Before we start

- There is no absolute truth here
- There is always a counterexample to the statements here
- Other people (e.g., your supervisor) may disagree in part
- This presentation is mostly a collection of advice by other people that we agree with
- Some of the advice here, marked in red, is for writing a *bad* paper, which you do *not* want to follow
Writing a good paper is not easy at all

- Many published papers you read are well written
- You may think that you are the only person with problems
- Wait until you review papers
- Most papers get rejected (often for good reasons)
- You cannot learn writing in theory, so write (and read) often
Overview

Setting

Process

Content

Structure

Language

Continuation
The setting

Before we talk about writing papers,

we need to clarify some facts about them
What is your goal?

You want to get a paper because

• make your results available to others,
• satisfy your Ph.D. requirements,
• increase your impact (= get citations)

...
What is your goal?

You want to get a paper because you want to

• make your results available to others,
• satisfy your Ph.D. requirements,
• increase your impact (＝ get citations)
• …
Who is your audience?
Who is your audience?

Humans

Scientists

from your field

from your area

from your sub-area

working on your problem
Who is your audience?

- Scientists from your field
- from your area
- from your sub-area
- working on your problem

Humans
The reviewer

- Reviewers are often the first readers of your paper
- The reviewers’ goals are different from yours
The reviewer

- Reviewers are often the first readers of your paper
- The reviewers’ goals are different from yours
  - Safe time,
  - Defend the quality of the community,
  - Defend their own work,
  - Community service / improve their CV,
  - …
The reviewers

Who are the reviewers?
The reviewers

Who are the reviewers?

- Experts working on the same topic
- People from your community aware of the state of the art
- People from your community unaware of the state of the art
- Senior people having worked on the topic for 20 years
- Ph.D. students working on a related topic since two months
Recall: Who is your audience?

Humans

Scientists

from your sub-area

from your area

from your field

working on your problem
Your audience: the reviewers

Bad news

• You need to write the paper for the reviewers

Good news

• You want to write the paper for the reviewers (because they perfectly represent your target audience)
How to *not* target the reviewers

Who are the reviewers?

- Experts working on the same topic
  
  **Be shallow; cite them incorrectly or not at all**
  
- People from your community aware of the state of the art
  
- People from your community unaware of the state of the art
  
- Senior people having worked on the topic for 20 years
  
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How to *not* target the reviewers

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  Do not help them assess the novelty

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  Hide relevant information in the technical part

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- People from your community unaware of the state of the art
  
  Complicate the presentation; make formal mistakes

- Senior people having worked on the topic for 20 years
  
  Hide relevant information in the technical part

- Ph.D. students working on a related topic since two months
  
  Do not provide the necessary background
How does the communication to a reviewer work?

- You need to say everything in the paper.
- You have exactly one attempt.
How does the communication to a reviewer work?

- You need to say *everything* in the paper
- You have *exactly one* attempt
How does a reviewer work?

Reading your paper

- They start in a neutral state
- While reading, they establish their opinion about the outcome (acceptance/rejection) and collect arguments
- After reaching a threshold, they lock in their opinion and only quickly go through the rest (or even stop reading)
How does a reviewer work?

Reading your paper

• They start in a neutral state
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Writing their review

• Summary, in particular your contributions
• Arguments for their judgment
What you should aim for

- Never leave the reviewer in any doubt
- Help the reviewer as much as possible in defending your paper
- Make attacking your paper as hard as possible for the reviewer
Use your guinea pigs

- Let other people read your paper before you submit
- You need to have the paper ready in advance for that
- They like you and will be nice, so instruct them to be critical
- Most important information: When did they get lost?
- The closer to your area the better, but general feedback about the introduction can be given by anybody from your field
- You can use them *only once* per paper
- Offer yourself to others (you also learn from that)
The don’ts

The following advice is, in large part, for writing a *bad* paper (marked in red)
Consider writing a duty

- **Start late**
  Writing takes time, so do not waste it until the very end

- **Never get feedback**
  *You* are the expert, other people would not understand

- **If anything, get feedback very late**
  You do not want to waste your colleagues’ time, so only show the final version to them
Never reflect

• Never revise or throw away what you have written
  That would not be productive
  You cannot identify your own mistakes anyway
  Why would you do better the next time?

• Never read the paper as a whole
  You know the paper, so there is no gain
  It takes so much time

• Do not stick to the style of other papers in the area
  It is your paper
  Those people are scientists, not professional writers
Write without a plan

• Do not start from a skeleton

TODO title

UNDISCLOSED AUTHOR(S)

Abstract. TODO what. TODO why. TODO how.

