How to Write for and Get Published in Scientific Journals

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Presentation

- **Section One:** Scientific publishing
- **Section Two:** Before you start…
- **Section Three:** Structuring your manuscript
- **Section Four:** Hints and tips

Section One *Scientific publishing*

- Why publish?
- Publishing in English
- The publishing timeline
- Peer review

Why publish? To exchange ideas globally!

HUBBLE SPACE TELESCOPE IMAGING AND SPECTRAL ANALYSIS OF TWO BROWN DWARF BINARIES AT THE L DWARF/T DWARF TRANSITION

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Your research is not complete until it has been published

ABSTRACT

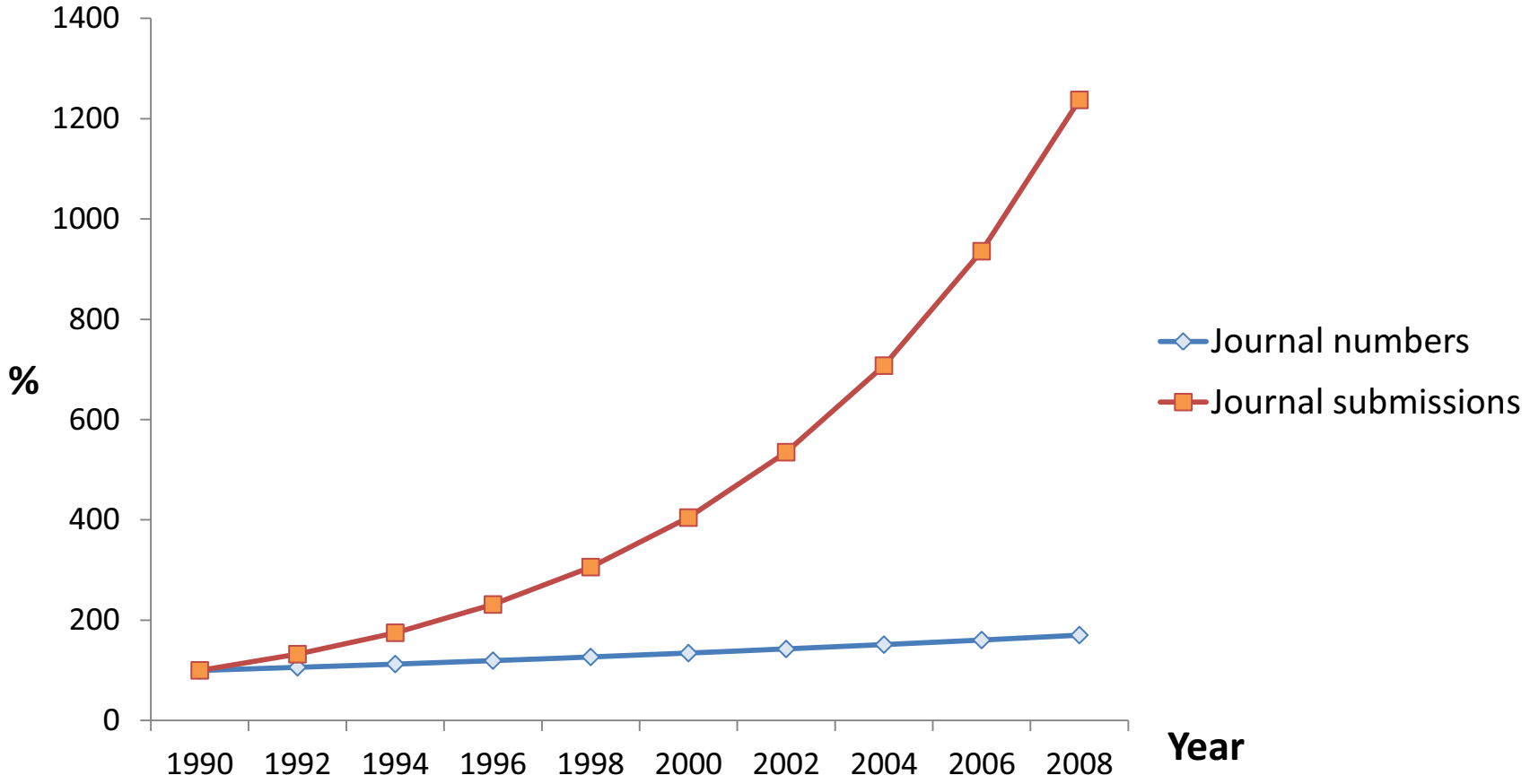
We present a detailed examination of the brown dwarf multiples 2MASS J08503593+1057156 and 2MASS J17281150+3948593 [illegible] that straddle the L dwarf/T dwarf transition. Resolved photometry from *Hubble Space Telescope*/NICMOS show opposite trends in the relative colors of the components, with the secondary of 2MASS J0850+1057 being redder than its primary, while that of 2MASS J1728+3948 is bluer. We determine near-infrared component types by matching combined-light, near-infrared spectral data to binary templates, with component spectra scaled to resolved NICMOS and K_p photometry. Combinations of L7 + L6 for 2MASS J0850+1057 and L5 + L6.5 for 2MASS J1728+3948 are inferred. Remarkably, the primary of 2MASS J0850+1057 appears to have a later-type classification compared to its secondary, despite being 0.8–1.2 mag brighter in the near-infrared, while the primary of 2MASS J1728+3948 is unusually early for its combined-light optical classification. Comparison to absolute magnitude/spectral type trends also distinguishes these components, with 2MASS J0850+1057A being ≈1 mag brighter and 2MASS J1728+3948A ≈0.5 mag fainter than equivalently-classified field counterparts. We deduce that thick condensate clouds are likely responsible for the unusual properties of 2MASS J1728+3948A, while 2MASS J0850+1057A is either an inflated young brown dwarf or a tight unresolved binary, making it potentially part of a wide, low-mass, hierarchical quintuple system.

