

Writing influential peer reviewed papers - an editor's perspective for young engineers



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- Why publish?
- Types of manuscript
- Checklist before writing: novelty, impact and readership
- Essential elements of a manuscript and quality check
- Ethics in publishing
- Journal selection
- Peer review process
- Concluding remarks

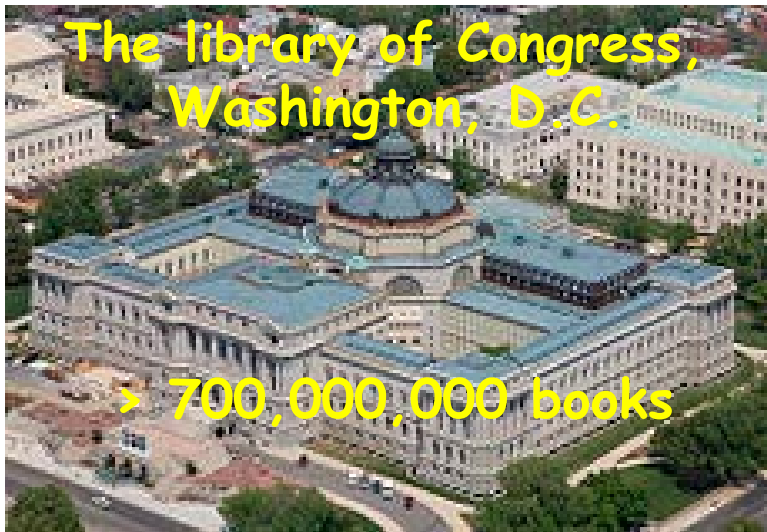


Why publish?



"Everything that can be invented has been invented"
Charles H. Duell, Commissioner of US patent office

Why add one more paper to the sea of knowledge?



"Little drops of water and little grains of sand make the mighty ocean and a pleasant land" - Julia A. Carney

Why publish?



Purpose of writing papers in peer reviewed journals

Identify the most appropriate answer:

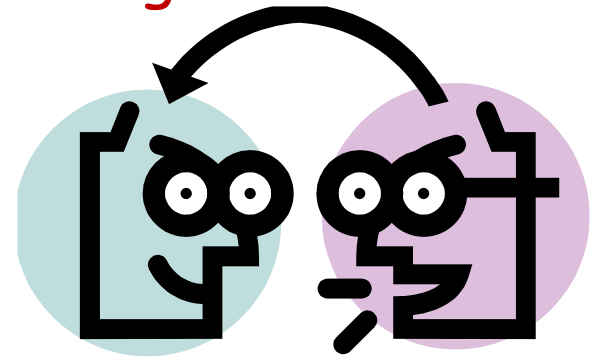


1. Earn M.S./Ph.D.
2. Impress others
(mother/boyfriend/girlfriend/advisor/everyone)
3. Get a better paid job
4. Communicate rigorous new knowledge
5. Avoid wasteful duplication of work
6. Prevent loss of valuable knowledge



