

Research for Fun

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Chair in Computational Intelligence

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Main references:

1. Elsevier, How to write a world-class paper?
2. Anne-Wil Harzing. Publish or perish. Presented at Manchester School, April 2008

- Enjoy performing creative research
- Enjoy publishing your research results
 - To publish or not to publish...
 - Tips for preparing a manuscript
 - Revisions and response to reviewers
 - Ethical issues
- Enjoy getting your papers cited
- No pains, no fun



Enjoy Performing Creative Research



- Working on topics that are of your interest and most suited for you
 - Theory-driven
 - Application-driven
- Creative and logic thinking
 - Analogy thinking (between two completely different systems)
 - Reverse thinking
 - Alternative thinking
- Think big, start small
 - Think like a physicist
 - Implement like an engineer

Learning without thinking leads to confusion, thinking without learning ends in danger - Confucius



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Creative Thinking



Reverse thinking



Analogy thinking



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Creative Thinking



Cell

- Concentration of protein 1, type G →
- Concentration of protein 2, type G →
- Concentration of protein 1, type P →
- Concentration of protein 2, type P →
- Diffusion of protein type G →
- Morphogen gradient →

Robot

- x-position
- y-position
- Velocity in x-coordinate
- Velocity in y-coordinate
- Local robot-robot interaction based on distance
- Target shape

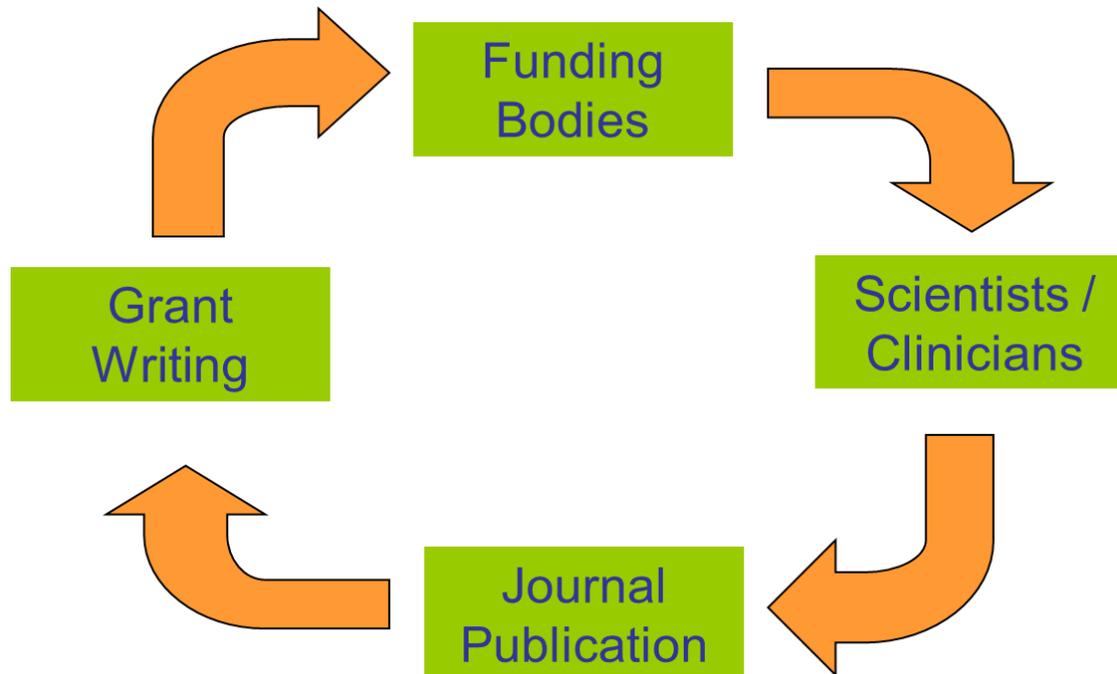


Analogy thinking



Alternative thinking

- Why publish?
 - Scientists publish to share with the research community findings that advance knowledge and understanding
 - Publish or perish?





