Objective

Share principles & experience accumulated as ...

- researcher
- editor-in-chief of high-quality journals
- conference program chair
- program committee member
- "teacher" of tech writing course

⇒ reduce beginner's frustration (rejected papers)
   stop repeating individual advice
Principles of Technical Writing

Outline

- General principles (Publish or perish...)
- Improving paper structure
- Improving paper clarity
- Improving style
- The beginner’s 7 sins

General principles: variations on “Publish or Perish”...

- Publish... why?
- Publish... where?
- Publish... who? for whom?
- Publish... how? - the paper lifecycle
- Publish... what?
- Publish... when?
## Publish... why?

- To communicate new findings, new knowledge
  - publication = ultimate result of scientific research
  - research work is never finished until it is published
- To let the community know about your work
  - recognition
  - contacts, fruitful collaborations
- To get useful feedback from peers
  - external, independent, frank (anonymous)
- To embellish your CV (+ CV of colleagues)

## Publish... where?

- Int’l journal
  - different quality standards, selectiveness & impact
  - research articles, letters, surveys, “Comments on”, magazine articles
- Int’l conference proceedings
  - different quality standards, selectiveness & impact
  - research paper, experience report, (poster)
Publish... where? (2)

- Journal vs. conference proceedings
  - journal ...
    - more impact (especially long-term impact)
    - more highly rated by selection/promotion committees
    - (much) deeper reviews
    - more space
    - wider target audience (usually)
    - fast-track special issues
  - proceedings ...
    - faster process
    - direct contacts & discussions + community awareness
    - sometimes more selective
    - selection of best papers for journal

Publish... where? (3)

- Journal vs. proceedings:
  - choice may depend on specific culture (check yours!)
  - not necessarily exclusive:
    - expanded version of conference paper can be submitted to journal (with spec of differences)

- Avoid poor-quality, low-impact journals/conferences
  - they reputedly need papers, lack serious reviewing process, are NOT selective
  - low impact on your CV too

Check impact factor
Publish... where? (4)

- To decide which conference, check
  - “submission topics” of Call for Papers
  - who is in the PC (appropriate reviewers for your topic?)

- For good, selective confs make sure the ratio
  \[ \frac{\text{NumberOfAcceptedPapers}}{\text{NumberOfSubmissions}} \]
  is mentioned in your pub list
  (usually available in PC chair’s foreword in proceedings)

Publish ... who?

- Each author should have contributed in some way
- Order of authors normally ± reflects weight of contribution...
  - in producing results
  - in writing paper
- Order may depend on specific cultures (check yours!)
- Every author must be aware of being an author (!!!)
- Set of authors should be invariant through the review process (to avoid conflict-of-interest problems)
- Advice: in case of doubt/problem, discuss it with authors & colleagues
Publish ... for whom?

- For reader (in particular, for reviewer :-)
  ... NOT for you!
  ↓
- Paper = pedagogical explanation of results
  "you and me together"

Golden rules
- identify who the reader will be, what her background is
- imagine yourself as the reader
- ask yourself questions ...
  is this interesting?
  is this comprehensible here?
  is this relevant?
  what questions are coming to reader's mind?
- do not speak highly of yourself / your work ...
  leave it to the reader to do that
  (cf. "democratic republic" syndrom)
Principles of Technical Writing

General principles:
variations on “Publish or Perish”...

- Publish... why?
- Publish... where?
- Publish... who?  for whom?
- Publish... how?   - the paper lifecycle
- Publish... what?
- Publish... when?

Publish... how?

From your perspective ...