Subject headings: binaries: visual — stars: individual (2MASS J08503593+1057156, 2MASS J17281150+3948593) — stars: low mass, brown dwarfs

Why publish in English?

- English is the **international language of science**
- Other scientists ***want*** to hear from Brazilian researchers!
- Allows you to become an effective science communicator
- International **reputation** enabling collaborations and work opportunities

Increased competition

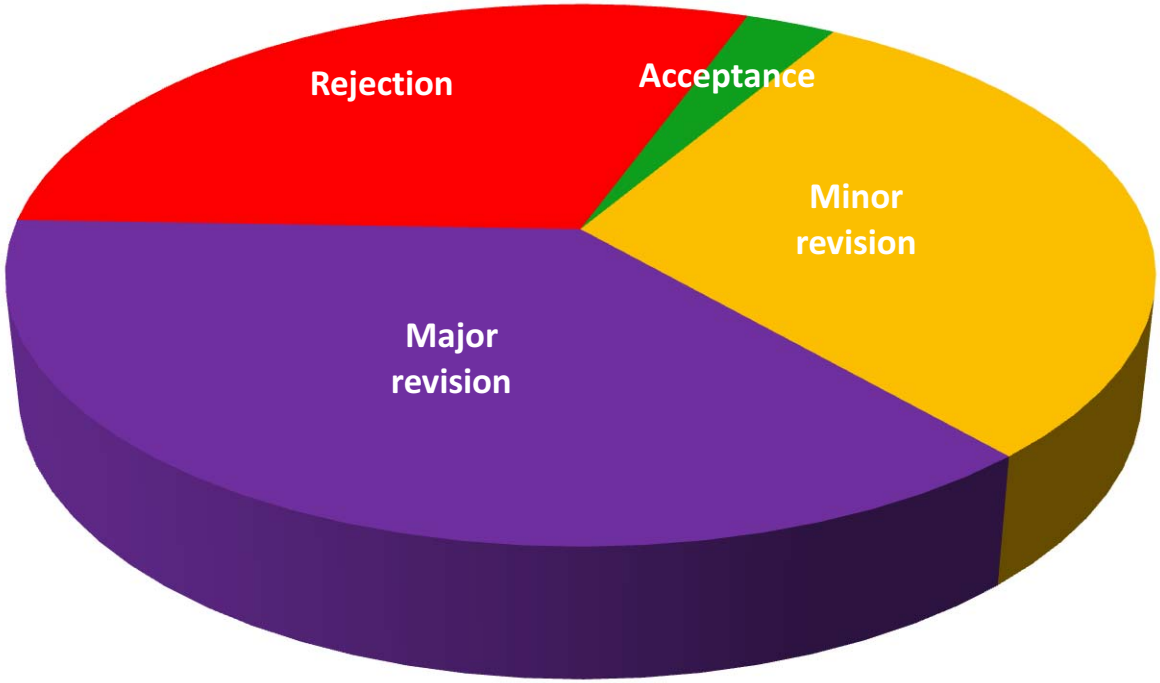


- Relative growth from 100% baseline in 1990

Peer review

- Exists to ensure that your paper is as ***scientifically robust*** **AND** ***complete*** as possible before joining the 'collective knowledge' as part of the literature
- An opportunity to ***improve*** your contribution
- So discoveries get correct accrediting

Peer review improves your manuscript



- Few papers are accepted without revision
- Rejection and revision are integral to the peer review process

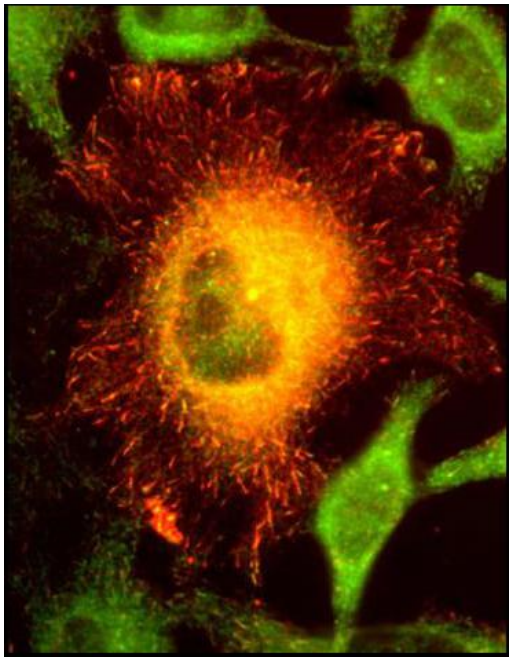
What do journal editors and reviewers want?

- Is the manuscript sufficiently novel?
- Is the manuscript of broad enough interest?

What do journal editors want?

Good quality science!

