

# Writing, presenting and applying for grants/positions

Tom Britton  
Stockholm University

November, 2020

## Glimps from a PhD course

PhD course: **Soft Skills for Mathematicians**

**Parts/sections:**

1. Writing a scientific paper
2. Submission, revision and giving feedback
3. Oral presentations
4. Writing/presenting a popular material
5. Writing applications
6. Career building in academia

## General remarks

**What makes a good mathematician/statistician?**

**Obvious answer:** someone who can solve hard important problems

## General remarks

### What makes a good mathematician/statistician?

**Obvious answer:** someone who can solve hard important problems

**But more is required:**

- Ability to identify important problems
- Ability to write interesting and pedagogical paper explaining solution
- Ability to given an interesting pedagogical oral presentation of solution
- Ability to successfully apply to positions and grants

# Writing and presenting

Unlike mathematics/statistics there is no exact *right* or *wrong* in how to write and present

The more you write/present – the better you get!

This lecture is about the "package" – not the mathematical content

The "package" is equally important for reaching out!

The lecture is **not** about software (LaTeX or similar)

## Before starting to write

Procedure: Preparation – writing – revision

### Things to consider when preparing:

- Who is the typical reader?
- What are the main messages? (Not too few or worse, too many) Write them down!
- What is good notation to be used?

# The "decreasing rule"

Keep in mind the decreasing or "half-time" rule:

## Out of all people that read the title

- 50% read the abstract
- 25% read the introduction
- Half of readership is lost with each section
- < 1% read the appendices

I think these numbers are **very optimistic** ...

## Consequences

**The title is very important:** to deliver the main message AND to attract the reader

**The abstract is very important:** should contain the main messages and a bit about methodology

**The introduction is very important:** I think it should contain a very short background, a statement of the problem(s) treated, a presentation of the results and description of the rest of the paper

Have the "decreasing rule" in mind: someone who reads 1-2 pages should benefit from this!



## More things before getting started

**Who should be author?** Important to decide in advance. They should contribute

**What "type" of journal will you submit to?** Will affect how you structure paper. **Aim fairly high!**

**Who/what should be acknowledged?** Supervisor, others who have contributed, financial support, ...

# Getting started

The first thing to do: write a **skeleton** ( $\approx$  list of contents)

The skeleton should contain the different (sub-)sections

The skeleton should also contain a description of what parts come in the different (sub-)sections (relating to the "main messages")

## A common structure of a mathematical paper

- Title, authors and abstract
- Introduction (possibly also containing main results)
- The model/problem (+ what have others done – references)
- one or more sections of theory
- illustration/application/numerics
- Discussion/conclusion: What has been done, possible alternative routes and extensions, why are the results interesting and how could they be improved even more
- Appendix (sometimes placed after references or in separate document)
- Reference list

## Minor comments

- It's ok to leave out some technical bits at first writing to keep *logical line* in writing procedure
- Equations are part of sentences!!!
- Don't start sentence with mathematical symbol
- Try to make the text "flow": leave less relevant technicalities to appendices (or technical sections)
- Admit or give reference where logical steps are left out
- Don't use phrases like: "it easily follows that ..." better with: "standard but tedious calculations reveal that ..."
- Use "I" or "we" in text? I prefer "we" even if only one author:  
We = I and the reader

## Specific remarks: Title and abstract

- Should be written "afterwards"
- **Title**: spend time deciding this! It is very important
- **Title**: should be informative, "catchy" and short (hard ...)
- **Abstract**: should both give the main result and attract the reader
- The abstract is not part of the paper: something defined in the abstract must also be defined in the main text

## Specific remarks: Introduction

### Introduction

- Readers who only read introduction should benefit from this
- Should explain the question studied + a short background
- I think the main results should also be stated here
- Unless given elsewhere, the introduction should end by describing the structure of the rest of the paper
- It should also try to catch the interest of the reader

## Specific remarks: Citations and references

- Direct the unfamiliar reader to some background text covering "your" area
- Avoid citing unpublished work, in particular your own
- Give page reference when citing books

## Specific remarks: Discussion/Conclusion section

- Should summarize main results (repeat the important!)
- Mention the strength of the results
- Mention also what can be done better, extensions and open questions