- Submit + cover letter
  contact information for corresponding author
  relation to your other papers  (if any)
- Wait for editorial/PC decision
- Study reviews      do not blame reviewers
- Revise accordingly
- Resubmit
  + detailed response to reviewers on
    how revision addresses concerns
- If paper accepted:  correct proofs rapidly
Publish... how? - the paper lifecycle

From the editor's perspective: one typical scenario:

- Author: Paper+CoverLetter -> Ack
- Editor or PC chair: Expert? Conflict?
- ReviewRequest (deadline) -> OK (ddl)
- Reminders -> ReminderSent
- Decision: repeat 1, 2, 3 times
- Variant: editors + EiC

Many exception scenarios (e.g., abnormal reviewer behavior)

3-4 reviewers, typically; often disagree

Decision: binary for conference; n-ary for journal:
- accept (never at 1st round)
- minor revision (most favorable case)
  no second round of reviewing, revision checked by editor
- major revision (most frequent case)
  new round of reviewing by external reviewers
- reject = new work to be done to address reviewers’ concerns

Hopefully 1 iteration on major revision, at most 2
Publish... how?

- Don't use reviewers as "debuggers"
- Do NEVER suggest referee names !!
- For journal submission:
  what if... you feel that the process is too slow?
  ask the editor/EiC for an update
  BUT do it wisely and NOT too often (e.g., every 3 months)

Publish... how? (2)

- What if... you don't agree with...
  - the editorial/PC decision
    NEVER ask to reconsider unless you have irrefutable evidence of unfair decision
    For journal: you may ask to resubmit a fully revised version of a rejected paper but it's anyway going to be handled as a new submission
  - reviewers comments
    if this may help in your work, ask the editor to forward your (polite) questions to the reviewer --e.g. for clarification of some points she made
Publish... how? (3)

Corollary:
As you benefit from a system, you must contribute to it
⇒ you should not decline review requests in your area
   unless very specific/serious reasons
   do reviews as good as those you would like to receive

General principles:
variations on “Publish or Perish”...

- Publish... why?
- Publish... where?
- Publish... who? for whom?
- Publish... how? - the paper lifecycle
- Publish... what?
- Publish... when?
Publish... what?

Two types of research contributions:
- invention of model, method, technique, tool to...
  develop, structure, restructure, reuse
  analyze
  evaluate
  measure
  understand ...
  artifact or process
- experiment-based discovery
  of phenomenon, law, structure, ...
  about artifact or process

Publish... what? (2)

Evaluation criteria for research papers:
- Original contribution
- Significant... - problem
  - solution
  + domain-specific qualities: useful, scaleable, ...
- Sound results
  + replicable
- High-quality presentation (we may help only here !)
Publish... what? (3)

Implications on presentation:

- To convince reader of originality...
  - specify objectives & contribution carefully
    [ abstract, intro, conclusion ]
  - compare with related work carefully
    [ paper introduction, special section ]
  - implement objectives carefully
    [ paper body ]

Publish... what? (4)

- To convince reader of significance ...
  - discuss why this problem is significant
    [ abstract, introduction, conclusion ]
  - discuss why your result is significant
    [ introduction, discussion section, conclusion ]
  in particular: what it may be useful for, why/how it replicates, scales up, etc.
Principles of Technical Writing

Publish... what? (5)

- To convince reader of soundness ...
  - make paper technically readable
    with sufficient detail & precision to make results verifiable, replicable
  - (for experiment-based research papers:)
    describe the experimental method carefully so that it can be assessed & replicated
    do not mix results (data) & their interpretation

Publish... what? (6)

- To convince reader of good presentation ...
  - high cohesion: one paper, one result
    don’t try to say too much ...
    ... but don’t try to say too little (cf. LPU problem)
  - self-contained paper
    put anything needed to understand results
    [ cf. background section ]
  - crystal clear presentation
    no literature nor poetry
    no "Agatha Christie" sort of writing
Publish... what? (7)

- To convince reader of good presentation (cont'd):
  - Good structure is essential... (cf. below):
    - tree structure... objective ← subobjectives
    - rigid, generic structure for experimental papers
      Introduction Method Results And Discussion
  - Some golden rules ... (cf. below)
    - say what you are going to do before doing it
    - avoid mere description of work done
      (no "we-did-this" paper)
    - avoid the 7 sins of novice writers (cf. below)

A few typical patterns for reviewer comments

- "the objectives are unclear"
- "too little beef"
- "the authors seem to ignore ..."
- "... so what?"
- "the paper fails to deliver what it promises"
- "unsubstantiated claims"
- "opinion paper..."
- "premature..."
- "the paper provides little evidence that the results do apply in real settings", "scaleability is questionable", etc
- "evaluation is weak"
- "rambling discussion..."
- [to editor/PC:] "boring", "unexciting", "substance-free"
Submit ... when?

