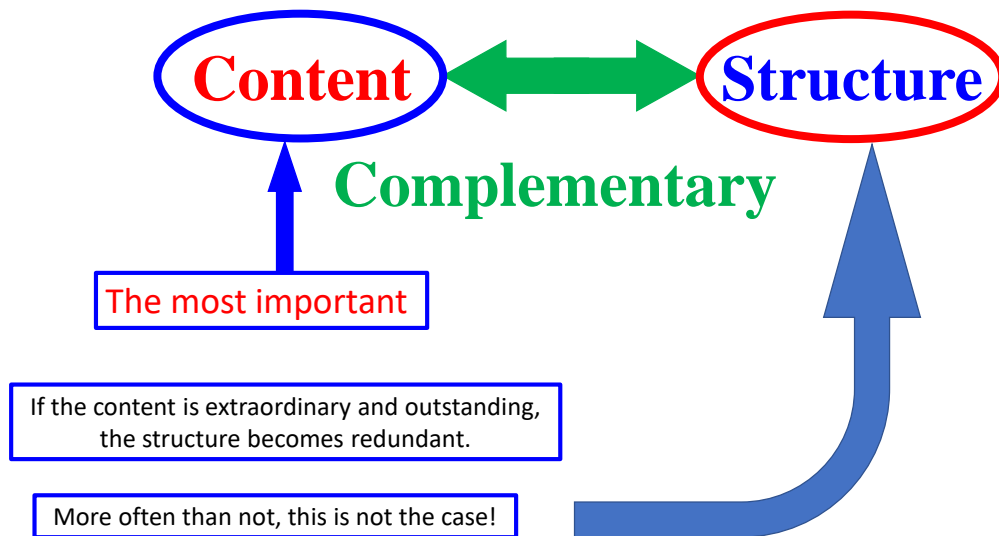
## It really depends!

- If I do not expect anything unusual, I definitely should NOT study either.
- If  $A_{0.1}B_{0.9}$  and  $A_{0.2}B_{0.8}$  have fundamentally different properties (structural, magnetic, electronic ...), investigating intermediate composition is definitely worthwhile, if not already known.

Recall the example of high temperature cuprate superconductivity and many other such examples.

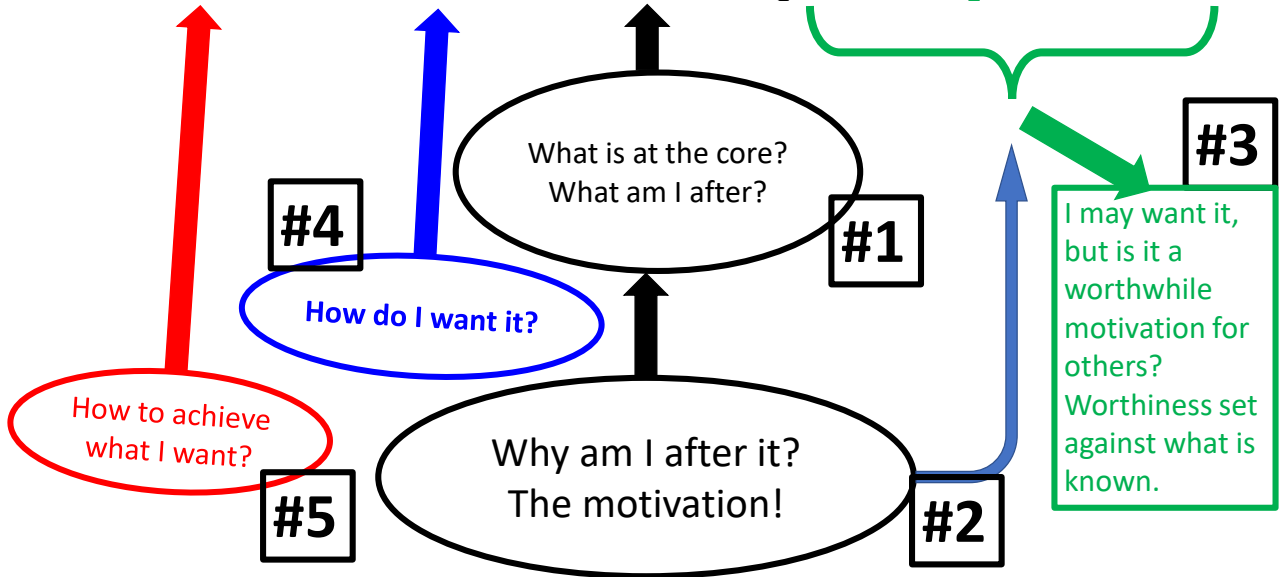
- In the case of X-Y/X-Z core-shell structures, it depends on structural match/mismatch of lattice parameters, tensile/compressive strength, optimisation of optical properties with overlayer thickness, ....

