

Scientific Writing 6951

THE
ASTROPHYSICAL JOURNAL
AN INTERNATIONAL REVIEW OF SPECTROSCOPY
AND ASTRONOMICAL PHYSICS

Wednesdays 10-12 Room 0.008

VOLUME XXXVII MAY 1913

THE
Astrophysics

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Oxford
English
Dictionary
Sixth Edition

Monthly Notices
of the
ROYAL ASTRONOMICAL SOCIETY

<http://www.astro.uni-bonn.de/~izzard/writing.html>

Scientific Writing



Welcome to *Scientific Writing*

- Classes weekly all semester from today
- Each class is approximately 90 minutes
 - Some time for *learning*: about half an hour
 - More time for *doing*: around an hour
- Work in small groups (*three?*)
- Interact : with each other and us!
- *Sometimes* a little homework (reading takes time)

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Before I forget

- Please email me so I can make a list of email addresses

izzard@astro.uni-bonn.de

Today – while you remember!

Thanks!

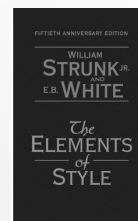
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Course Resources: Books 1

The Elements of Style
Strunk and White

www.gutenberg.org/ebooks/37134
home.ccil.org/~cowan/style-revised.html



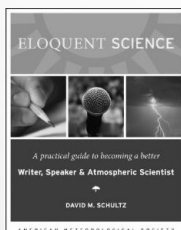
Scientific Writing for Young Astronomers
<http://www.swya.org/>

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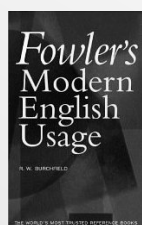
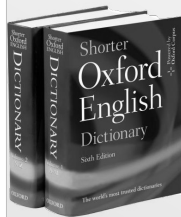


Course Resources: Books 2

Eloquent Science
Schultz



Oxford English Dictionary and Fowler's Modern English Usage



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Course Resources: Web

<http://www.astro.uni-bonn.de/~izzard/writing.html>

We will update the website with:

- Slides
- Exercises
- Useful information
BUT you are quite capable of searching for resources yourself!
This is the 21st century and the internet is your friend . . .

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Course Resources: Humans



Robert Izzard



Frank Bertoldi

There are no stupid questions!

Course Resources: You

Please ask questions!



Why learn to write well?

If you want to be a scientist:

You have to write a thesis and publish papers!

“START > DO > FINISH > PUBLISH”

Why?

To **communicate** with others: scientists or not.

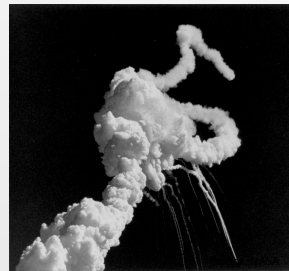
Survey of engineers:

- 24% of time spent writing
- 31% of time spent working with written material

Richard M. Davis, *Technical Writing: Its Importance in the Engineering Profession and Its Place in the Engineering Curriculum*, AFIT TR 75-5 (Wright-Patterson AFB, Ohio: Wright-Patterson Air Force Base, 1975).

Why learn to write well?

Space shuttle *Challenger*



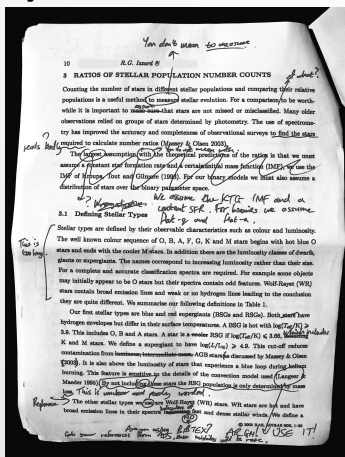
“Thus the engineers, who were very concerned since they knew the consequences of *<the failure mechanism>*, did not present the data in a way that showed the trends or that could be explained to a sceptical senior NASA manager. They thought they were communicating but missed one of the fundamental rules of good communication which is to express your position in a way that your customer can understand.”

Prof. Daniel Hastings, MIT Engineering Systems Division

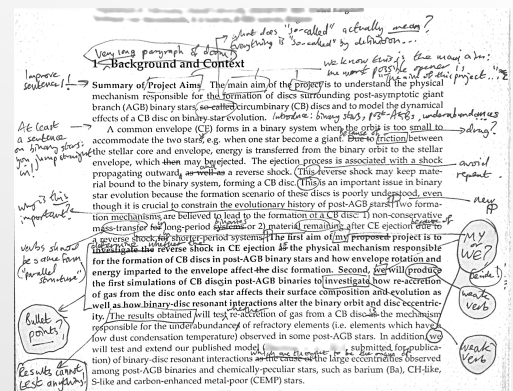
See also: Feynman, Richard P. “An Outsider’s Inside View of the Challenger Inquiry.” *Physics Today* 41(February 1988): 26-37.