- Not too soon ... and not too late ...
- Not too often (unless you are genius) ?
- Advice:
  - refrain from submitting half-baked ideas --keep them for workshops
  - refrain from submitting below the LPU threshold
    (LPU = Least Publishable Unit)

General principles: conclusion

- Publish (& not perish) ...
  - original, significant, sound work
  - well presented
  - in good journals & conferences
  - with good people
  - at good time

repeated publication of weak papers may severely damage your reputation...

- Be a good reviewer
Outline

- General principles
- Improving paper structure
- Improving paper clarity
- Improving style
- The beginner’s 7 sins

Improving paper structure: golden rules

- Avoid flat structure
  
  paper $\neq$ sequence of descriptive statements
  
  = tree structure: goals (sections)
  
  $\leftarrow$ subgoals (subsections)

  present top-down, not bottom-up
Principles of Technical Writing

Improving paper structure: golden rules

◆ Avoid flat structure
  paper ≠ sequence of descriptive statements
  = tree structure: goals (sections)
    ← subgoals (subsections)
-present top-down, not bottom-up

◆ Avoid unordered structure within section
  section ≠ unordered list of items
-present by order of...
  importance, naturalness, diagram, etc

◆ Reader should always know what’s going on
  – why are we here?
  – where are we coming from?
  – where are we going to?
Improving paper structure: golden rules

- Reader should always know what’s going on
  - *why are we here?*
  - *where are we coming from?*
  - *where are we going to?*
  - present logical structure  [ intro ]
  - say what you are going to do before doing it
  - make current context obvious  [ transition between sections ]

Overall paper structure

- Title, authors
- Abstract  (critical!)
- Keywords & phrases
- Introduction  (critical!)
- (Background section)
- Paper body
- (Related Work section)
- Conclusion  (critical!)
- Acknowledgement
- References
- (Appendices)
The paper Title

- Critical because...
  - used by many, many potential readers
    ⇒ decision to read abstract (and then paper?) or not
  - used by bibliographic systems for paper retrieval
    inappropriate title may miss target readership

- Tip: short but informative
  - not too short: need for specificity
  - not too long: ≠ abstract
  - no waste of words
  - no abbreviation, jargon, or ref to other papers

bad “A Study on ...” “Some Observations on ...”
“BBN-based Analysis of MTFTP Protocols: New Results”
The paper **Authors**

- Authors take intellectual responsibility of results presented
- Sensitive issue - source of arguments & conflicts
- Each author should have made important contributions; order of names normally reflects weight of contribution
  - in producing results ...
  - in writing paper ...
- Everyone listed should know she is listed as an author
- Tip: in case of doubt/problem, discuss it among the authors (and other colleagues)

The paper **Abstract**

- Critical because...
  - used by editor to select *appropriate* reviewers
  - used by reviewers as entry point $\Rightarrow$ very first opinion
  - used by readers $\Rightarrow$ decision to read or not
  - used by review journals to publicize paper
  - used by bibliographic systems for paper retrieval
- Goal: give a sense of what paper is about
The paper Abstract (2)

- Conflicting requirements ...
  - comprehensible
  - self-contained (published independently)
  - short (≈ 250 words)
  - precise, to the point
  - convincing

⇒ best compromise needed

Write it over and over again!

