



ELSEVIER



How to write great papers and get published

Understanding and benefiting from the publishing process

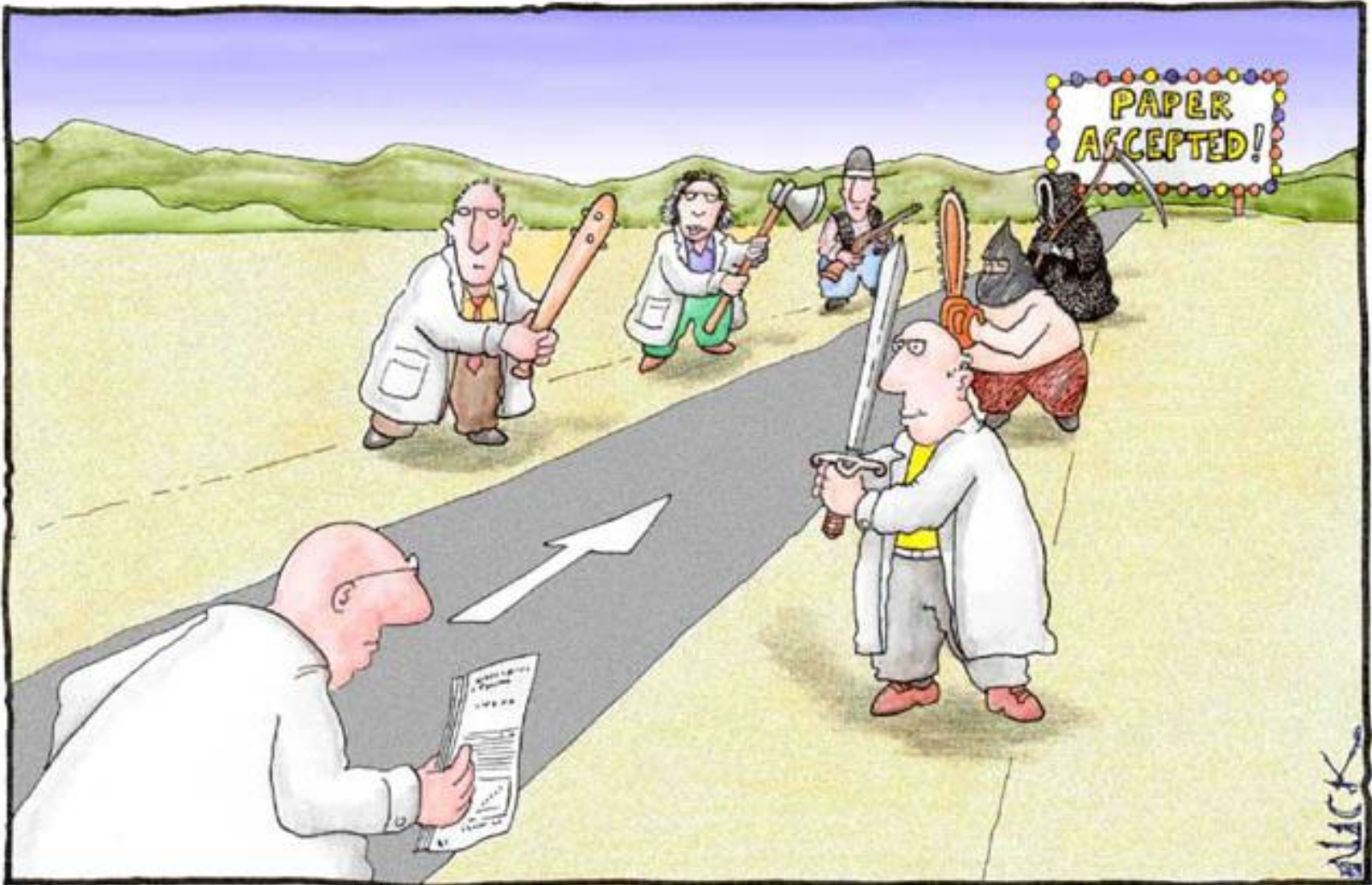
Presented by: dr. Simone Munao, Publisher - Mathematics
Location/Date: Beijing, June 17th 2019

Workshop Outline

- Using online tools to help journal selection
- Typical article structure
- Open Access or not
- Promoting your research using social media
- Publishing ethics

Questions and Answers

Why are you here?





Elsevier Publishing Campus

Identifying the right
journal

And writing for it

Select the best journal for submission

- Look at **your references** – these should help you narrow your choices.
- **Review** recent publications in **each “candidate journal”**. Find out the hot topics, the accepted types of articles, etc.
- Ask yourself the following questions:
 - ✓ Is the journal **peer-reviewed** to the right level?
 - ✓ Who is this journal’s **audience**?
 - ✓ How **fast** does it make a decision or publish your paper?
 - ✓ What are the various **Impact metrics** for the journal?
 - ✓ Do you want/need to publish Open Access?
 - ✓ Does it really exist or is **dubious**? (check for example archived version of Beall’s List of Predatory Open Access Publishers)

Choose the right journal

Investigate all candidate journals to find out

- Aims and scope
- Accepted types of articles
- Readership
- New paper types
 - go through the abstracts of recent publications)

Home > Journals > Biochemical Pharmacology

Biochemical Pharmacology

> Supports Open Access

Editor-in-Chief: S.J. Enna

> View Editorial Board

ISSN: 0006-2952

Submit Your Paper

View Articles

Guide for Authors

Abstracting/ Indexing

Track Your Paper

Order Journal

Journal Metrics

Biochemical Pharmacology publishes original research findings, Commentaries and review articles related to the elucidation of cellular and tissue function(s) at the biochemical and molecular levels, the modification of cellular phenotype(s) by genetic, transcriptional/translational or drug/compound-induced modifications, as well as the pharmacodynamics and pharmacokinetics of xenobiotics and drugs, the latter including both small molecules and biologics.

The journal's target audience includes scientists engaged in the identification and study of the mechanisms of action of xenobiotics, biologics and drugs and in the drug discovery and development process.

All areas of cellular biology and cellular, tissue/organ and whole animal pharmacology fall within the scope of the journal. Drug classes covered include anti-infectives, anti-inflammatory agents, chemotherapeutics, cardiovascular, endocrinological, immunological, metabolic, neurological and psychiatric drugs, as well as research on drug metabolism and kinetics. While medicinal chemistry is a topic of complimentary interest, manuscripts in this area must contain sufficient biological data to characterize pharmacologically the compounds reported. Submissions describing work focused

Research Update

Targeting transcription factors by small compounds—Current strategies and future implications Review Article
Pages 1-13
Judith Hagenbuchner, Michael J. Ausserlechner

▶ Abstract | ▶ Graphical abstract | PDF (1767 K)

Bibliometric indicators



What is the Impact Factor (IF)?

Impact Factor

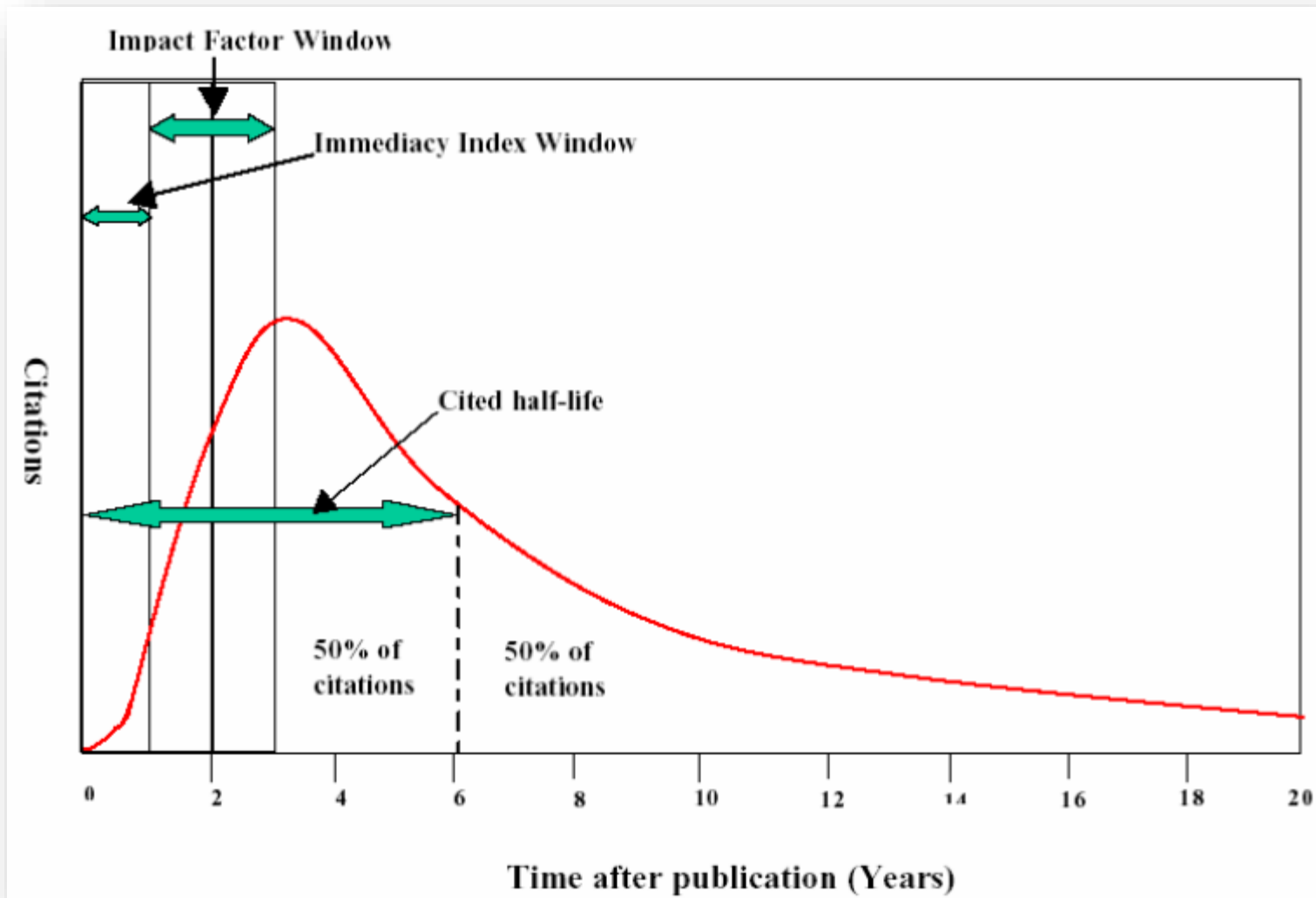
[the average annual number of citations per article published]