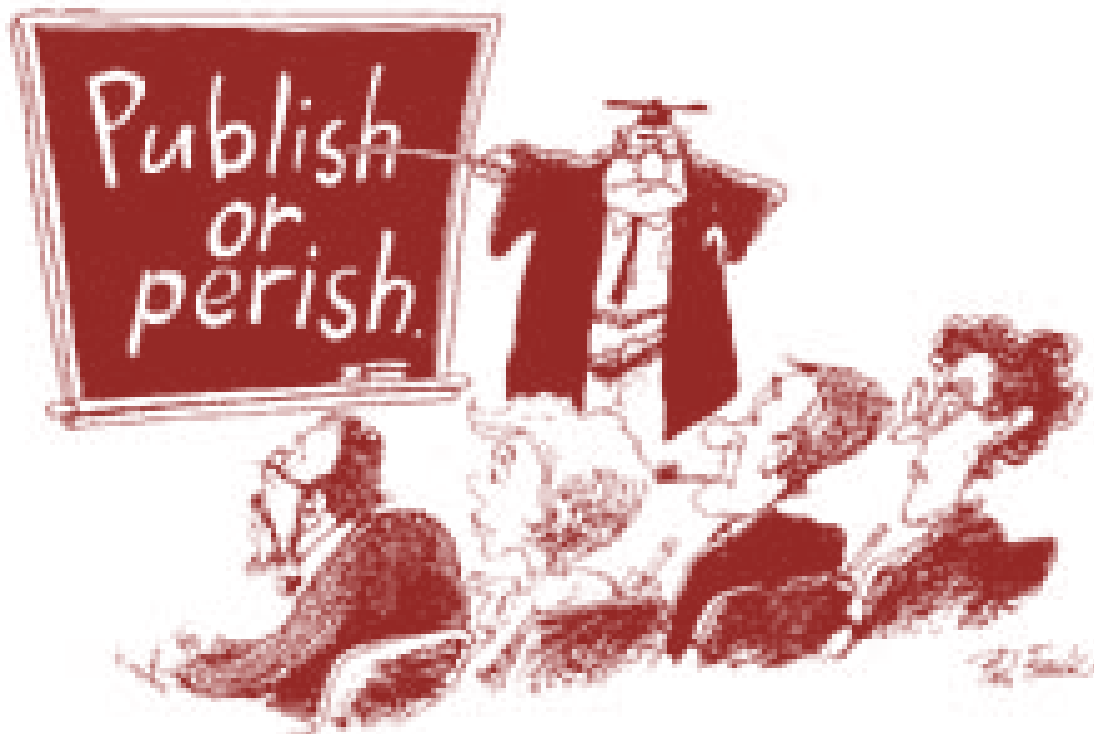
Methods of dissipating new knowledge

1. Tell your advisor
2. Write a thesis
3. Speak at a conference
4. Write a book
5. Write a report (prize winning?)
6. Write a conference paper
7. Write a peer reviewed journal paper



Researchers are judged by their journal papers

Why publish?



"The greatest ideas are (literally) worthless if you keep them to yourself" - Simon Peyton Jones

Publish what? New knowledge useful to readers in a timely manner

How?

Types of papers



Technical papers - majority of peer reviewed papers

Reviews - some journals only publish reviews - more time consuming and much more difficult to write

Perspectives - points of view on contemporary topics - current status and future directions

Letters to the editor - comments on published articles and author's rebuttals

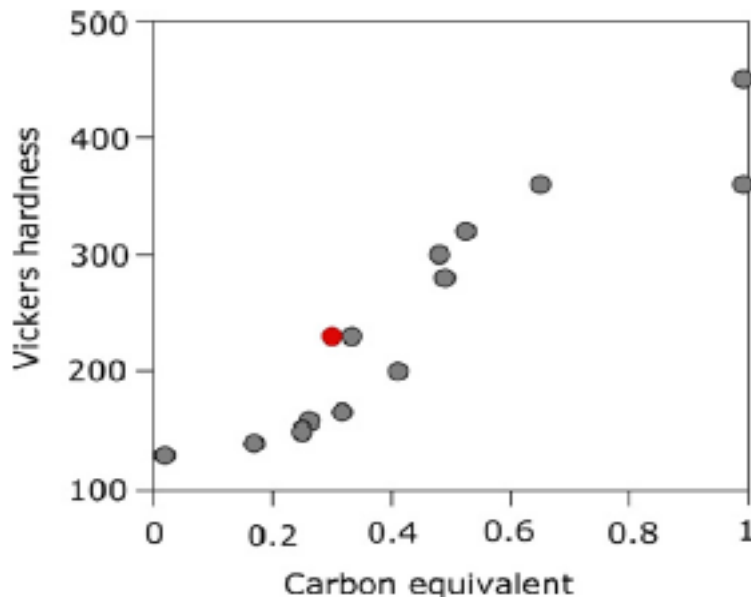
Editorials - introduction to a special issue of a journal on a contemporary topic; topics of interest to a particular journal

Types of papers



Writing reviews are much more difficult than technical papers

Reviews are most useful if they establish facts that are not available in individual technical papers



Example: results from many papers to show a trend

From Nandan, DebRoy & Bhadeshia, Progress in Materials Science, 2008

Much more time consuming

Our focus => technical papers (majority of peer reviewed papers)

Checklist before writing a technical paper



The main idea: "A re-usable insight, useful to the reader"

- Simon Peyton Jones



Prime novelty: the main idea should be new and useful, supported by a thorough search of literature







Impact of research: the findings should represent significant advancement of the field

Scope/audience: the work should be of sufficient interest to a community of scholars

Meet these requirements? => Start writing ASAP

Typical content of a technical paper



	Typical Length	Number of readers
Title*	<15 words	
Abstract*	<150 words	
Introduction	<2 pages	
Experimental procedure and materials	<1 page	
Results and discussion	<4 pages	
Summary and conclusions*	<1 page	
References	Several pages	

* Many readers read these first

- To read or not to read? - readers often decide from the title
- Guide search engines - friendly to abstracting services
- Many more people read the title than the entire paper
- Should not contain symbols, abbreviations, equations etc.
- Short - 10 and 15 words is common, may depend on the journal



Abstract



Seen first => most important

Shows the most important features of the paper in a nutshell

Journals often prescribe word limits - 100 to 150 words not uncommon

One (occasionally two) paragraph(s) - no references

Many authors write the abstract last



Attract attention - why is this paper worth reading?

