

Expect problems and eat them  
for breakfast

*Aziz Mohaisen*

# About me

- Assistant Professor @ UB since August 2015
- Ph.D. from University of Minnesota in 2012
- Senior Research Scientist at Verisign Labs
- Researcher at ETRI from 2005 to 2009
  - ...
- Work on security and privacy in networks
  - and some other random topics
- ... and I run for fun.

# Outlines

- About me!
- Why you should do a Ph.D.
- The (title) problems
- The PROCESS
  - Where to find (research) problems
  - How to solve your problems
  - Publishing and being famous (maybe not really)
  - ... a few words about time management
- What I do (no, really, what I do?)

# Why you should do a Ph.D.

- You are here, so you already know!
  - But seriously, why are you here?
- Personal motivation:
  - I want to learn more about “that thing”!
  - valuable asset; **potentially** higher paid job
  - It’s a prestige (despite inflation)
  - Do things that only Ph.D.'s can do.

## Why you should do a Ph.D., (2)

- Not having the right motivation? Reality:
  - You will live poor for a certain amount of time
  - You will have to live under pressure... a lot of it
  - May not get a lot more money than master's
  - Your job prospects, well, might not be great
- Again, to the positive side:
  - Somebody will pay you (minimally) to do something that you (hopefully) like.

# Expect Problems!

- Staying motivated is really difficult!
  - So you want to finish ASAP
- Sometimes you want to hide! Don't hide for long
  - Commit, deliver frequently, and ask for feedback.
- When you finish, you are expected to be the expert.
  - So be that expert (there's no or).
- Publishing is the name of the game!
  - Read and write, that's easy (said)!
  - And grow your network!
- Time is limited! Manage it wisely.

# The Process

- Find problems
- Solve them
- Publish... and maybe get famous
  - and move on with your life.
  - (do all the coursework before you can move)
- More on time management

# How to Find Problems

- Three possible ways to find problems
  - Find a new problem by yourself
    - Requires preliminary (hard) work!
  - Ask your adviser for a problem to work on
    - They would have a problem or two they work on
  - Consult the community for open problems
    - Perhaps possible in the theory community and less likely in systems in general.
    - Be careful, open problems are difficult ones



# How to Find Problems (1)

- Find a problem by yourself
  - Take a seminar course on your favorite subject
    - You will know what problems people work on!
  - Read the art on a **broad** problem of interest.
    - Know what solutions people tried and why
  - As you go:
    - Develop critical thinking qualities
    - Challenge assumptions (kindly) for a better world!
    - Claim that as your problem, and work on it!

# How to Find Problems (1)

- Read good papers from good conferences
  - Hawaii int'l conf. on sys sci. is an exception
- Don't read bad papers, not even for fun
  - At least not at the beginning of your formative time; not even by famous people!
  - Consult your adviser on what's good.
    - Acceptance rates, impact factors, x-indexes, etc., aren't necessarily the only indicator of good.

## How to Find Problems (2)

- Ask your adviser for a problem
  - Adviser's have problems that they work on
  - Read the art on that particular problem
    - Know what solutions people tried and why
  - As you go:
    - Develop critical thinking qualities
    - Challenge assumptions (kindly) for a better world!
    - Try something new that will solve the problem.

# How to Find Problems (3)

- Ask the community
  - Less likely to get a good problem with system research, but at least worth trying
  - More relevant to theory research, where you'll find papers dedicated to open problems
    - They are really difficult; that's why they are open?
  - Do an internship; problems there are for free
  - Attend seminars and talks
    - Free cookies and some good problems