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Should I Publish This?



WANTED

- Originality
- Significant advances in field
- Appropriate methods and conclusions
- Readability
- Studies that meet ethical standards

NOT WANTED

- Duplications
- Reports of no scientific interest
- Work out of date
- Inappropriate methods or conclusions
- Studies with insufficient data

“Just because it has not been done before is no justification for doing it now.”

– Peter Attiwill, Editor-in-Chief, *Forest Ecology and Management*



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Should I Publish This?



- Have you done something new and interesting?
- Have you checked the latest results in the field?
- Have the findings been verified?
- Have the appropriate controls been performed?
- Do your findings tell a nice story or is the story incomplete?
- Is the work directly related to a current hot topic?
- Have you provided solutions to any difficult problems?

- Manuscript Type
 - Full articles / Original articles
 - Letters / Rapid Communications / Short Communications
 - Review papers / Perspectives
- Self-evaluate your work: Is it sufficient for a full article? Or are your results so thrilling that they need to be revealed as soon as possible?
- Ask your supervisor and colleagues for advice on manuscript type. Sometimes outsiders may see things more clearly than you.



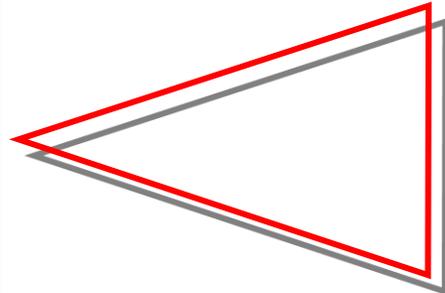
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Preparation - Which Journal?



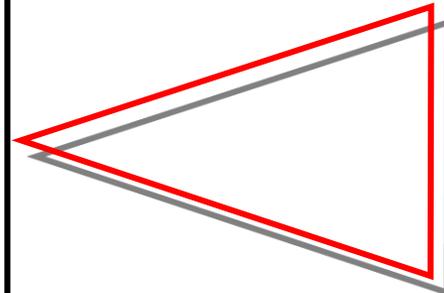
- Check
 - Aims and scope (check journal websites and recent articles)
 - Types of articles
 - Audience
 - Current hot topics (go through recent abstracts)
- Consulting the Guide for Authors will save your time and the editor's
 - Ensure that you use the correct
 - Layout
 - Page limit
 - Nomenclature, abbreviations and spelling (British vs. American)
 - Reference format
 - Number/type of figures and tables
- DO NOT gamble by scattering your manuscript to many journals even if you are not sure to which journal to submit your paper

- Title
- Authors
- Abstract
- Keywords



Be accurate and informative for effective indexing and searching

- Main text
 - Introduction
 - Methods
 - Results
 - Discussion (Conclusion)



Each has a distinct function

- Acknowledgements
- References
- Supplementary material

- **Title** – A good title should contain the **fewest** possible words that **adequately** describe the contents of a paper

DO

- Convey main findings of research
- Be specific
- Be concise
- Be complete
- Attract readers

DON'T

- Use unnecessary jargon
- Use uncommon abbreviations
- Use ambiguous terms
- Use unnecessary detail
- Focus on part of the content only

- Authors and affiliations: Consistent in spelling and abbreviation

- Abstract type
 - **Indicative (descriptive)** abstracts outline the topics covered in a piece of writing so the reader can decide whether or not to read on. Often used in review articles and conference reports
 - **Informative abstracts** summarize the article based on the article structure, but without section headings
 - **Structured abstracts** follow headings required by the journal. Often used in Medical journals
- Check carefully which type fits the journal of your choice

- The quality of an abstract will strongly influence the editor's decision

A **good** abstract

- Is precise and honest
- Can stand alone
- Uses no technical jargon
- Is brief and specific
- Cites no references