For example, the 2014 impact factor for a journal is calculated as follows:

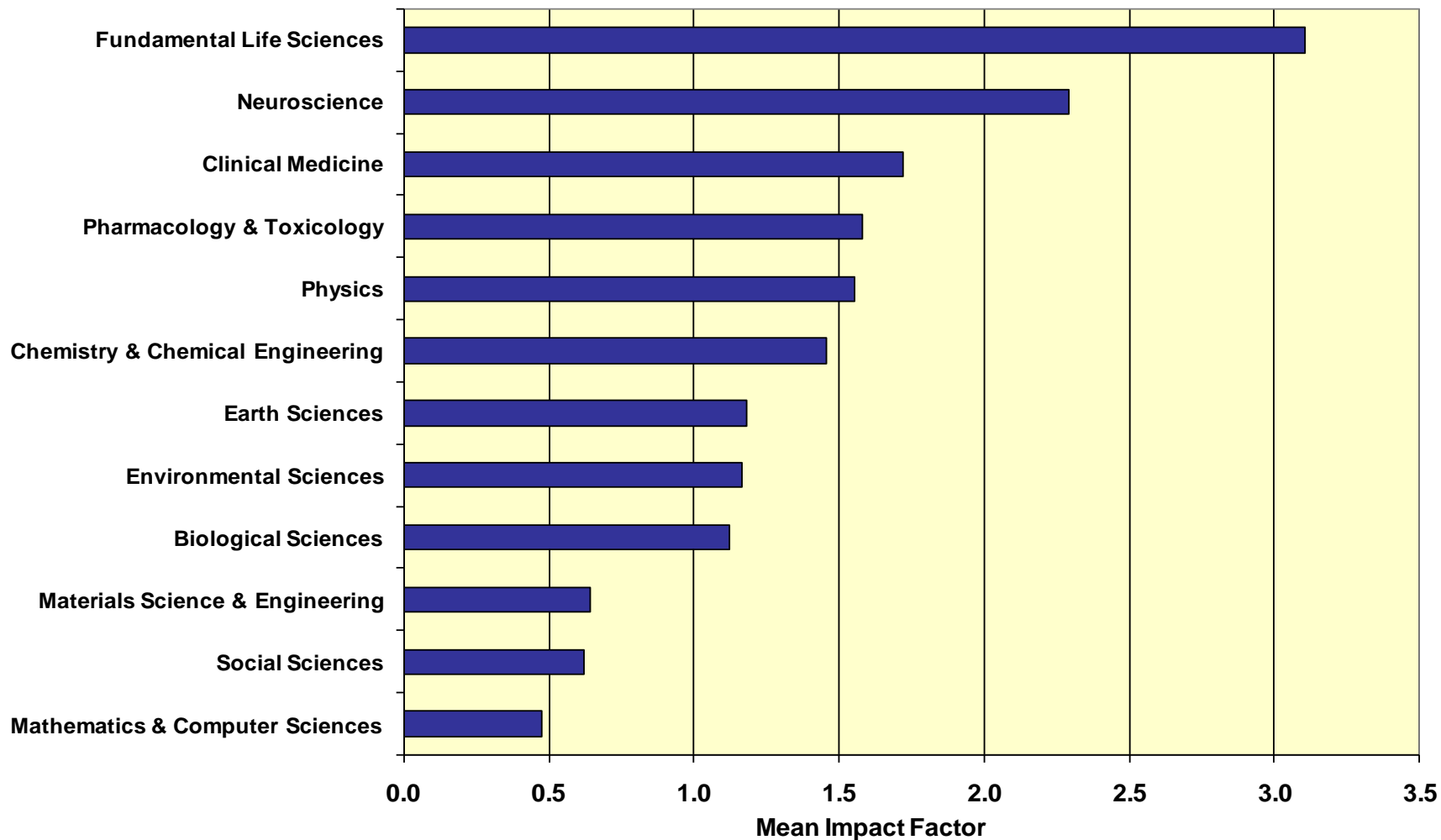
- A = the number of times articles published in 2012 and 2013 were cited in indexed journals during 2014
- B = the number of "citable items" (usually articles, reviews, proceedings or notes; not editorials and letters-to-the-Editor) published in 2012 and 2013
- 2014 impact factor = A/B
- e.g. **600 citations** = **2.000**
150 + 150 articles

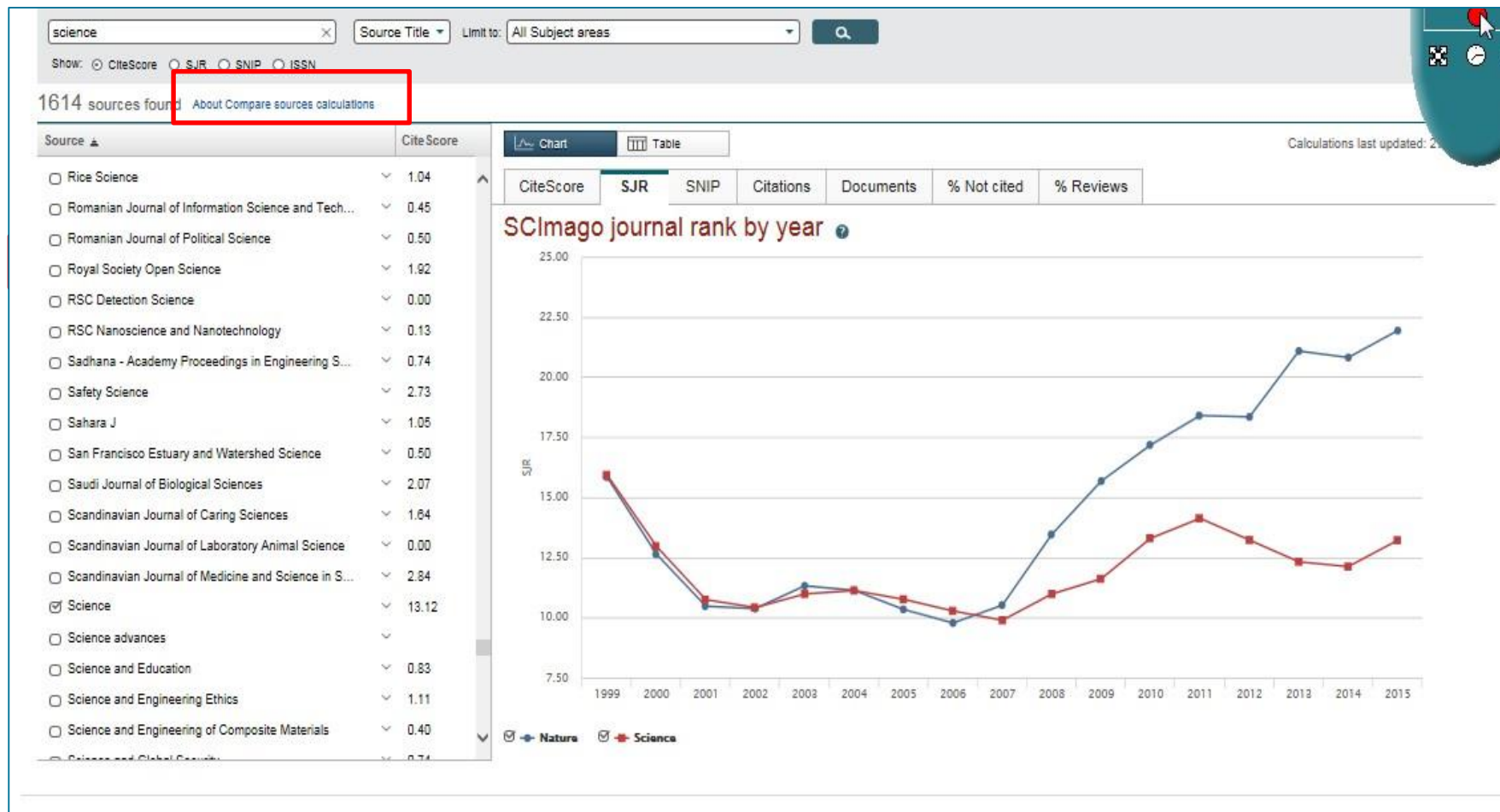


Impact Factor and other bibliometric parameters



Influences on Impact Factors: Subject Area





Identify the right audience for your paper

- ✓ Identify the sector of readership/community for which a paper is meant
- ✓ Identify the interest of your audience
- ✓ Get advice from your university library team on where to publish
- ✓ Ask your supervisor or colleagues for recommendations



Your Journals list for this manuscript

So you now have a list of candidate journals for your manuscript.....

