

# Discussion of last week's homework

- How did you select conferences/journals?
- How did you select the paper?
- How did you select your project topic?

# Scientific reading and reviewing

# **WHY AND HOW TO READ RESEARCH PAPERS?**

# Why read research papers?

- Read for a conference or a class
- Keep current in your own field
- Get “up to speed” in a new field
  - Learn about a sub-field (e.g., wireless)
  - Learn about another discipline that may offer solutions to a problem

# Too many papers...

- Example: Networking Conferences
  - SIGCOMM: ~ 40 papers
  - SIGMETRICS: ~ 20 papers
  - IMC: ~ 40 papers
  - CoNext: ~ 30 papers
  - ICNP: ~ 30 papers
  - Infocom: ~ 100 papers
  - Journals, workshops, ...
- Per year: More than 2,000 pages to read
- Impossible to read it all...
  - doesn't even count cross-disciplinary reading

# Step 1: Deciding *what* to read

- **Purpose:** Learn about “hot topics” of current research in an area. (searching for problems, etc.)
- **Approach:** Scan papers in latest conference proceedings
  
- **Purpose:** Get up to speed on sub-field
- **Approach:** Transitive closure of related work of papers in a top conference
  
- **Purpose:** Learn about an area that is further afield
- **Approach:** Ask expert colleagues

# Step 2: Deciding *How* to Read

- Always “top down”
  - First: Abstract, introduction, conclusion
  - Rest of paper if necessary
    - If you want to do follow-up research
    - If you want to better understand the methods/conclusions
- Next steps depend on specific purpose
  - News reading
  - Deep diving
  - Literature survey

# Invariant comprehension questions

- What is the **problem**?
- What are the **contributions**?
- What are the **conclusions**?
- What is the **support** for the conclusions?



# Invariant Evaluation Questions

- What is the “**intellectual nugget**”?
  - Each paper should have a single key intellectual contribution
  - Remembering this key idea will also give your brain a way to “index” the paper
- What is the main conclusion/contribution?
  - New finding? Method? Perspective?
- (Why) is the conclusion **important**?
- Does the content **support** the conclusion?
  - If so, how?
  - Are the methods sound? In other words, do the main conclusions appear to be correct?
  - Are the results likely to be affected by the method?

# Reading the News

- **Conference proceedings**
  - Goal: Grasp main idea of a collection of a large number of papers. Keep informed about problems and recent solutions
- **Top-Down Method**
  - Skim table of contents: Papers are clustered into “sessions” which typically identify the main areas
  - Consider authors
  - Prioritize by (1) area of interest (2) reputable authors

# Deep Diving

- **Goal:** seek to understand some problem area in greater depth
- Find the seminal paper in the field
- Read carefully, including evaluation

# Literature Surveys

- Create the seed
  - Recent paper from top conference
  - Survey paper, if one exists
  - Seminal paper, if it is different from the above
- Perform transitive closure of cited work
  - Read related work sections of above papers

# Keeping Notes

- One-sentence summaries are infinitely better than nothing at all
- Primitive approach: Single file of notes
- Better: Database with BibTeX
  - There are some existing tools for bibliography management
  - Will also help you more quickly construct related work sections for your papers

# From Reading to Research

- A major reason to read research papers is to obtain new research ideas
- How can we arrive at new research ideas by studying papers that describe “solved problems”?

# Some Questions to Ask

- **Time travel:** Will the solution apply  $n$  years from now?
- **Context switch:** Does the solution or technique apply to other problem domains?
- **Unfinished business:** Does the paper describe future work or directions? Open problems?

# More Questions

- **Follow Up:** Can the claims in the paper be better supported using other methods? Or, perhaps refuted?



# **HOW TO REVIEW A PAPER?**

# Reading vs. Reviewing

## Reading

- Information gathering, typically for the benefit of your own research  
(You are a scientist.)

## Reviewing

- Goal is to
  1. Determine a paper's suitability for some conference
  2. Provide feedback to authors to improve paper

(You are a teacher/evaluator.)

# A review form

- Confidence of the reviewer
  - Multiple choice
  - What is your qualification for reviewing the paper?
- Evaluation
  - Accept, weak accept, can't decide, weak reject, reject
- Summary of the paper
  - Your summary of the paper and its main contributions
- Strengths
- Weaknesses
- Detailed comments
  - Comments to back-up your rating and help authors improve paper
- Confidential comments for the committee

# The Best Reviewers Are Able to Provide One Bit of Information

- Should the paper be accepted or rejected?
- Always arguing to accept or reject papers doesn't provide useful information
  - A middle-of-the-road approach is necessary

# Main Question

- **Does the paper make a significant contribution to the field?**
- Are the results **surprising**?
- Would the paper spark **new research**?
- Are the ideas **clearly expressed**?

