Two steps in Writing

- Progress:
  - Organizing yourself and your thoughts

- Writing:
  - **General stylistic guidelines**
  - Specific (but important) suggestions

The Writing Process

- Writing should **be part of** the research process
  - It's really hard to "Do The Work" and then "Write It Up"
  - Writing down your glimpse of thoughts
  - Writing on a regular basis helps to pin down the details, and helps to focus your ongoing research
  - Writing about papers you read
  - Keep the advisor aware and remember what you are doing. (memo is important)

General paper structure

- Introduction
- Motivation
- Main Design
- Performance Evaluation
- Related work
- Conclusion

Abstract

- 150 – 200 words
- 1 sentences about the problem considered in this paper (and 1 sentences about the specific area/topic)
- 1-2 sentences as to why the problem is interesting (a.k.a important) to study
- 1-2 why other schemes did not solve it politely and objectively
- 1-2 sentences describing main idea
- 1-2 sentences on the evaluation methodology (show effort)
- 1 sentence highlight the key result.

Section 1: Introduction

- This section is an expanded version of the Abstract
  - WHAT you are talking about
  - WHY Bother
  - Why smart people like you did not solve it (Timing? Trends?)
  - How: you main idea

- One logical way to organize it is to: expand the abstract and replace each grouped set of sentences with a paragraph.

Section 1: Introduction

- You might add a brief 1-2 paragraph on critiquing related work in general
  - Recommend NOT to talk too much about particular work in this section
- A short paragraph on key contributions and key performance results from the paper
- Do not provide too much details on your design
- It is YOUR job to sell this paper and this Section is critical in setting the reviewer's mindset; you must make them want to read the rest of the paper

Section 2: Motivation

- Expand the motivation paragraph in introduction to evidences
  - Use data to show why the problem you mention is true or interesting. E.g. sensing irregularity.
  - Use data to show why the assumption you make is true. E.g., radio would not change very quickly
  - Use data to show why previous problems do not work (under the setting you identified)

- Motivation should be different form design/challenges

Section 3: Main Design Section

- Clear presentation (formal if possible) of problem statement; constraints considered, design goals/objectives
- Clearly the assumptions. Defend your assumption (not just list them)
- Present all formal notations/definitions and acronyms
- Proposed Mechanism(s)
  - This might be split into several sub-sections
  - Build up your work in a manner easy to understand for the reader
- Use of figures AND examples to illustrate concepts is important
- Complex Algorithmic /flowcharts shall be avoid
- Number Important Theorems, Definitions, Equations

Section 4: Performance Evaluation

- Theoretical Analysis (normally in design part in system paper)
- Empirical (Experimental Analysis)
- Simulation or Programming package based Analysis

- Clearly state:
  - Methodologies used
  - System Assumptions used in the evaluation
  - System parameters that are varied
  - Performance metrics that are studied

Section 4: Performance Evaluation

- Baselines
  - Naïve design
  - Optimal solution (using exhaustive search)
  - State of art baseline
  - Variations of the schemes you proposed

Section 4: Performance Evaluation

- Do not think that the user can figure out everything just by looking at the graph or table

- If you are using graphs/tables to present results, the explanations of these are really critical
  - 1 sentence to describe what this experience is about
  - 1 sentence to describe the general trend of results
  - 1 sentence highlight abnormalities in a graph (if any)
  - 1 sentence to choose one date point to explain the different between difference between your solution and baselines.

  - Be objective in this section – if your algorithm fails for some cases, state so – do not gloss over that fact!

Section 4: Performance Evaluation

- When presenting graphs:
  - Are x-axis, y-axis clearly labeled in the figure and explained in text?
  - Are font sizes readable (by middle-aged people in the least!)
  - Are legends legible in the figure – it is easy to visually differentiate the different plots in a graph?
  - Rule of thumb: around 5 plots per graph is good (for line plots)
  - Use bar graphs, line graphs effectively - try different means and see which one conveys results better
  - Do not Microsoft Excel (my recommendation!) – Use gnuplot, matlab, or other packages
- Summarize the key findings from the performance studies in a paragraph at the end of the Section

Section 5: Related Work

- Purpose of related work
  - Officially: provide background on your work
  - Implicitly: explain why your work is new

- Taxonomy & Design space coverage
  - Why you are new or different
  - Be cautious about judging/criticizing other's work.

- Finish with a paragraph on WHAT is missing from past work (for e.g., they make unrealistic assumptions, they work only for restricted cases) and how your paper is different from all those.

Other sections

- Discussions and Future Work
  - You might try to stay ahead of the reviewers by stating your mechanism's known weaknesses and where improvements are possible
  - Do not sweep dust under the rug
- Conclusions/Summary Section
  - This is similar to the abstract – but do not cut-and-paste
- Acknowledgments (Be specific, Be honest, and be generous)
- Bibliography
- Appendices
  - Detailed proofs that are not needed in main section; Detailed tables
  - Conference papers (non-theory) usually do not have app