- Use the abstract to “sell” your article

- **Introduction** -- Provide the necessary background information to put your work into context
 - Why the current work was performed
 - Aims
 - Significance
 - What has been done before
 - What was done (in brief terms)
 - What was achieved (in brief terms)

DO

- Consult the Guide for Authors for word limit
- “Set the scene”
- Outline “the problem” and hypotheses
- Ensure that the literature cited is balanced, up to date and relevant
- Define any non-standard abbreviations and jargon

DON'T

- Write an extensive review of the field
- Cite disproportionately your own work, work of colleagues or work that supports your findings while ignoring contradictory studies or work by competitors
- Describe methods, results or conclusions other than to outline what was done and achieved in the final paragraph
- Overuse terms like “novel” and “for the first time”

- Method / model – a clear and adequate description of the proposed method that a knowledgeable reader is able to reproduce your results
- Simulation/experiment results
 - Provide detailed experimental setup
 - Include statistically sound and fair comparisons

DO

- Use figures and tables to summarize data
- Show the results of statistical analysis
- Compare “like with like”

DON'T

- Duplicate data among tables, figures and text
- Use graphics to illustrate data that can easily be summarized with text

- Discussions and conclusions
 - summary of the method and results
 - Limitations and future work

Do

- How the results relate to the study's aims and hypotheses
- How the findings relate to those of other studies
- All possible interpretations of your findings
- Limitations of the study

Avoid

- Making “grand statements” that are not supported by the data
Example: *“This novel treatment will massively reduce the prevalence of malaria in the third world”*
- Introducing new results or terms

- Acknowledgement
 - Acknowledged anyone who helped you with this work (with an explicit reason) and ask their permission
 - Acknowledge sources of funding, including any grant or reference numbers
- References
 - Ensure that the references are correct and complete
 - Use the required style
 - Avoid citing articles published only in the local language
 - Avoid excessive self-citation and journal self-citation
- Appendices and / or supplementary materials
 - Move detailed proofs to appendices
 - Include background method and data in a supplementary document

- Figures
 - Labels, legends and numbering should be legible
 - Messages of the figure should be understandable without turning to the text
- Transitions between the sections and paragraphs
 - The paper should be understandable by reading the first sentence of each paragraph
- Abbreviations 
 - Define non-standard abbreviations on first use in both the abstract and the main text
 - Don't abbreviate terms used only once or twice in the entire manuscript – spell these out in full
 - Acronyms: capitals not required in the definition unless a proper noun or start of a sentence
 - ubiquitin proteasome system (UPS)**
 - NOT**
 - Ubiquitin Proteasome System (UPS)**

- Use short sentences
- Refrain from using passive verbs
- Use consistent verb tense: “Before tumors **were** microdissected, epithelial cells **are...**”
- Use consistent plural / singular
- Use “,” “which” correctly
 - “To identify biomarkers of prostate cancer, we performed microarray analysis, using custom cDNA arrays”
 - “Data were normalised to the internal reference housekeeping gene actin, **which showed...**” → “Data were ..., **revealing that ...**”
- Consistent style (American or British English)

- Integers less than 10 should be spelled out, e.g., “3 methods” → “three methods”
- “existing works” → “existing work”
- “don’t” → “do not”
- Avoid repeating, e.g.,
 - “The performance of the proposed algorithm is better than that (not “the performance”) of the NSGA-II”
 - “ ... repeat again ...” → “...repeat ...”;
 - “in addition, ... also” → “in addition”