Establish **prime novelty** - clearly state (a) what is **important and new** and (b) what is **known and not known**.

How is the work different from what is available in the literature?

A succinct review of recent peer reviewed literature => establish prime novelty. Relation between work undertaken and existing literature. Avoid unfocused general review.

Last para: questions/hypothesis and other important contents



Experimental procedure and materials



Provide as much details as needed to reproduce the experiments

It is the author's responsibility to evaluate the quality and reproducibility of the data

Referee's concerns about quality and reproducibility of the results (data without error bars) adversely impact acceptability of manuscripts



Interpret and not narrate - major findings in relation to existing literature

Discuss significance of the new results explicitly

Point out limitations of findings and uncertainties and errors in the data

Relevant shortcomings of literature => fair game, as long as purposeful and professional

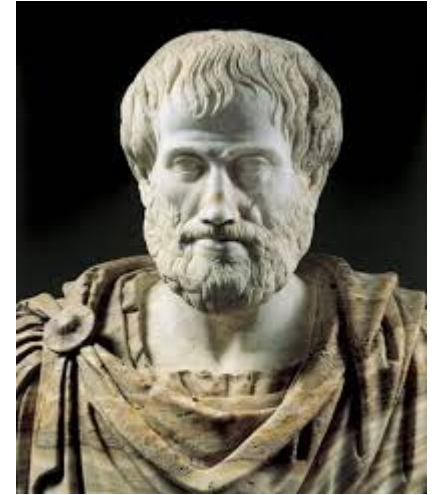
Discuss unexpected results



Based on observations and not authority

"Women have fewer teeth than men"
- Aristotle

He never counted Mrs. Aristotle's teeth



Opinions are not facts, certainly not new knowledge

Linus Pauling believed that many disease could be cured
by vitamins!



High impact of conclusions: The findings should be sufficiently important to represent significant advancement of the field.

Brief and succinct

Tables, figures, data and pictures not necessary to establish the conclusions perhaps do not belong in the manuscript. They should be reviewed critically for exclusion.



Quality check before submission



- Does the body of the paper provides **evidence to support each claim made in introduction** (prime novelty)
- Evidence can be measurements, analysis and comparison, theory, case studies ...
- Free of mechanical defects - the figures and micrographs should be of high quality - check for missing figures and tables, inappropriate formatting
- **Get comments** on the manuscript from as many people as possible before submission to a journal - readers do not have to be experts

**"If you have no critics you'll likely have no success."
- Malcolm X**

Compliance with the copyright law - inappropriate to republish a paper or its part.

Permission from the copyright holder is a must when previously published material is needed in a manuscript. Permissions to republish a figure are granted routinely by most publishers.

Editors and reviewers cannot use manuscripts submitted for publication except for the review process

A manuscript cannot be submitted simultaneously to more than one journal

Prevention of plagiarism

Editors and referees must disclose conflicts of interests

Selection of a journal

Which journal is appropriate - scope and readership

How are the journals rated?

How is the journal rating useful to authors?



Match manuscript content \Leftrightarrow journal's coverage of the field, rating & ability to promote articles

Journal dependent citations of three similar papers (different systems)

Journal A (2007)
186 (mild steel)

Journal B (2006)
120 (aluminum alloy)

Journal C (2006)
81 (stainless steel)

Impact factor



Average number of citations of papers published in last 2 years

Selected JCR Year: 2014

Rank	Full Journal Title	Total Cites	Journal Impact
1	ACTA MATERIALIA	44,197	4.465
2	CORROSION SCIENCE	24,492	4.422
3	SCRIPTA MATERIALIA	23,137	3.224
4	JOURNAL OF ALLOYS AND COMPOUNDS	54,156	2.999
5	MATERIALS SCIENCE AND ENGINEERING A-STRUCTURAL MATERIALS PROPERTIES MICROSTRUCTURE AND PROCESSING	51,048	2.567
6	INTERMETALLICS	6,969	2.131
7	INTERNATIONAL JOURNAL OF REFRACTORY METALS & HARD MATERIALS	2,968	1.989
8	HYDROMETALLURGY	6,268	1.933
9	JOURNAL OF MATERIALS SCIENCE & TECHNOLOGY	2,650	1.909
10	MATERIALS CHARACTERIZATION	4,895	1.845
11	PHILOSOPHICAL MAGAZINE	11,044	1.825
12	JOM	3,894	1.757
13	METALLURGICAL AND MATERIALS TRANSACTIONS A-PHYSICAL METALLURGY AND MATERIALS SCIENCE	19,262	1.730
14	SCIENCE AND TECHNOLOGY OF WELDING AND JOINING	2,053	1.707
15	METALS AND MATERIALS INTERNATIONAL	1,483	1.579
16	CORROSION REVIEWS	186	1.526
17	METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE	4,620	1.461
18	KOREAN JOURNAL OF METALS AND MATERIALS	517	1.405
19	WELDING JOURNAL	2,201	1.378
20	MATERIALS AND CORROSION-WERKSTOFFE UND KORROSION	1,568	1.373