# First Step: Read and Re-Read

- Read the paper once to get the main ideas and contributions
  - Try to make the “one bit” decision here
- Read again and take notes (for your review)
- Start to organize a review...

# Evaluation Method

- Motivation and Conclusions
  - Is the problem important?
  - Will a solution advance the state of the art?
  - Is there a single important intellectual contribution?
- Support
  - Are the results sound, and does the evaluation support the conclusion?
- Learning
  - Did you learn anything? Was it worth learning?
  - Will the paper generate discussion?

# Consider the Audience

- Will this generate discussion?
- Is this a paper that's going to send people to the hallway?
- Will the people who commonly read these proceedings benefit from the contributions?
  - Would people who read *other* proceedings benefit more from the paper?



# Consider the Standards

- Workshops are typically more permissive as far as accepting “vision” without completed, supported work
  - More emphasis on “fostering discussion”
- Conference: Depends on quality of papers in the reviewers’ piles and selectivity
- Journals often have the highest standards, especially since the review process is iterative

# Consider the Purpose

- Survey
  - Is the overview complete?
- Tutorial
  - Is the description correct and clearly described?
- Proposal
  - Does the research agenda that is advocated make sense?  
Is it worthwhile?

# How to Write the Review Itself

- **Start with a summary**
  - Demonstrates to the authors (and to you!) that you understand the main point of the paper
- Discuss how authors do or do not deliver on the claims/contributions of paper
- Discuss positive aspects (if any)...try to find something
- Provide high-level suggestions for improvement
- End with nits (spelling, punctuation, etc.)

# General Tips on Tone and Content

- Be polite and respectful
- Provide suggestions for how to improve the paper
  - You may see the paper again!
  - If the paper is accepted, the flaws should be fixed
- Be positive
- The point is *not* to shoot the paper down

# Common Mistake: Being Too Critical

- Don't miss forest for the trees!
  - Papers are never perfect
  - Your job is to determine whether a paper's flaws invalidate the contributions (and whether the contributions are significant)
- Being too critical can prevent important research results from being published

# Other mistakes and no-nos

- Insulting the authors
  - Criticize the paper, not the authors
  - “The paper did not address...”
- Revealing your own research agenda
- Distributing submitted papers
- Spending too much time reviewing a paper
  - Rule of thumb: Don’t spend more time reviewing a paper than the authors did writing it!
  - If a paper is sloppy or flawed, don’t waste your time
- ...

# DISCUSSION

V. Paxson, "End-to-End Routing Behavior in the Internet." *IEEE/ACM Transactions on Networking*, Vol.5, No.5, pp. 601-615, October 1997.

What is the problem?



What are the contributions?

What are the conclusions?

What is the support for the  
conclusions?

# Why this paper?

- Winner of the *2006 ACM SIGCOMM Test of Time Award*
  - “it marks a moment of change in network measurement.”
  - “Paxson showed that, using proper statistical techniques (notably Wolff’s elegant PASTA principle), one could gather considerable information about the behavior of the network core using measurement stations solely at the edge of the network.”

# Homework 2

- One PDF file with two parts
  1. Literature survey for the project (at most one page, not counting references)
    - First, search the literature to identify the most relevant papers to the topic of your project
    - Second, write one page summarizing these related papers.
      - You should do a critical summary of each paper, highlighting how each paper contributes to the state of the art
      - Clearly identify the seminal paper in the area of your project
        - » A seminal paper is a kind of "classic" in a broad meaning of the term. It is a paper which has served as a model for other papers, which first has presented an influential view of theory.
      - Prepare using latex/bibtex
  2. A paper review (no page limit)
    - Write a review for the paper
      - J. Huang, F. Qian, Z. M. Mao, S. Sen and O. Spatscheck, "Screen-Off Traffic Characterization and Optimization in 3G/4G Networks", IMC'12.
      - <http://www-net.cs.umass.edu/imc2012/papers/p357.pdf>
    - Review form available from class website

# Notes on homework

- Some things to pay attention
  - Don't forget your name
  - Follow format specified on the web
  - Follow page limits
- Only accept submissions by deadline
  - Deadline: 1 Oct 2013 11pm CEST
  - Submission site: <https://tibre.lip6.fr/hotcrp/metho13-2>
- Reminder
  - <http://www-npa.lip6.fr/~tixeuil/m2r>
  - Then METHO

# Recommended reading

- S. Keshav, “How to read a paper”, *ACM Computer Communication Review*, July 2007.
  - <http://blizzard.cs.uwaterloo.ca/keshav/home/Papers/data/07/paper-reading.pdf>
- T. Roscoe, “Writing reviews for systems conferences”, March 2007.
  - <http://www.inf.ethz.ch/personal/troscoe/pubs/review-writing.pdf>