

# Writing a research paper

# Organizing a research paper

- Decide up front what the point of your paper is and stay focused as you write
- Once you have decided on the main point, pick a title
- Start with an outline
- Use multiple levels of headings (usually 2 or 3)
- Don't ramble!

# Typical paper organization

- Abstract - Short summary of paper
- Introduction - Motivation (why this work is interesting/important, not your personal motivation)
- Background and related work - Sometimes part of introduction, sometimes two sections
- Methods - What you did; in a systems paper you may have system design and evaluation sections instead
- Results - What you found out
- Discussion/Conclusions - May include conclusions, future work, discussion of implications, etc.
- References
- Appendix - Stuff not essential to understanding the paper, but useful, especially to those trying to reproduce your results - data tables, proofs, survey forms, etc.

# Road map



- Papers longer than a few pages should have a “road map” so readers know where you are going
- Road map usually comes at the end of the introduction
- Tell them what you are going to say, then say it, (and then tell them what you said)
- Examples
  - In the next section I introduce X and discuss related work. In Section 3 I describe my research methodology. In Section 4 I present results. In Section 5 I present conclusions and possible directions for future work.
  - Waldman et al, 2001: “This article presents an architecture for robust Web publishing systems. We describe nine design goals for such systems, review several existing systems, and take an in-depth look at Publius, a system that meets these design goals.”

# Use topic sentences

- (Almost) every paragraph should have a topic sentence
  - Usually the first sentence
  - Sometimes the last sentence
  - Topic sentence gives the main point of the paragraph
- First paragraph of each section and subsection should give the main point of that section
- Examples from Balebako et al, 2015
  - In this section, we provide a brief background on policy in the United States regarding smartphone data collection.
  - Smartphones have characteristics that distinguish them from personal computers (PCs), and impact the harms and concerns from data sharing.

# Avoid unsubstantiated claims

- Provide evidence for every claim you make
  - Related work
  - Results of your own experiments
- Conclusions should not come as a surprise
  - Analysis of related work, experimental results, etc. should support your conclusions
  - Conclusions should summarize, highlight, show relationships, raise questions for future work
  - Don't introduce completely new ideas in discussion or conclusion section (other than ideas for future work)
  - Don't reach conclusions not supported by the rest of your paper