Why learn to write well?

Avoid nasty editing! (and editors!)



Avoid bloodshed!



Why learn to write well?

Enjoyable pastime!

***How you communicate affects others.
Be considerate!***

I spend (>?) 25% of my time proof-reading ...

I would prefer to spend that time doing research!

For you:

Writing is an essential part of research.

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How lucky you are...



Scientific Writing

How lucky you are...



Literature is difficult!

You do **NOT** have to learn to write literature!

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Why now?

Your immediate concern:

Thesis (or papers) to write by a deadline

Also:

Talk(s) to give – **Astrosem** (Mondays)

Group **meetings**

And

Assignments!

**KNOW YOUR
AUDIENCE!**

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Scientific writing

- Is **not literature**: no more difficult than “research”!
- Often has a specialist readership
- Includes
 - Description of research
 - Interpretation and significance
- Must be **CLEAR**, **PRECISE** and **CONCISE**
- Bad style and/or language skills **KILL** your paper!



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Be clear

Do not force your reader to guess what you mean

- Present **logical arguments** convincingly
- Your job is to **inform** and **educate** the reader
- Good **style** helps
- Good **English** helps too



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Be precise

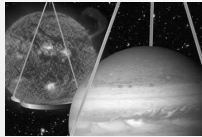
There is no room for ambiguity!

"For our binary models we must also assume a distribution of stars over the binary parameter space."

Better:

"For binary stars we assume a flat- q distribution for mass ratios and a flat- $\ln a$ distribution for separations."

- Be careful with technical words e.g.
- "The Sun weighs 10^{33} g."
- Communicate *exactly* what you mean!



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Be concise

Use as few words as possible but as many as you need

Original:

"The largest assumption with the theoretical predictions of the ratios is that we must assume a constant star formation rate and a certain initial mass function (IMF), we use the IMF of Kroupa, Tout and Gilmore (1993)."

My version:

"We assume the Kroupa, Tout and Gilmore (1993) initial mass function and a constant star formation rate."

- You are **NOT** paid by the number of words you write!
- Learning how to edit will help! (Classes 11, 12)

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To do:

- Reading articles (Class 2, 3)
- Preparation and planning (Classes 4, 7)
- Writing (Classes 3, 5) and drawing (Class 6)
- English language style (Classes 8-10)
- Editing (Classes 11, 12)
- Criticism, peer review (Class 11)
- Also: Remember to **read**, do the **Astrosem**
- *There is no exam, neither will you receive credit points*

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Thinking and Writing

Writing and thinking well use the same skills

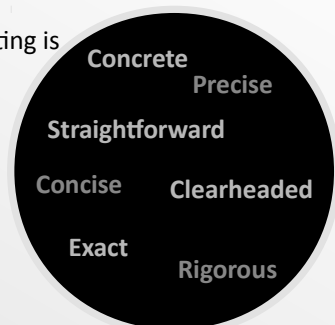


You can already **think** – otherwise you would not be here. So... **writing** is the next step.

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Summary

Scientific writing is



These are the qualities associated with scientists!
i.e. **YOU!**

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Exercise 1

List the kinds of writing a **scientist** is required to produce
and *for whom* ...

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Exercise 1

Answers include:

Dissertations, progress reports, laboratory journal, journal papers, conference proceedings, case histories (in medicine), review articles, product/book reviews, project proposals, grant applications, popular science articles, minutes (protocol), (lecture) notes, handouts, press releases, tweets, (code) documentation, instructions, letters, questionnaires, CVs, observing proposals, posters, emails, critiques, referee reports, exams . . .

Related: oral presentations (talks), radio/TV shows, vod/podcasts, interviews . . .

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Exercise 2

Please fill in the **questionnaire!**



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Homework Exercise

Find the websites of ApJ, A&A and MNRAS

(hint: **Google!**)

Choose an article from their latest edition:

About something that *interests* you!

In what order did you read the article?

(e.g. Title, Abstract, Figure 1, Introduction, Table 1, Method, ...)

Email me the answer over the weekend

izzard@astro.uni-bonn.de

We shall discuss the results

of your "survey" next week . . .

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