

# Module 8: practical writing strategies

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# Types of conference lectures

- (1) “Talklets” (5-10 min. “mini-presentations”)
- (2) Typical oral presentations ( $20 \pm 5$  min)
- (3) Long-form talks (about 40-45 min.)

# Some general recommendations

- 1 min./slide = good rule of thumb, but no “law written in stone”
- “Presenter tools”: allows preparing notes beforehand and seeing them on your laptop screen (while audience only sees slides)
- text and background colors should be complementary if at all possible (life saver when you have a lousy projector)
- sans-serif or “humanist” types preferred
  - may change as true-HD projectors will become common
- Font sizes: 24pt. and up recommended (smaller only for footnotes)
- Animations, slide transitions: avoid “dancing bears” (Samuel Johnson)
- presentations involving multimedia: save yourself “cannot find file” embarrassments. Insist on presenting from the same computer as the talk was prepared on (to avoid “missing file”) issues. If impossible, do a “dry run” before the session or during a break to ensure everything got transferred correctly

# Talklets

- Very common in some disciplines, less so in ours
- You have only 5-10 minutes, so be very brief and to the point
- Gershom's unpaid advice:
  - #1: put complete author list and acknowledgments on the title slide (you won't have time otherwise)
  - #2: put summary and conclusions on the next slide (so even if nothing else gets said or heard, that is out there)
  - 3rd and later slide: explanation (sacrificial)
  - Presenting a poster to a professor who asks: basically the same idea as a talk let

# Ordinary conference talks

- Most common
- Range from 15-25. Typically 20 minutes. Convention is that you leave 5 min. for discussion (Q&A). In practice often unrealistic.
- Typically on a single study (or 2-3 closely related ones that can be woven into a single story)
- Some level of detail possible
- Many conferences will only accept talks from professors (or sometimes postdocs), but some (notably ACS meetings) actively encourage students
- Invited lectures typically longer than contributed ones

# Group and departmental seminars

- Typically 1 hour including Q&A, 45-50 min. exclusive of Q&A
- Group seminars: generally focus on a single topic in great detail
  - probably the easiest to prepare and “script”/“time”
  - fairly tolerant of language in the “informal register”
- Dept. seminars: often multiple subjects
  - like extended conference talks, but longer
  - Ph.D. thesis presentation: allow 15 min. or so for theoretical background
    - at conference talk, in-depth review of theoretical background generally inappropriate
  - In general: neither “talk down” nor “talk up” to your audience. Apropos: “Dogs look up to you, cats look down on you. Give me a pig! He looks you in the eye and treats you as an equal.” (Winston Churchill)

# Extended conference talks

- Typically 40 min.
- Nowadays, almost universally cover several topics
  - several small projects unified by one overarching topic
    - special case: Ph.D. thesis presentation
  - several new projects in a research group
- My usual “modus operandi” [lit.: “way of working”]:
  - Organize lecture as a group of short talks
  - Start off the presentation with an outline slide
  - Keep 1-2 “sacrificial subjects” in case one has time left for some reason.

# Workshop & “Summer[/Winter] School” presentations

- Meant to be more didactic and “how-to”
- More detail allowed and appropriate
- Typically need to focus not just on one’s own research



# “Timing”/“Pacing” talks

- Highly recommended, *especially* if you have only a short time slot.
- In the humanities and social sciences, considered acceptable to just write out a speech in longhand and read it off the page
  - In the sciences, uncommon and frowned upon. Do this only as a last resort, e.g., in order to overcome crippling stage fright
- Give a few “practice talks” to an empty room, the mirror,... and time them
  - If nothing else, will give you a good idea about timing, and which parts need condensing/expanding
  - I sometimes write 1st drafts of my own talks by lecturing to an empty room or voice recording app, then drawing up outline and preparing slides based on that

# Coping with stage fright

- Generally with Israeli students, opposite problem (overconfidence), but...
- One's first talk at a major conference can be intimidating
- Practice in front of others, perhaps arrange for the same talk to be "tried out" at a group of departmental seminar first
- Memorizing a scripted talk:
  - very helpful if you have an excellent verbal memory. Beware of memory lapses ("brain freezes") however: ensure to have cues on slides, notes,... for that event.
- "Notes" in Powerpoint (or Keynote): very helpful if you can be sure you will see your screen in "presenter mode" (rather than "video mirroring"). Perhaps print a "handout with notes" of the slides just in case
- In general, if you build slides in such a way that they make sense even if read independently of your narration, less risk of "losing one's place"
- Remember: you're not the only one who's ever had to cope with this
- Language issues: thorough mastery of English is anyway a "must" in today's professional world. Recorded scientific talks on YouTube, scientific audiobooks: very helpful if by native speakers

# Is there “one correct way” to construct/write a paper?

- Short answer: no
  - Each specialty has its own conventions
  - Each journal/publisher has its own “house style”, albeit not always “written in stone” in all respects
  - If you found a certain approach that works for you, why not stick with it?
    - If you switch fields, you may need to (un)learn habits
- Non-negotiable in all cases:
  - Good, sound science
  - Logical presentation
  - Good English, mostly in the “formal register”

# Basic ingredients

- Always there in one form or another:
  - Introduction
  - Materials and Methods/Experimental Methods/Computational Methods
    - Should contain enough detail that anybody who wants to reproduce your work can do so
    - In “Letters/Communications”, may be mostly or entirely relegated to Electronic Supporting Information (ESI)
  - Results and Discussion (sometimes two separate sections)
  - Conclusions