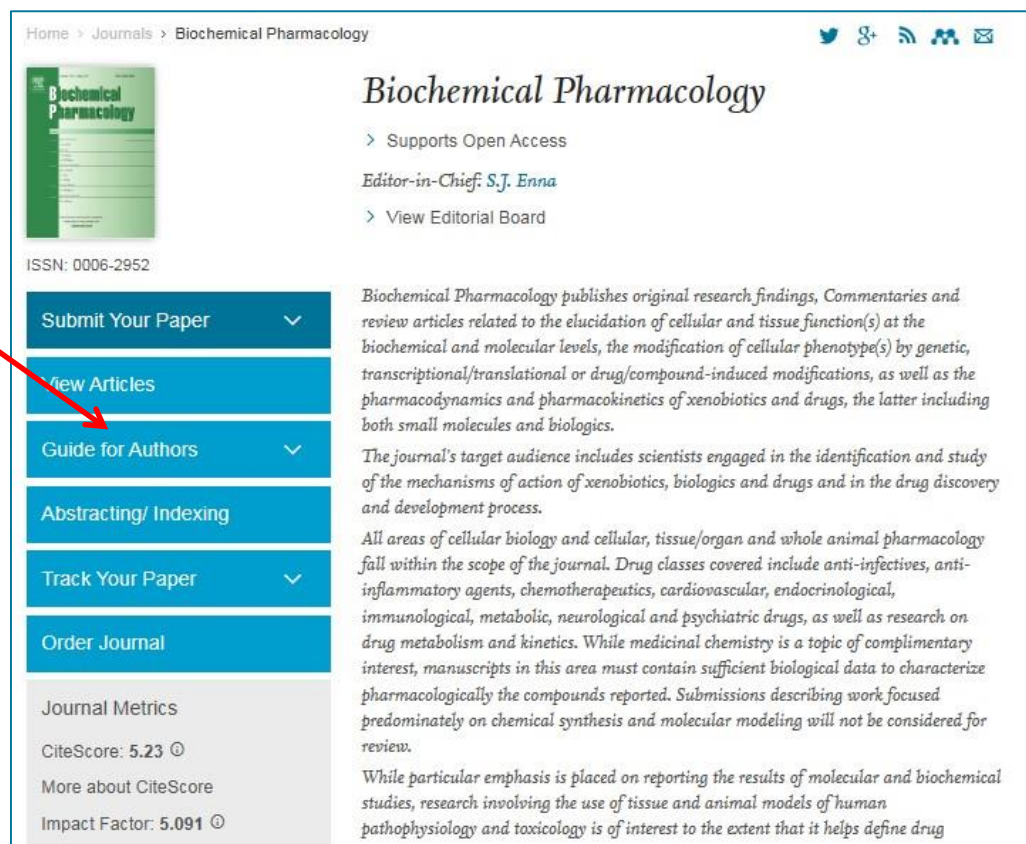
- ✓ All authors of the submission agree to this list and the sequence of journals
- ✓ Write your draft as if you are going to submit to the first journal on your list. Use its Guide for Authors - these differ per journal

✗ DO NOT gamble by submitting your manuscript to more than one journal at a time.

International ethics standards prohibit multiple/simultaneous submissions, and editors DO find out! (Trust us, they DO!)

Read the 'Guide for Authors'- Again and again!

- Stick to the Guide for Authors in your manuscript, **even in the first draft** (text layout, nomenclature, figures & tables, references etc.). In the end it will save you time, and also the editor's.
- Editors (and reviewers) do not like wasting time on poorly prepared manuscripts. It is a sign of disrespect.



Home > Journals > Biochemical Pharmacology

Biochemical Pharmacology

> Supports Open Access

Editor-in-Chief: S.J. Enna

> View Editorial Board

ISSN: 0006-2952

Submit Your Paper

New Articles

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Order Journal

Journal Metrics

CiteScore: 5.23

More about CiteScore

Impact Factor: 5.091


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The journal's target audience includes scientists engaged in the identification and study of the mechanisms of action of xenobiotics, biologics and drugs and in the drug discovery and development process.

All areas of cellular biology and cellular, tissue/organ and whole animal pharmacology fall within the scope of the journal. Drug classes covered include anti-infectives, anti-inflammatory agents, chemotherapeutics, cardiovascular, endocrinological, immunological, metabolic, neurological and psychiatric drugs, as well as research on drug metabolism and kinetics. While medicinal chemistry is a topic of complimentary interest, manuscripts in this area must contain sufficient biological data to characterize pharmacologically the compounds reported. Submissions describing work focused predominately on chemical synthesis and molecular modeling will not be considered for review.


While particular emphasis is placed on reporting the results of molecular and biochemical studies, research involving the use of tissue and animal models of human pathophysiology and toxicology is of interest to the extent that it helps define drug

Read the 'Guide to Authors'- Again and again!



Browse journals > Biochemical P... > Guide for auth...

Guide for Authors

 Author information pack

- [> Submit your paper](#)
- [> Track your paper](#)
- [> Order journal](#)
- [> View articles](#)
- [> Abstracting](#)
- [> Editorial board](#)

| | | |
|--|---|---|
| <p>INTRODUCTION</p> <ul style="list-style-type: none"> • Types of papers • Scientific Checklist | <p>PREPARATION</p> <ul style="list-style-type: none"> • Manuscript preparation • Language • Use of Word Processing Software • Article Layout • Title and Abstract • Keywords • Compounds • Acknowledgments • Nomenclature and abbreviations • GenBank • Footnotes | <ul style="list-style-type: none"> • Figure Legends • Tables • References • Institutional Email Address • Graphical Abstract • Archival Material Requirement • AudioSlides <p>AFTER ACCEPTANCE</p> <ul style="list-style-type: none"> • Online proof correction • Offprints • Useful Links |
| <p>BEFORE YOU BEGIN</p> <ul style="list-style-type: none"> • Ethics in publishing • Declaration of interest • Submission declaration and verification • Changes to authorship • Copyright • Open access • Submission • Categories | | |

Common problems with submissions:

An international editor says...

*“The following problems appear **much too frequently**”*

- *Submission of papers which are clearly out of scope*
- *Failure to format the paper according to the Guide for Authors*
- *Inappropriate (or no) suggested reviewers*
- *Inadequate response to reviewers*
- *Inadequate standard of English*
- *Resubmission of rejected manuscripts without revision*

– Paul Haddad, Editor, *Journal of Chromatography A*

Why is language important?

Save your editor and reviewers the trouble of guessing what you mean

Complaint from an editor:

“[This] paper fell well below my threshold. I refuse to spend time trying to understand what the author is trying to say. Besides, I really want to send a message that they can't submit garbage to us and expect us to fix it.

My rule of thumb is that if there are *more than 6 grammatical errors* in the abstract, then I don't waste my time carefully reading the rest.”

Scientific Language – Overview

Write with clarity, objectivity, accuracy, and brevity.

Key to successful scientific writing is to be alert for common errors:

- ✘ Sentence construction
- ✘ Incorrect tenses
- ✘ Inaccurate grammar
- ✘ Not using English

Check the Guide for Authors of the target journal for language specifications

Scientific Language – Sentences

- ✓ Write direct and short sentences – more professional looking.
- ✓ One idea or piece of information per sentence is sufficient.
- ✗ Avoid multiple statements in one sentence – they are confusing to the reader.

Authorship: Who is allowed to be an Author?

- Policies regarding authorship can vary
- Most common example: the International Committee of Medical Journal Editors (“Vancouver Group”) declared that an author must:
 1. **substantially contribute** to conception and design, or acquisition of data, or analysis and interpretation of data;
 2. **draft** the article or **revise** it critically for important intellectual content; and
 3. **give their approval** of the final full version to be published.
 4. agreement to be **accountable for all aspects of the work** in ensuring that questions related to accuracy or integrity of any part of the work are appropriately investigated and resolved.

ALL four conditions must be fulfilled to be an author!

All others would qualify as “Acknowledged Individuals”

Authorship - Sequence & Abuses

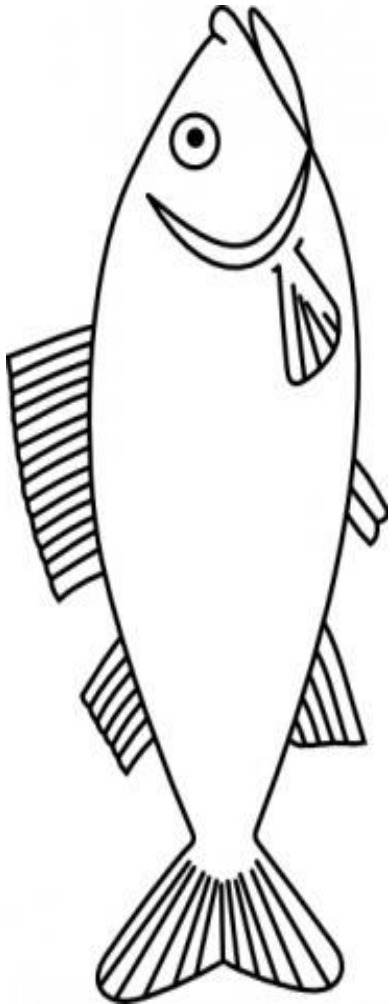
- General principles for who is listed first:
 - First Author
 - Conducts and/or supervises the data generation and analysis and the proper presentation and interpretation of the results
 - Puts paper together and submits the paper to journal
 - Corresponding author
 - The first author or a senior author from the institution.
 - Particularly when the first author is a PhD student or postdoc, and may move to another institution soon.
- Abuses to be avoided:
 - ✗ Ghost Authorship: leaving out authors who should be included
 - ✗ Gift Authorship: including authors who did not contribute significantly



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Typical article
structure

Typical Structure of a Research Article



- Title
- Abstract
- Keywords

Make them easy for indexing and searching! (informative, attractive, effective)

- Main text (IMRAD)
 - Introduction
 - Methods
 - Results
 - And
 - Discussions

Journal space is not unlimited.

