Writing Advice

What Will You Be Writing and When?

- Write early and often
- Helps to focus logic
- Great mechanism to share ideas
- Technical reports: good ideas, preliminary results, early versions of papers
- Conference papers: varying difficulty of acceptance; tough conferences typically have 20% to 25% acceptance rates
- Workshop papers: often easier to get accepted, great opportunities to meet important researchers in focused areas
- Journal papers: typically more content than conference papers, approx. 2 year turn-around

Barriers to Writing

- **Writing well is hard**
- **Fear**
- **Lack of consistent effort**
- **Poor writing skills**
  - Little Red Schoolhouse course
  - Every quarter
  - Great for non-English speakers
  - Good review of basic grammar, sentence structure, usage

Do You Need a Review of Basic Writing?

- **Are there errors in the following sentences?**

- We used a defective hammer which broke after pounding the first nail.
- The dog lost it's bone.
- He had to choose between three options.
- I feel badly about that.
- She went along with Emily and I when we visited Mom.
- After our company hired a new typist, our proofreader found less mistakes than usual.

Typical Paper Organization (Systems)

- **Abstract:** summarize results
- **Introduction:** motivate problem, again summarize results, outline of paper
- **Background:** discuss issues, design choices
- **Experimental methodology:** describe simulation environment, testing conditions, benchmarks, hardware, experiments
  - **Goal: describe experimental conditions in enough detail that other researchers can duplicate your experiments**
- **Results:** experimental data, analysis
- **Conclusions:** summarize results, contributions of paper

Strategies for Writing

- Start with an outline
- Write rough drafts
- Be concise (hard)
  - Two extremes: too much or too little
- State ideas clearly (harder)
- Avoid the wrong tone: not too formal, not too colloquial
  - (e.g., don't use Usenix-style slang about hacks in a conference paper; know your audience)
- Finding the right tone:
  read lots of papers! (good ones)

- Avoid unnecessary jargon
- Define terms the first time they are used
  - Sometimes need to re-define later in the paper
- Write in third person plural ("We" not "I")
- Use active voice, not passive voice
  - "We designed and measured a large disk array" NOT "A large disk array was designed and measured"
- Start paragraphs with topic sentences

- Overall structure: emphasize main ideas and results
  - Chronological order is not the best (First I did X, then I did Y, ...)
  - Just because you spent a lot of time working on something doesn't mean it contains an interesting idea
- "Avoid adverbs"
  - Eliminate "very", "seriously", "extremely"
  - Don't say your technique is "very effective"-- state your results and let others evaluate them
  - Technology trends change fast: "very high bandwidth" is likely to look low in a few years
- Write smooth transitions between sections

- Don't be arrogant
  - "We invented this technique..."
  - "We discovered this fundamental truth..."

- Don't write a mystery novel
  - Don't put minor points before major ones (This method was good, ... but a second method was better, ... and the third was best of all.)
  - State main ideas and results in abstract and introduction
  - Preview results at beginning of each section
  - Clearly summarize results in conclusion section
  - "Tell them what you're going to tell them, tell them, and tell them what you told them."

- Think about what a casual reader will look at:
  - Abstract
  - Introduction
  - Figures/tables
    - Write captions that explain the lessons to be learned from the graphics
  - Conclusion

- Editing tips:
  - **Read it out loud**
  - Spell check
  - Grammar check
  - That/which checks
  - Eliminate adverbs ("very")

Questions from "How to Write a Good Systems Paper"

- **Original Ideas**
- Are the ideas in the paper new?
- How do you know? Know the state of the art, current research
- Can you state the new idea concisely?
- What is the problem being solved? Explain why it can't be solved using existing techniques
- Is work significantly different from other published work, or an obvious extension of existing techniques? (avoid LPU: least publishable unit)

- Are the ideas significant enough to justify a paper?
- Are comparisons with previous work clear, explicit?
- Does the work comprise an extension, validation or repudiation of earlier but unproven ideas?
- Have you referenced older as well as recent papers?
  - Don't "reinvent" 20-year-old ideas
  - Avoid unpublished material, personal communication references
  - Goal: other people can follow your reasoning, have access to the same background material you had

- **Reality**
- Be honest: implementation or paper design?
- If implemented, how has it been used and what has been learned?
- Negative results are interesting: "we thought this would work, but it didn't"
- Usual model: publish a design paper early, and then a year or two later, publish an experience paper
- Usually: successful design papers include early implementation results

- **Lessons Learned**
- What have you learned?
- What should readers learn? Spell lessons out.
- How generally applicable are these lessons? State assumptions on which conclusions rest.

- **Choices**
- What were the alternatives considered?
- Why were choices made the way they were? Explain.
- Were original choices correct? Were hypotheses correct?

- **Context**
- What are the assumptions?
- Are they realistic? Especially important for unimplemented systems. (Simulators only as good as the models on which they are based.)
- How sensitive are results to the assumptions?

- **Focus**
- Remove excess baggage from introductory sections
- Support your main points
- Include just enough material from earlier work for readers to follow arguments

- **Presentation**
- Are ideas organized and presented clearly, logically?
- Terms defined before use?
- Minimize forward references ("Each file contains a list of items, which will be described in Section 9")
- What is intent of paper: global survey or selective treatment
- Does abstract communicate important ideas of paper?
- Avoid passive voice
- Avoid references to future work. ("Note to reviewers: this vaporware design will be fully implemented, debugged, measured and evaluated in the final paper." --- Reviewers don't believe these!)

Thesis Writing

- Consistent effort
- Avoid burnout
  - Pick your most productive hours of the day
  - Guard those hours vigilantly: Write every day during that period
  - Your job: 2 to 3 hours of writing every day