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## THOUGHTS ON WRITING AND GETTING PUBLISHED

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### WRITING IS THE SOLUTION TO A PROBLEM

It is also very very difficult to do well. More difficult than calculus, quantum mechanics or general relativity. Any number of people master those concepts but far fewer ever learn to write well. If you can master a scientific discipline AND write well you can make a living just off that combination of skills.

### WHY DO WE WRITE?

We write to communicate what we have done.

If you stay in academia you will meet people who have done wonderful research. And you wonder why you didn't know about their work. It's because they didn't publish it. We worry sometimes that we put too much emphasis on publication: you'll have heard the phrase "publish or perish." But if you don't publish your research it's like it never happened. You can only communicate it to a handful of people. But successful scientists write down their ideas and findings and thereby communicate them to millions.

This year is the centenary of Albert Einstein's publication of five papers that revolutionized our view of the universe. Imagine he had had these ideas but never published them: or been so incompetent in his grasp of the written language that nobody could understand what he meant – where would we be then?

So writing is not just something for the humanities, it is a central skill for all kinds of scholars – you can't escape it.

And writing is extremely difficult. Especially writing well. By writing well I mean writing so that people who will never meet you will know what you are talking about. And especially writing well in a technically demanding field.

### PRACTICE

If you want to write well there is only one method: practice. Here at UF we talk about Gordon rule writing requirements of 2,000, 4,000 or 6,000 words. You need to write thousands of words every day. Keep count of how many words you write in your professional life. You should aim to write many tens of thousands of words every year. Only by such massive practice can you hope to get better. I am a better writer today for having written two 100,000-word books than I was before. That extra practice has made a difference.

### WRITE WRITE WRITE

Find space to write. That means finding a cool calm place to write – but also finding the time. Good blocks of uninterrupted time. There are people who do this by getting up before dawn or write late at night. Though I'm sure that works for some people, I am not at my best at either of those times. I

write best in the morning after a good night's sleep. So I steal that time from my other responsibilities to get on with writing.

Although you should identify a best place to get on with writing, you should not get into the mindset of only writing when conditions are perfect. Keep a bound notebook with you at all times so that you can write whenever you have a quiet moment. Write everywhere.

Answer every email in complete sentences. None of these stupid emoticons ☺. They are shortcuts for illiterate people. Buy blank greeting cards and write in your own thoughts. Things that started out in an email to a collaborator have ended up cut and pasted into my articles and books.

Copy good style whenever you find it. But don't plagiarize. I have a Turkish friend who could write research reports in excellent English before he could speak English fluently. I asked him (in German) how he achieved this. He said he kept a notebook of good turns of phrase that turned up in research articles and adapted them to his own purposes when he came to write in English.

If you don't like what you've written take a new blank page and start again.

Learn to type if you can't already.

Spend hours every day writing. Practice, practice, practice.

#### **CRITICISM**

But some practice is better than others. The best practice is corrected practice. I know it hurts to receive a text back that you sweated over only to find it covered in red ink and corrections, but this editing is a very valuable service. Exploit it for all it's worth. In later life you may find yourself paying somebody to correct your writing. Even people who cannot write that well themselves recognize bad writing and it makes a very poor impression. If you go on in future life to hold a position where you want to appear like a professional, you will absolutely have to present your public (clients, staff, whatever they may be) with clear accurate prose. And if you can't master this for yourself you will have to pay somebody to fix your writing for you. So make the best use you can of the feedback you are getting for free.

And take all criticism seriously. There is no such thing as unfair criticism – only criticism that doesn't make its points accurately. All criticism – except the blatantly dishonest – conveys that your text has failed to communicate with at least one reader.

Become a good critic of your own writing. Read what you have written – preferably after a gap of several days. Build this gap into your timetabling of writing. This is a very difficult skill. Try and learn what your flaws are (I tend to reuse the same words a lot).

Read the oed online and the columns in newspapers and magazines about the meanings of words. Practice good grammar. (Don't worry about spelling).