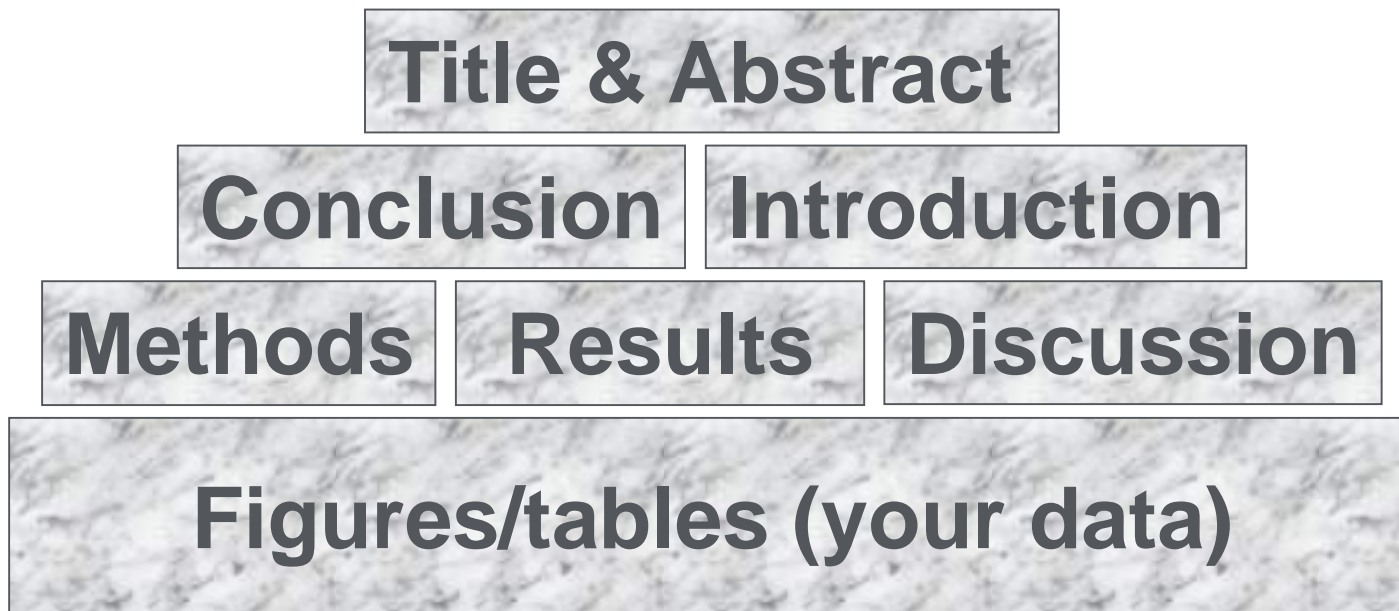
Your reader's time is scarce.

Make your article as concise as possible - more difficult than you imagine!

- Conclusion
- Acknowledgement
- References
- Supplementary Data

- Reviews, MicroArticles etc different layout.
- Social sciences more discussion and less data.

The process of writing – building the article



Title

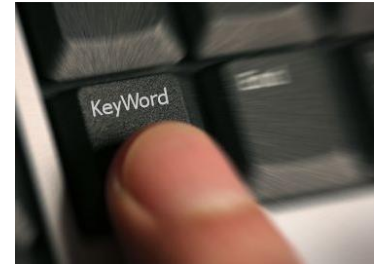
A good title should contain the **fewest** possible words that **adequately** describe the contents of a paper.

Effective titles

- ✓ Identify the **main** issue of the paper
- ✓ **Begin** with the subject of the paper
- ✓ Are accurate, unambiguous, specific, and complete
- ✓ Are as **short** as possible
 - ✓ Articles with **short, catchy titles** are often better cited
- ✗ Do not contain rarely-used abbreviations
- ✓ Attract readers - Remember: readers are the potential authors who will cite your article

Keywords

In an “electronic world”, keywords determine whether your article is found or not!



Avoid making them

- ✘ too general (“drug delivery”, “mouse”, “disease”, etc.)
- ✘ too narrow (so that nobody will ever search for it)

Effective approach:

Look at the keywords of articles relevant to your manuscript

Play with these keywords, and see whether they return relevant papers, neither too many nor too few – a good guideline.

Abstract

Tell readers what you did and the important findings

- One paragraph (between 50-250 words) often, plus Highlight bullet points
- **Advertisement for your article**, and should encourage reading the entire paper
- A clear abstract will strongly influence if your work is considered further

Graphite intercalation compounds (GICs) of composition $C_xN(SO_2CF_3)_2 \cdot \delta F$ are prepared under ambient conditions in 48% hydrofluoric acid, using K_2MnF_6 as an oxidizing reagent. The stage 2 GIC product structures are determined using powder XRD and modeled by fitting one dimensional electron density profiles.

A new digestion method followed by selective fluoride electrode elemental analyses allows the determination of free fluoride within products, and the compositional x and δ parameters are determined for reaction times from 0.25 to 500 h.

What has been done

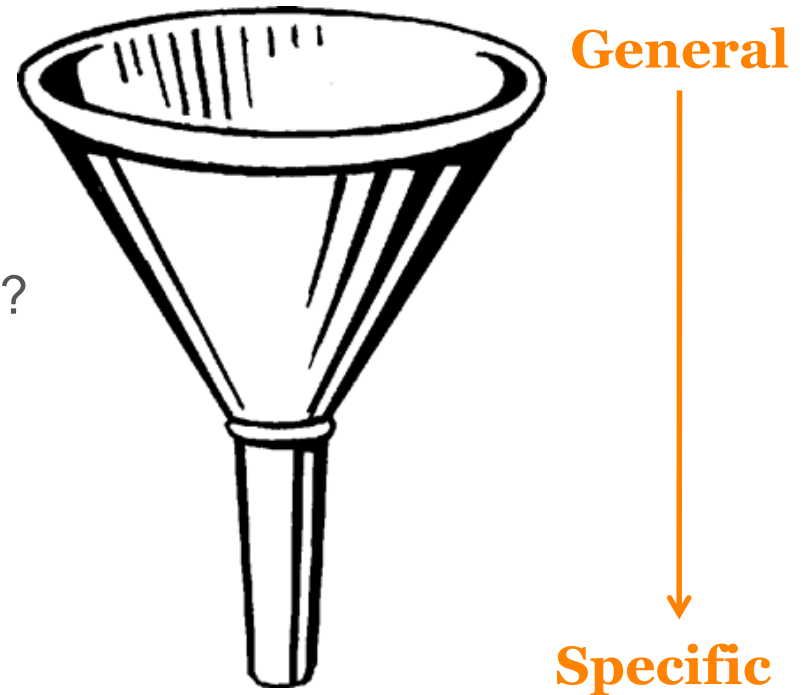
What are the main findings

Introduction

The place to convince readers that you know why your work is relevant, also for them.

Answer a series of questions:

- What is the problem?
- Are there any existing solutions?
- Which one is the best?
- What is its main limitation?
- What do you hope to achieve?



Pay attention to the following

- ✓ Before you present your new data, put them into perspective first
- ✓ Be brief, it is not a history lesson
- ✗ Do not mix introduction, results, discussion and conclusions. Keep them separate
- ✗ Do not overuse expressions such as “novel”, “first time”, “first ever”, “paradigm shift”, etc.
- ✓ Cite only relevant references
 - Otherwise the editor and the reviewer may think you don't have a clue what you are writing about!

Methods / Experimental

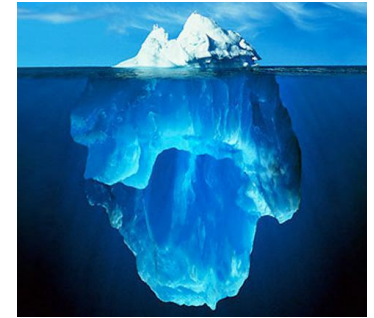
- ✓ Include all important details so that the reader can repeat the work.
 - Details that were previously published can be omitted but a general summary of those experiments should be included
- ✓ Give vendor names (and addresses) of equipment etc. used
- ✓ All chemicals must be identified
- ✗ Do not use proprietary, unidentifiable compounds without description. State purity and/or supplier if it is important.
- ✓ Present proper control experiments
- ✗ Avoid adding comments and discussion
- ✓ Write in the past tense
 - Most journals prefer the passive voice, some the active.
- ✓ Consider use of Supplementary Materials
 - Documents, spreadsheets, audio, video, ...

