Top-10 tips for writing a paper

Jim Kurose
Department of Computer Science
University of Massachusetts
2006 CoNEXT student workshop panel

1: Every paper tells a story
- what is the “elevator pitch” of your story?
  elevator pitch = summary that is short enough to give during an elevator ride
- the story is not what you did, but rather
  ◦ what you show, new ideas, new insights
  ◦ why interesting, important?
- why is the story of interest to others?
  ◦ universal truths, hot topic, surprises or unexpected results?
- know your story!

2. Write top down
- computer scientists (and most human beings) think this way!
- state broad themes/ideas first, then go into detail
  ◦ context, context, context
- even when going into detail … write top down!

3 Introduction: crucial, formulaic
- if reader not excited by intro, paper is lost
- recipe:
  ◦ para. 1: motivation: broadly, what is problem area, why important?
  ◦ para. 2: narrow down: what is problem you specifically consider
  ◦ para. 3: “In the paper, we …”: most crucial paragraph, tell your elevator pitch
  ◦ para. 4: how different/better/relates to other work
  ◦ para. 5: “The remainder of this paper is structured as follows”

4. Master the basics of organized writing
- paragraph = ordered set of topically-related sentences
- lead sentence
  ◦ sets context for paragraph
  ◦ might tie to previous paragraph
- sentences in paragraph should have logical narrative flow, relating to theme/topic
- don’t mix tenses in descriptive text
- one sentence paragraph: warning!

5. Put yourself in place of the reader
- less is more:
  ◦ “I would have sent you less if I had had time”
  ◦ take the time to write less
- readers shouldn’t have to work
  ◦ won’t “dig” to get story, understand context, results
  ◦ need textual signposts to know where “story” is going, context to know where they are
    • good: “e.g., Having seen that … let us next develop a model for … Let Z be …”
    • bad: “Let Z be”
- what does reader know/not know, want/not want?
  ◦ write for reader, not for yourself
6. Put yourself in place of the reader
- page upon page of dense text is no fun to read
  - avoid cramped feeling of tiny fonts, small margins
  - create openness with white space: figures, lists
- enough context/information for reader to understand what you write?
  - no one has as much background/content as you
  - no one can read your mind
  - all terms/notation defined?

7. No one (not even your mother) is as interested in this topic as you
- so you had better be (or appear) interested
- tell readers why they should be interested in your “story”
- don’t overload reader with 40 graphs:
  - think about main points you want to convey with graphs
  - can’t explore entire parameter space
- don’t overload reader with pages of equations
  - put long derivations/proofs in appendix, provide sketch in body of paper

8. State the results carefully
- clearly state assumptions (see overstate/understate your results)
- experiment/simulation description: enough info to nearly recreate experiment/description
- simulation/measurements:
  - statistical properties of your results (e.g., confidence intervals)
- are results presented representative?
  - or just a corner case that makes the point you want to make

9. Don’t overstate/understate your results
- overstatement mistake:
  - “We show that X is prevalent in the Internet”
  - “We show that X is better than Y” when only actually shown for one/small/limited cases
- understatement mistake: fail to consider broader implications of your work
  - if your result is small, interest will be small
  - “rock the world”

10. Study the art of writing
- writing well gives you an “unfair advantage”
- writing well matters in getting your work published in top venues
- highly recommended:
- who do you think are the best writers in your area: study their style

11. Good writing takes times
- give yourself time to reflect, write, review, refine
- give others a chance to read/review and provide feedback
  - get a reader’s point of view
  - find a good writer/editor to critique your writing
- starting a paper three days before the deadline, while results are still being generated, is a non-starter
Section Headings as a Roadmap

User-Guided Symbiotic Space-Sharing of Real Workloads,

1. Introduction
2. Symbiotic Space-Sharing
   2.1 Increased Environment
   2.2 Effects of Resource Contention
   2.3 Scheduling of Parallel Applications
   2.4 Prototype Scheduler
3. Symbiotic Space-Sharing Practice
   3.1 Realistic Application Workload
   3.2 What Do Users Know?
   3.3 User-guided Symbiotic Space-Sharing
4. Related Work
   4.1 Multithreading
   4.2 Paging
   4.3 Time-sharing
   4.4 SMP Memory Bus Contention
   4.5 Other Related Work
5. Conclusions and Future Work