- Will stand up to peer review
- Original research that advances a field in some way
- Interesting to the journal's readership
- Active research areas
- ***Clear and concise English***



Section Two *Before you start …*

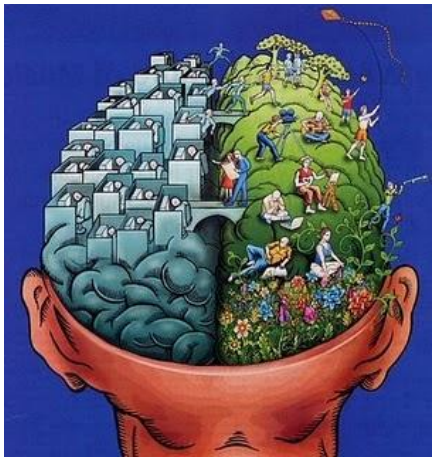
- Read
- Study design
- Select an appropriate journal
- Ethical issues

Reading helps your writing

- Both sides of the brain are essential and work in harmony

Logic

Reading



Creativity

Writing

- Similarly, reading and writing are connected

The importance of reading

- Ensures the most appropriate ***research questions*** are asked
- Ensures the most appropriate ***methods*** are used
- Ensures results are interpreted in the appropriate ***context***
- Ensures the most relevant studies are ***cited***
- Helps with identification of suitable ***target journals***

Reading improves your writing

- Read as often as possible
- Discuss with your colleagues

- Assists you with journal selection
- Provides ideas for your next manuscript

Strategies for reading

Read Title and Abstract first

Self-assess knowledge of topic

Read Results or the relevant parts of the Results

Read Discussion for interpretation

Refer to Introduction and Methods only if necessary

Experimental design *Get it right*

- ***CRITICAL***

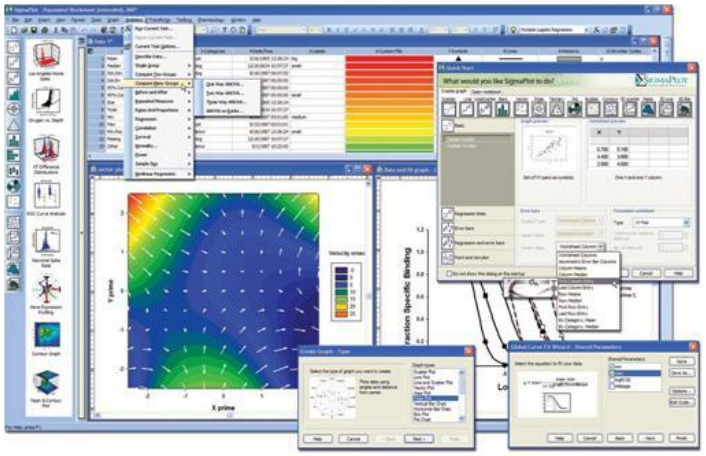
What is your hypothesis or research question?

THE AIM(S) OF YOUR STUDY

- What methods are appropriate?
  - Do you have the relevant resources?
- Identify your controls

Experimental design *Get it right*

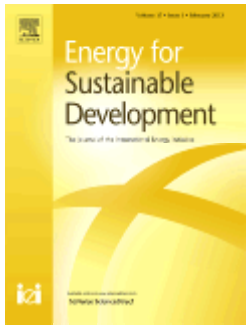
- Sample sizes (*n*) large enough?
- Which statistical test(s)?

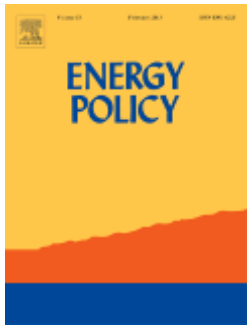


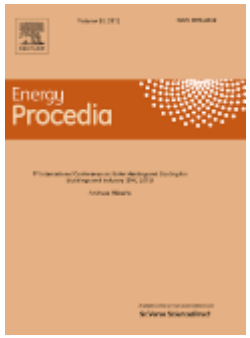
When in doubt – talk to a statistician!

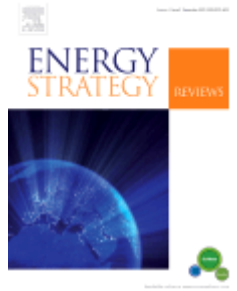
- Does your study comply with ALL ethics requirements?