Reviewers will criticise incomplete or incorrect method descriptions, and may even recommend rejection

Results – what have you found?

The following should be included

- ✓ the **main findings**
 - Thus not *all* findings. Decide what to share.
 - Findings from experiments described in the Methods section
- ✓ Highlight findings that **differ** from findings in previous publications, and **unexpected** findings
- ✓ Results of the **statistical analysis**

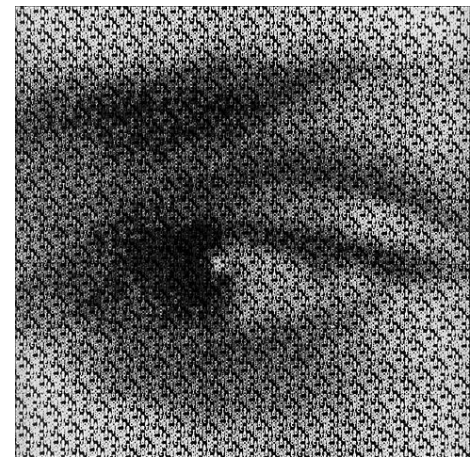


Results – Figures and tables

Illustrations are critical, because:

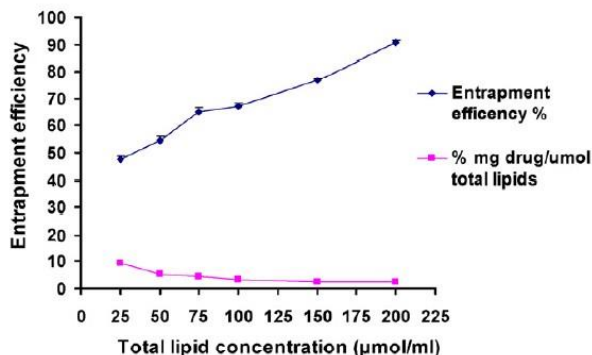
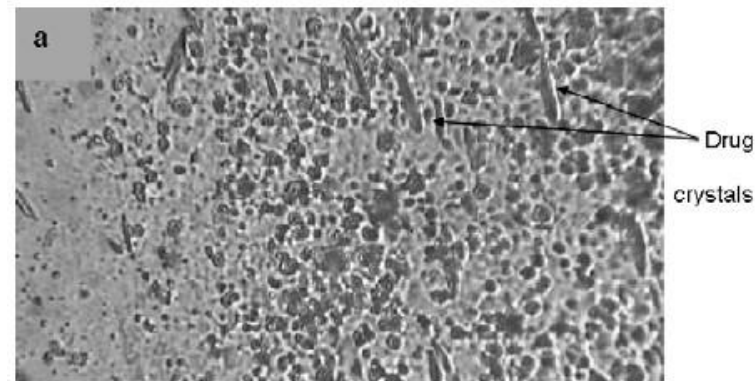
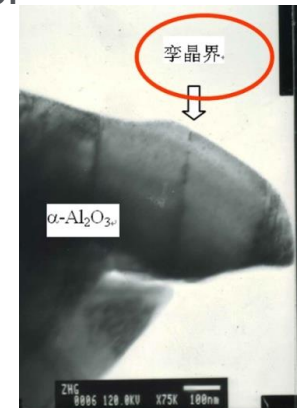
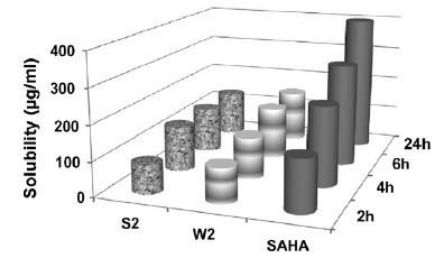
- Figures and tables are the most efficient way to present results
- Results are the driving force of the publication
- Captions and legends must be detailed enough to make figures and tables self-explanatory
- Figures and tables should not need further explanation or description in text. Less writing and less reading. Let your figures do the work instead of words.

*"One Picture is Worth a
Thousand Words"
Sue Hanauer (1968)*



Results – appearance counts!

- ✓ Un-crowded plots
 - ✓ 3 or 4 data sets per figure; well-selected scales; appropriate axis label size; symbols clear to read; data sets easily distinguishable.
- ✓ Each photograph must have a scale marker of professional quality in a corner.
- ✓ Text in photos / figures in English
 - ✗ Not in French, German, Chinese, Korean, ...
- ✓ Use colour ONLY when necessary.
 - ✗ If different line styles can clarify the meaning, then do not use colours or other thrilling effects.
- ✓ If used, colour must be visible/distinguishable when printed in black & white.
- ✗ Do not include long boring tables!



Discussion – what do your results mean?

- It is the most important section of your article. Here you get the chance to SELL your data! Many manuscripts are rejected because the Discussion is weak.
- **Check for the following:**
 - ✓ Do your results relate to the original question or objectives outlined in the Introduction section?
 - ✓ Do you provide interpretation for each of your results presented?
 - ✓ Are your results consistent with what other investigators have reported? Or are there any differences? Why?
 - ✓ Are there any limitations?
 - ✓ Does the discussion logically lead to your conclusion?
- **Do not:**
 - ✗ Make statements that go beyond what the results can support
 - ✗ Suddenly introduce new terms or ideas

Conclusions

- ✓ Present global and specific conclusions
- ✓ Indicate uses and extensions if appropriate
- ✓ Suggest future experiments and indicate whether they are underway
- ✗ Do not summarize the paper
 - The abstract is for that purpose
- ✗ Avoid judgments about impact
 - Others can comment, you should not.

References: get them right!

- ✓ Please **adhere to the Guide for Authors** of the journal
- ✓ It is your responsibility, not of the Editor's, to format references correctly!
- ✓ Get help, save time - use Reference management software
- ✓ Check
 - Referencing style of the journal
 - The spelling of author names, the year of publication
 - Punctuation use
- ✗ Avoid citing the following if possible:
 - Personal communications, unpublished observations, manuscripts not yet accepted for publication
 - Articles published only in the local language, which are difficult for international readers to find

Reference Management Software helps

- Many journals are helpful in formatting the journal reference style for you (e.g. Elsevier's Your Paper Your Way service).
- If the publisher is not offering this service it is your responsibility to format references correctly!



en.wikipedia.org/wiki/Comparison_of_reference_management_software

Supplementary Material

- Data of secondary importance for the main scientific thrust of the article
 - e.g. individual curves, when a representative curve or a mean curve is given in the article itself
- Or data that do not fit into the main body of the article
 - e.g. audio, video,
- Original figure before color correction or trimming for clarity
- Not part of the printed article
 - Will be available online with the published paper
- Must relate to, and support, the article

Cover Letter

Y

- Submitted
- Mention v
- Note spe

Professor H. D. Schmidt
 School of Science and Engineering
 Northeast State University
 College Park, MI 10000
 USA

January 1, 2008

Dear Professor Schmidt,

Enclosed with this letter you will find an electronic submission of a manuscript entitled "Mechano-sorptive creep under compressive loading - a micromechanical model" by John Smith and myself. This is an original paper which has neither previously nor simultaneously in whole or in part been submitted anywhere else. Both authors have read and approved the final version submitted.

Final approval from all authors

Mechano-sorptive is sometimes denoted as accelerated creep. It has been experimentally observed that the creep of paper accelerates if it is subjected to a cyclic moisture content. This is of large practical importance for the paper industry. The present manuscript describes a micromechanical model on the fibre network level that is able to capture the experimentally observed behaviour. In particular, the difference between mechano-sorptive creep in tension and compression is analysed. John Smith is a PhD-student who within a year will present his doctoral thesis. The present paper will be a part of that thesis.

Journal
 (interest)

Three potential independent reviewers who have excellent expertise in the field of this paper are:

- Dr. Fernandez, Tennessee Tech, email1@university.com
- Dr. Chen, University of Maine, email2@university.com
- Dr. Singh, Colorado School of Mines, email3@university.com

Explanation of importance of research

I would very much appreciate if you would consider the manuscript for publication in the *International Journal of Science*.

Sincerely yours,

Suggested reviewers

A. Professor

Do everything to make your submission a success

- **No one gets it right the first time!**
 - ✓ Write, and re-write
- Suggestions
 - ✓ After writing a first version, take several days of rest. Come back with a critical, fresh view.
 - ✓ Ask colleagues and supervisor to review your manuscript. Ask them to be highly critical, and ***be open to their suggestions.***
 - ✓ Make changes to incorporate comments and suggestions. Get all co-authors to approve version to submit.