Section Headings as a Roadmap

Sparrow: Distributed, Low Latency Scheduling by Kay Ousterhout,
Patrick Wendell, Matei Zaharia, and Ion Stoica, SOSP ’13

1. Introduction
2. Design Goals
3. Sample-based Scheduling for Parallel-Jobs
   3.1 Terminology and job model
   3.2 Per-task sampling
   3.3 Batch sampling
   3.4 Problems with sample-based scheduling
   3.5 Late binding
   3.6 Proactive Cancellation
4. Scheduling Policies and Constraints
   4.1 Handling placement constraints
   4.2 Resource allocation policies
5. Analysis
6. Implementation
   6.1 System components
   6.2 Spark on Sparrow
   6.3 Fault tolerance
7. Experimental Evaluation
8. Limitations and Future Work

Section Headings as a Roadmap

Sparrow: Distributed, Low Latency Scheduling
by Kay Ousterhout, Patrick Wendell, Matei Zaharia, and Ion Stoica, SOSP ’13

1. Introduction
2. Design Goals
3. Sample-based Scheduling for Parallel-Jobs
4. Scheduling Policies and Constraints
5. Analysis
6. Implementation
   6.1 System components
   6.2 Spark on Sparrow
   6.3 Fault tolerance
7. Experimental Evaluation
8. Limitations and Future Work

Section Headings as a Roadmap

Sparrow: Distributed, Low Latency Scheduling
by Kay Ousterhout, Patrick Wendell, Matei Zaharia, and Ion Stoica, SOSP ’13

1. Introduction
2. Design Goals
3. Sample-based Scheduling for Parallel-Jobs
4. Scheduling Policies and Constraints
5. Analysis
6. Implementation
   6.1 System components
   6.2 Spark on Sparrow
   6.3 Fault tolerance
7. Experimental Evaluation
8. Limitations and Future Work

Section Headings as a Roadmap

Sparrow: Distributed, Low Latency Scheduling
by Kay Ousterhout, Patrick Wendell, Matei Zaharia, and Ion Stoica, SOSP ’13

1. Introduction
2. Design Goals
3. Sample-based Scheduling for Parallel-Jobs
4. Scheduling Policies and Constraints
5. Analysis
6. Implementation
   6.1 System components
   6.2 Spark on Sparrow
   6.3 Fault tolerance
7. Experimental Evaluation
8. Limitations and Future Work

CIS 640: Logical Flow, “Tell a Story”

- Section and subsection titles should tell the story
- Topic sentences of each paragraph should tell the story
- Each paragraph should tell the story
  - Tell ’em what you are going to say
  - Say it.
  - Tell ’em what you said.
### Paragraphs
- Guide the reader through the paper
- Explain, substantiate, support your claims
- A paragraph is a group of sentences focused on one idea
- **One paragraph <-> one major point or idea**
- Each paragraph has a **topic sentence** that expresses the main idea of the paragraph, tells the reader what this paragraph will be about

### Structure of the paragraph
**Sandwich Structure**
- Topic sentence
- Support sentences
- Recap or summary sentence
- Claim
- Evidence
- Concluding observation

### Types of Paragraphs
- **Narration**
- **Description**
- **Definition**
- **Example and Illustration**
- **Division and Classification**
- **Comparison and Contrast**
- **Analogy**
- **Cause and Effect**
- **Process**

### Coherent Paragraphs
- **Coherence**: details of the paragraph fit together in a way that constitute a focused set of ideas
  - Choose the right paragraph pattern
  - Write sentences that support the topic sentence
  - Write sentences that flow naturally one from the next regarding the ideas
  - Write sentences that make sense within the paragraph, belong to that paragraph

### Cohesive Paragraphs
- **Cohesion**: the sentences flow naturally, one to the next based not only on the ideas, but also on the writing style
  - Connect the ideas logically
  - Use consistent style across sentences (terminology, tense, tone, point of view)
  - Use transitional words and phrases (watch out for illusory cohesion – use of the transitional words mechanically)
5 Steps to Writing an Effective Paragraph
(Prof. Mike Kaspari, U. Oklahoma)

- Have a compelling and descriptive topic sentence
- The body should have an inevitable logic
- Include a juicy example
- Mix up your sentence structure
- Conclude with a strong summary statement.