**So, the bottom line is:** Is there a thought of your own behind what you wish to tackle as a research problem!



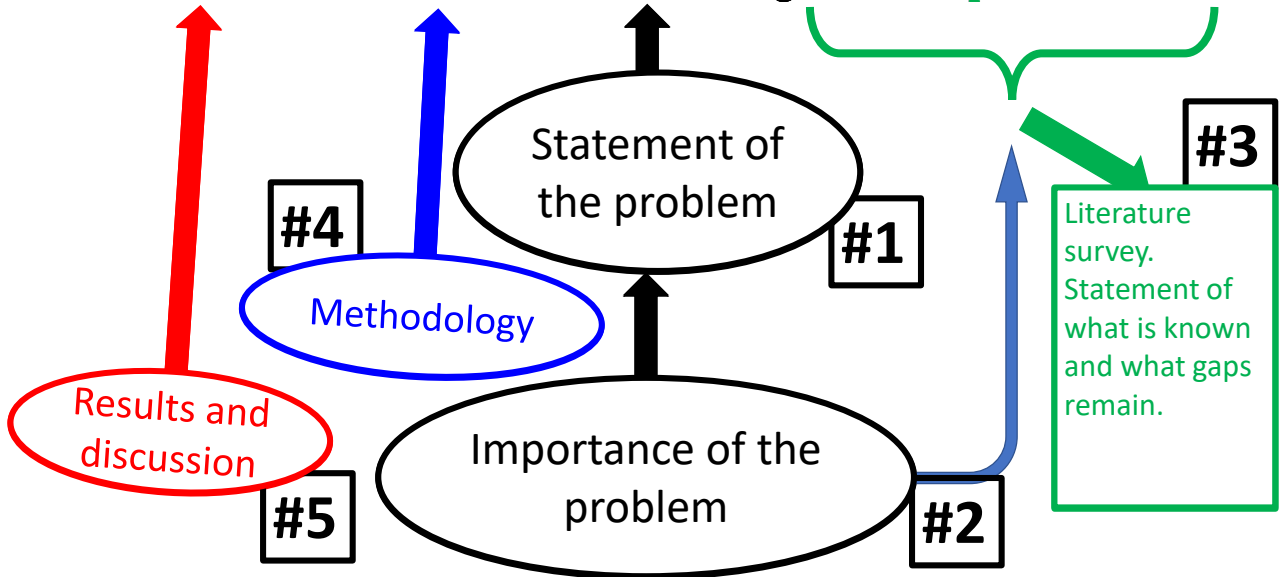


# Fundamentals of Effective Scientific Writing: Manuscripts and Grants



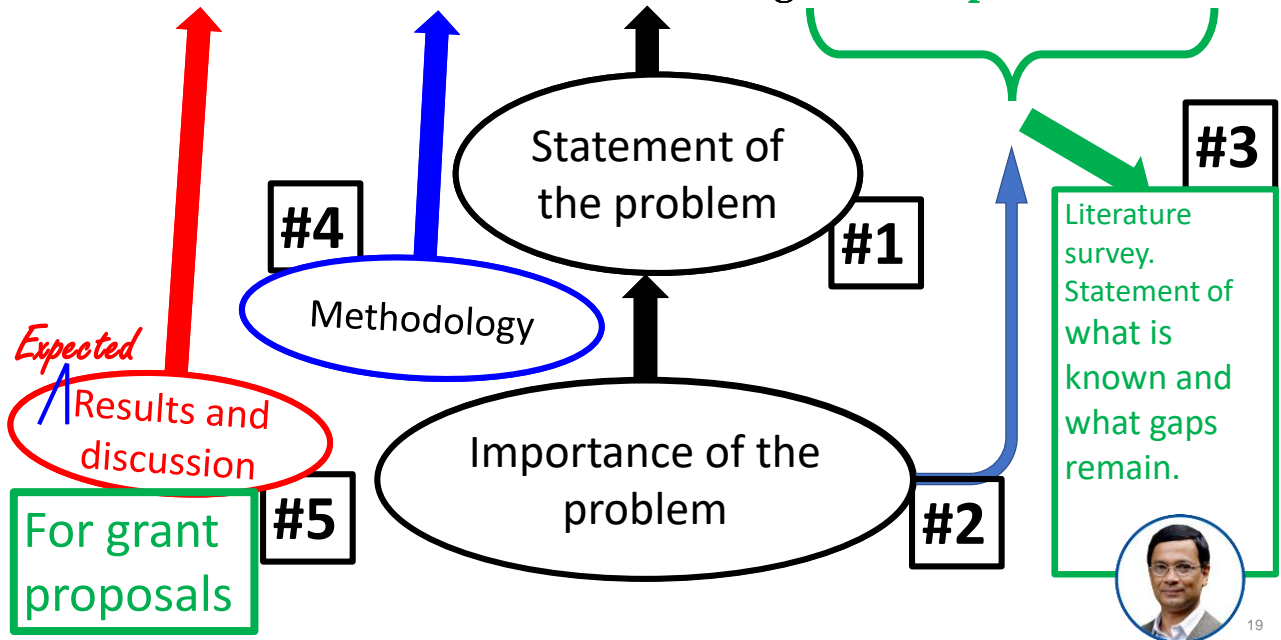
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# Fundamentals of Effective Scientific Writing: Manuscripts and Grants