#### **KNOW YOUR AUDIENCE**

In academic writing, as in any writing, the first step is to know your audience. For whom are you writing? There are basically two audiences you should be interested in: your scholarly peers, and the broader public.

## TRADE WRITING

Writing for the broader public is a lot of fun – and can be profitable. The public at large has a great hunger for knowledge of what academics are up to, but rather few scholars are willing or able to bridge the gap. I suspect students might be better at this than are those of us who have grown accustomed to talking only to our colleagues. I write all my popular science for my father. He left school at 13 and has no understanding of even the simplest scientific matters. But he has always taken a great interest in what I do. So I have spent hours struggling to find terms for my science that make sense to him. Bat echolocation is like watching waves bounce off boats in a harbor – but those same waves pass through anchor chains apparently without noticing them.

## ACADEMIC WRITING

We mainly struggle to teach our students to write like us – like academics. I can only comment from personal experience about scientific writing, but I'm sure the same general principles hold in all fields of academe. The standard scientific report is a very dense text that is extremely difficult to get right. And you will get very little help from the editors of scientific journals.

Start with the Methods section. It's easiest and can be written while the experiment is still on going. We tell students that it must be written in just enough detail so that suitably qualified scientists could reproduce the experiment. That doesn't really help because newcomers don't know what it is that suitably qualified scientists might know or not. The best and easiest way to prepare the method section is to find published research papers that report experiments most closely resembling the study you are carrying out. Use their level of detail as a guide.

If you didn't already before you started your study, then at the same time as running your experiment you should be reviewing all the relevant literature. It isn't enough to photocopy papers from the library, you must read them too and write your own summary. These summaries can then be merged into a narrative text that discusses the different themes that have been considered in the science that precedes yours. Only when you are completely on top of this literature can you consider the Introduction to your paper.

We tell students, as we tell each other, that the introduction to a scientific paper should set up the problem that the study is going to solve (or at least contribute to the solution of). So we expect here to find a statement of a problem (how do bats fly in the dark?); some mention of previous approaches that have been made – just enough to explain why the present study was carried out. And we expect the Introduction to conclude with some hypotheses to be tested or at least paths to be explored, and these should seem like the natural and logical next steps in the march of science from ignorance to wisdom.

But I'll let you into a secret. You are not writing history here. Nobody will know if you are not scrupulously honest in identifying what the reasons really were that inspired you to carry out your experiment. It can happen that after an experiment is complete and the results are analyzed, you realize your original idea was a little misjudged but that your experiment actually demonstrates quite clearly that something else must be going on. You can, if you want to, claim that this something else was what you were looking for all along. Even scientific papers read better if they have a good narrative thrust to them and you may get a better narrative by not being entirely historically accurate. So although you can write the Methods section before the experiment is complete I would not recommend attempting the Introduction until the results have been analyzed.

I have an experiment that I started in 2002. Most of the data was in by early 2003. But we just couldn't understand it. I went to a conference in March 2004. It was mid afternoon, I was half asleep.

Suddenly I realized that a data analysis method that was being demonstrated might yield order from the chaos of my results. As soon as I got home I tried it, –Eureka! – everything has fallen into place with a pretty interesting outcome.

After the Introduction and Methods have been written and the results are ready, writing the Results section is usually fairly straightforward. You have decided what you want to say you were looking for, you know how you looked for it, so it must be fairly evident what the main themes are to the results. It can help to have subheadings through the Results section - even if you delete them later. Many scientific journals don't like to see a lot of small sections with their own subheadings but it may help you to organize your ideas to put the subheads in – even if you only delete them later.

Certainly when you come to the final section of the paper – the Discussion – you should use subheadings to organize your ideas. It is here that you recapitulate what you looked for and what you found, but now you place these discoveries into the context of the literature – the field of science to which you are contributing. Don't just cut and paste your review of the literature. Here you should extract from the literature those aspects, those debates, to which you can add something. Don't exaggerate, but don't be timid in pointing out where what you have found contradicts what others found. Suggest why that might be so, and point the way to new studies that will add further clarity to this problem.

