2. Topics in scientific written communication

Parts heavily based on:

"Advice on writing a scientific paper" by C. Sterken, 2006, In Astrophysics of Variable stars, ASP Conf. Series v.349, Eds. Sterken & Aerts Histogram of ADS referee papers



ADS counts as referee papers some conference proceedings

Any author order

Goal of lecture

Inform you on

- The specifics of the written communication
- How a paper is structured
- How the refereeing process works
- What are citations and impact factors
- How you can improve



Written versus oral communication

Written information

- Has no body language
- Can be misunderstood and cited out of context
- Allows high level of detail
- Has long delivery timescales -> last forever
- Is read alone

Why do scientists publish?

Report new results and get credit
Cover meeting travel costs
To get a job, promotion or grant
Achieve social climbing by being visible on ADS

Types of scientific "papers"

- Research paper in a refereed journal
- Letter
- Information bulletins and telegrams
- Review paper
- Instrument/software manuals
- Invited talk, contributed paper or poster in a conference
- Grant or telescope/computer time application
- Other papers
 - Ticket, Salami & Karaoke paper
 - Hoax paper
 - Outreach paper

Research paper

Writing a paper is a process
 Start drafting your paper while work is in progress

Requirements of a good paper

- Good science
- Clear
- Accurate
- Concise
- Good logical structure

Structure of a research paper

Title and running title

- Brief and attractive, no abbreviations
- Authors
 - Order should be a progression of delivered effort/labor
 - First author is responsible for the work/wrote most of the paper
 - Beware of gratuitous co-authors
 - Typos in co-authors names
- Abstract
 - Why, how and what
 - Impact is >50x higher than paper (ads friendly)
 - No reference to the paper structure
- Introduction
 - Statement of the problem and outline of the work
 - Careful citation
 - Recycle your telescope proposal here
 - One of the last parts to be written

Structure of a research paper

Methods/observations/computations/theory

- One of the first parts to be written

Results

- Use minimum interpretation of the data at this stage
- One of the first parts to be written
- Analysis/discussion
 - Interpretation/analysis goes here
 - Always compare to previous work
 - Present limitations of work
 - Translate the accuracy of your data into the physical domain

Structure of a research paper

Conclusions

- Recap problem
- Summarize your conclusions
- Acknowledgments and dedications
 - Always give credit and acknowledge the help of others
 - Don't forget your grant reference
 - Use common sense
 - Dedications are rarely used in research papers
- References and citations
- Postscript and appendix
 - Use appendix to ease reading of paper
 - Use postscript to add "in press" short comments



The editorial process

Goals

- Save time to the community by certifying and rationalizing written communication
- Help the author

First author Scientific Editor

First author

- Verifies that all collaborators agree on publishing the paper
- Makes sure a colleague reads the paper
- Submits PDF to the scientific editor (can use sound arguments to avoid certain referees)

Scientific Editor

- Preliminary filter
- Check if the paper is not a duplication (©)
- Sends paper to referee (typically use ADS to find referee)

The editorial process: referee

First author

Scientific Editor

Referee

- Judges scientific interest and originality
- Sends a report to Scientific Editor (including confidential remarks)
 - Scientific content: Acceptable?
 - Style and language: well-written, concise, self-contained, language editing
 - Why should this paper be published?
 - Are the assumptions spelled out clearly?
 - Are the methods fully described?
 - Are the new results adequately emphasized?
 - Are all the figures and tables necessary and properly laid out?
 - Which material (sections, tables, figures) should be published in electronic form only?
 - Is the designation of objects according to IAU rules?