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## Fundamentals of Effective Scientific Writing: Manuscripts and Grants



### A few tips on the Results and Discussion:

As the name suggests, we have a collection of results, we wish to present them to the reader and discuss these.

- How to present individual results

*What is the best way?*

Results are best presented in the form of a figure, wherever possible.

Some points to keep in mind while making figures:

Choose the right font and size.



## A few tips on the Results and Discussion:

As the name suggests, we have a collection of results, we wish to present them to the reader and discuss these.

- **How to present individual results**

*What is the best way?*

Results are best presented in the form of a figure, wherever possible.

**Some points to keep in mind while making figures:**

Choose the right font and size. Combine symbols with colours and line types.

(In a B&W print, only symbols and line types will save your figure!)

Do not overcrowd a figure; make multiple figures rather than stuffing a figure!

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## A few tips on the Results and Discussion (continued):

- **Develop the discussion on the figure to walk the reader through**

*Meaning?*

State what the figure shows.

Then describe what the reader is supposed to see there.

Then discuss the relevance and importance of these observations to the central theme.



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## A few tips on the Results and Discussion (continued):

- **Make sure that you have not stuffed in irrelevant information**

*How do I judge?*

Just count the number of sentences you have written on a figure beyond its description. Too few! Redundant figure?

- **The story must unfold logically**

*How do I know?*

If you ever need to discuss Fig. N after Fig. M, where  $N < M$  (e.g. Fig. 3 being discussed, even in brief, after discussing Fig. 4 or 5), the manuscript is possibly not arranged optimally.



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## A few tips on the Results and Discussion (continued):

- **Arrange results to build up a tempo, an increasing level of excitement**

*How do I do it?*

Best achieved by arranging experiments/results/figures that feed into proving the central theme with increasing emphasis and precision, eliminating all doubts from the reader's mind.



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## Thumb rules:

### Manuscript & Grant proposal

Focus on **a single strong message** in a manuscript or a proposal.

Count how many distinct messages you are trying to present.

Are different messages inter-related? Make the interconnection evident and arrange these messages to build up towards the central theme.

### Grant proposal



Do not make it appear like a shopping list. What you ask for should be critically derived from the work proposed to be carried out.



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## Why should it be funded?



1. If there are prior reports  **It is no longer novel!**
2. If there is no prior report  **How do we know it is feasible!**

Raise these questions to yourself and find convincing responses prior to you start writing a grant proposal and once again, before you meet the Project Advisory Committee to defend your proposal.



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## Let me share my approach as an Editor of with you:

**The thing that we look for is the content** (Does it have a spark, an original thought, an unexpected result)

When we have a good feeling for the content, we even help the authors to improve the presentation.

As authors, we all are convinced of the content of our manuscript, but that is not enough. If I cannot explain my ideas to Editors and reviewers, the fault is likely to be in my ability to explain and not in readers' ability to understand.

**We try to gauge the content from the cover letter, title, abstract, parts of the introduction, conclusion and figures. So, the importance of these parts in getting past the editor and into the review stage.**

### Some Tips:

**Title:** Crisp and specific (Should provide a clear idea of the content)

**Abstract:** Using the minimum text, provide the context and motivation of the work. Follow this, with references to specific samples and experimental/theoretical techniques, to clearly state the most important findings or contributions of the work along with their implications.