1 INTRODUCTION

TODO

This paper makes the following contributions:

• TODO

1.1 Related work

2 PRELIMINARIES

TODO

3 TODO MAIN SECTION TITLE

TODO

Theorem 3.1. TODO main theorem

TODO

4 EXPERIMENTAL EVALUATION

TODO

5 CONCLUSION

TODO

Author's address: undisclosed author(s).
Write without a plan

• Write from the beginning to the end
  This is how you read papers, after all

• Get lost in details
  • Prepare figures, tables, examples etc. immediately
  • Make every sentence perfect
  • Tweak the layout

Now is as good as ever, and it has to be done anyway
Content
Be unclear about the contribution

- Never explicitly say what your contributions are
  Everybody *loves* mystery stories
  The readers are scientists – they will figure it out
  Signposting is so primitive
Do not focus

• Results: the more the merrier

We present three algorithms to solve problem A. We realized that the second algorithm can also be used to solve problem B, so we also present an optimization for problem B. We also found a subclass of A to make the algorithm from [17] run in linear time.

• Put in everything you have

Below is another example [...] Alternatively, we could have defined [...] Remark 34 [...] 

• Tell your whole story

First we tried A. But that did not work. Next we tried B. That solved A’s problems but now we had new problems. Eventually, C worked
Avoid motivation

- Do not explain why your work is relevant and difficult
  Everybody knows that
  There is no reason required to do basic research
  Implies citing other work, which reduces your own credit
  You did the theory; let other people think about applications

- Do not explain the structure
  There is only one natural structure

- Do not provide any intuition
  Informal, not scientific
  Scientists do not like prose – we like formulas
Seven sins about proofs

• Do not explain definitions and theorems before the formal statement

• Prove trivial results, especially if the proofs are long and require additional theory

• Skip over complicated steps, maybe calling them “trivial”

• Nobody likes reading long proofs, so keep them short

• Be sure to have a typo in a theorem or definition

• Have a free variable in your theorem that was defined in a subclause two pages before

• Do not double-check dependencies after editing
Recall: Who is your audience?

- Scientists from your field
- from your area
- from your sub-area
- working on your problem

Humans
Background information

- Do not provide any background information
  Context is a waste of space
  The readers are supposed to be experts
  If not, they are still researchers, so they will look things up
Be bold

• Make unsubstantiated claims

   *We present the best algorithm*
   *No approach can solve this problem*

• Never add a reference to claims

   *This is a well-known and open problem. We […]*

• The reader will immediately be on guard
   *A single superlative can destroy the reader’s trust*
Mountain vs. molehill
Mountain vs. molehill

Computer programs often have bugs. It is very important to eliminate these bugs [1, 2]. Many researchers have tried [3, 4, 5, 6]. It really is very important

Consider this program, which has an interesting bug. […] We show an automatic technique for identifying and removing such bugs
Recall: Communication to a reviewer

- You need to say everything in the paper.
- You have exactly one attempt.
Weaknesses in your contribution

- Hide your weaknesses
  Will result in the following statement in the review:

  *The authors seem unaware of the shortcoming*[...]*

- Draw attention to your weaknesses

  *Our approach does not work in setting A at all, is weaker than approach X in setting B, and weaker than approach Y in setting C*

- Make other approaches inferior so your approach shines
  Only discuss scenarios/experiments in favor of your approach
  Remove experiments where your approach does not win
  Show no comparison/discussion at all
Structure
OCAR narrative structure (storytelling)

- **Opening**
  Introduce your characters = objects of study, conjecture

- **Challenge**
  What is the question that drives your research?
  What are the difficulties?
  What has been tried before?

- **Action**
  Prove your claims, emphasize

- **Resolution**
  How your contribution has changed the state of the art
The title

• Gives a good idea about the content

• Contains keywords
  Think about how you search for related work

• Catchy
  Fancy titles can have a subtitle to satisfy the above constraints
  Examples:
  • *Gaussian elimination is not optimal*
  • *ALGOL 68 with fewer tears*
  • *Nineteen dubious ways to compute the exponential of a matrix*
  • *Fingers or fists? (The choice of decimal or binary representation)*
  • *Pole dancing: 3D morphs for tree drawings*
The abstract

- Three sentences: What, why, and how
- The reader should understand what you do
- The reader should want to read the paper
- Avoid technical language and symbols
- Only promise what you can deliver
- Is not part of the paper
  Hence literal overlap with the paper is fine
  Do not forget to introduce abbreviations later again
The abstract


*Mathematics books and journals do not look as beautiful as they used to. It is not that their mathematical content is unsatisfactory, rather that the old and well-developed traditions of typesetting have become too expensive. Fortunately, it now appears that mathematics itself can be used to solve this problem.*
Introduction

• Most important section
• Contains *everything* but on a higher level
  • The problem, including a motivation
  • Your solution
  • Your contributions
  • That’s it!
• Forward references (not necessarily an “Outline” paragraph)
• Often an example/picture helps conveying the idea
The contributions
List of claims that you substantiate with evidence in the remainder

This paper makes the following contributions:

• We describe the WizWoz system.
• We study its properties.
• We have used WizWoz in practice.

