WCRE 2007 Doctoral Symposium

Some Points of Advice
for those who pursue graduate studies (and more) in software

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Starting a career ...
What does it take…

…

• to do a PhD,
• to get a job,
• to get tenure and promotion?
It takes a few things

• Choose a good problem
• Do demonstrably good work towards addressing the problem
• Publish the work in good venues
• Develop a community of collaborators
• Be open to change

And a good bit of LUCK does not hurt either!
How to Choose a Problem

• Well established vs. Hot
  – Slicing vs. Service Oriented Architectures

• Theoretical vs. Practical
  – Model-driven testing vs. Software Asset Recommendation

• In any case, it should be
  – not too easy and not too hard
  – of interest to (at least) one community
  – in an area for which you have (or are willing to put the time to learn) the background
How to choose a thesis supervisor (or more generally collaborators)

• Senior or junior?
  – It makes a difference wrt fame, money, and time

• In any case, you need to be able to
  – respect and trust them
  – work with them

• *It does not hurt if you like them also*

It’s all about “area” and “chemistry”
How to Do Research

• Read papers
• Keep a record of your work
  – to know where (and how fast) time goes
  – to remember the dead ends that you have been through
• Have regular meetings with your supervisor
  – to manage his/her expectations
  – to put pressure on him/her
• Establish a close group of colleagues
  – who can act as comiserators, cheer leaders, proof readers
• Find a role model
  – to keep being inspired
• Find a mentor outside from your immediate group
  – A senior researcher in the community
  – A member of your particular background (especially important for women)
The “elevator” test

• Are you able to explain what is your goal and why it is important in less than 5 min to a non expert?

• What is « the thesis of your thesis »?
How to evaluate your research

• Internally
  – Algorithm performance

• Against a realistic system case study
  – Algorithm precision and recall in an open-source project

• Against a test bed
  – The “PRedictOr Models In Software Engineering” data sets

• Against an existing straw-man
  – Fact extractors against grep

• Empirically with real developers working on real projects
  – The “Hippikat” approach
How to Publish

• Write good papers
  – On a recognizable, interesting and substantial problem
  – With a good solution that somehow improves on “the state of the art”

• Choose a good mix of venues, including
  – Regular events
  – High-impact venues
  – Venues in each of your potential communities
Decide wisely on the venue mix

- **Conference papers**
  - takes 6/8 months
  - acceptance rate from 10% to 40%
  - good conferences and workshops represent good value for money

- **Journal papers**
  - 6 months up …
  - not only novelty it must be 30% and plus different from conferences
  - for good papers acceptance rate can be as high as 30%-35%

- **Book chapters**
  - you need to be invited and it is not clear how much they count
How to Write a Thesis

• By example
  – Look at good and bad examples
• Think about the overall structure of the document and the internal structure of the chapters
  – Make sure that the structure is explicit
• Writing is tough, be prepared for it
  – Make yourself write regularly
  – Do other things in parallel
How to get a Job

• Make yourself known
  – Participate to conferences, meet people, keep in touch with them regularly

• Decide what kind of job you want
  – Academic, industrial, research only, teaching only

• Decide what other jobs you will consider

• Tell people you are looking for a job (not too much) ahead of time
  – Put your upcoming application in the grapevine
How to Have a Life

- Decide (on a regular basis) what your current priorities are
- Recognize your tolerances
  - How unhappy and for how long can you be?
- Make a point to socialize with your people regularly
Managing Change

- Change is part of the process
- When it happens (you fall out with your advisor, the topic is not working any more, the method or implementation has to change)
  - Do not lament the wasted effort
  - Do not throw good effort after the bad
- Manage it by
  - Reusing as much as possible
  - Reviewing your goals and expected timelines

*It is not the strongest of the species that survives, nor the most intelligent, but the one that is most responsive to change*
Others who know ....

- How to Write Research Papers, Tao Xie, Department of Computer Science North Carolina State University [http://people.engr.ncsu.edu/txie/publications/writepapers.pdf](http://people.engr.ncsu.edu/txie/publications/writepapers.pdf)
- Tomorrow's Professor, Richard M. Reis, IEEE Press.
- Robert K. Yin on “Case Study Research: Design and Methods”