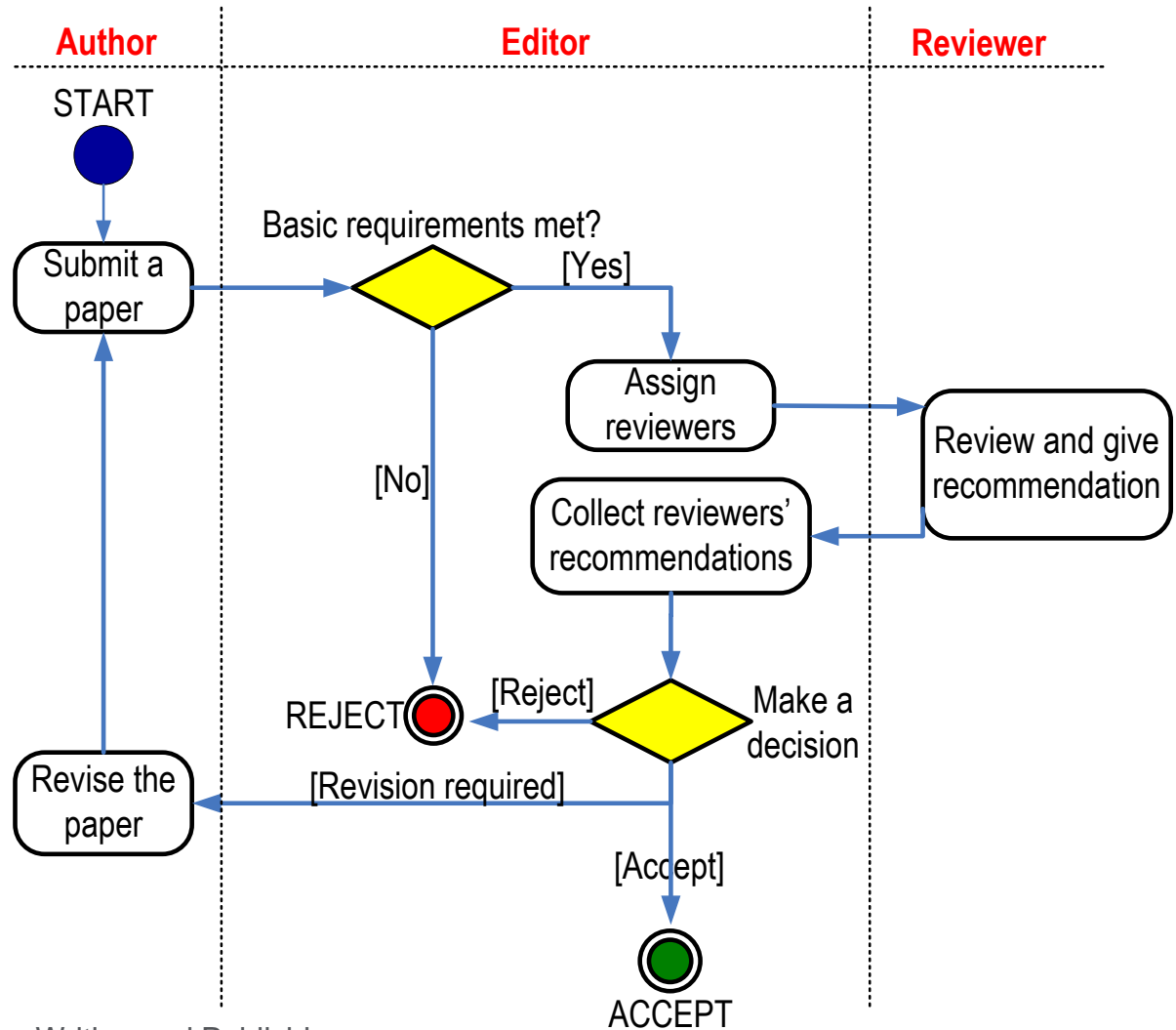
Then it is the point in time to submit your article!



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The peer review process

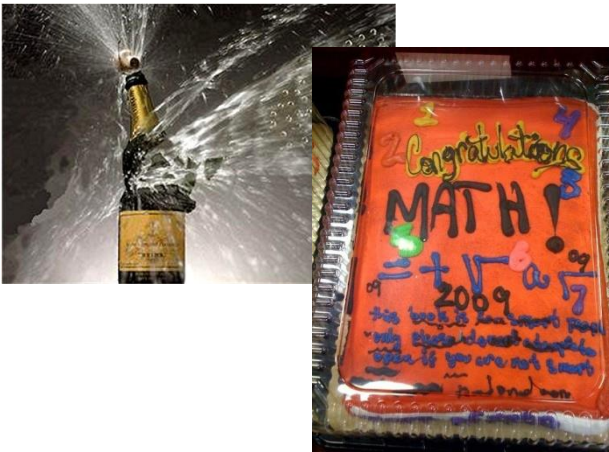
The Peer Review Process is not a black hole!



First Decision: “Accepted” or “Rejected”

Accepted

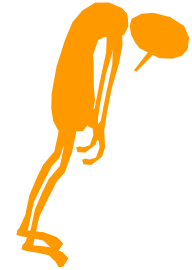
- Very rare, but it happens



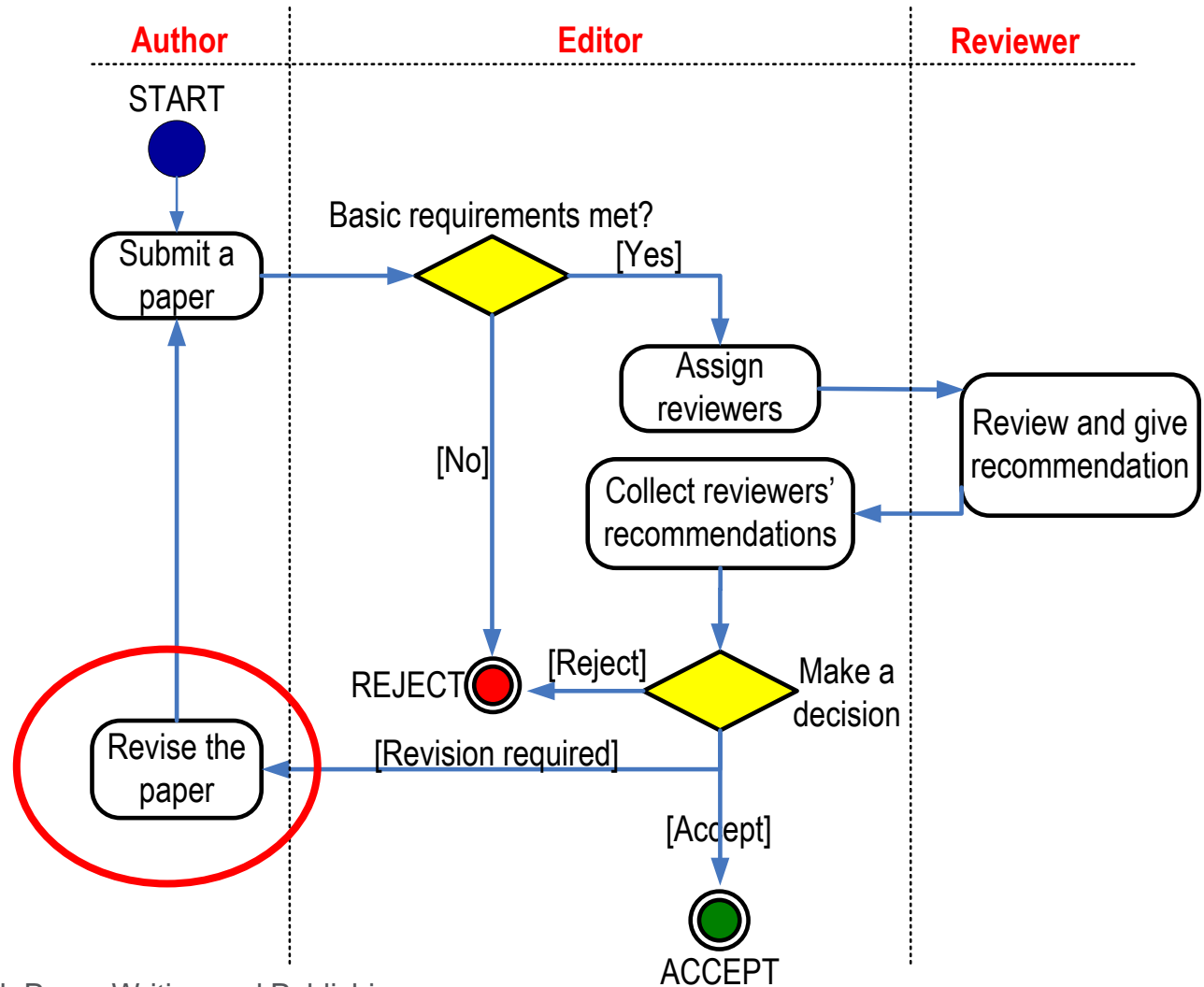
- Congratulations!
 - Cake for the department
 - Now wait for page proofs and then for your article to be online and in print

Rejected

- Probability 40-90% ...
- Do not despair
 - It happens to everybody
- Try to understand WHY
 - Consider reviewers' advice
 - Be self-critical
- If you submit to another journal, begin as if it were a new manuscript
 - Take advantage of the reviewers' comments and revise accordingly
 - They may review your manuscript for the next journal too!
 - Read the Guide for Authors of the new journal, again and again.



The Peer Review Process – revisions



First Decision: “Major” or “Minor” Revision

- Major revision
 - The manuscript may finally be published in the journal
 - Significant deficiencies must be corrected before acceptance
 - Usually involves (significant) textual modifications and/or additional experiments
- Minor revision
 - Basically, the manuscript is worth being published
 - Some elements in the manuscript must be clarified, restructured, shortened (often) or expanded (rarely)
 - Textual adaptations
 - “Minor revision” does NOT guarantee acceptance after revision, but often it is accepted if all points are addressed!

