

# Scientific writing

BREWED

IN DUBLIN

Greg Donovan

International Whaling  
Commission

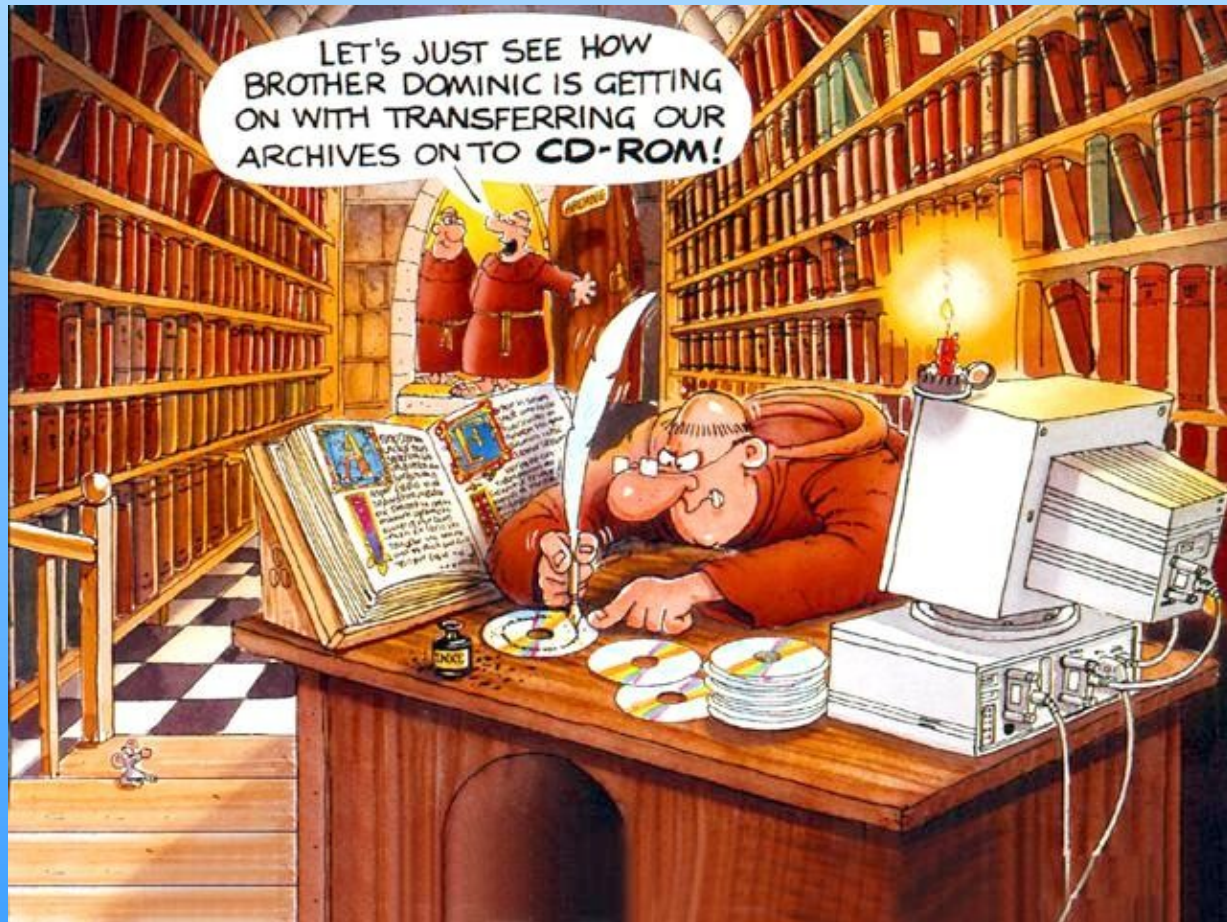
# Why write?