#### **NARRATIVE, NARRATIVE, NARRATIVE.**

All texts are narratives. No matter how deeply obfuscated by technical writing style, every text is a narrative. You must find the story and tell it to the best of your ability. No empirical paper, no matter how dull and dry it may appear, is a true history of how an experiment was carried out. Empirical papers are often largely fiction in the sense that the hypotheses the paper claims to have set out to test may not have occurred to the authors until years after the experimental work was completed.

#### **PRACTICE**

It is very very hard to write a good scholarly paper. There is a strong tradition in most areas of science for papers that are written in a passive dead style, that lack any clear narrative direction (most scientists wouldn't even acknowledge that their papers need a narrative thrust), and that are fiendishly technical with a grapeshot of three-letter acronyms (or should that be a GS of TLAs?). That doesn't have to be the case and clear papers will surely have much more impact than muddy ones.

But by the time you are submitting your first papers to *Science* and *Nature*, nobody will be there helping you get any better. Reviewers will just dismiss your papers as too difficult to follow – they will offer no support in improving your clarity. Protected by the anonymity that the journal editor guarantees them, they will simply rubbish your attempts in the cruelest terms.

So make the most of whatever writing instruction you can get. Listen to what your instructors say. Some time in the future you may be crying out for helpful supportive criticism of your writing.

#### **GETTING PUBLISHED**

Submit your best shot. Even a ms that looks perfect to you will contain errors. If it contains flaws you are aware of that will add up to a hopeless case.

Always be aware of the journal you are submitting to. You are just wasting time if you submit to an ill-suited journal.

Include a clear, brief cover letter briefly identifying what the major results of your study are. Suggest four reviewers – not collaborators but people likely to be sympathetic. Editors often use at least one

of these – even if they don't invite their nomination. If there is anyone likely to be offended by what you have done always ask for those people not to review. Don't give reasons and don't specify more than two vetoes. Make sure you mention anything the journal instructions tell you to and submit the right number of copies. **DO NOT SUBMIT A MS TO MORE THAN ONE JOURNAL AT A TIME.**

Reviewing is blind – sometimes masked. Reviewers are not paid and hate having to do this chore. Try and make yours the ms that is a pleasure to read.

Papers are never accepted the first time. You will receive reviewers' comments that seem to willfully misunderstand and underestimate what you are about. You must respond to reviewers' comments constructively and as if they were helpful no matter how stupid they strike you as being. Make it easy for the editor to accept your revised version by accompanying it with a detailed cover letter explaining exactly how you have responded to the reviewers' criticisms. Always err on the side of being too flexible and responsive. Resist the urge to tell the editor what a bunch of idiots the reviewers are.

Be aware that some journals never invite resubmission. For these editors every paper that is not accepted is rejected. That doesn't mean you should revise the paper and send it back to them – it just means they are making no guarantee that they will accept a revision. Even if an editor says he never wants to see your paper again that doesn't mean you couldn't completely revise it with a new title and send it back (though you might well do better to try a different journal).

Book Publishing operates according to different rules. You can send an enquiry letter (max two pages) to as many publishers as you like. If they are interested they will ask for (usually) an overview of what the book is about, a detailed outline with some detail on each chapter, and a couple of other things, possibly including a couple of sample chapters. For a scholarly book these materials will usually be sent out to academics to review who will be invited to pick themselves a couple of books from the publisher's catalog as recompense. You can't send your book to too many potential publishers because there is only a limited number of experts in any one scholarly field. Still you are a free-agent until you sign a contract.

#### **FINALLY**

The difference between scholars who successful in getting their work published and those who are unsuccessful is NOT that successful people get all the breaks. Successful people have had many many papers rejected. But they refuse to accept that they are beaten. They write back to editors pointing out how reviewers have missed the point. They revise their work and send it out to another journal and another and another. They do not take a rejection letter home to cry over (as I have done) and entertain thoughts of giving it all up – they keep plodding, keep writing, keep revising and keep submitting *Nil desperandum – Never Give Up!*