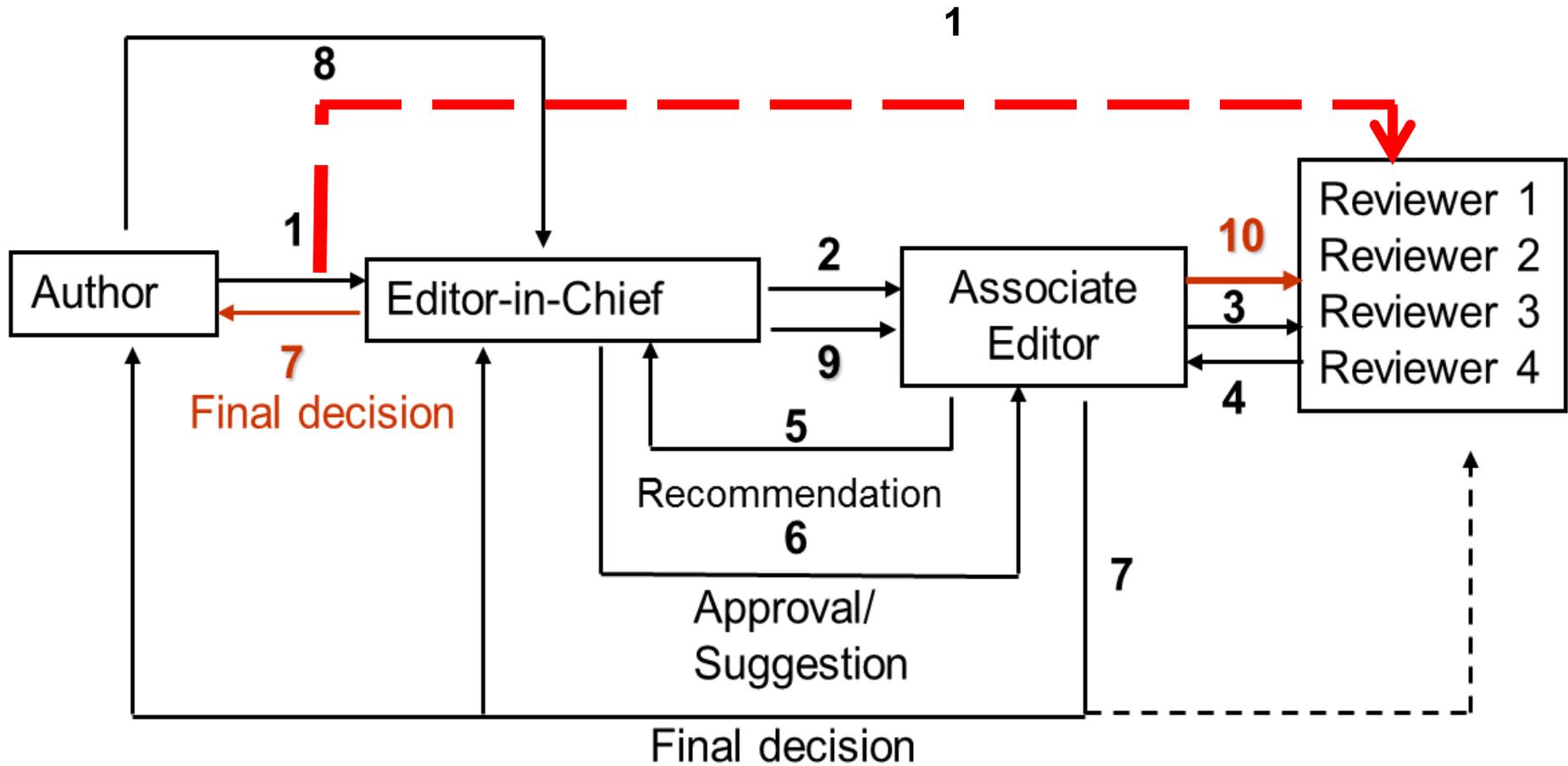


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Review Process



Accept subject to minor /
major revisions / Re-submission



Do

- Respond to all points; even if you disagree with a reviewer, provide a polite, scientifically solid rebuttal rather than ignore their comments
- Provide page and line numbers when referring to revisions made in the manuscript
- Perform additional calculations, computations, or experiments if required; these usually serve to make the final paper stronger
- State specifically what changes you have made to address the reviewers' comments, mentioning the page and line numbers where changes have been made