- **‘Communication of your research results/views to as many people as possible for time immemorial’**
- **Obtain a qualification**
- **Get a job**
- **Get a grant**
- **COMMUNICATE!**



# A sad truth.....

- No place for humour ☹



# For whom?

- **Essay**
- **Thesis**
- **Contract report**
- **Publication**
- **Grant proposal**
- **Review**
- **YOURSELF!**



# What never to say (1) : grants

- The purpose of science is to get paid for doing fun stuff
- Nominally, science involves discovering something new about the Universe, but this isn't really necessary.
- What is really necessary is a grant.
- In order to obtain a grant, state:
  - the research will discover something incredibly fundamental.
  - you are the best, so you should cite yourself early and often
  - Cite other papers only if you are on the author list.
- You will quickly find out that:
  - (a) your project is not as simple as you thought
  - (b) you can't actually solve the problem.
- However -- and this is very important -- you must publish anyway!



# A few basics

## □ Principles always the same:

### □ Logic

□ Structure

□ Progression

### □ Style

□ Clarity

□ Precision

□ Economy

### □ Philosophy

□ Honesty

□ Humility

□ Confidence



# And most important:

▣ Interesting!

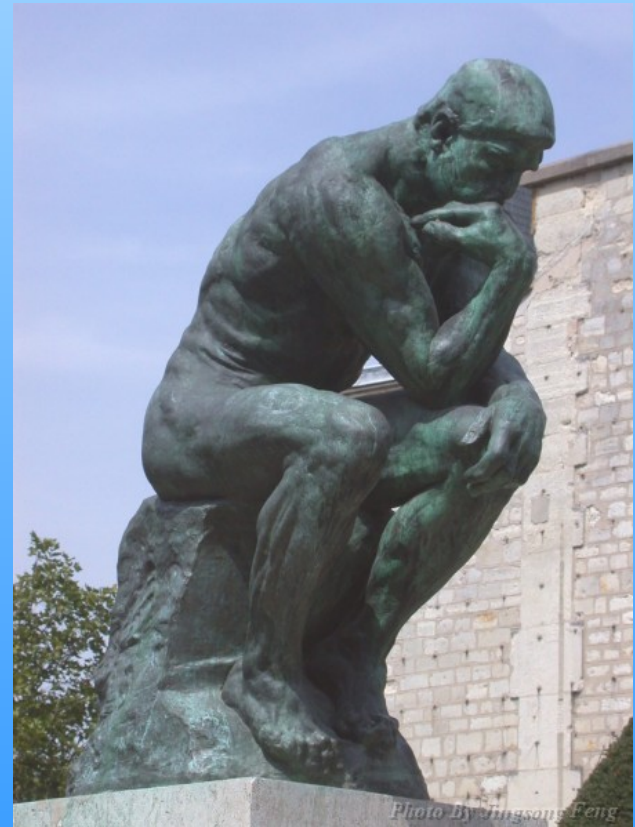


**RÉAL**  
**MANCHESTER**



# structure

- ▣ **Logical progression – applies to research itself as well as writing:**
  - ▣ **Title**
  - ▣ **Abstract**
  - ▣ **Introduction**
  - ▣ **‘Materials’ and**
  - ▣ **Methods**
  - ▣ **Results**
  - ▣ **Discussion**
  - ▣ **Conclusion**
  - ▣ **References**
  - ▣ **OUTLINE FIRST!**





Never mind  
grandad, at  
least I'm  
listening

# Title styles

- **Broad titles:**
  - **Blue whales in the SE Pacific in winter**
- **Informative titles**
  - **Blue whales concentrate off Peru in winter**
- **Interrogative titles**
  - **Blue whales: where are they in winter?**
- **Series titles:**
  - **Blue whales in the SE Pacific (1): winter**

**Be concise, interesting, informative and follow the style needed for the purpose intended: index and abstracting services**

***Balaenoptera musculus? Journal style***



# abstract

- **Concise <350 words**
- **Identify prime subject and results**
- **Aim is to persuade reader to read!**
- **State objectives and scope**
- **Results and conclusions (unless methodological paper)**
- **Avoid:**
  - **acronyms**
  - **references**