The paper Abstract (3)

- Typical structure
  - Introduce context & motivation (1 paragraph)
    *what is the problem, why it is important*
  - Summarize contribution (1-2 paragraphs)
    *what is the solution/result, why it is important*
    *how was the result obtained (approach, method)*
    *what are the implications*
The paper Abstract (4)

◆ Tips

- cf. Phone booth analogy ...
  - expensive long-distance call with change for 3 min only

- Provide substance, no noise
- No salespeech
- Avoid non-standard abbreviations
- Avoid references to literature

The paper Abstract (5)

◆ Tips (cont’d)

- The opening para should be your best para
  its first sentence your best sentence [Knuth]
  if paper starts badly:
    reader gets resigned to fight with your prose
  if paper starts smoothly:
    reader gets hooked
The paper Abstract (5)

- **Tips** (cont’d)
  - The opening para should be your best para its first sentence your best sentence [Knuth]
    - if paper starts badly:
      - reader gets resigned to fight with your prose
    - if paper starts smoothly:
      - reader gets hooked
    - e.g. worst way to start: “An X is Y”
    - bad: “An important technique for X is Y”
    - good: “Y is an important technique for X, because…”

The keywords & phrases

- **Used by bibliographic systems for paper retrieval**
- **Requirements:**
  - suggestive
  - accurate
  - standard, commonly used terms
- **Usual ordering:** from specific to general
The Introduction section

- Critical because reviewers & readers make their opinion from it
  (especially if little time available for reading paper)

- Goal: give a more extensive sense of what paper is about

The Introduction section (2)

- Requirements ...  
  – comprehensible (if possible: to broader audience)
  – flowing smoothly, zooming from general to specifics
  – convincing
  – no claim left unsubstantiated in the paper
  – no duplication of sentences from abstract

  *Get regularly back to intro for revision!*
**The Introduction section (3)**

- **Typical structure**
  - 1. Background picture
    - *Context of the problem addressed*
    - *Overview of relevant work in the area (incl. yours)*
    - *Definition of the problem, motivation for addressing it*
      (possible analogies with similar problems)
  - 2. Objective
    - Purpose of the paper

**The Introduction section (4)**

- **Typical structure** (cont'd)
  - 1. Background picture
  - 2. Objective
  - 3. Overview
    - basic ideas on how objective is achieved
      *contribution, main results, important messages*
      *assumptions, range of applicability*
      *approach followed*
      *implication of results*
The Introduction section (4)

- **Typical structure** (cont’d)
  - 1. Background picture
  - 2. Objective
  - 3. Overview
    - basic ideas on how objective is achieved
    - *contribution, main results, important messages*
    - *assumptions, range of applicability*
    - approach followed
    - *implication of results*
  - 4. Organization
    - brief summary of content of each subsequent section
      
      to make *logical architecture of paper visible*

The Background section (if needed)

- **Goal**
  - Make paper self-contained
  - Define what you will be using throughout the paper
  - Definition of basic concepts, global notations, special terms, abbreviations, etc.
  - Summary of previous results on which paper is based
The paper Body

◆ Tree structure
  - goals/subgoals \Rightarrow sections/subsections
  - reasonable granularity
  - reasonable depth (2-3 levels)

bad 3.4.2.5. Making sure sections are pretty short
     (... followed by 3-line subsection ...)

The paper Body (2)

◆ For each section:
  - Transition para, if not done at end of previous section
    start with brief context restoration:
    what has been done, what remains to be done
  - Specification of objective of this section
  - [ If needed: definition of local/terminology & notations ]
Principles of Technical Writing

The paper Body (2)

- For each section:
  - Transition para, if not done at end of previous section
    start with brief context restoration:
    what has been done, what remains to be done
  - Specification of objective of this section
  - [ If needed: definition of local terminology & notations ]
  - Material to achieve current objective
    (→ introduction of finer subobjectives)
  - [ Transition para, if not done at beginning of next section ]
    end with brief context restoration:
    what has been done, what remains to be done

The Related Work section

- Goal
  - Precise, comparative discussion of related results
    respective pros & cons
    at much greater level of detail than in the Introduction