# Deviations from typical structure (1)

- Comments on another paper:
  - Generally either criticism (stay polite!) or pointing out implications not discussed in the original paper
  - Ties in closely to the paper being commented on
  - “Fisking” (line-by-line quotation with refutation) common on blogs, not accepted in scientific journals
- Review papers: two major types, which I shall name by their most representative journals:
  - “Accounts of Chemical Research”: fairly short (8-10 journal pages), topical, focused on the work in one’s own group
    - Almost always by invitation only
  - “Chemical Reviews”: long to very long, expected to cover all relevant literature exhaustively and objectively
    - Usually by invitation only, but a proposal and outline can be submitted to a journal editor, who may issue an invitation in response

# Deviations from typical structure (2)

- Methodology papers: generally follow this pattern
  - Introduction
  - Derivation of the method
  - Presentation of a practical protocol [“recipe”]
  - Validation
    - Performance for some relevant practical problems
    - Don’t “shoot fish in a barrel”
  - Conclusions
    - A word of advice: don’t claim your method is a panacea, state reservations and limitations honestly
  - Appendices:
    - Used for material required to “get the job done” (e.g., proof of some needed mathematical theorem or lemma) but that would break up the flow of the paper too much
      - Too little for separate paper
      - Too good to just “bury” in Electronic Supporting Information

# How *not* to start writing

- Start at the beginning and move on straight to the end
  - When I've successfully done this, I was actually “cheating” since I had basically written the thing in my head before sitting down at the computer
  - Otherwise, a recipe for “writer’s block”
  - One scenario where this may be practical after all: reworking a talk into a paper
    - since you (should) have a coherent outline already

# A good place to start

- Prepare all your tables and graphs
- Study them carefully.
- Every observation you can think of: write down in sketchy form, either on 3x5 index cards or in a word processor with an outline mode (a separate screen may be helpful: I use Evernote on a 2nd computer, have used my phone in the past)
  - alternatively, print the graphs out and annotate the printouts
- After the first pass, rearrange the cards in a logical order. Then type up in outline (“bullet point”) form
  - If already in outliner, you can obviously skip typing
  - you may get ideas to check things
- Make a second pass
  - any additional experiments/calculations required or desirable?
    - if yes, feasible with available resources in realistic time?
- Iterate until convergence
- You now have the skeleton of “Results and Discussion”. Now “translate” your bullets into good English prose



# Introduction: ingredients

- Some general context of the problem (don't become *overly* general)
- Specify the problem
- What has been found in previous studies
  - Exhaustive review possible if new and narrow topic
  - Often neither possible nor desirable. Generally, make sure to cite:
    - First paper to address the problem
    - Any good recent review article(s)
    - Papers with key findings directly relevant to the present paper
- What questions remain unanswered
- Goals of the present study
- Often (especially for long papers), a statement of the key findings that will be presented. (“In the following, we will show that...”)

# Detective stories?

- Most of your instructor's early papers are basically in “detective story” form
- However, that is usually not the optimum way to proceed
- Generally more suitable for short to medium-length papers, focused on a very narrowly defined problem (e.g., the hunt for some elusive molecule in interstellar space)

# Abstract

- Should be short (100–300 words)
- State all the key findings concisely
- Anything that people are likely to use as search keywords (acronyms or synonyms)
- In general, the aim is to
  - make people search in SciFinder, Web of Science, PubMed,... notice your paper
  - get them interested enough that they will also read it!
    - [Soviet-era joke:] “Comrade, the KGB has developed a technique for talking to dead people!” “Yes, but will they listen?”
- Write at the beginning or at the end?
  - If the paper is based on a talk given earlier, you generally already have an abstract
  - Otherwise, I generally write mine at the end

# Conclusions section

- Restate salient conclusions of paper
  - some people just quote their abstract verbatim as conclusions (or vice versa)
  - some journals let you get away with stating conclusions in bullet-point form (a personal quirk of mine)
- A statement of reservations may be appropriate in some (self-evident) cases. (“It should be noted that our method is not intended for use on/will break down for/...”)
- Often, a statement of perspectives/prospects for future research/“quo vadis” [“whither next?”] may be appropriate
  - such a statement typically does *not* belong in an abstract

# Acknowledgments

- Usually brief section (1-2 paragraphs) at the very end of the paper
- Mandatory: include all granting agencies that funded the research
  - include grant number, if available
  - generally required for grant progress reports to the granting agency
  - Example: “This research was (partially) funded by Israel Science Foundation grant 709/05 and by the Helen and Martin Kimmel Center for Molecular Design.”
- Essentially mandatory: acknowledge any fellowships you received (especially those requiring progress reports)
- Scientific courtesy:
  - acknowledge any results communicated prior to publication that had a significant impact on the paper
  - any helpful discussions with non-coauthors/comments on preprints/... that were instrumental in shaping the final paper
  - particularly helpful referee comments: your instructor acknowledges whenever he can, but some editors object to “thanking people for doing what should be their job”
- Personal acknowledgments and dedications:
  - parents, amorous partners, friends: “es passt nisht” (Yiddish: “simply not done”) in scientific papers. OK in thesis.
  - festschrift (issue in honor of senior scholar) or memorial issue: many journals have policies that no reference must be made to this being a special issue (to ensure the paper is reviewed like any others). One can do this obliquely by inserting into the introduction a few references to the work of the person being honored/remembered

# Electronic Supporting Information (ESI) and “rich content”

- Not all papers require ESI
- When needed, absolute minimum is: all information needed to repeat the experiment/calculations
- Increasingly, journals can handle “rich content” as part of ESI
  - movies of animations
  - Cartesian coordinate files of molecular structures, displayed as manipulable “ball and stick” structures
    - ensure no platform-specific or for-pay plugins required
  - Source code of computer programs
    - Sample inputs and outputs
  - I often include spreadsheets with raw data, for people to manipulate themselves
  - Etc....

# Free-form discussion