Peer review process

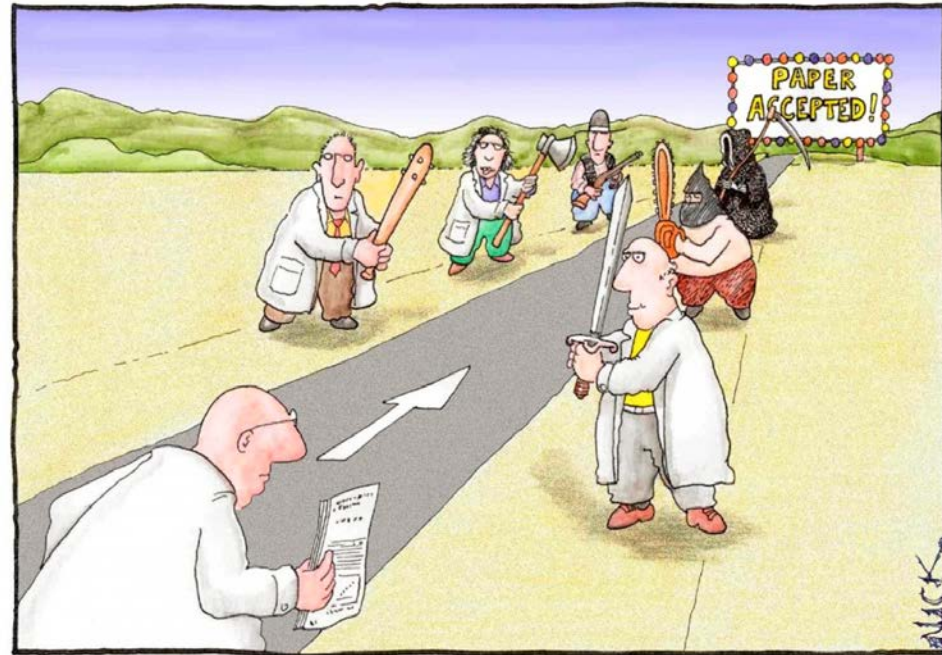
Author submits manuscript

Preliminary review by the editor - may not send for peer review in many cases

Editor sends paper out for peer review

Experts review, often provide useful suggestions

Author revises manuscript



Most scientists regarded the new streamlined peer-review process as "quite an improvement."

Editors accept or reject manuscripts

Addressing reviewers' comments

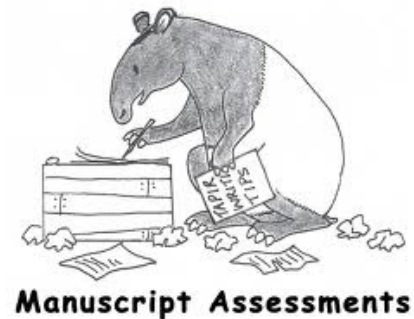


Reviewers are recognized experts in their fields

They often suggest optional or mandatory revisions of the manuscript

The reviews are a valuable gift to improve the manuscript

After the manuscript is revised, a point by point response to the reviewers' comments is to be submitted together with the revised manuscript



What if the manuscript is not accepted? (on rare occasion)



"It is impossible to live without failing at something, unless you live so cautiously that you might as well not have lived at all - in which case, you fail by default..... Failure taught me things about myself that I could have learned no other way."



J.K. Rowling

Rejection is temporary - an opportunity to improve the manuscript and **publish a better paper** at the end

From: "The Fringe Benefits of Failure, and the Importance of Imagination," Annual Meeting of the Harvard Alumni Association, Copyright of JK Rowling, June 2008



From: <http://harvardmagazine.com/commencement/the-fringe-benefits-failure-the-importance-imagination>

Summary



- Journal papers communicate new knowledge, avoid duplication of work and provide recognition to authors
- Start writing a manuscript as soon as three conditions are satisfied
- Some guidelines are helpful for assembling each component of a paper - many good papers are available on this topic + some comments here
- Follow a list of pre-submission tasks & ethical issues for the current manuscript
- Select a journal based on its scope, rating & ability to promote articles
- Collaborative peer-review marshals expertise of leading researchers to improve manuscripts and helps authors and the community

Happy publishing!

<http://www.matse.psu.edu/modeling>