Don't

- Take it personally!
- Repeat the same response over and over; if a similar comment is made by multiple people explain your position once and refer back to your earlier response in responses to other reviewers or the editor
- **Resubmit the paper elsewhere** without significant revisions addressing the reasons for rejection and checking the new Guide for Authors

“The reviewer is clearly ignorant of the work of Bonifaci et al. (2008) showing that”



“Thank you for your comment. However, we feel that the assumption in our model is supported by recent work by Bonifaci et al. (2008), who showed that ...”



- Minor new contributions, unjustified motivation
- Obscure presentation
- Missing relevant references
- Unfair comparisons
 - Parameter setting unjustified
 - Different constraints
 - Compared algorithms outdated
- Results not reproducible
- Results unconvincing
 - Lack of **statistic significance**
 - Benchmarks / test problems are untypical or insufficient



Ethical Issues - Multiple Submissions



- You should not send your manuscripts to a second journal UNTIL you receive the final decision from the first journal
- Re-publication of a paper in another language is acceptable, provided that there is full and prominent disclosure of its original source at the time of submission
- At the time of submission, authors should disclose details of related papers, even if in a different language, and similar papers in press



Ethical Issues - Plagiarism



“Plagiarism is the appropriation of another person’s ideas, processes, results, or words without giving appropriate credit, including those obtained through confidential review of others’ research proposals and manuscripts”

Federal Office of Science and Technology Policy, 1999

Unacceptable paraphrasing, even with correct citation, is considered plagiarism

For more information on plagiarism and self-plagiarism, please see: <http://facpub.stjohns.edu/~roigm/plagiarism/>

- **Original (Gratz, 1982):**

Bilateral vagotomy resulted in an increase in tidal volume but a depression in respiratory frequency such that total ventilation did not change.

- **Restatement 1:**

Gratz (1982) showed that bilateral vagotomy resulted in an increase in tidal volume but a depression in respiratory frequency such that total ventilation did not change.



Ronald K. Gratz. *Using Other's Words and Ideas*.

Department of Biological Sciences, Michigan Technological University

- **Original (Buchanan, 1996):**

What makes intentionally killing a human being a moral wrong for which the killer is to be condemned is that the killer did this morally bad thing not inadvertently or even negligently, but with a conscious purpose – with eyes open and a will directed toward that very object.

- **Restatement 2:**

Buchanan (1996) states that we condemn a person who intentionally kills a human being because he did a "morally bad thing" not through negligence or accident but with open eyes and a direct will to take that life.



Ronald K. Gratz. *Using Other's Words and Ideas*.

Department of Biological Sciences, Michigan Technological University

Authorship credit should be based on

1. Substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data
2. Drafting the article or revising it critically for important intellectual content
3. Final approval of the version to be published

Authors should meet conditions 1, 2, and 3. Those who have participated in certain substantive aspects of the research project should be acknowledged or listed as contributors. Check the Guide for Authors and ICMJE guidelines: <http://www.icmje.org/>

What Gets Your Paper Accepted

- A**ttention to details
- C**heck and double check your work
- C**onsider the reviews
- E**nglish must be as good as possible
- P**resentation is important
- T**ake your time with revision
- A**cknowledge those who have helped you
- N**ew, original and previously unpublished
- C**ritically evaluate your own manuscript
- E**thical rules must be obeyed