- Tips
  - Show personal synthesis
    do never copy from other papers!
  - Aggregate logically by topic
    avoid rambling among unrelated papers!
The Conclusion section

- Critical because reviewers & readers may read it more carefully than paper body  
  (especially if little time available for reading paper)

- Goal: provide final picture

The Conclusion section (2)

- Requirements: cf. Introduction ...
  - comprehensible  (if possible: to broader audience)
  - flowing smoothly --from recap to new perspectives
  - honest assessment
  - no unsubstantiated claim, no overgeneralization or extrapolation to bigger picture
  - no salespeech
  - no duplication of sentences from abstract or intro

Get regularly back to conclusion for revision!
The Conclusion section (3)

Tips

Mark of good summary is revelation [van Leunen] ...

"Remember this, reader? And that?

Well, here’s how they fit together"

The Conclusion section (4)

Typical structure

- 1. Summary of paper
  key contribution, results, ideas, messages ...
  why they are significant

- 2. Perspective
  more specific comparison with relevant work
  [ if no Related Work section ]
The Conclusion section (5)

- **Typical structure** (cont’d)
  - 1. Summary of paper
  - 2. Perspective
  - 3. Critical assessment
    - the pros: strengths of results, benefits
    - the cons: weaknesses of results, limitations
  - 4. Open issues & future work

The Acknowledgement section

- **Goal**
  - Ack grant, fellowship, funding source (often required by contract)
  - Thank people ...
    - advisors, colleagues, technicians, programmers, etc
  ...
  who contributed in some way
  seminal ideas, guidance, suggestions during work, inspiring discussions, comments on drafts, help in experiment, pointers to literature
The Acknowledgement section

◆ Goal
- Ack grant, fellowship, funding source (often required by contract)
- Thank people ...
  advisors, colleagues, technicians, programmers, etc
  ... who contributed in some way
  seminal ideas, guidance, suggestions during work, inspiring discussions,
  comments on drafts, help in experiment, pointers to literature

◆ Tips
- Be fair but reasonable... and not embarrassing!
- Specificity is best cure for clichés

The paper References

◆ Goal
- For reader:
  opens door to... further information
  independent judgement
- For writer:
  keeps you honest, shows your contribution
Principles of Technical Writing

The paper References

◆ Goal
- For reader:
  opens door to... further information
  independent judgement
- For writer:
  keeps you honest, shows your contribution

◆ Tips
- be meticulous & comprehensive... but use all refs listed
- avoid secondary or not publically available material
- meet journal/conference requirements
  if permitted: use informative identifiers e.g. [Ver99]

The paper Appendices

◆ Goal
  to prevent...
  - readers from being lost in subsidiary details
  - smooth paper flowing from being disrupted
  - paper structure from getting hidden
The paper Appendices

- **Goal**
  - to prevent...
    - readers from being lost in subsidiary details
    - smooth paper flowing from being disrupted
    - paper structure from getting hidden

- **Typical use**
  - proofs of theorems/algorithms
  - programs
  - highly detailed figures or tables

Structuring experimental papers: the IMRAD structure

- **Specialization of what we presented so far**
- **IMRAD** = rigid structure, easy roadmap for authors - editors - reviewers - readers
  - What question/problem was studied ?
    Answer = **Introduction**
  - How was the problem studied ?
    Answer = **Methods**
  - What were the results ?
    Answer = **Results**
  - What do the findings mean ?
    Answer = **Discussion**
IMRAD: the Materials & Methods section

- **Goal**: Describe & justify the experimental design to make the experiments **repeatable** by peers
  
  reproducibility = basis of Science

- **Rule**: must provide enough details
  
  (otherwise rejected outright by reviewers)
  
  if new, unpublished method: give all needed details

- **Tip**: chronological presentation (with sub headings)

  Cf. cookbook recipes:
  
  How?
  
  How much?

