

## White paper Competition Talk

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"Science writing": Generally, writing about science.

The term has come to encompass all writing about science that is not a technical report, i.e. writing about science so that it can be understood by nonscientists, and/or scientists in a completely different field.

i.e. , explaining science

### Technical Reports:

- A journal article which reports and interprets new findings
- A review article which reviews and attempts to synthesize recent progress in a field.
- A grant application which extrapolates recent findings into the future and advocates funding for continuing experiments.  
This is an example of persuasive writing

### Science Writing:

- A text book Technical, but often for the non- (or emerging) expert. Text books are distinguished by often attempting to be comprehensive within their scope.  
Better written = more interesting = more explaining

My favorite: Molecular Biology of the Cell, Bruce Alberts et al.

- Science Journalism A very broad category. Interpreting scientific findings (within a limited scope) for non-scientists and explaining why they are interesting and important.

Examples: Newspaper + magazine articles. Books (Michael Pollan), websites, NOVA, etc.

- Scientific Memoirs Scientists (generally famous ones) interweave a personal narrative of their lives with an explanation of their findings and how they made them.

Examples: James Watson, The Double Helix  
Eric Kandel, In Search of Memory

What You Are Doing:

A combination of a Grant Proposal + Science Journalism

NOT: A review article, interpreting new findings,  
writing a memoir, writing a text book

## Persuasive Writing:

You are advocating a particular position, and, via justification with evidence, convincing someone else to adopt it.

You need not avoid the first person: active is better than passive.

### The General Strategy that Worked Last Year:

- Introduce the social problem  
(tell a story)
- Introduce your scientific/technological solution to that problem  
(Explain the technology)
- Explore some other plausible solutions to the problem, and why they wouldn't work as well as yours.
- Specific policy prescription for encouraging the implementation of your chosen solution
- Wrap it up.

N. B. This year coming up with an original policy proposal, based on your own take on a certain area, is highly encouraged.

Your proposal should be broken up into clear sections, with headings / summaries that summarize each section.

Example:

Introduction

vs.

Introduction: Dependence on Foreign Oil is a Leading Threat to Economic + National Security

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Scientific Explanation

One model, "nomological" (nomos: law)  
Karl Hempel

what/why question:

Facts / data

Law tying together facts

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That which was to be explained

Example:

(Why did the ball roll?) What force was acting on the ball?

Facts ( Mass of ball: 3 kg  
Observed acceleration of ball: 3 m/s<sup>2</sup>

Law (  $F=ma$  )

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(A force acted on it.) The force acting on the ball was 9 Newtons

Often in a technical report, the law component is omitted.

Our data is ...  
[Assumed knowledge]

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Assertion: "We propose / this supports ..."

So, I propose a similar form for a "Science-writing explanation"

A carefully selected set of facts

Your assertion, based on research, about what connects them.

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Interpretation and significance.

- Inherent to an effective science-writing explanation is simplification.
- Without attempting to deceive, you must pick the most significant evidence for your proposal.
- A litany of evidence without connecting assertions is meaning less (and alienating) to a non-expert.
- This simplification is one of the greatest challenges of good science writing and good explanation.

## Figurative Language

- Often it is tempting to employ similes/metaphors in a scientific explanation to make the unfamiliar familiar. This is fine, as long as the simile/metaphor is precise.

### Good Example:

"If chromatin is subjected to treatments that cause it to unfold partially, it can be seen under the electron microscope as a series of 'beads on a string'. The string is DNA, and each bead is a 'nucleosome core particle' that consists of DNA wound around a protein core formed from histones. The beads on a string represent the first level of chromosomal DNA packing."

Molecular Biology of the Cell, 4<sup>th</sup> Edition.

- The metaphor is precise, and fully explained.

### Weaker Example:

"The nucleus contains the chromosomes, long thin structures made of DNA that carry genes like beads on a string. In addition to controlling the cell's ability to reproduce itself, genes tell the cell what proteins to make to carry out its activities."

Eric Kandel, In Search of Memory

- Beads are different from a string. This could imply that genes are different from DNA.

- If a metaphor is imprecise, then your explanation is probably not quite right. (N.B. This generally applies to word choice as well.)

Finally, one general piece of advice for all non- (and even most) creative writing!

Be Clear.

- Mean what you say, and say what you mean.  
The Bible; Strunk and White, The Elements of Style

You are leading the reader into a mode of thinking.  
If it is not clear to you, it is definitely not clear to your audience.

Have others read your draft, and ask them what they think it means, not just to correct your grammar.