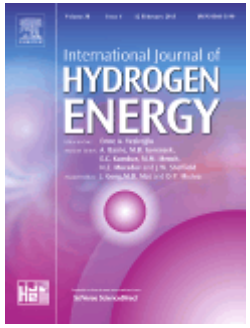
Journal selection

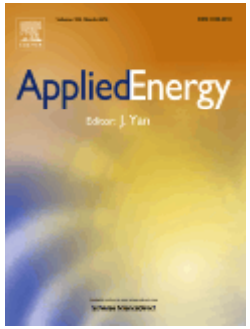


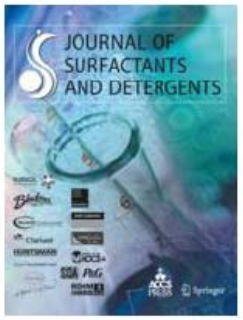


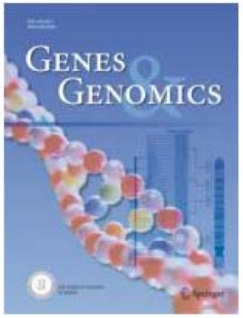


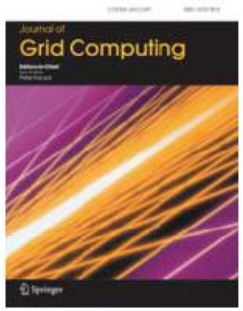












Listed by highest Impact Factor

Impact Factors

Category: ENERGY & FUELS, Sorted by **Impact Factors**

Rank	Title	2011 Impact Factor
1	ENERGY EDUCATION SCIENCE AND TECHNOLOGY	31.677
2	PROGRESS IN ENERGY AND COMBUSTION SCIENCE	14.220
3	ENERGY & ENVIRONMENTAL SCIENCE	9.610
4	RENEWABLE & SUSTAINABLE ENERGY REVIEWS	6.018
5	PROGRESS IN PHOTOVOLTAICS	5.789
6	INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL	5.111
7	APPLIED ENERGY	5.106
8	BIORESOURCE TECHNOLOGY	4.980
9	JOURNAL OF POWER SOURCES	4.951
10	BIOFUELS BIOPRODUCTS & BIOREFINING-BIOFPR	4.738
11	SOLAR ENERGY MATERIALS AND SOLAR CELLS	4.542
12	INTERNATIONAL JOURNAL OF HYDROGEN ENERGY	4.054
13	BIOMASS & BIOENERGY	3.646
14	PROCEEDINGS OF THE COMBUSTION INSTITUTE	3.633
15	GLOBAL CHANGE BIOLOGY BIOENERGY	3.617
16	COMBUSTION AND FLAME	3.585
17	BIOENERGY RESEARCH	3.562
18	ENERGY	3.487
19	FUEL	3.248
20	FUEL CELLS	3.149
Renewable Energy		2.978
Fuel Processing Technology		2.945
Energy Policy		2.723
International Journal of Coal Geology		2.542
Solar Energy		2.475
Energy & Buildings		2.386
International Journal of Electrical Power and Energy Systems		2.247
Energy Conversion and Management		2.216
Applied Thermal Engineering		2.064
Chemical Engineering & Processing: Process Intensification		1.924
Geothermics		1.919
Energy for Sustainable Development		1.625
Fusion Engineering and Design		1.490

Choosing a target journal

- Journal selection should be based on an ***honest evaluation*** of the manuscript
- Compare with the stated ***aims and scope*** and ***impact factor*** of potential target journals

Factors to consider

- Aims and scope
- Publishing frequency
- Impact factor
- Target audience
- Open access or subscriber
- Prestige
- Cost
- Publication type

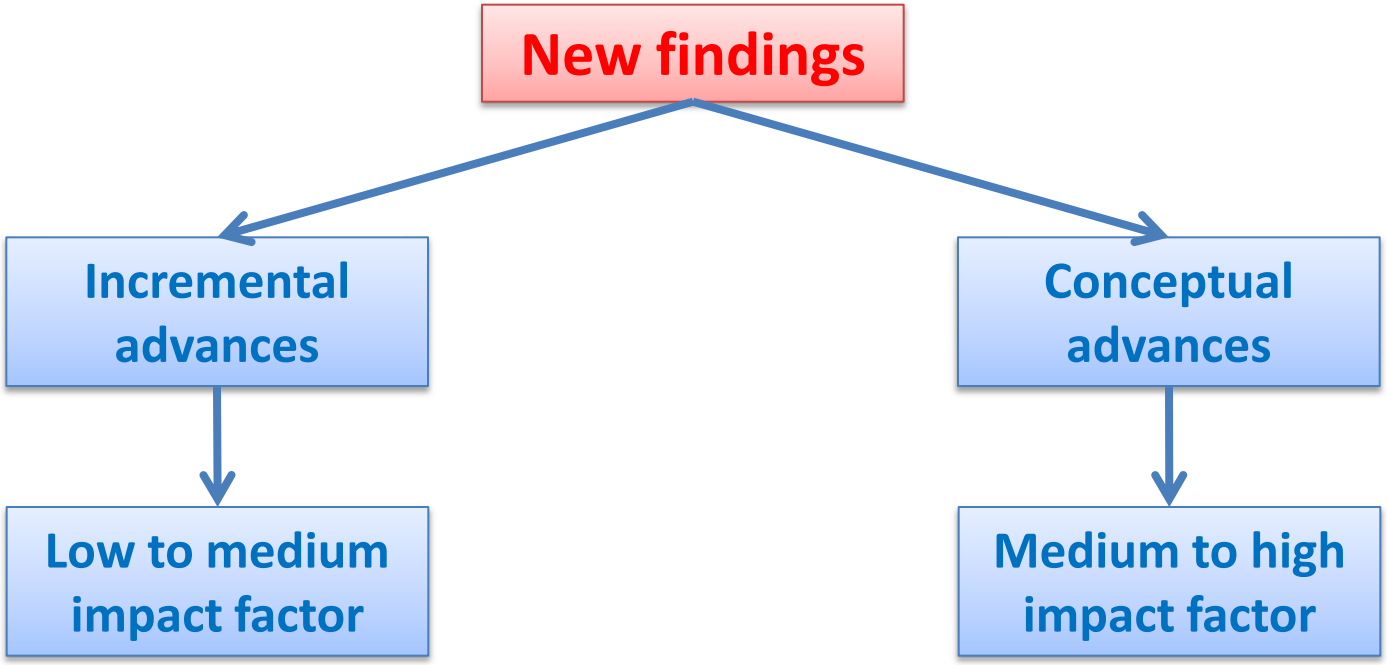
Which factor is most important to you?

Evaluating significance: importance

- Specific interest only or of **interest to many**
- **Affect** many (*e.g.* new tool)
- Support for (or contradiction of) an **existing theory**
- **Substantially improve our understanding** of a phenomenon or provide a **new technology or disease treatment**?

Evaluating significance: novelty

- How ***new*** are my results compared with those already published?



