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Reviewing an Academic Paper

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Acknowledgements

- This talk is based on:
  - Materials by Alan Burns, Jim Woodcock, John Clark
  - “The Task of the Referee”, Alan Jay Smith
  - “A Guide for New Referees in Theoretical Computer Science”, Ian Parberry
  - “How NOT to review a paper. The tools and techniques of the adversarial reviewer”, Graham Cormode
  - “We are sorry to inform you…”, Simone Santini

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Outline

- Peer review: what, why and how
- Reviewing academic work & writing a review
- Unusual and exceptional cases

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Peer review

- The process of scrutinising new work
- Conducted by experts in the same area as the authors
- With the goal of ensuring high quality publications

- If you expect to publish, you should expect to review!
- Initially with your supervisor, and later for other senior academics in your community

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What's in it for me?

- Contribute to your research community
- Build your reputation and status
- Read state-of-the-art work before everyone else
- Increase your chances of publication
  If you learn to think like a fox, you will be a safer chicken
- Appointment as a programme committee chair or journal editor

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Peer review process

- **Submission** of a new paper by authors
- **Assignment** of reviewers by senior academic (PC chair / journal editor)
- **Scrutiny** of the work by reviewers
- **Decision** by reviewers and senior academic, and response to authors

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Issues with peer review

- Reviewers can be influenced by the reputation of the authors or current status quo of the community. *Nobody wants to tell the emperor that he has no clothes.*

- Reviewers check the acceptability of the work for publication, and not its validity. *Later work might show this work to be invalid (and it might be retracted)*

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Your task as a reviewer

- Form an **opinion** about the work
- Determine whether the work is **publishable**
- Make a recommendation and produce a report

When is work publishable?

- A “sufficient contribution”
  - Major results (less than 1% of all papers)
  - Good, solid interesting work (less than 10%)
  - Minor but positive contribution (10% to 30%)

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When is work publishable?

- **Purpose**:
  what is the problem considered? how is the problem addressed? are the outcomes clear from the outset?
- **Appropriateness**:
  is the work suitable for this outlet?
- **Significance**:
  is the problem important? are the results new and an improvement over existing work? does the paper make clear the contributions over existing work?

When is work publishable?

- **Correctness**:
  is the actual execution correct? (e.g., proofs, statistics, algorithms).
  are the correct conclusions being drawn?

  don't expect papers to provide absolute answers to questions. are the results adequate?

When is work publishable?

- **Validity**:
  is the method suitable? is it clear?
  are new ideas communicated with the right level of detail?

  "I ran the algorithm 5 times on the iris dataset [1]. It produced an excellent answer every time, far quicker than other techniques [2,3]. I conclude that this is definitely the way to go. Everyone should use my new algorithm."

When is work publishable?

- **Validity (continued)**:
  what about other datasets?
  what about size of data sets?
  training versus evaluation data?
  statistical significance of results?
  were [2,3] intended for this type of problem?
  is the algorithm tuned and evaluated against the most basic versions of [2,3]?

When is work publishable?

- **Presentation:**
  is the work incomprehensible (and hence unpublishable)?
  are the title, abstract and introduction appropriate?
  is the paper structured logically?
  are there any grammatical or spelling errors? is the wording too colloquial?
  are the figures, tables and listings legible?
  is this paper really 2 papers (or 0.5 papers)?

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When is work publishable?

- Key question to ask is **what did I learn?**

The reviewing report

- Different formats used by different conferences / journals
- Often includes:
  - A short summary of the paper
  - Justification for your recommendation (accept / reject)
  - Constructive criticism of the work
  - Suggestions for possible improvements
  - A list of grammatical / typographical errors

Summary

- Usually one paragraph
- Summarise your interpretation of the paper
- Useful for authors
  - “The reviewer clearly has no idea about my work.”
  - “My work is clearly not discernible from the paper.”
- Useful to identify parts of the paper that you didn’t completely understand and need to re-read.

Justification

- You will make a recommendation for the paper
- Your report must justify that recommendation
- General tips:
  - Focus on the major highlights / issues
  - Make a small number of strong arguments

Justification

- Be specific in your major points:
  - ***Bit bland.*** *"Nice idea. But to really be useful the work needs to be more general."*
  - ***Much better****. "The paper addresses a very practical problem, which is caused by deficiencies in the underlying technology. As a direct consequence, the proposal is rather straightforward and it cannot be easily generalised for the following four reasons..."*

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Constructive Criticism

- Criticism is not about being nasty
- Balanced & reasoned assessments about contributions

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Constructive Criticism

- *"The annotation language used in this paper was subsequently greatly improved by X [1] (virtually all modern work uses X's annotation language), but the fundamental approach remains unchanged to this day, e.g., [2,3,4,5,6,7,8]." !!!!!!!!!!!!!!!!!!!!!!*
- ***Better:*** *"X maintained that, although he could not prove it, VIC was almost certainly true [1]. Many others agreed, expressing hope that it would soon be proved [2,3,4,5,6]. Only Y expressed doubt, commenting that mathematical fact isn't subservient to hope [9]. This proved well-founded, when in 2004, Z produced a counter-example [10]."*

Constructive Criticism

- ***Not OK:*** *"I can't begin to indicate the naïvety of X's compiler work [1]. The optimisation is nonexistent, it makes no attempt whatsoever to address the important issues of concurrency (how bad is that?), and the error handling is atrocious. I could have done better myself."*
- ***Much Better:*** *"In 1965, X produced the first compiler for language Y [1]. Although by modern standards Y is not a particularly complicated language, it nevertheless posed several new problems at the time, such as Z. Some of the solutions adopted by X feature in most modern compilers..."*

Suggested improvements

- Mostly relating to exposition: clarifications, more details, more discussion, omit an unnecessary part
- Be realistic and helpful:
  - Ask yourself what is achievable in the time allowed for revisions.
  - If asking for additional material, suggest areas that can be condensed (to make room)

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Making a recommendation

- Based on your opinion as to whether the paper makes a significant contribution.
- Your recommendation might be:
  - strong accept / accept / weak accept / borderline / weak reject / reject / strong reject
  - accept / major revisions / minor revisions / reject
- There may be a discussion if you and the other reviews make vastly different recommendations.

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Decisions & revisions

- The senior academic sends a response to the authors:
  - Contains the overall recommendation
  - The reviewers' reports (anonymised)

- You might see the paper again, after revisions:
  - Journals typically allow multiple rounds of revisions
  - Conferences often do not, but some have rebuttals.

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Reviewing principles

- **Anonymity (“blind” reviewing)**
  the reviewers’ identities are not known to the authors
- **Confidentiality**
  all work is confidential until publication
- **Fairness**
  scrutiny of the work should be impartial and reasonable
- **Professionalism**
  reviews should be timely, courteous and honest

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Not all work is born equal

- **Scope and reputation of outlet**
  a workshop on the “aerodynamic properties of beach volleyballs” is very different to a top journal, e.g. Science
- **Survey and tutorial papers**
  seek to unite or explain a body of existing work, rather than propose novel work
- **Experience reports**
  seek to validate and evaluate existing work, rather than propose novel work

Ethical issues

- **Conflicts of interest**
  reviewing work objectively is impossible if the authors and reviewers are friends (or “foes”)
- **Academic misconduct**
  prior publication, unrevised resubmissions, and plagiarism must be reported
- **Simultaneous submission**
  subverts the reviewing process and is normally not allowed (but is hard to detect)