## After the first draft written

- Leave the manuscript for a few days (otherwise you are "blind")
- Then go through it:
  - First look at the general structure: is everything there?, adequate level of detail?, easy to follow the logical line?, can something be removed?
  - Then go through the manuscript in detail
  - Pretend you are a typical reader of the journal in question
  - Change whole paragraphs rather than sentences
  - Focus more on removing than adding things!
- If several authors: read and comment each others' contributions
- Repeat everything above (at least) once more **Date versions!**

## After the second and third drafts are written

- Have someone else read and comment the manuscript (supervisor, student colleague, ...)
- Preferably someone being the intended "typical reader"
- Adjust according to suggestions: if they didn't understand something, the same probably holds for others

# Submitting to a journal

Aim fairly high!

**Cover letter:** Write a short letter without any mathematical symbols explaining: why your manuscript is interesting, what your main results are, and why the manuscript is suited for that particular journal

Submit!, Many people wait too long before submitting

If the journal allows (nearly all journals do): put also manuscript on ArXiv/similar

# Revision

**Quick rejection:** "Not suitable for our journal". Consider suitable alternative and submit. Positive: no long delay

**Rejection after review:** Positive: Reviews with constructive suggestions. Negative: Long delay. Revise comments you agree with and resubmit to alternative journal

**Major revision:** Negative: requires much work. Positive: if **all points** are addressed it will be accepted

**Minor revision:** Make suggested changes and resubmit quickly

## Response letter

Referees are: nice, helpful and experts in your field. If they misunderstood something it is your problem!

### Response letter:

- Thank referees and editor
- Paste **all** comments by referees into letter
- After each of their comments, using distinctive text format (e.g. italic): explain very briefly how addressed and give detailed page reference(s)
- Don't give long arguments/explanations
- Comments requiring much work which you don't find meaningful should be addressed at least in part

## Oral presentation

- Many similarities with writing
- **Main difference:** Impossible to cover everything. **Be simple!!**
- Who are you talking to? Should affect presentation
- Remember: audience is not specialist and have not read the paper
- Try to catch the listeners interest
- Be very simple in beginning and possibly a bit more technical towards the end
- Consider how much time you have when preparing talk
- Give the talk loud for yourself when preparing – takes longer time
- **Never** talk too long. Shorter is fine
- Some slides towards the end should be possible to skip

## Oral presentation: details

- Not complete sentences in slides
- Not too much information on one slide
- Catch eye contact with people in the audience (Hard in Zoom ...). Not always the same person
- Speak loud! Not too fast
- Talk only about the important parts of the work
- Most important that audience understand your problem (if not they surely will not understand solution!)

## Oral presentation: details

- Talk about a special case rather than most general situation
- You may have notes on the side for your memory
- Unexperienced speakers are recommended to learn 1-2 sentences at the start by heart
- Make a slightly longer stop after saying important results

**After talk:** aks in advance to get feedback from supervisor/student colleagues – learning to give talks is a process



## Writing an application: Who will read it?

Some difference between grant application and academic job application. Focus here is on similarities

Find out who will read the application

- Nearly always a panel with 1-2 expert(s) in your field and some non-experts
- Non-experts will read CV, list of publication and summary/introduction to research plan
- Expert(s) will also read rest of application

# Cover letter

## Cover letter

One page

Should summarize all of your application: publications and their impact, important talks, teaching skills, grants

# CV and List of Publications

## The CV

Not too long (about 2 pages)

**Include:** contact details, academic degrees, job positions, scientific talks, grants and prizes, teaching experience, number of publications and bibliometrics, referee jobs, organization of meetings, something that makes you stick out, reference persons, ...

## List of publications

Reverse chronological order and numbered

Explain your contributions and author order

Papers first: published and submitted with ArXiv-link

Thereafter Proceedings, book chapters, ...

# Research plan

## **When writing research plan:**

Explain why problem is important

Present short term and long term goals

Mention preliminary results (fine as long as not yet submitted)

Long term goals may be more visionary and not guaranteed you will reach them: high risk high gain

Highlight what is new, both in general but also compared to your earlier work

# Summary

I have now given some advice on how to write, give talks and apply

My points need not (all) be suitable for you

Most important that you reflect on these issues

Solving important mathematical/statistical problems is important,  
but presenting the results pedagogically is just as important