**Figures:** Self-contained and self-explanatory. Use the caption to briefly tell what the figure shows and implies. 27

## So far, I have told you the “Do’s”. Now let me tell you the “Don’ts”:

- We have **zero-tolerance** for any form of **plagiarism, data manipulation or misrepresentation** and any other **violation of ethical guidelines** that all authors must familiarise themselves with before submitting any manuscript.
- We are **super-allergic** to any apparently **deliberate avoidance of relevant citations** to give credence to the claim to novelty of the work.
- We are **allergic** to any attempt at **unnecessary self-citations**.
- We are also **allergic** to the use of **unqualified superlative adjectives**: “very important”, “novel”, “excellent”, “outstanding”, .... (Do not try to impress. Clarity of thought and presentation is more important).
- We are also **allergic** to **routine work** and suggest avoiding words like “Detailed”, “exhaustive”, ....

## Before I end, a suggestion to my young colleagues in the audience:

All writing consists of three components –

- **content,**
- **logical arrangement, and**
- **aesthetics.**

It will be a good exercise for you to categorise all the tips in my slides in terms of these being suggestions to improve the content, logical arrangement, and/or aesthetics.

**THANK YOU!**



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## Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



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**For those of you that would like to get your research published, what stage are you currently in?**

- I am ready to submit now
- I am searching for a journal
- I am writing a manuscript
- I am doing research
- Not applicable



*\* If your answer differs greatly from the choices above tell us in the chat!*

# Effective Scientific Writing II: Manuscripts and Grants

## *The Best Practices*



Department of Science & Technology  
Government of India



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Ashutosh Sharma, Department of Science & Technology, New Delhi  
& Indian Institute of Technology, Kanpur

Email: [ashutos@iitk.ac.in](mailto:ashutos@iitk.ac.in)

Homepage: <http://home.iitk.ac.in/~ashutos/>

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### Grants and Papers:

**The Pareto Principle:** 80/20 rule, the law of the vital few states that roughly 80% of the effects come from 20% of the causes!



**While Writing:** Be Excited, Don't Procrastinate, Probe and Think (like a referee & reader), Devote Time, Have Patience, Revise, Revise.....

- 
- ✓ Not a Lab Report! Not (too) Incremental! Solution to a Problem!
  - ✓ **Focus** (motivation), **Novelty**, **Non-obvious** (Prior Art Gaps),  
*New Insights, Useful, Superior.....*
  - ✓ **5M:** *Mechanics, Materials, Methods, Machine (Device),  
Manufacturing (Design); & MAN!*



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## From Contents to Structure: Storytelling

- ❑ Determine the right journal, see instructions for authors!
- ❑ Create a Skelton & logical flow map of Information
- ❑ Fill in Figures, Tables and Major Points/Focus which repeat
- ❑ Next, Materials & Methods, Results & Discussion, Conclusions
- ❑ Now, Introduction & References, Abstract and Title + Keywords!



**With Quality & Impact!**



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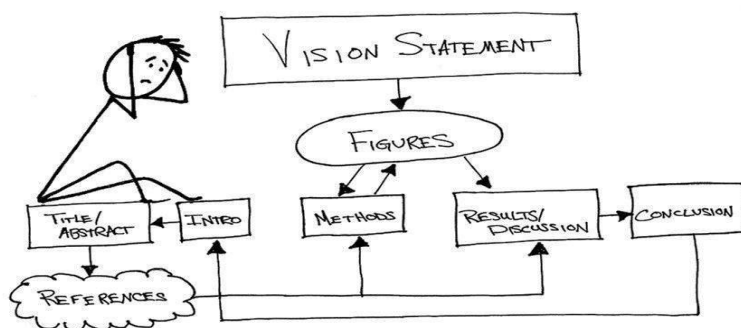
## Some Parting Shots!

- **Title & Abstract** (not Real!!)
- **Introduction & References** are NOT random!
- **Justify to Editor** (Justify to yourself!)
- **All papers are incomplete!** Don't judge others harshly!!
- **No cut-paste job!** No Recycled of Figures!!
- **Harmonize different sections** written by different coauthors
- **Selective Citations!** Referee Suggestions!!!



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# Live Long and Publish, Good Stuff even Great Stuff...



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## Fundamentals of Effective Scientific Writing: Manuscripts and Grants



**Professor Ashutosh Sharma**  
Secretary, DST, Govt. of India  
Editor, *ACS Applied Materials and Interfaces*



**Professor Dipankar Das Sarma**  
IISc Bangalore  
Editor, *ACS Energy Letters*



**Dr. Deeksha Gupta**  
Associate Director-India,  
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