Manuscript Revision

- Prepare a detailed Response Letter
 - ✓ Copy-paste each reviewer comment, and type your response below it
 - ✓ State specifically which changes you have made to the manuscript
 - ✓ Include page/line numbers
 - ✗ No general statements like “Comment accepted, and Discussion changed accordingly.”
 - ✓ Provide a *scientific* response to comments to accept,
 - ✓ or a convincing, solid and polite rebuttal when you feel the reviewer was wrong.
 - ✓ Write in such a manner, that your response can be forwarded to the reviewer without prior editing
- Do not do yourself a disfavour, but cherish your work
 - You spent **weeks** and **months** in the lab or the library to do the research

.....*Why then run the risk of avoidable rejection by not taking manuscript revision seriously?*

Increasing the likelihood of acceptance

All these various steps are not difficult.

- ✓ You have to be consistent.
- ✓ You have to check and recheck before submitting.
- ✓ Make sure you tell a logical, clear, story about your findings.
- ✓ Especially, take note of referees' comments. They improve your paper.

This should increase the likelihood of your paper being accepted, and being in the 30% (accepted) not the 70% (rejected) group!

What leads to acceptance ?

- ✓ **A**ttention to details
- ✓ **C**heck and double check your work
- ✓ **C**onsider the reviewers' comments
- ✓ **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

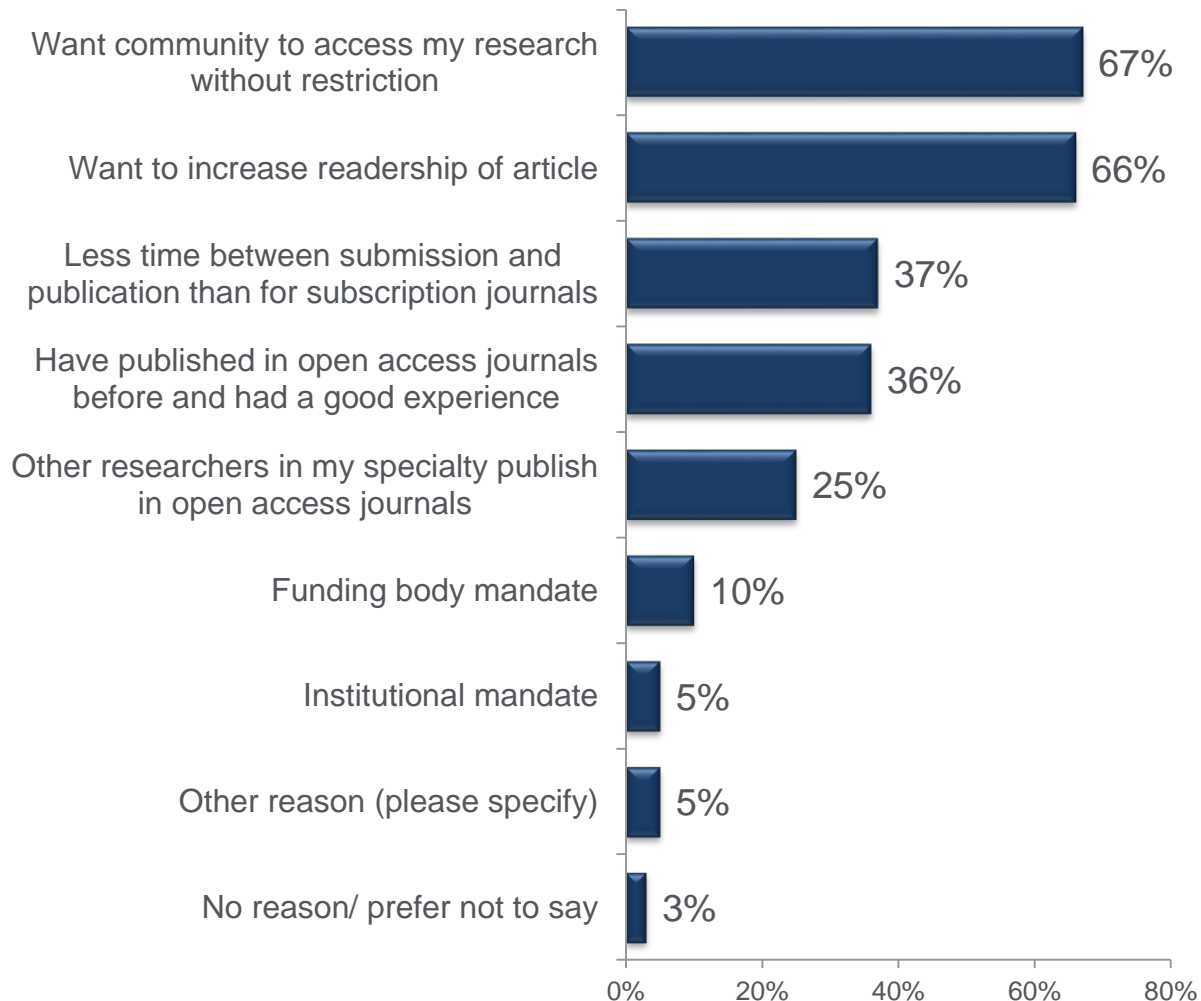
– Nigel John Cook
Editor-in-Chief, *Ore Geology Reviews*



Elsevier Publishing Campus

Open access
publishing

Why publish in an open access journal?



14%

have been asked by their departmental head or funding organization to publish open access

Tips for publishing gold open access

- **Find the right journal:** Look for reputable journals
- **Collect key info:** Check your funding body and institution's policies
- **Make your article OA:** Select a license and pay an OA fee
- **Publish OA:** Share the final version of your article!

Much more information may be found online at Elsevier Publishing Campus

And your library has great resources too:

<https://www.utwente.nl/en/lisa/service-manuals/!/product/p908815/open-access-publishing>



Elsevier Publishing Campus

Promoting your article

Your Paper is Published – What now?

- Your paper becomes visible online in the journal website, such as ScienceDirect, Springer Link etc. and in databases as SCOPUS, PubMed, etc.
- There are many things you can also do to draw attention to your great research just online...
- Think Social Media! Check out the **Publishing Campus** for suggestions.

More information

- www.elsevier.com/promote-your-work



Animation video (YouTube)

<https://www.youtube.com/watch?v=zRXnbKtHkHM>

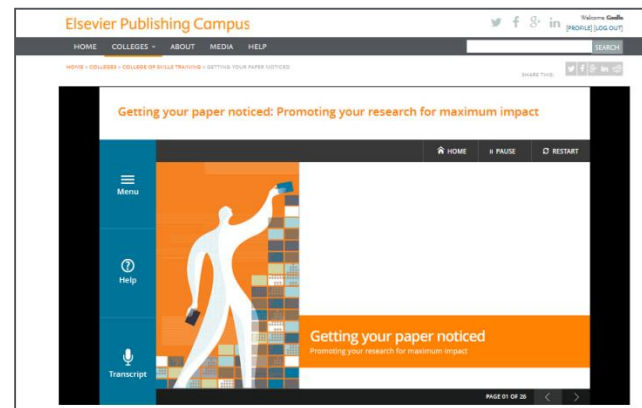
- www.publishingcampus.com: College of Networking / Getting Noticed



Brochure



Factsheet



Online lectures and interactive courses



Elsevier Publishing Campus

Publication Ethics

Author Responsibilities

As authors we have lots of rights and privileges, but also we have the responsibility to be ethical.

Ethics Issues in Publishing

Scientific misconduct

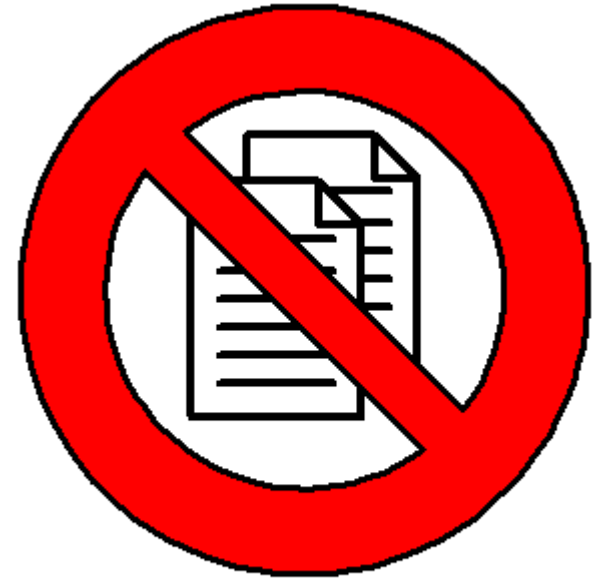
- Falsification of results or images

Publication misconduct

- Plagiarism
 - Different forms / severities
 - The paper must be original to the authors
- Duplicate publication
- Duplicate submission
- Appropriate acknowledgement of prior research and researchers
- Appropriate identification of all co-authors
- Conflict of interest

Plagiarism

- A short-cut to long-term consequences!
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No Copying

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- "Other" whistleblowers
 - "The walls have ears", it seems ...



doi:10.1016/j.sigpro.2005.07.019 Cite or Link Using DOI

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RETRACTED: Matching pursuit-based approach

Available online 24 August 2005.

This article has been retracted at the request of the Editor-in-Chief and Publisher. For more information on this article, please visit <http://www.elsevier.com/locate/withdrawalpolicy>.

Reason: This article is virtually identical to the previously published article "A matching pursuit-based approach for SNR improvement in ultrasonic NDT of highly scattering materials", *Independent Nondestructive Evaluation International*, volume 38 (2005) 453 – 458 authored by N. ...

An article in which the authors committed plagiarism: it will not be removed from ScienceDirect ever. Everybody who downloads it will see the reason for the retraction...

the echoes issuing from the flaws to be detected. Therefore, it cannot be cancelled by classical time averaging or matched band-pass filtering techniques.