Evaluating significance: relevance

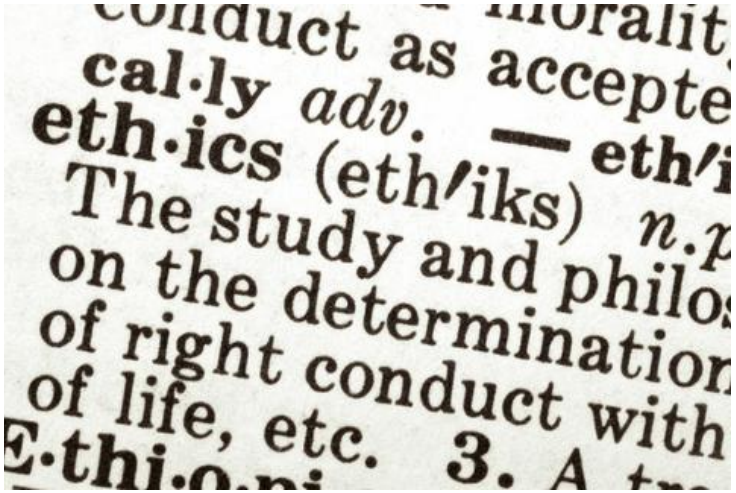
- Are my findings of relevance only to a ***specific geographical region or ethnic population*** or do they have implications for other regions and populations?
- High impact factor journals may consider specific findings if they are the ***first of their kind*** or of ***international significance***.

Evaluating significance: appeal

- Is my work in an area of **'popular appeal'**? *E.g.* is it likely to be reported in mainstream or lay scientific media
- **Examples:**
  - Optogenetics
  - Epigenetics
  - Stem cells
  - Higgs boson
  - Global warming
  - Clean tech

Publication ethics

DO NOT…


conduct as accepte
cal·ly *adv.* — eth′i
eth·ics (eth′iks) *n.p*
The study and philos
on the determination
of right conduct with
of life, etc. 3. A

- Multiple submissions
- Plagiarism
- Improper author contribution
- Data fabrication and falsification
- Improper use of human subjects and animals
- Conflicts of interest

Conflicts of Interest

- Actual ***OR*** perceived

  "Authors ***MUST*** disclose interests that might ***APPEAR*** to affect their ability to present or review data objectively"

- Guidelines
  - Committee on Publication Ethics (COPE)
  - European Association of Science Editors (EASE)
  - Council of Science Editors (CSE)
  - International Committee of Medical Journal Editors (ICMJE)
  - Good publication practice for communicating company sponsored medical research: the GPP2 Guidelines (*BMJ* 2009, **339**:b4330)

Section Three *Structuring your manuscript*

- You are telling a story

Beginning → Middle → End

(Introduction) (Body) (Conclusion)

- ***MUST*** be easy to read ***AND*** easy to understand

‘Tell them three times’

- **Introduction/Beginning**
  - *Assertion*
  - ‘tell them what you are going to tell them,’
- **Body/Middle**
  - *Evidence*
  - ‘tell them,’
- **Conclusion/End**
  - *Affirmation*
  - ‘tell them again what you told them’.

Basic manuscript structure

- Expanded **IMRaD** model
  - Abstract
  - **I**ntroduction — *Assertion*
  - **M**ethods
  - **R**esults — *Evidence*

    and
  - **D**iscussion — *Affirmation*
  - References

The ‘write’ order

- For maximum clarity and consistency, write your manuscript in this order:

Methods Results	Write **during** the research
Introduction Discussion	Write **after** selecting your target journal
Title Abstract	Write **last**

The importance of your title

- Grabs the reader's attention
- Be specific and concise
- **Avoid** jargon, abbreviation and acronyms.

Abstract *Summarizes your work*

- Concise (100–300 words)
- 1–4 sentences – describe problem(s) addressed
- 1–4 sentences –objectives/hypotheses
- 1–2 sentences – techniques; **AVOID** details
- 1–3 sentences – most important results
- Final sentence – concluding statement

The majority of people will only read this section, it must be able to 'stand alone'

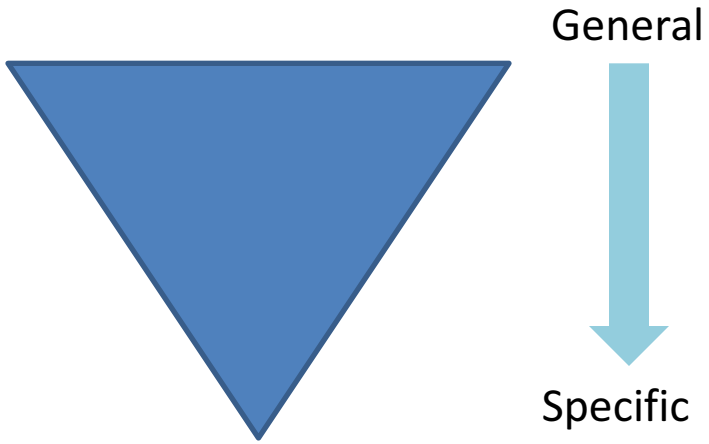
What question (problem) was studied?

The answer to this question is contained within your Introduction

Beginning → Middle → End

Introduction *Beginning*

- Sufficient background information
  - Puts your work into context
  - Start with a broad background



- Comprehensive literature review
- Cite reviews

Introduction *Middle*

- ***Rationale***
  - The reason(s) for doing this work?
  - Why is it important?
  - Justify your work
- Explain how you tried to address the problem (1–2 sentences)
- **DO NOT** state results from your study 

Introduction *End*

- State the methods you plan to use
- ***Clearly*** and ***explicitly*** state 1–3 specific hypotheses or objectives of your study

Methods *How did you carry out your work?*

- Subheadings
  - Easier to read
- Past tense
- New methods ***must*** be described in sufficient detail that they can be reproduced
- Established methods can be referenced
  - Save time and effort

Materials and methods *Example*

Materials and methods

Materials. Culture media were obtained from Life Technologies (Gaithersburg, MD). Okadaic acid was purchased from Alexis Company (Läufelfingen, Switzerland). Antibodies to MEK1/2 and phosphorylated MAPK were purchased from New England Biolabs (Beverley, MA).