- No results description in this section yet!
**IMRAD: the Results section**

- Core of the paper
- Presentation of the data, but predigested: only representative data, not all
  
  "The fool collects facts, the wise selects them"

- No method description anymore!
- Not interpretation of data yet! (next section)
- No references

---

**IMRAD: the Results section (2)**

- Be crystal clear
  paper will stand or fall on this section

- If n variables tested ...  
  - show in Table or Graphs only those affecting the reaction 
  - for the others: say you did not find out under the experimental conditions 
    absence of evidence is not evidence of absence
IMRAD: the Results section

• Be crystal clear
  paper will stand or fall on this section

• If $n$ variables tested ...
  - show in Table or Graphs only those affecting the reaction
  - for the others: say you did not find out under the experimental conditions

  absence of evidence is not evidence of absence

• Avoid redundancy

  Most common fault: repetition in text of what is apparent in Figures or Tables

• Avoid verbiage

  bad  It is clearly shown in Figure X that...

IMRAD: the Discussion section

• Goal: show the relationships among observed facts, the meaning of results

• Harder part to define & to write
  another cause of rejection!

• Often, far too long
IMRAD: the Discussion section

- **Tips:**
  - Try to present the principles, relationships, generalization shown by the results
    - not a reformulation or recap of the results!
  - Point out any exception or any lack of correlation, define unsettled points
  - Show how your results and interpretations agree (or contrast) with previously published work
  - Don't be shy - discuss the theoretical implications of your work as well as any possible practical application
  - State your conclusions as clear as possible
  - Summarize your evidence for each conclusion
Principles of Technical Writing

Outline

- General principles
- Improving paper structure
- Improving paper clarity
- Improving style
- The beginner’s 7 sins

Improving paper clarity

- The golden rule
  Avoid unnecessary jargon, formalism, details, ...
- Specifics
  - Headings
  - Transitions
  - Examples
  - Figures
  - Metaphors
  - Definitions
  - Notations, formulas
  - Formatting
  - Programs, proofs, experiments
Improving paper clarity: Headings

- Requirements ...
  - concise
  - specific
  - suggestive

  beware typos...

  bad:  “Some tips for making the content of this paper better”
  good: “Improving paper clarity”

Improving paper clarity: Transitions

- Sometimes needed within section
- Goal: take care of reader
  - what does she know so far ?
  - what should be expected next & why ?
Improving paper clarity: Figures

◆ Goal
Provide visual overview of result, model, process

◆ Tips
- Choose suggestive graphical symbols & icons
- Complement with accurate caption + explanation in text
- Use numerical values & units that make sense

- Make sure that the semantics of graphical symbols (boxes, arrows, etc) is...
  - well-defined
  - consistent throughout paper
Improving paper clarity: Examples

- **Goal:** clarify abstract concepts
  - concrete explanation is most effective

- **Tips**
  - Choose interesting examples
    - reduced versions of real situation, *not artificial*
    - simplified to ease understanding, *but not trivial*
    - generalizable to convince reader
  
  - Do not keep moving from one example to the other
    use same running example throughout paper
Improving paper clarity: **Metaphors**

- **Goal**
  explain unfamiliar, brand new, complex concept
- **Example**
  ant colony optimization in combinatorial problem solving

---

Improving paper clarity: **Definitions**

- **Goal**
  - technical accuracy
  - **conciseness** [cf. procedure call, macro]
- **Tips**
  - Define every concept, term, variable, ... before its first use
do not believe the reader has YOUR notion in mind
  (unless classical concepts)
Improving paper clarity: Definitions

◆ Goal
  - technical accuracy
  - conciseness [cf. procedure call, macro]

◆ Tips
  - Define every concept, term, variable, ... before its first use
    do not believe the reader has YOUR notion in mind
    (unless classical concepts)
  - Reformulate a complex definition just given,
    in a complementary, more intuitive way
    to reinforce reader’s understanding
  - Illustrate by an example

Improving paper clarity

◆ The golden rule
  Avoid unnecessary jargon, formalism, details, ...