• We give the syntax and semantics of WizWoz that supports concurrent processes (Section 3). Its innovative features are […]
• We prove that the type system is sound, and that type checking is decidable (Section 4).
• We have built a GUI toolkit in WizWoz and used it to implement a text editor (Section 5).
The related work

- Two valid locations:
  - A subsection of the introduction (shallower discussion)
  - Right before the conclusion (deeper discussion)
- Purpose:
  - Make other works bad
  - List all papers you know
  - Give context
  - Show evidence that the problem is relevant
  - Elaborate on the novelty
The preliminaries

- Optional
- Alternative: concepts used only once can be introduced later
- Only contains *known* things (e.g., notation)
- Simple structure, keywords (readers will come back here later)
The main part

• This is the section you should start writing with

• There can be follow-up sections for discussions or extensions
The evaluation or case study

- Necessary if there is (almost) no theory
- Necessary if you describe an algorithm
The conclusion

• Optional but very common

• Remind the reader of the main results

• Careful: some readers skip the main part
  So write this section on the level of the introduction

• Open problems, Future work
Audience breakdown per section

- Title (1,000 readers)
- Abstract (100 readers)
- Introduction (10 readers)
- Main part (1 reader)
- Related work & conclusion (5 readers)
Signposting

- The first section explains the other sections
- The first sentence of a section explains the section
- The first sentence of a paragraph explains the paragraph
Examples

• Use examples
• Use figures for illustration
• Ideally have a running example (typically hard)
• Examples do not make a paper informal
• Examples do not relieve you from being precise
Be fancy

- Impress the reader with your English skills
  The paper is your novel, your poem

- Use long sentences with many subclauses
  Deep thinking reflects best in deep sentences

- Use fancy words
  If you need a dictionary, others will do as well

- Use qualifiers and fillers

  We should all try to do a little better, we should all be very watchful of this rule, for it is a rather important one and we are quite sure to violate it now and then
Be fuzzy

- Prefer the general to the specific, the vague to the definite, the abstract to the concrete

  *A period of unfavorable weather set in.*

  *It rained every day for a week.*

- Never commit

  *We try to […]*

- Mix facts and opinions
Be confusing

• Use ambiguities wherever you can

A quadratic polynomial has a linear derivative with exactly one root. It can be easily computed.

• Use a great variety of words and form to refer to the same concept (“variatio delectat” – variety is delighting)

Formerly, science was taught by the textbook method, while now the laboratory method is employed

Formerly, science was taught by the textbook method; now it is taught by the laboratory method
Abbreviations and symbols

- Do not use abbreviations and symbols
  Rather spell out everything dozens of times

- Introduce lots of notation

- Use obscure abbreviations, symbols, and font packages

- Do not introduce all abbreviations and symbols

- Start sentences with symbols or digits

  *Start with 3.1. 3.2 comes next. \( \pi \) is in between.*

- Do not stick to notational and intuitive conventions
  Greek letters, capital/small letters, other symbols, \ldots
  Graph \( G \), function \( f \), natural number \( n \), iterators \( i, j, k, \ldots \)

- \LaTeX{} macros simplify a change in notation later
Further language crimes

• The active voice should be avoided

  The results were obtained

  We obtained the results

• Put things in the negative form, ideally with double negation

  He was not very often on time

  He usually came late

  It is not impossible

• Mix tenses, and do it often
What to do after a rejection

• Do not listen to your reviewers’ comments
  Obviously they hate you and are ignorant

• Just resubmit the same manuscript again
  There is no chance that you get the same reviewers

You should understand that once you have a soundly accept-proof manuscript you should resubmit it every year. You will become part of the mythology of your field. As program committee succeeds program committee, the question will be asked, ‘Did you get Old Whosit’s paper again? What’s he calling it this year?’
I used to hate writing assignments, but now I enjoy them.

I realized that the purpose of writing is to inflate weak ideas, obscure poor reasoning, and inhibit clarity.

With a little practice, writing can be an intimidating and impenetrable fog. Want to see my book report?

"The dynamics of interbeing and monological imperatives in 'Dick and Jane: A Study in Psychic Transrelational Gender Modes.'

Academia, here I come!
References I


References II


- **W. Strunk and E. B. White.** *The Elements of Style.*