Induction of cell death. Cell death was induced as described previously [15]. Briefly, cell death was induced by adding okadaic acid (0-300 nM, Alexis Co.) after washing slice cultures in serum-free medium.

Light and electron microscopy. Cultures were fixed in 2.5% glutaraldehyde and 1% formaldehyde, treated with 1% OsO_4 in 0.1 M phosphate buffer, pH 7.4, dehydrated in a graded series of ethanol and propylene oxide, and flat-embedded in an epoxy resin (Durcupan ACM, Fluka, Neu-Ulm, Germany). Semi-thin sections were stained with toluidine blue, and ultra-thin sections were stained with 1% uranyl acetate for 20 min and 1% lead citrate for 2 min.

Statistics. For statistical analysis, 2-tailed Student's *t*-test was used to assess the significance of mean differences. Differences were considered significant at a *P*-value of 0.05 or less.

Materials described first
Suppliers/locations given

Clear subheadings
References used to save space

Enough information to reproduce the experiment

Statistical test parameters provided

Results *What did you find?*

- Accurate, brief, clear
- Use subheadings
- Use ***past tense*** to describe your results
- When referring to figures and tables, use ***present tense***
- **DO NOT** explain your results ✗
- **DO NOT** duplicate data among figures, tables and text ✗

Results *Example*

Results

Okadaic acid induces death of dentate gyrus neurons selectively. Hippocampal slice cultures treated with OA (1–300 nM) showed selective cell death of neurons in the dentate gyrus, but neurons in the CA1–3 regions were largely unaffected. Cell death occurred in a time- and dose-dependent manner. Propidium iodide staining of treated slides indicated….

Clear subheadings

Electron microscopy revealed a number of ultrastructural changes in hippocampal pyramidal neurons, particularly those in the CA3 region, in slices treated with 300 nM OA for 24 h (Fig 3). These changes included slight nuclear aggregations (arrow in Fig 3A), accumulation of mitochondria around nuclei (arrowheads in Fig 3B) and an increased amount of endoplasmic reticulum (Fig 3C). As shown in Figure 4, the nuclei of pyramidal neurons in the CA1 and CA3 regions…

Graphics used to save space

Involvement of MAPK signaling in the effect of OA. Compared with slices treated with medium only and treated slices at 0 h, slices treated with 300 nM OA showed increasing levels of phosphorylated MAPK at 4 h, 8 h, 16 h and 24 h, with no corresponding change in the levels of total MAPK. This increase was prevented in slices that were co-incubated with a protein kinase inhibitor. In addition, the levels of phosphorylated Tau were higher in OA-treated slices than in control slices…

Clear comparisons made

Display items *Tables and figures*

- Present a large amount of data ***quickly*** and ***efficiently***
- Present ***most significant*** result as a figure or table
- Keep it simple — use separate panels if necessary
- **AVOID** duplication with the text
- Label all parts of your figures
- Legends must be able to ‘stand alone’

Display items *Tables*

Clear concise legend/caption

Table 1. Percentages of cells that were dead as indicated by propidium iodide staining within a single field-of-view (40,000 μm^2) using a 40x objective lens in hippocampal slices treated with a variety of concentrations of okadaic acid. Data are means±SD for 20 fields of view per treatment and region.

Data divided into categories for clarity

Treatment	CA1	CA2	CA3	DG
0 nM OA (medium only)	1.5±0.7	1.7±0.3	1.2±0.9	1.6±0.4
10 nM OA	1.6±0.9	1.6±0.4	1.4±1.1	2.5±0.9
75 nM OA	1.9±1.1	1.9±0.6	2.1±1.2	11.9±2.1
150 nM OA	1.9±1.3	2.1±0.5	2.5±1.5	19.6±3.3
300 nM OA	2.1±1.2	2.1±0.5	3.0±1.2	26.7±4.5

OA=okadaic acid; CA1–CA3=the CA1–CA3 regions of the hippocampus; DG=the dentate gyrus of the hippocampus

