HOW TO BE SUCCESSFUL AT SCIENTIFIC WRITING

Tanja Mitrovic

Department of Computer Science and Software Engineering
University of Canterbury
Christchurch
New Zealand


South Pacific Ocean
Tasman Sea
Auckland
Hamilton
Tauranga
North Island
Gisborne
New Plymouth
Napier
Cook Strait
Palmerston North
WELLINGTON
Greymouth
South Island
Christchurch
South Pacific Ocean
Dunedin
nvercargill
Stewart Island
0 150 300 km
0 150 300 mi


© Virtual New Zealand
www.vnz.co.nz


© Virtual New Zealand
http://www.vnz.co.nz


© Virtual New Zealand
www.vnz.co.nz


copyright 1993 philg@mit.

UNIVERSITY OF CANTERBURY

- Second oldest University in New Zealand (1873)
- ~13,000 students
- Arts, Commerce, Education, Engineering, Fine Arts, Forestry, Health Sciences, Law, Music, Social Work, Speech and Language Pathology, Science, Sports Coaching

CSSE

- 420 FTEs in 2016
- 13 academic staff
- BSc in Computer Science
- BE in Software Engineering
- PG Diploma in Computer Science
- MSc in Computer Science
- ME in Software Engineering
- PhD

OVERVIEW

- Why write?
- How to Convey Your Idea
- Papers
- Theses
- Academic Writing Style
- Tips

WHY WRITE?

- To communicate your ideas to others
- To shape research
- Forces you to be clear
- Crystallize your ideas
- Helps develop new ideas

HOW TO CONVEY YOUR IDEA

- Describe the problem
- Explain why it is a worthwhile problem to work on
- Show that it has not been solved
- Explain your idea
- Show that your idea works
- Compare your idea to what others have done
- Point out the original contribution to knowledge

AT THE BEGINNING

- Start early!
- Select the conference / journal
- Think about the audience

PAPERS: STRUCTURE

- Abstract
- Keywords
- Introduction (1 page)
- The problem (1-2 pages)
- Your idea (2 pages)
- Results (5 pages)
- Related Work (2 pages)
- Conclusions (1-2 pages)
- Acknowledgements
- References

TITLE & HEADINGS

- Very important
- Short
- Informative
- Specific
- Describes the content

ABSTRACT

- Often written last
- Used by readers to decide whether to read the paper
- What to put into the abstract:
  - State the problem
  - Say why the problem is important
  - Describe your solution
  - What is good about your solution

INTRODUCTION

- Discuss the problem
- Introduce ideas, hypotheses and results
- State contributions clearly

CONTRIBUTIONS

- Should be defendable

We describe SystemX	The innovative features of SystemX presented in Section 3 are …
We study the properties of SystemX	We proved that …
We have used SystemX in practice	The results of using SystemX in practice are …

RELATED WORK

- Better to have it after you present your work
- If it is after the Introduction, it might overwhelm the reader
- Cite relevant work in passing in the paper, but leave the comparisons to the end
- Give credit to others
  - NOT: Other work [13] shows that …
  - BUT: Johnson (2015) shows that …

MAIN SECTIONS

- Be clear about your idea – use examples
- Acknowledge limitations of your idea/approach
- Get feedback from “competition”: ask them to check whether you described their work correctly

BEFORE SUBMITTING THE PAPER

- Leave it aside for a while, and then read it again!
- Get other people to read your paper and give you feedback
- Tell them what you struggled with
- Review
- Submit by the deadline
- Follow instructions for authors
- Spell checker!

AFTER GETTING REVIEWS

- If your paper is accepted – Congratulations!
- Be grateful for criticism
- Reflect on and learn from reviews
- Improve your paper

THESIS STRUCTURE

- Title page
  - Title
  - Name
  - Supervisor’s name
- Declaration
- Acknowledgements
- Abstract
- Contents
- Chapters
- References
- Appendices

EXAMINERS WILL BE LOOKING FOR:

- What is this student's research question?
- Is it a good question?
  - Has it been answered before?
  - Is it a useful question to work on?
- Did the student convince me that the question was adequately answered?
- Has the student made an adequate contribution to knowledge?