# introduction

- **Introduce reader to relevant literature**
  - **Standing on the shoulders of giants**
- **Explain why you did what you did (Clearly state objectives of study)**
  - **What is the problem? (State of knowledge)**
  - **Why is it important? (Information gaps)**
  - **What solution/approach (Your work)**
- **Be selective: most relevant last and in more detail**



# What not to say 2: introductions

- **The real purpose of introductions is to cite the work of:**
  - **Yourself!**
  - **Your advisor/benefactor/potential colleague**
  - **Your spouse/friend/potential spouse friend**
  - **anyone as long as your name is on the paper**
- **Include everything**
  - **refereed journal articles**
  - **conference proceedings**
  - **unpublished work**



# Materials and methods


- ▣ **Does what it says on the tin!**
- ▣ **Laboratory/field techniques**
- ▣ **Sample size**
- ▣ **Quantitative methods**
- ▣ **State where established methods (then brief explanation and reference)**
- ▣ **If new methods explain in more detail**
- ▣ **Allow for repetition by reader**



# results

- **Careful consideration to Tables and graphs – presentation v. important**
- **Be selective – don't throw in everything Excel has to offer!**
- **Do not repeat information – highlight (e.g. trends, best case)**
- **Include significance where appropriate**
- **Be consistent e.g. with significant figures**
- **Sensitivity to uncertainty**





**The Magnusson  
approach  
looks more  
robust to me**

# Discussion and conclusion

- Refer to the results don't repeat
- What do your observations mean?
  - Are any assumptions violated?
  - Sensitivity to conclusions
- What conclusions can you reach
  - Describe any patterns/principles
  - Explain any anomalies
  - Suggest additional research to improve
- The broader picture
  - Theoretical, practical implications
  - Limit speculation to testable in 'near' future



# guidelines

- **Follow the route: your finding(s) → literature → theory → real application**
- **State whether/how much study achieved the objective(s) stated in the introduction?**
- **Provide evidence for each conclusion**
  - **be honest about alternative explanations even if not your favourite**
  - **Suggest ways to reduce hypotheses/remove anomalies**
- **Don't get carried away!**



# References (boring but!)

- ▣ **Essential!**
- ▣ **Follow a set style in both text and reference list**
  - ▣ **Develop your own database**
- ▣ **No need to reference the obvious!**
  - ▣ **The Mediterranean Sea (e.g. Pliny the Elder, 79)**
- ▣ **Check, check and check again**



# style

- To some extent this is personal
- Avoid personal pronouns unless it is necessary, e.g.
  - **stating your opinion**
  - **avoiding tortuous sentence construction**
- Avoid subjective qualifiers
  - **E.g. large, few, great**
- Learn to love language and its flow, even in its less-than-poetic forms



# Be careful

- **Using more words is NOT clever**
  - **because instead of** based on the fact that
  - **for or to instead of** for the purpose of
  - there were **several subjects** who **completed...;**
  - it is suggested that **a relationship may exist...;**
- **Using big words is NOT clever in itself – use appropriate and well-defined words**
- **Avoid jargon as an excuse for not understanding**
- **Good grammar is good grammar – read about it**
- **Use a spellchecker but don't always believe it 😊**



# Words have meanings!

- **A few to look out for:**
  - **Effect, Affect**
  - **Data, Datum, Criteria, Criterion**
  - **Alternate, Alternative**
  - **Decimate**
  - **Significant**
  - **Compare with; compare to**
- **And avoid redundancy**
  - **Blue in colour, rectangular in shape**



# Final tips

- **Read a lot of papers and decide what you believe to be good and bad practice**
- **Spend time on your outline first**
- **Avoid pomposity**
- **Read it out loud!**
- **Get colleagues to read it**
- **Double-check:**
  - **References**
  - **Acronyms**
  - **Definitions and consistency**



How do I know  
you're Irish?



**Take up Irish history tonight**