◆ Specifics
  – Headings
  – Transitions
  – Examples
  – Figures
  – Metaphors
  – Definitions
  – Notations, formulas
  – Formatting
  – Programs, proofs, experiments
Principles of Technical Writing

Improving paper clarity: Notations

◆ The golden rule: favor lightweight notation

◆ Tips
  - Avoid subscripting when not necessary
    e.g. use set operators if no indexing needed

bad: Let $X = \{X_1, \ldots, X_n\}$
  - need to speak of elements $X_i$ and $X_j$ all the time
  - if subsets are needed: 2-level subscripting needed!
    $\{X_{i1}, \ldots, X_{in}\}$

good: Let $x, y \in X$ and $U, V \subseteq X$
  - no explicit enumeration
Improving paper clarity: Notations (2)

◆ Tips (cont’d)

- Use notations consistently, follow uniform conventions
  e.g. for choosing variable names
  e.g. uppercase letters for sets, lowercase for elements

  bad: \( A_j \) for \( 1 \leq j \leq n \) ... \( b_k \) for \( 1 \leq k \leq n \)

- Never same notation for different things
  never same thing with different notations
Improving paper clarity: Formulas

Tips

Readers / reviewers tend to skip formulas at first reading

- Avoid mere listing of sequence of formulas:
  tie them together with running commentary

  text should flow smoothly when
  replacing each formula by “blah”

- Give name or number to formula / theorem
  if needed for further reference
Improving paper clarity: Formatting

- **Tips (cont'd)**
  - Use indentation to make visible the (complex) structure of a sentence, theorem, formula, program, ...
    
    good: Theorem *(theorem name)*. Let \( x, y \in X \) ...
    
    If ...
    
    then if ...
    
    then ...

  - **Pagination:** avoid cutting formula, program, ...
    
    by use of table, figure, ...
    
    keep (sub)heading with next paragraph
Improving paper clarity: Specific problems

- Presenting an algorithm / program
  - Carefully present ...
    - the specifications: WHAT it does
      - good: GIVEN ...
      - FIND ...
    - the reasoning followed to build it
  - Provide abstract version (if needed, or in Appendix)
  - Avoid comments following sequence of instructions

Improving paper clarity: Specific problems (2)

- Presenting a proof of theorem
  - Favor backward over forward presentation

- Presenting an experiment
Principles of Technical Writing

Outline

- General principles
- Improving paper structure
- Improving paper clarity
- Improving style
- The beginner’s 7 sins

Improving style: some rules

- *Golden rule:* Keep sentences short
  cut long sentences (2-3 lines) & introduce redundancy

- Avoid... "also" in consecutive sentences,
  "thus" when causal connection is obvious
  heavy padding e.g. "because of the fact that"

- Text is like music, sentences have rhythm
  read, re-read your prose
  & change wording if it does not flow smoothly
Improving style: some rules (2)

- Do not use superlatives of praise ...
  - for your own work (cf. supra)
  - for others: explain why it is "interesting", "remarkable"

- Avoid "I" unless your person is relevant
  Use ...
  - active form with other subject
  - or passive form (use moderately)
  - or "we" = you and me together

Improving style: use of verb tenses

- Rule for experimental papers ...
  - present tense for established knowledge
  - past tense in Methods and Results sections because reference to work you did
Improving style: incomplete lists

- **Rules of usage:**
  - item-1, item-2, etc.:
    to point out that the list is not exhaustive
  - item-1, item-2, ...:
    when the reader can infer the rest
  - general-item, e.g., specific-instances:
    to point out that there might be more instances
    than those referred to explicitly
    (often used in discussion of related work)

- **Tip:** avoid overdose of etc., e.g. and ...
  some people just hate them

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Improving style: names & numbers

- **Capitalize names such as**
  Theorem 1, Algorithm X, Method Y

- **Small numbers should be spelled out unless used as names**
  bad: The method requires 2 passes
  good: Algorithm 2 is illustrated in Fig. 1; it requires 17 iterations.
  The count was increased by 2. There are two reasons for this.
Improving style: citations