# In any case

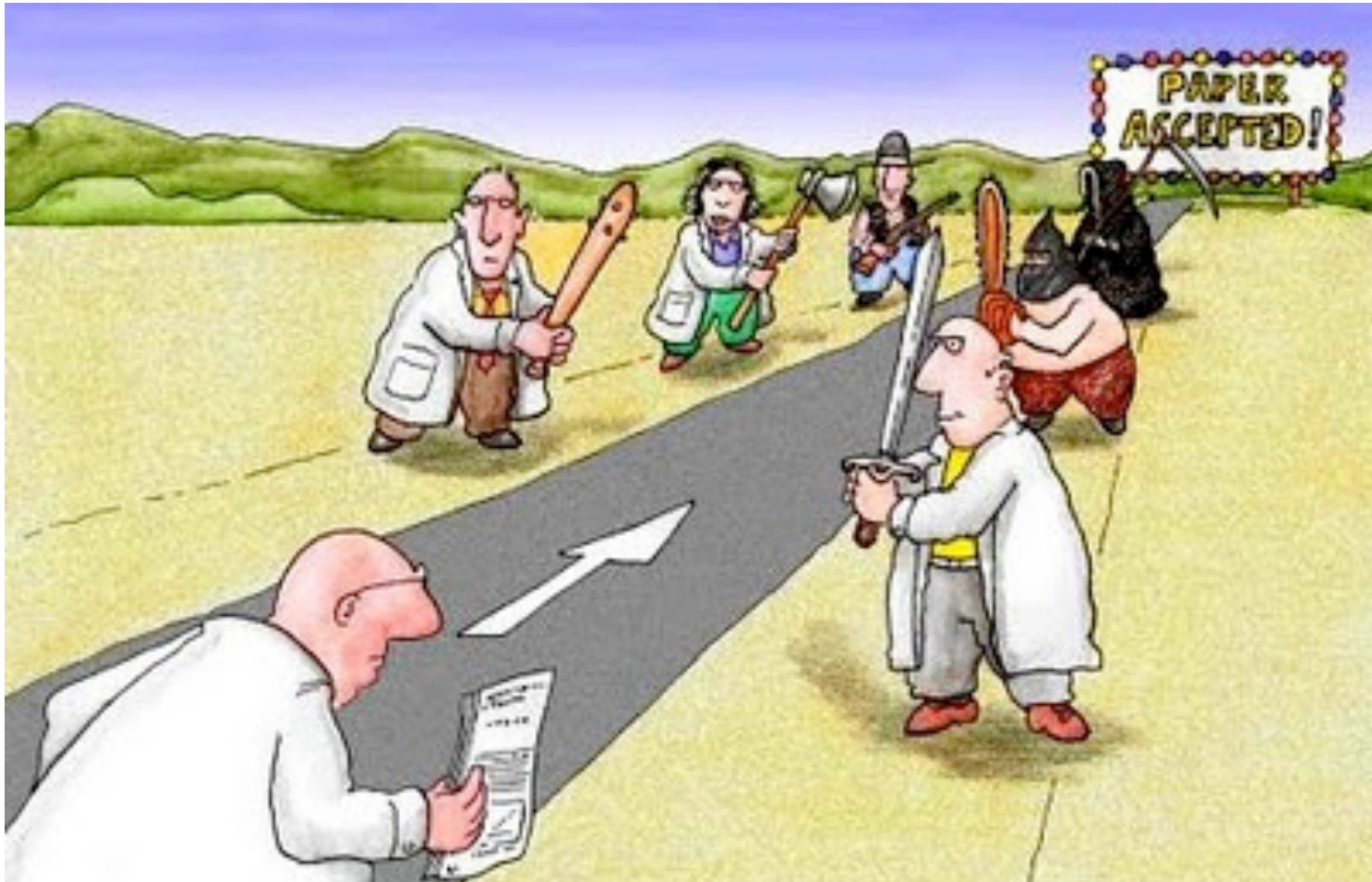
- Start early (as early as possible)
  - Find an adviser with whom you want to work
    - Take a class with that adviser, and do well.
    - My 1 semester rule: you might not like him or her!
  - Communicate with your adviser regularly
    - Hands-on advisers vs. hands-off advisers
      - Both are good – just pick what works for you!
    - Request at least 1 meeting per week!
    - Use your adviser's time wisely.

# How to solve problems

- I don't really know!
- Problems have structure
  - Similar problems are addressed similarly
    - To know that, you have to read enough
- .. And sometimes a problem is all you need.



# On Publishing



# On Publishing

- You don't get a Ph.D. without publishing
  - Peer-reviewed work; conferences & journals.
    - They are selective; 10-15% is not unheard of and 15-25% is the norm for selective conferences.
    - It's an easy measure of your expertise
    - You need that also to get a research job afterwards.
  - How many depends on area, adviser, school, etc
  - Publishing can be a rewarding experience
    - And can be very painful – rejection tastes sour!