– Nigel John Cook, Editor-in-Chief, *Ore Geology Reviews*

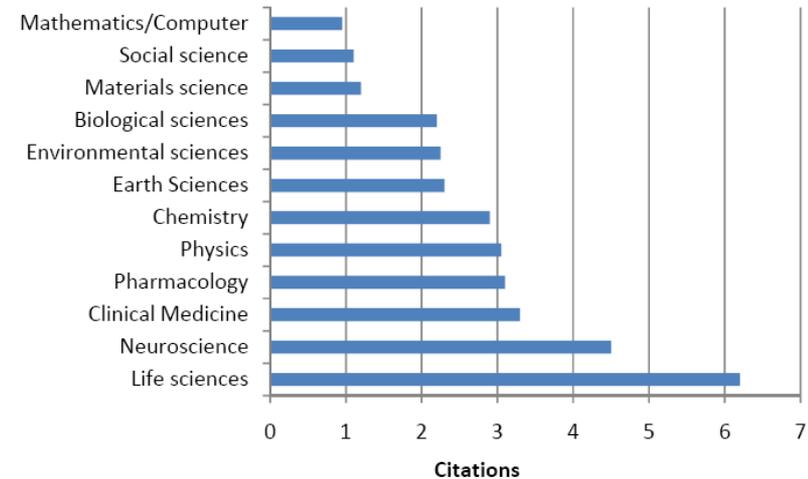
- Why publish if nobody cites your work?
 - 80% of published paper have never read by audience other than authors and reviewers
 - It is part of **fun** to see your paper cited
- ... but how to get your papers cited?
 - publish in a journal with high an impact factor
 - build up your reputation
 - ❖ papers get easily cited if the author has good reputation
 - a paper that does not exist was cited more than 200 times: first self-cited by mistake in a paper whose author is a very well known scientist

- **C**ommunicate (they can't cite your paper, if they don't know it)
 - Make your papers on-line available (pay attention to copyright)
 - Attend conferences and **talk** to people (talk to at least **2 new colleagues** in detail about your research)
 - Email, ask for papers and send yours in return
 - Invite visitors / seminar speakers
 - Join professional organization
- **C**ollaborate
 - Co-authored papers are cited more
 - Your collaborators will cite you in other projects
- **C**ontribute
 - Reviewing journal and conference papers
 - Involving in conference activities
- **C**are
 - For your own reputation and others
 - Alert collaborators and congratulate them on their achievements
 - **Thank** others for their help!

- Everything you do in research will be subject to the scrutiny of “Peer Review”
 - applying for a grant
 - getting your work published
 - getting promoted
 - ... and many others
- Reviewers are just people
 - rarely completely dispassionate and objective
- Research takes place in a social context

- Peer-review?
- Citation-based statistics (bibliometrics)?
 - Journal impact factor (IF)
 - ✗ for the whole journal, not single papers
 - ✗ can be manipulated
 - ✗ different from discipline to discipline
 - h-index / g-index?
 - ✗ Contribution of the authors not accounted for
 - ✗ Citation context not accounted for

Average citations per article



- A free software developed by Prof. Anne-Wil Harzing, University of Melbourne:
<http://www.harzing.com/pop.htm>
- Based on googlescholar data, the software calculates:
 - Author impact
 - ❖ Total number of papers
 - ❖ Total number of citations
 - ❖ Average number of citations per paper
 - ❖ Hirsch's h-index and related parameters
 - Journal impact: Ranking of papers appeared in a particular journal in a particular year based on citations

“When using Publish or Perish for citation analyses, we would like to suggest the following general rule of thumb:

- If an academic shows good citation metrics, it is very likely that he or she has made a significant impact on the field.
- However, the reverse is not necessarily true. If an academic shows weak citation metrics, this may be caused by a lack of impact on the field, ...”



No Pains, No Fun



Essential: **P**³

- **P**erformance – do excellent research
- **P**ractice
 - Start as a student and support your students
 - Submit papers first to conferences
 - Let your colleagues review your work first
- **P**ersistence – be tolerant of
 - a paper being rejected
 - a grant proposal being not funded
 - a proactive request being neglectedand ... never give up!

Many thanks for you attention!

Acknowledgement: I am grateful to Judy Bai from Elsevier for organizing this event and inviting me to give a presentation.