- **Goal of citations:**
  - for reader: open door to ... further information
    independent judgement
  - for writer: keep you honest
    highlight your contribution

Improving style: citations (2)

- **Tips:**
  - Citations should embed specific information
    typically: who, when, what
    one way to specify who, when is: [Ver99]
    but often other systems are required, e.g. [39]

  good: Verleysen has shown that poorly written papers
    get rejected [39, 41].
Improving style: citations (3)

- **Tips (cont’d):**
  - **Avoid long lists of pointers:** they necessarily convey unspecific information  
    
    **bad:** Some work has been done to address this problem [6, 19, 38, 24, 47, 3, 19].
  
  - **Do not disrupt sentence flow**  
    
    **bad:** The XX method [6, 19, 38] cannot be used to verify [8, 28, 31] this property [2, 8, 28].

Improving style: quotations

- **Goal:** avoid plagiarism
- **Problem:** quotations make text more hybrid & awkward
- **Tip:** paraphrase, and make explicit reference to source

  **good:** As Bertrand pointed out, poorly written papers get rejected [39, 41]

  **good:** This definition, borrowed from [39], stresses the role of ...
Improving style: footnotes

- Footnotes are like parentheses
  - disrupt smooth text flowing
  - result from remorse & poor structuring
  (cf. below: 7 sins of tech writer)

⇒ avoid them wherever possible

Improving style: acronyms

- Convenient for compound terms occurring repeatedly
- Reader cannot remember more than a few (beside standard ones)

⇒ avoid AOD (Acronym OverDose)
Improving style: texts with maths

- Different formulas must be separated by words
  (cf. supra: readability when replacement by "blah")

- Symbols in different formulas must be separated by words
  bad: Consider $S_q$, $q < p$.  
  good: Consider $S_q$, where $q < p$.  

- Don’t start a sentence with a symbol
  bad: $x^n - a$ has $n$ distinct zeroes.  
  good: The polynomial $x^n - a$ has $n$ distinct zeroes.  

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Improving style: texts with maths (2)

- The sentence preceding a theorem (algorithm, etc.) should be complete
  bad: We now have the following
          Theorem. $H(x)$ is continuous.
  good: We can now prove the following result.
          Theorem. The function $H(x)$ is continuous.

- The statement of a theorem should be self-contained and should be motivated

- Do not use $\Rightarrow$, $\forall$, $\exists$ within text (unless paper on logics)
  replace them by words: implies, for all/every, there exists
Outline

- General principles
- Improving paper structure
- Improving paper clarity
- Improving style
- The beginner’s 7 sins

The beginner’s 7 sins

- Typical flaws often made by novice writers
  sometimes non-novice as well!
- Check them out when re-reading your prose!
- Adapted from
  B. Meyer, “On Formalism in Specifications”,
- Different kinds of sins
  - mortal ⇒ fatal consequences
  - venial ⇒ unfortunate consequences
The beginner’s 7 sins: mortal sins

- Inadequacy: text element not adequately stating some feature of your approach
- Omission: important feature of your approach not stated by any text element
- Contradiction: text elements stating some feature of your approach in an incompatible way
- Ambiguity: text element allowing some feature of your approach to be interpreted in different ways

The beginner’s 7 sins: venial sins

- Noise: text element yielding no information on any feature of your approach
  - Variant: uncontrolled redundancy
    - "... on feature already stated"
- Forward reference: text element making use of features of your approach not defined yet
- Remorse: text element stating some feature of your approach lately / incidentally (cf. use of parentheses)

Remorse & forward reference often come together: caused by poor structuring of text (important features not explained first)
Other sins in more specific contexts

- **Overspecification**: text element stating some feature not of your problem, but of your solution
  define problem first, then solution

- **Wishful thinking**: text element stating some (speculated) feature of your approach that cannot be verified

**Example**: (from a famous paper by highly respected scientists ...)

text formatting [Goodenough & Gerhart 77]

For fruitful bedtime reading