## On Publishing (2)

- Being a good researcher doesn't imply being a good writer or vice versa!
  - Writing is a skill you will learn over time
    - Been a researcher for 10 years; I'm still learning.
    - I keep all of my embarrassing drafts
  - Dedicate time to learn writing, and take that learning process very seriously.
  - You have to write to a variety of audiences
    - But elements of style would be the same.

# On Time Management

- Plan your time effectively
- Get to know yourself
- Track your progress!
  - Monthly, weekly, Daily
  - Quarterly, semester-ly, annual, etc.
- Have fun
  - Really, you need that!

# Plan Time Effectively

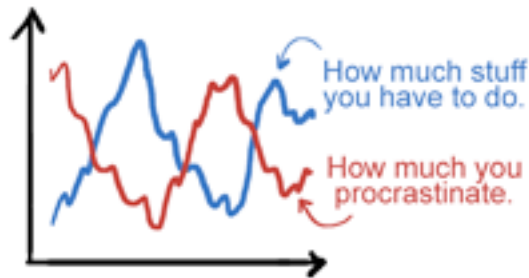
- Keep time
  - Know what you want to do, organize, and commit, and just do it!
- Prioritize
  - Quality goals!
- Accomplish tasks
  - And subtasks; “excellence is not an act”
- Deal with perfection
  - Don't try, really don't try.



# Plan Time Effectively

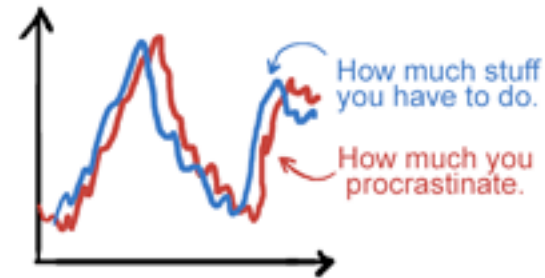
## Procrastination

Ideally:



$$\text{Procrastination} \propto \frac{1}{\text{How much stuff you have to do}}$$

In reality:



$$\text{Procrastination} \propto \text{How much stuff you have to do}$$

JORGE CHAM © 2010

WWW.PHDCOMICS.COM

Get to know yourself!



# Track Your Progress

- Parkinson's Law
  - “work expands so as to fill the time available for its completion”
    - Have firm deadlines
    - ... they will help you achieve goals!
    - ... they will help you prioritize work!
  - Be reasonable about what you can achieve.
    - Get others involved in your deadlines for accountability; adviser 😊

# Work Hard & Have fun!

- Fun is part of time management, too.
  - I regret for not having fun during my Ph.D.
    - Okay, maybe not enough fun.
  - Have a hobby
    - I started all my hobbies after defending!
  - Have friends
    - Grow your social network, not only geeks!
    - One or two close friends you can chat research with
    - Your adviser can be your friend, or maybe not.

# Work Hard

## List of Professor-Approved Holidays

When it's ok to not work:

- Christmas (morning)
- The Apocalypse (but you're still going to check e-mail, right?)
- Your Professor's Birthday



WWW.PHDCOMICS.COM



# What I do! ([bit.ly/1MwrtxY](http://bit.ly/1MwrtxY))

- Security and privacy in networked systems: a security analytics approach
  - Malware analysis and attribution
    - web, binary, infrastructure, etc.
  - DDoS attacks analysis, modeling, and prediction, and defenses.
    - Botnet-based attacks; data-driven approach.
  - Privacy in the DNS (and other) eco-systems
  - Cybercrime economics and intent analysis.

# Conclusion

- You are here, so do your best
  - I hope you are here for the right reasons
  - Work hard, but have fun
  - Time management is very important
  - Start on your research as soon as possible.
- Ask for help when needed
  - Your adviser is your second best friend
    - You are your best friend.
- ... and good luck!

*What To Do When...*

**LIFE GIVES YOU LEMONS.**

**DON'T MAKE LEMONADE!**

**MAKE LIFE TAKE THE LEMONS BACK.**



**GET MAD!**



**YELL - I DON'T WANT YOUR DAMN LEMONS!**

*Then...*



**DEMAND TO SEE LIFE'S MANAGER.**



**BURN DOWN THEIR HOUSE.\***