Writing a Research Paper in Mathematics

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University of Bath

Postgraduate Away Day
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There is a virtually inexhaustible supply of badly written papers.

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- "Massively parallel computers (MPCs), characterized by their scalable architectures, are a viable platform on which to solve the so-called grand-challenge problems. These distributed-memory systems are expandable and can achieve a proportional performance increase without changing the basic architecture. In order to take full advantage of scalable hardware, the application software must also be scalable to exploit the increased computing capacity."
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- Do **not plagiarise**.
- Try **not to write the paper so only you know what you are talking about, and the reader does not have a clue!**

Outline

The Audience

Who are you writing this particular paper for?

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Think of a specific reader

- Interest your reader.
- Leave out trivial results.

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- Most journals provide style files/templates.

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Now you have a "skeleton" to work with!

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- Add keywords.

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Abstract

- Present the main results of the paper.
- Should be short and crisp.
- Avoid empty phrases like "In this article we prove, among other results, that ...". Just write "We prove that .."
- No complicated formulae.
- As independent from the article as possible.

Writing an abstract

Abstract MadLibs!!

This paper presents a _____ method for _____
(synonym for *new*) (sciencey verb)
the _____. Using _____, the
(noun few people have heard of) (something you didn't invent)
_____ was measured to be _____ +/- _____
(property) (number) (number)
_____. Results show _____ agreement with
(units) (sexy adjective)
theoretical predictions and significant improvement over
previous efforts by _____, et al. The work presented
(Loser)
here has profound implications for future studies of
_____ and may one day help solve the problem of
(buzzword)
_____.
(supreme sociological concern)

Keywords: _____, _____, _____
(buzzword) (buzzword) (buzzword)

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Introduction

1. Abstract and introduction are your **main "selling points"**.
2. Interest your reader in the first paragraph!
3. States the problem, history of work and related problems/pointers to relevant work.
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Main Sections

- The body of the paper.
- Contains theorems/proofs/definitions/algorithms/numerical approaches.
- Choose section titles carefully!
- Not more than 5-7 sections, use subsections for better organisation.

More details

Proofs

- The formulation of theorems and proofs is particularly important.
- Be precise.
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References

- Add the references (most of them will be needed in the introduction).
- Use BibTeX, MathSciNet, Google Scholar etc.
- Make sure your reference list is accurate and up-to-date.
- A narrow bibliography, particularly restricted to the author, is suspicious.
- A long bibliography is only really appropriate for survey papers.

Outline

Presentation and style

Make your paper clear and enjoyable to read!

Do not waffle!

You do not want the reader to get angry or bored.

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  - label for equations/figures/Theorems etc. (LaTeX).

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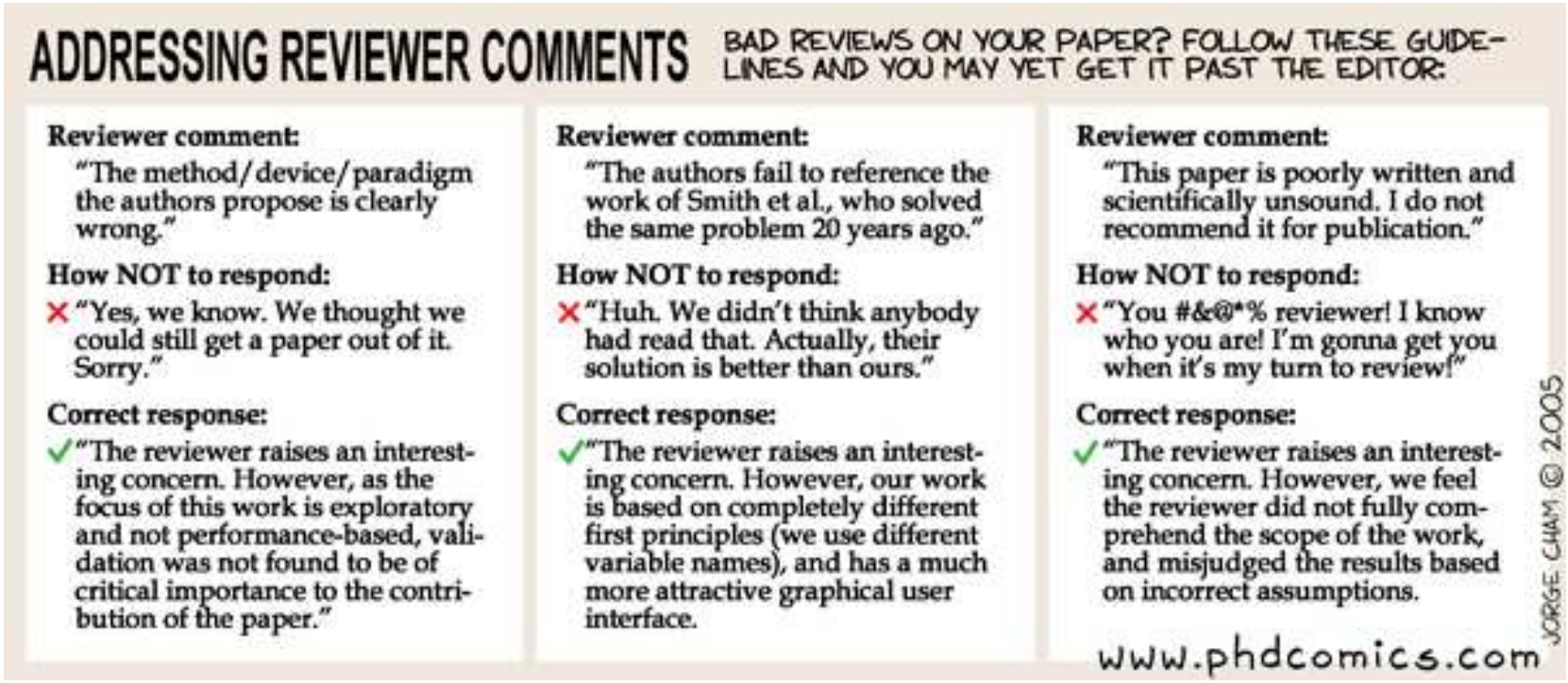
7. The whole process usually takes about a year, but often longer.

Addressing referee's comments



N. J. Higham, *Handbook of writing for the mathematical sciences*, Society for Industrial Mathematics, 1998.