THESIS ABSTRACT

- One page
- Summary of the thesis
- Background (issue/problem)
- Main goals (what are you trying to do?)
- Method/approach (what you did)
- Results (what you found)
- Conclusions (fulfilled aims?)
- Implications/applications/future research

INTRODUCTION

- Outline of the problem
- Aims and objectives of the research
- Research questions & Hypotheses
- A brief road map

RELATED WORK

- Divide into sections
- References!
- Show how it relates to what you did

MAIN CHAPTERS

- Design & Implementation
  - Explain why you chose your approach
- Results
- Discussion
  - To what extent have you addressed the problem outlined in the introduction?
  - Have you advanced the discipline?
  - Explain your results
  - If a result was unexpected, can you suggest an explanation?

CONCLUSIONS

- Summary
- Research questions
- Significance
- Limitations
- Future work

AT THE END

- References
  - Use a consistent citation system
  - Use a tool (Bibtex, Endnote, …)
  - Keep complete references
- Appendices

ACADEMIC WRITING STYLE

- Interesting and readable
- Objective, neutral and unemotional
- Good use of grammar and punctuation

ACADEMIC WRITING STYLE

- Concise: do not write in a long-winded way
  - "*despite the fact that*" instead of "*although*"
  - "*based on the fact that*" instead of "*because*"
  - "*not infrequently*" instead of "*often*"
  - "*at the present moment*" instead of "*now*"

ACADEMIC WRITING STYLE

- Precise
- Tense: describe what you did in the past tense
- Do not use colloquialisms (e.g. *Have a go*)
- Use “such as” rather than “like”

  e.g. *Languages such as Java and HUGS…*
- Acronyms
- Avoid passive voice

NUMBERS

- If less than 20, should be written

  e.g. *In the second phase, three participants …*
- But not for percentages

  e.g. *There was a 7% increase*
- If there are both small and large numbers in the same sentence, use numbers

  e.g. There were between 4 and 32 processors in each machine.
- Numbers at the beginning of a sentence should be written as words

  Twenty nine participated completed the post-test.

PUNCTUATION AND CAPITALIZATION

- Ensure your work is easy to read
- Use a consistent style
  e.g. *See Table 1.2*
- Comma separates and define parts of a sentence
  - *In 1998, Anderson and Lebiere published the ACT-R theory …*
  - *The study, which aimed to confirm our hypothesis, was conducted …*
- Colon used to introduce an explanation of preceding statement, or a question
  - *The hypothesis was confirmed: the improvement of the experimental group was statistically significantly higher than the improvement of the control group.*
  - *A future research question remains: how can the ITS further improve its effectiveness?*

PUNCTUATION AND CAPITALIZATION

- Semicolon is between the comma and the colon. It is often used to contrast ideas

  His speech was excellent; his manners were appalling.

- Quotation marks: different opinions
  - Use double quotes for primary quotations
  - Use single quotes for secondary quotations (quotations within quotations) or for emphasis (an alternative could be to use italics or bold face)
  - e.g. *One of the reserved words in C is 'for'*
  - e.g. "There are no dull subjects, only dull minds."

- Apostrophes
  - used to indicate possession (e.g. *Anderson's method*)
  - Contractions should not be used (*can't* should be written *cannot*)
  - Watch out for its and it's!

- Good style guides available

GRAMMAR

- Spelling
- Articles
- Prepositions: must be memorised

  I entirely agree with you.

  We agree about most things.

  We agreed on the date.

  I'll agree to your suggestion if you lower the price.

GRAMMAR

- Misplaced modifiers

  The woman saw the man on the hill with a telescope.

- Subject/verb agreement

  What is the correct verb?

  A bowl of apples, oranges, apricots and peaches ***was/were*** *placed on the table.*

CORRECTIONS

- Typographical/Grammatical errors
- Poor presentation
- Additional references required
- Missing pieces of work

THAT OR WHICH?

- **That**
  - used for a defining clause
  - if the clause is removed, the meaning is altered
  - E.g. ``Dogs that eat bones keep their teeth healthy.“

- **Which**
  - used in a situation (usually bounded by commas) when removal of the clause is not crucial to the meaning of the sentence.
  - E.g. ``Dogs, which can be trained to do anything, love to fetch balls.''

TIPS FOR STUDENTS

- Start early!
  - **Writing makes your ideas clearer**
  - **Adds variation**
  - **Get feedback - present often**
- Allow time
- Read theses by other students
- Proof read
- Do not make the reader work too hard
- It is impossible to be too clear!
- Think about your audience
- Time management
- Manage your stress!

TIPS FOR SUPERVISORS

- Start early!
  - Ask your student to write weekly reports
  - And summaries of papers read
- Encourage the student to publish
- Encourage the student to present
  - Group seminars
  - PG conference
  - PhD in 3
- Ask the student to do some reviews