

# CISC-810: Research Foundations

Pengcheng Shi, PhD  
PhD Program in Computing and Information Sciences



Good science is paramount –  
work with your mentors to  
understand what constitutes  
good versus bad papers



# Always Look from a Distance

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See your paper as the reviewer will see it – believe me the reviewer will not see it as the best thing since sliced bread, even though you do!



Understand that even the best  
scientists get rejected and/or  
have to make major/minor  
revisions



Last Will  
of

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Remember what you put in the literature is your scientific legacy after all else is gone



# A Few Obvious Ingredients of a Good Paper

- Novelty – figure it out for yourself – do not rely on your advisor
- Good coverage of the literature
- Good data
- Strong statistical support
- Clarity of presentation
- Thought provoking discussion/insight

Bad?  
Good?



# How to Write a Good Paper?

- Start writing the day you start the research
- Maintain a good bibliographic database
- Think about which venues early
- Be aware of the obvious flaws of writing
- If you do not write well, take classes – the earlier the better
- Become a reviewer



If you hate writing – get over it if  
you want to become a researcher



# Major reasons for rejection

- Confirmatory (not novel)
- Poor experimental design
  - Poor controls
  - Hypothesis not adequately tested
- Inappropriate for the specific venue
- Poorly written



# Tips

- Know the journal, its editors, and why you submitted the paper there
- Pay close attention to spelling, grammar, and punctuation
- Make sure references are comprehensive and accurate
- Avoid careless mistakes
- Read and conform to “Instructions for Authors”



# The Seven Deadly Sins

- Data manipulation, falsification
- Duplicate manuscripts
- Redundant publication
- **Plagiarism**
- Author conflicts of interest
- Animal use concerns
- Humans use concerns

# What constitutes redundant publication?

- Data in conference abstract? No
- Same data, different journal? Yes
- Data on website? Maybe
- Data included in review article? OK if later
- Expansion of published data set? Yes

# Start Writing the Day You Start the Research

- Why?
  - It will help you focus your efforts – the paper defines the scope and the level of detail needed
  - The paper will get written – much good research NEVER gets written up

Bad?  
Good?



# What makes a good research paper?

- Good science
- Good writing
- Publication in good venues

Bad?

Good?



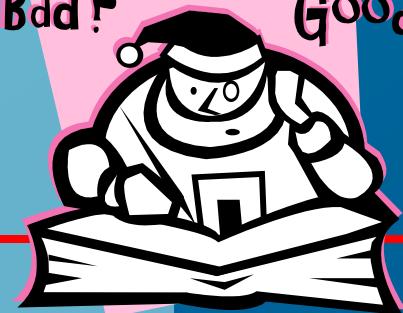
# What constitutes good science?

Novel – new and not resembling something formerly known or used (can be novel but not important)

Mechanistic – testing a hypothesis - determining the fundamental processes involved in or responsible for an action, reaction, or other natural phenomenon

Descriptive – describes how things are but does not test how things work – hypotheses are not tested.

Bad? Good?



# What constitutes a good journal?

Impact factor –

average number of times published papers are cited up to two years after publication.

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Immediacy Index –

average number of times published papers are cited during year of publication.

# Journal Citation Report, 2003

Journal Index	Impact Factor	Immediacy
Nature	30.979	06.679
Science	29.162	05.589
Hypertens	05.630	00.838
AJ P Heart	03.658	00.675
Physiol Rev	36.831	03.727
Am J Math	00.962	00.122
Ann Math	01.505	00.564

*5907 journals*

# Things to consider before writing

## 1. Time to write the paper?

- has a significant advancement been made?
- is the hypothesis straightforward?
- did the experiments test the hypothesis?
- are the controls appropriate and sufficient?
- can you describe the study in 1 or 2 minutes?
- can the key message be written in 1 or 2 sentences?

*“Those who have the most to say usually say it with the fewest words”*

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## 2. Tables and figures

- must be clear and concise
- should be self-explanatory

## 3. Read references

- will help in choosing journal
- better insight into possible reviewers

# Things to consider before writing

## 4. Choose journal

- study “instructions to authors”
- think about possible reviewers
- quality of journal “impact factor”

## 5. Tentative title and summary

## 6. Choose authors



# Maintain a good bibliographic database

- Get a copy of Endnote or similar program
- Read the papers you store!
- Consult a citation index (ISI, Google Scholar) and consider using that to annotate your database entries

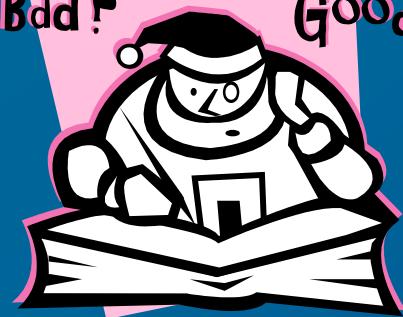
Bad? Good?



