

General Advice for Students

- ✓ Why do so few people make significant contributions?
 - ✓ What is the difference between those who have impact and those who don't?
 - ✓ One factor is expectations
 - ✓ If you think you can't almost certainly you won't
- ✓ Prepare Yourself
 - ✓ The time to start is now
 - ✓ Do what you love (that's easy) and love what you do (that's the challenge)
 - ✓ Don't worry about how intrinsically smart you are or anyone else is
 - ✓ To do significant things you have to neglect other things
 - ✓ Be careful about your commitments but when you commit really do it
 - ✓ Take time to think important thoughts
 - ✓ Refuse to let the urgent drive out the important
 - ✓ Be careful about who you spend time with

Advice for Grad Students

- ✓ Research Requires Courage
- ✓ Research Involves Risks
 - ✓ Social and emotional
 - ✓ Risks to reputation and pride
 - ✓ High probability any particular project, especially if challenging, will fail
- ✓ Transitioning from student to independent researcher
 - ✓ A difficult transition from being a student to being a research contributor
 - ✓ Think of yourself not as a graduate student but as a young researcher in your field (the wider context is key to making wise decisions)
 - ✓ Reputations start early
 - ✓ Learn how to balance multiple things and deal with ambiguity
 - ✓ You have more time and flexibility now than you likely ever will again
 - ✓ Be smart in using your time
 - ✓ Get to know people in your field (email, conferences, talks, visits, ...)
- ✓ Develop a Research Portfolio
 - ✓ Your time is the investment currency
 - ✓ Portfolio should be a mix of differing risk/payoff projects
 - ✓ Adjusting the mix
 - ✓ Work on important problems

Research Advice




- ✓ Goal is to have impact
- ✓ Feedback is key: seek out and value thoughtful critics
- ✓ Do real stuff: make sure you are solving problems some one (especially you!) cares about
- ✓ Stay focused on questions you deeply care about
- ✓ Become methodologically sophisticated and know the literature
- ✓ Develop research taste: for selecting problems, how to attack them, and how to communicate results
- ✓ Your real legacy will be not only you papers but your influence of your colleagues, students, and others

Science is a Social Activity

- ✓ Doing
 - ✓ Collaborate, collaborate, collaborate
- ✓ Talking
 - ✓ Importance of both formal and informal interactions (Hinton, DER)
 - ✓ From water cooler chats to lab meetings to classes and seminars to conference talks
 - ✓ TAing and teaching are important opportunities
- ✓ Writing
 - ✓ A constant activity and continual developing skill (Knuth, DAN)
 - ✓ Set aside time to write
 - ✓ A new challenge is learning how to write proposals

Refuse to let the urgent
drive out the important



Remember it has to be fun too

Writing Advice

Clear Writing Goes Hand in Hand with Clear Thinking

Improving either will improve the other

A Reflective Conversation with Materials

Writing Advice

- ✓ Purpose is not mere presentation of information, but rather its real communication
- ✓ If the reader is to grasp what the writer means, the writer must understand what the reader needs
- ✓ What matters is that your audience accurately perceives what you had in mind
- ✓ Write with the reader in mind

Writing Advice



Expectation and Context

- ✓ Readers do not simply read; they interpret
 - ✓ We cannot succeed in making even a single sentence (even a single word) mean one and only one thing; we can only increase the odds that our readers will tend to interpret our discourse according to our intentions.
- ✓ Structure is important in helping manage interpretation
 - ✓ Interplay between substance and structure
 - ✓ Information is interpreted more easily and more uniformly if it is placed where most readers expect to find it
- ✓ Take care with the different levels of the units of discourse
 - ✓ Every unit has a purpose and a structure (at least a beginning and an end)
 - ✓ article - section - paragraph - sentence - clause - word
 - ✓ spend time thinking about each level
- ✓ Part of learning to write (and read) scientific papers is learning the genre

Writing Advice



At each level there is a topic position

- ✓ For example, the information that begins a sentence establishes for the reader a perspective for viewing the sentence
 - ✓ readers expect a unit of discourse to be a story about what shows up first
 - ✓ readers also expect the material occupying the topic position to provide them with linkage (looking backward) and context (looking forward)
 - ✓ In reading, as in most experiences, we appreciate the opportunity to become familiar with a new environment before having to function in it

Conflicts between writing and reading

- ✓ One of the many reasons rewriting is important is that on initial writing you are often trying to get out a new thought and you naturally focus on the new information. This is the need of you as a writer. The reader needs this new information to be tied to old and for a context to be built up to help them interpret it.

Writing Advice



Heuristics

- ✓ Follow a grammatical subject as soon as possible with its verb
- ✓ Provide a context for the “new information” you want the reader to emphasize
- ✓ Place appropriate “old information” (material already stated in the discourse) in the topic position for linkage backward and contextualization forward
- ✓ Articulate the action of every clause or sentence in its verb
- ✓ Provide context for the reader before asking the reader to consider anything new
- ✓ Try to ensure that the relative emphases of the substance coincide with the relative expectations for emphasis by the structure
- ✓ and many, many more heuristics

Writing Advice



Before You Write

- ✓ Put time and thought into your paper before you start a first draft
- ✓ For your paper to be interesting and effectively communicate, you need to
 - ✓ present a point of view
 - ✓ interpret rather than merely summarize what you have read
 - ✓ argue your position logically

Outlines

- ✓ Often a good idea
- ✓ Useful when you get stuck

Writing from the Inside Out

- ✓ What are the main points you want to make?
- ✓ What does the reader need to know to understand those points?

One Metaphor: Taking your readers on a trip

- ✓ Keep them from getting lost
- ✓ Make the journey interesting

Know Your Reader

Writing Advice

Stages: Thinking, Drafting, Revising and Editing (multiple passes; many, many)

Drafting

- ✓ Draft is writer-centered; you are telling yourself what you know and think
- ✓ This is often the most creative part
- ✓ Concentrate on getting out the ideas and then explaining and supporting them
- ✓ Don't focus on low level details (spelling, word choice, ...) at this point

Revising

- ✓ This is where most of your time should be spent
- ✓ Become reader-centered; focus should be on readers' needs and expectation.
 - ✓ What do you need to say to convince the reader?
 - ✓ Is the organization effective?
 - ✓ Do readers need to know X before they can understand Y?
 - ✓ Your job is to make the reader's job easy
- ✓ Focus on structure at each level; from overall argument structure, to section and paragraph structure, to sentence structure, to word choice
- ✓ Make connections between ideas explicit and clear

Editing

- ✓ Check for grammar, mechanics, and spelling. Don't forget to spell check your paper as the very last thing you do
- ✓ Avoid low-level editing until late in the writing process

Revising

Takes Time

- ✓ Multiple sessions. Putting it aside is important

Be Willing to Delete

Get Feedback

- ✓ You are often not the best judge of whether your draft is clear
- ✓ Discuss aloud what you are trying to achieve
- ✓ Read your paper aloud. Ears can pick up what your eyes miss

Construct a Backward-Outline

- ✓ Identify the main idea(s) in each paragraph. Rank their importance in advancing your thesis. Consider connections between and among ideas

Rethink Your Thesis

- ✓ Consider how your argument can be restructured, how points might be reordered, how you can cut irrelevancies or redundancies, how you can add complications and implications

Then Work on Introduction and Conclusion

- ✓ Now you know what you want to say
- ✓ Begin paragraphs with topic sentences
- ✓ Link ideas in each paragraph to your thesis

Proofread

- ✓ Aim for precision and economy of language
- ✓ Sometimes good way to get back into a paper but be careful