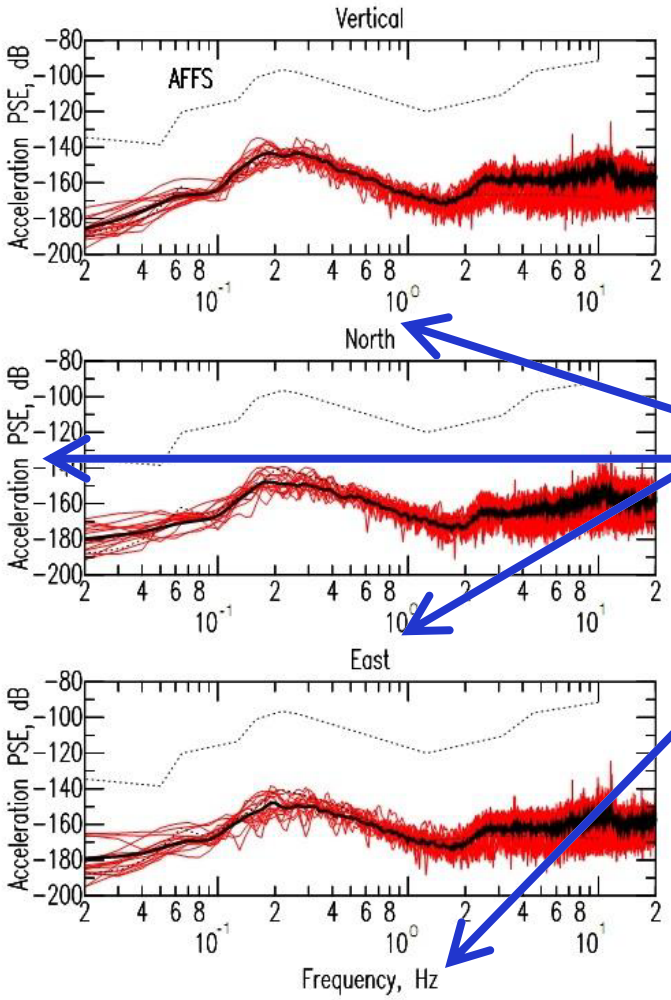
Abbreviations defined

Display items *Figures*

Multiple panels: sets of related data are shown in a single figure

Clear, 'stand alone' legend

Fig. 4 Noise spectra at station AFFS. Acceleration power spectra (in decibels relative to 1 m2/s4) are shown for the vertical, north and east components. Individual spectra are shown in *red* and the average spectra in *black*. Also shown are the average low and high noise spectra (*dotted line*) of Peterson (1993)



Complicated data separated into smaller and simpler components

Axes clearly labeled

Discussion *So what?*

What do these findings mean?

The answer to this question is in the Discussion

Beginning → Middle → End

Discussion *Beginning*

- **AVOID** repeating the results section ✗
- Answer the research question(s) posed
- ***Emphasize*** the major finding(s) first
- What is your major conclusion, based on the results you have presented?

Discussion *Middle*

- Interpret your results …
  - Compare with other studies
    - Same or different?
    - Possible reasons why?
- Unexpected results
- Briefly describe any limitations
  - Sample sizes
  - Complementary tests
  - How could experiments be improved?

Discussion *End*

- Restate major conclusion(s)
  - *In summary …* **OR** *In conclusion …*
- Possible real world applications and implications
- Suggest future work

"Clinical and research priorities include furthering our understanding of the pathogenesis of *M. pneumoniae*-associated CNS disease, development of more reliable serologic assays, and defining the role of quantitative PCR in distinguishing acute infection from asymptomatic carriage and prolonged post-infection shedding"

– Bitun & Richardson *Curr Infect Dis Rep* 2010, **12**:282-290

References

- **ALWAYS** format your references
- Formatting is required *in text* for citations and for your references section
- Use reference management software

zotero

RefWorks

Section Four *Hints and tips*

- Clear communication
- Language
- Cover letters
- Responding to reviewer comments

Readability

"only 4% of readers understand a 27-word sentence first time"

- Reader objectives
  - Only need to read once
  - Do not have to read slowly
  - Can understand author logic immediately

Simple is best

- Simple language ***IS*** best
- Makes ***YOUR*** science more relevant
- Minimizes confusion – maximizes understanding
- Science is often complex
  - Use simple language to help more people understand your work

Simple words *Examples*

PREFERRED	AVOID
more	additional
enough	adequate
clear	apparent
try	attempt
show	demonstrate
try	endeavor
very	exceedingly

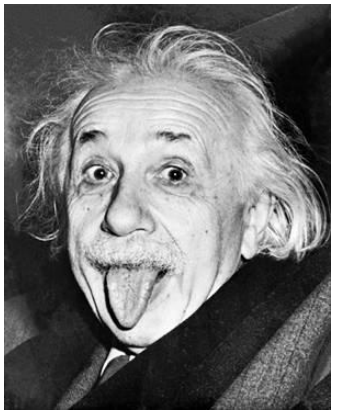
Unnecessary words *Further examples*

PREFERRED ✓	AVOID ✗
Because	For the reason that
First	In the first place
Soon	In the not too distant future
Four	Four in number
Green	Green color
After	Subsequent to
Before	Prior to
Usually	Except in a very few instances

Help your readers understand

"If you can't explain something simply,
you don't understand it well."

– Albert Einstein



- Write to ***express*** **NOT** impress
- Consider your audience – their native language may not be English

Online resources

- Paradigm Online Writing Assistant

http://www.powa.org/

- Springer Exemplar

http://www.springerexemplar.com/

- Google Scholar

http://scholar.google.com/

- Purdue Online Writing Lab

http://owl.english.purdue.edu/owl/

Recommending reviewers

"… the contact details (including email addresses) of at least four potential peer reviewers for your paper. These should be experts in your field of study, who will be able to provide an objective assessment of the manuscript's quality. Any peer reviewers you suggest should not have recently published with any of the authors of your manuscript and should not be members of the same research institution."

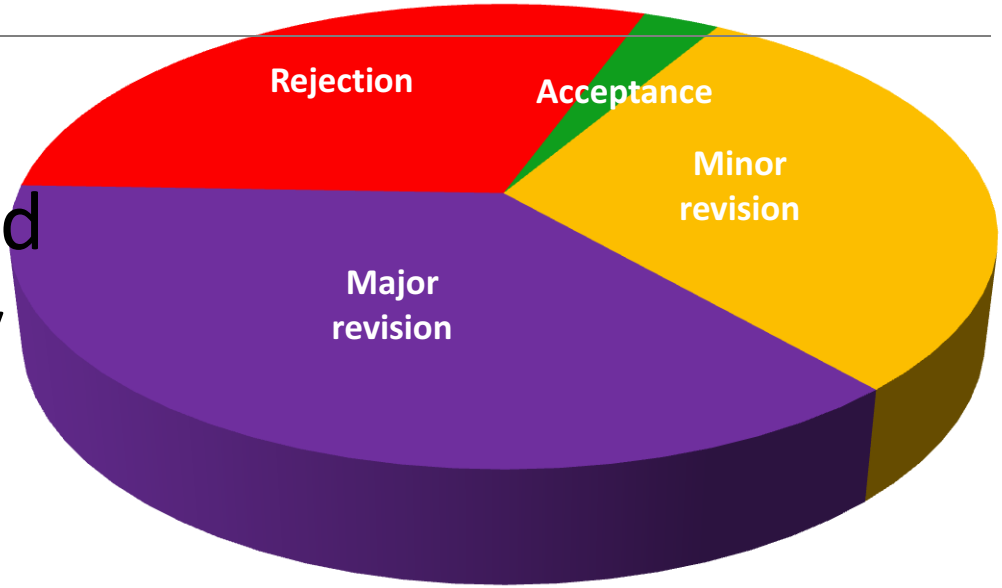
- Who ***ARE*** these experts?
- Read as much as possible!
- Know your competitors
- Provide a reason for recommending/excluding a reviewer
- Editors have the final decision on reviewer choice