The editorial process

First author Scientific Editor

Referee

- Scientific Editor
 - Forwards non-confidential report to first author
 - If rejected finds second referee

First author

- Makes sure he understands the referee comments
- Forwards the comments to the co-authors
- Doesn't contact the referee if he has disclosed his name
- Answers in a positive way to the referee
- Submits corrected version to Scientific Editor
- Scientific Editor
 - Accepts paper, or further interaction with referee
- First author
 - Sends source of paper to editorial office

The editorial process



Scientific Editor

Publisher

- Paper is proofread (?)
- Forwards source to publisher

Publisher

- Paper is typeset corrected, compiled
- Issue is generated by merging all manuscripts in a master
- Indexes are build no more corrections implying page changes are possible.
- PDF proofs are generated (you can/should interact here)
- Final paper published

The editorial process: timescale

Scientific Editor

 ~3 months (A&A)

 Publisher

 ~>3 months (A&A)
 You don't care

Time at scientific editor for papers accepted in 2005



Common mistakes: (low level)

- Publisher instructions are not read and followed
- Margins (titles, figures, tables) are not respected
- Non standard fonts in eps files
- Figures with too thin lines
- Bitmaps with too low resolution
- Macros inside the manuscript
- Confusion between eps and ps
- Exceeding page limits (conference papers)

Copyright

Use your common sense
 You can publish "parts" of a conference proceedings in a paper (and vice-versa)

Main journals

- Ap. J., MNRAS, AJ, A&A
- 57% of all ISI 2004 astronomy papers
- 78% of all ISI 2004 astronomy citations
- Citations
 - Number of times a paper appears in the bibliography of a paper from a (certified) journal
- Impact factor
 - average number of times articles from the journal published in the past two years that have been cited in the corresponding year

- Citation/Impact factors vary widely from (sub) discipline to (sub) discipline
 - Do not overuse them to access the scientific quality of your paper



Abbreviated Journal Title	2004 total cites	Impact factor	Immediacy index	2004 articles	Cited half- life	% of all papers
ANNU REV ASTRON ASTR	5043	18.839	1.800	15	9,8	0
ASTROPHYS J SUPPL S	13565	15.231	2.724	203	7,1	2
J COSMOL ASTROPART P	1014	7.914	1.943	141	1,3	1
ASTROPHYS J	144264	6.237	1.616	2478	6,2	23
ASTRON J	26385	5.841	1.226	523	5,9	5
MON NOT R ASTRON SOC	43858	5.238	1.306	1222	5,3	11
ANNU REV EARTH PL SC	1971	5.188	0,75	20	10	0
ACTA ASTRONOM	881	4.019	0,32	25	5,9	0
PUBL ASTRON SOC PAC	5926	3.900	0,595	111	8,9	1
ASTRON ASTROPHYS	63293	3.694	0,971	1870	5,8	18
ASTROPART PHYS	2196	3.610	1.388	103	4,2	1
REV MEX ASTRON ASTR	587	3.296	0,263	19	5,5	0
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Bibliometry: the big 4

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Increasing the impact of your paper in a growing field

- Good science
- Well written and published in a main journal
- Publicity
 - Astro-ph (>2x), newsletters, ADS friendly (abstract+references)
 - Workshops/conferences/talks



The H-index

- Suggested in 2005 by Jorge E. Hirsch, also called Hirsch index or Hirsch number
- h of his Np papers have at least h citations each
 - the other (Np h) papers have at most h citations each
- Advantage: measure simultaneously the quality and sustainability of scientific output
- Disadvantage: scientists with a short career are at an inherent disadvantage
- Some numbers
 - John Ellis: h = 101
 - Steven Weinberg: h = 88
 - Richard Feynman: h = 32

How to improve

- Read papers, Read a lot of papers, Read lots of papers every month
- Read a few articles/books
 - Advice on writing a scientific paper, by C. Sterken, 2006, In Astrophysics of Variable stars, ASP Conf. Series v.349, Eds. Sterken & Aerts
 - The Science of Scientific Writing, 1990, Gopan & Swan, American Scientist.
 - Scientific Papers and Presentations, by Martha Davis, 2004, 2nd ed.
 - Editorship and peer-review at A&A, by Claude Bertout & Peter Schneider, 2004, A&A, 420, E1
 - Instructions for authors of main journals
 - The Rise and Citation Impact of astro-ph in Major Journals, by T. Metcalfe, 2005, arXiv:astro-ph/0503519
 - Not so deep-impact, 2005, Editorial, Nature, 435, 1003
 - *h-index* http://en.wikipedia.org/wiki/Hirsch_number
- Ask the opinion of someone you respect on your final draft

Thank you!