Many signal processing techniques have been utilized for signal-to-noise ratio (SNR) improvement in ultrasonic NDT of highly scattering materials. The most popular one is the split spectrum processing (SSP) [1–3], because it makes possible real-time ultrasonic test for industrial applications, providing quite good results. Alternatively to SSP, wavelet transform (WT) based denoising/detection methods have been proposed during recent years [4–8], yielding usually to higher improvements of SNR at the expense of an increase in complexity. Adaptive time-frequency analysis by basis pursuit (BP) [9,10] is a recent technique for decomposing a signal into an optimal superposition of elements in an over-complete waveform dictionary. This technique and some other related techniques have been successfully applied to denoising ultrasonic signals contaminated with grain noise in highly scattering materials [11,12], as an alternative to the WT technique, the computational cost of the BP algorithm being the main drawback.

In this paper, we propose a novel matching pursuit-based signal processing method for improving SNR in ultrasonic NDT of highly scattering materials, such as steel and composites. Matching pursuit is used instead of BP to reduce the complexity. Despite its iterative nature, the method is fast enough to be real-time implemented. The performance of the proposed method has been evaluated using both computer simulation and experimental results, even when the input SNR (NR) is lower than 0dB (the level of echoes from the microstructures is above the level of the echoes).

2. Matching pursuit

Matching pursuit was introduced by Mallat and Zhang [13]. Let us suppose an approximation of the ultrasonic backscattered signals $x[n]$ as a linear expansion in terms of functions $g_i[n]$ chosen from an over-complete dictionary. Let H be a Hilbert

space. We define the over-complete dictionary as a family $D = \{g_i; i=0, 1, \dots, L\}$ of vectors in H , such as $\|g_i\| = 1$.

The problem of choosing functions $g_i[n]$ that best approximate the analysed signal $x[n]$ is computationally very complex. Matching pursuit is an iterative algorithm that offers sub-optimal solutions for decomposing signals in terms of expansion functions chosen from a dictionary, where ℓ^1 norm is used as the approximation metric because of its mathematical convenience. When a well-designed dictionary is used in matching pursuit, the non-linear nature of the algorithm leads to compact and sparse signal models.

In each step of the iterative procedure, vector $g_i[n]$ which gives the largest inner product with the analysed signal is chosen. The contribution of this vector is then subtracted from the signal and the process is repeated on the residual. At the m th iteration the residue is

$$r^m[n] = \begin{cases} x[n] & m=0, \\ r^{m-1}[n] + a_{k(m)} g_{k(m)}[n], & m \neq 0, \end{cases} \quad (1)$$

where $a_{k(m)}$ is the weight associated to optimum atom $g_{k(m)}[n]$ at the m th iteration.

The weight a_i^m associated to each atom $g_i[n] \in D$ at the m th iteration is introduced to compute all the inner products with the residual $r^m[n]$:

$$a_i^m = \frac{\langle r^m[n], g_i[n] \rangle}{\langle g_i[n], g_i[n] \rangle} = \frac{\langle r^m[n], g_i[n] \rangle}{\|g_i[n]\|^2} = \langle r^m[n], g_i[n] \rangle. \quad (2)$$

The optimum atom $g_{k(m)}[n]$ (and its weight $a_{k(m)}$) at the m th iteration are obtained as follows:

$$g_{k(m)}[n] = \underset{g_i \in D}{\operatorname{argmin}} \langle r^{m-1}[n] \rangle^2 = \underset{g_i \in D}{\operatorname{argmax}} |a_i^m|^2 = \underset{g_i \in D}{\operatorname{argmax}} |a_i^m|. \quad (3)$$

The computation of correlations $\langle r^m[n], g_i[n] \rangle$ for all vectors $g_i[n]$ at each iteration implies a high computational effort, which can be substantially reduced using an updating procedure derived from Eq. (1). The correlation updating procedure [13] is performed as follows:

$$\langle r^{m+1}[n], g_i[n] \rangle = \langle r^m[n], g_i[n] \rangle - a_{k(m)} \langle g_{k(m)}[n], g_i[n] \rangle. \quad (4)$$

Figure Manipulation – some things are allowed

As long as they don't obscure or eliminate info present in the original image



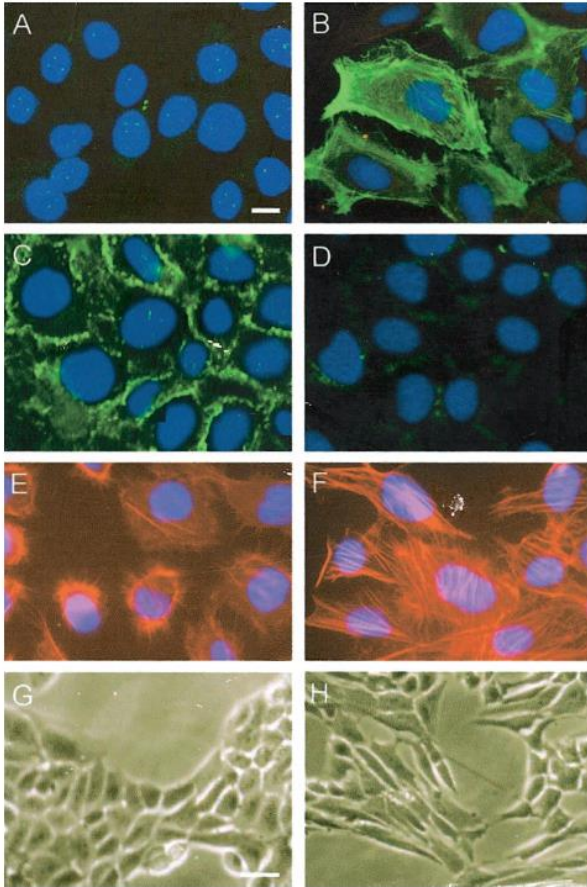
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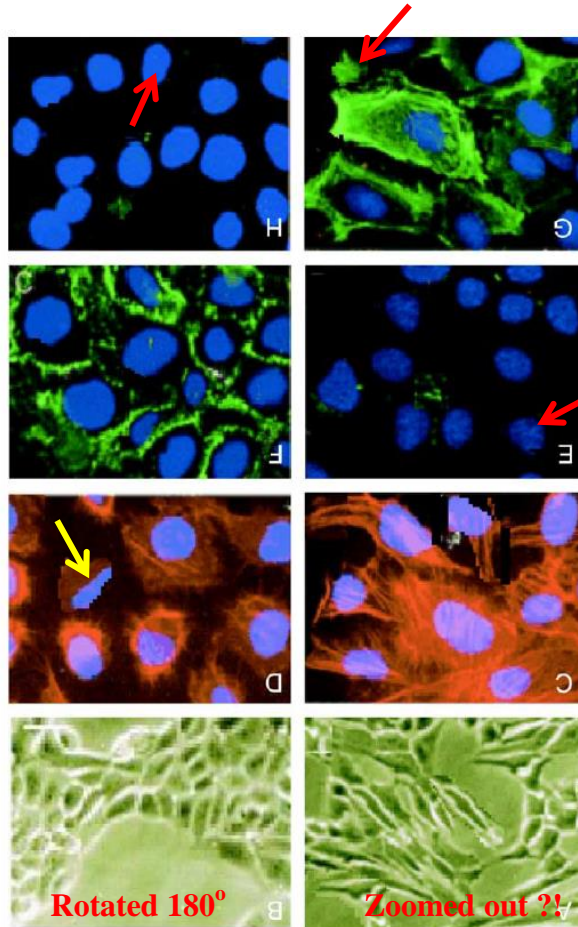


Figure Manipulation: Example - Different authors and reported experiments

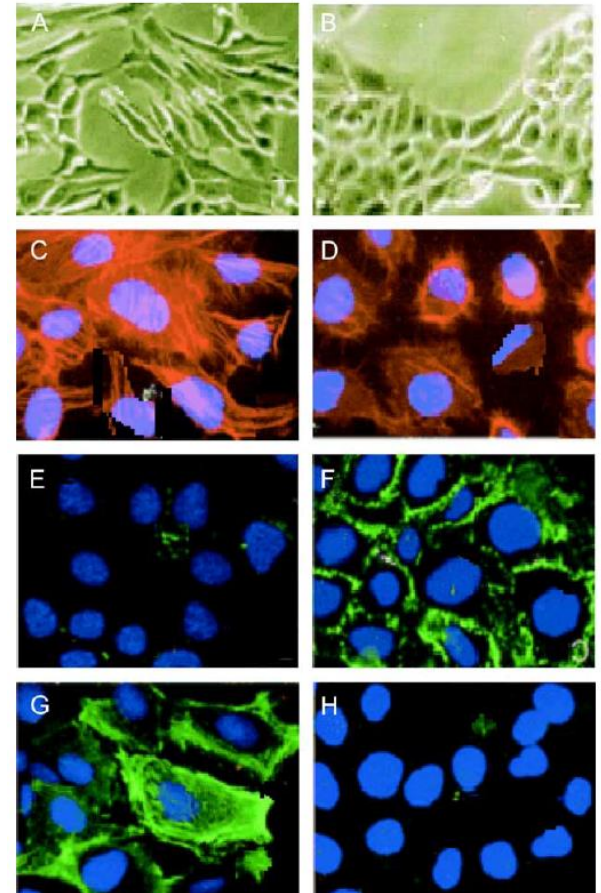
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Questions?

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