## Think about which journals early

- Read the guides to authors very carefully with particular emphasis on the scope
- Think about the intended readership
- Consider impact factors carefully
- Be aware of any pre-submission options
- If you don't read papers in the journal then it is most likely not the right journal

Bad? Good?



## Be aware of the obvious flaws of writing

- Don't try and prove you are smart
- Avoid the kitchen sink syndrome
- Start from an outline
- Work towards making your paper a pleasure for the reviewer to read
- Obey the guide to authors



# Become a reviewer

- There are way more young people than old in this field – they want you to review
- Approach the program committee of conferences like this
- Approach the editorial staff of various journals

Bad? Good?



# The Post Review Phase

- Get over it
- Do not get defensive unless it is really called for
- Address EVERY aspect of the reviewers concerns
- Make it obvious to the reviewer through the cover letter and the revised manuscript itself of the changes you have made
- Do not add new science unless it is called for



# Writing the manuscript

The hardest part is getting started!

# Parts of a manuscript

Title

Abstract

Introduction

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Methods

Results

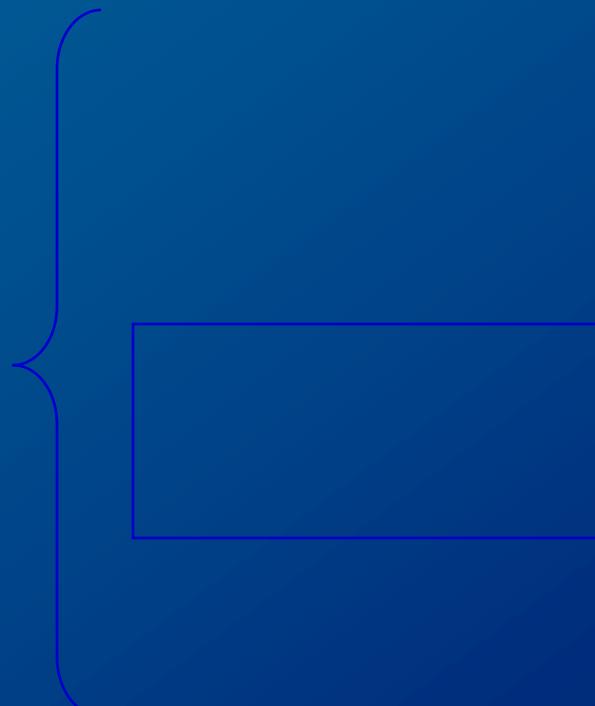
Discussion

Acknowledgements

References

# Write in what order?

Title  
Abstract  
**Introduction**  
Methods  
Results  
Discussion  
Acknowledgements  
References



# Methods and materials

- Best to begin writing when experiments still in progress.
- Should be detailed enough so results can be repeated by others.
- Reference published methods where appropriate.
- Include animal/human use approval information.
- Use descriptive subheadings
  - Algorithms description
  - Hardware implementation

# Results

- Briefly repeating protocols can be effective
- Tables and figures must be straight forward and concise
- Present main findings referring to tables/figures.
- Do not speculate or over discuss results.

# Introduction

- Build case for why this specific study is important/necessary
- Provide brief background
- State hypothesis / central question
- Give a one sentence summary of findings

# Discussion/Conclusion

- First answer question posed in introduction
- Relate your conclusion to existing knowledge
- Discuss weaknesses and discrepancies
- Explain what is new without exaggerating
- Do not repeat results
- Conclusion/summary, perspectives, implications

# References

- Relevant and recent
- Be highly selective
- Read the references
- Do not misquote
- Use correct style for journal

# Abstract

- Critical part of paper
- State main objective
- Summarize most important results
- State major conclusions and significance
- Avoid acronyms
- Write and rewrite until flawless

# Title

- Will determine whether paper gets read
- Avoid long title (see journal rules)
- Avoid abbreviations
- Title format:

“The effects of heat on ice”

“Heat melts ice”

“The role of heat in melting ice”

# Words and expressions to avoid

## Jargon

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a considerable amount of  
on account of  
a number of  
Referred to as  
In a number of cases  
Has the capacity to  
It is clear that  
It is apparent that  
Employ  
Fabricate

## Preferred use

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much  
because  
several  
called  
some  
can  
clearly  
apparently  
use  
make

# Revise, revise and revise

- All authors should participate
- Review order of data presentation
- Polish the writing style
- Double check references
- Look for typos
- Double check spelling

# Develop a good writing style

Read well written articles

Try to get good writers to review

Learn from editing changes

# Submission

1. Read instructions carefully
2. Fill out all necessary forms
  - Copyright transfer
  - Conflict of interest
3. Write cover letter (suggest reviewers)

# Questions?

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