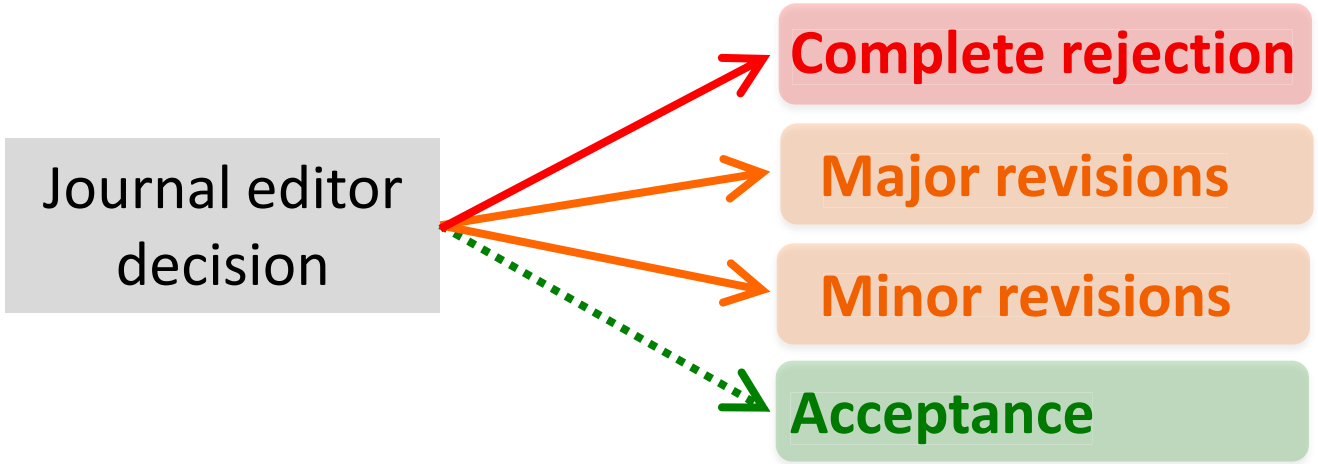
Potential reviewers

- From your reading and references
  - Groups doing similar work, producing similar results
  - Possible collaborators
- Networking
  - Meetings, conferences and congresses
  - People that comment positively
- Aim for younger and mid-level scientists

Peer review

- Very few papers are immediately accepted without need for any revisions





Reasons for rejection: the science

Methods

Validations

Research question

Statistics

Data versus conclusions

Reasons for rejection: the manuscript

Methods detail

Citations

Rationale and aims

Results format

Limitations

Reasons for rejection: other

Inappropriate journal selected: scope, impact, audience

Inappropriate timing: too early or late

Revision *How to respond*

- Politely respond to ***ALL*** the reviewers' comments in a response letter
- Make it easy to see the changes
  - Refer to line and page numbers
  - **Different color font**
  - Highlight the text

Revision *How to respond*

- Conduct the additional experiments suggested
  - If this is impossible, you ***MUST*** explain why
- You can disagree with reviewers **BUT** provide evidence (cite references)
- Comply with deadlines

Post-referee revisions *The response*

Dear Dr. _____: **[address the editor by name]**

Thank you for your consideration of our manuscript entitled _____ **[insert manuscript title here]**. We have reviewed the comments of the reviewers and have thoroughly revised the manuscript. We found the comments helpful, and believe our revised manuscript represents a significant improvement over our initial submission.

In response to the reviewers' suggestions we have **[summarize the key changes here]**

Post-referee revisions *Point-by-point*

[After the introduction to the response, address ***all reviewer points individually***]

Reviewer Comment: *In your analysis of the data you have chosen to use a somewhat obscure fitting function (regression). In my opinion, a simple Gaussian function would have sufficed. Moreover, the results would be more instructive and easier to compare to previous results.*

Response: We agree with the reviewer's assessment of the analysis. Our tailored function makes it impossible to fully interpret the data in terms of the prevailing theories. In addition, in its current form it would be difficult to tell that this measurement constitutes a significant improvement over previously reported values. We have redone the analysis using a Gaussian fitting function.

Post-referee revisions *Disagreement*

[Sometimes you will disagree with the reviewer. Keep your response ***polite and professional***]

Reviewer Comment: *In your analysis of the data you have chosen to use a somewhat obscure fitting function (regression). In my opinion, a simple Gaussian function would have sufficed. Moreover, the results would be more instructive and easier to compare to previous results.*

Response: We agree with the reviewer that a simple Gaussian fit would facilitate comparison with the results of other studies. However, our tailored function allows for the analysis of the data in terms of the Smith model [Smith et al, 1998]. We have added two sentences to the paper (page 3 paragraph 2) to explain the use of this function and Smith's model.