LabMAg
laboratório de modelação de agentes

Taking a PhD in Informatics Engineering

a biased perspective

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PhD in IE – talk overview

- PhD in general
  - the student's point of view
  - the supervisor's point of view
- PhD in IE
  - institutional environment
  - the thesis
  - the future
  - social environment

why take a PhD in IE?

- you should have a solid reason

- sheer pleasure in research
- future job preparation – research related
- better at it than at any other activity
- want to show them how computers could be!

the 1 M€ question

how to succeed getting a PhD?

the student's side

It all depends on the advisor

the advisor's side

that's student's work

Keagle Photography Library – Univ Chicago

a compromise ?

- **yes**

  (the politically correct answer)

  - depends on the advisor
  - depends on the student
  - depends on the institution
  - depends on the context
  - depends ...

bottom line

- committing to one single cause

student's motivation

motivated type

mathematical formulation

- "Newton's" 2nd law of graduation

$$age_{PhD} = \frac{flexibility}{motivation}$$

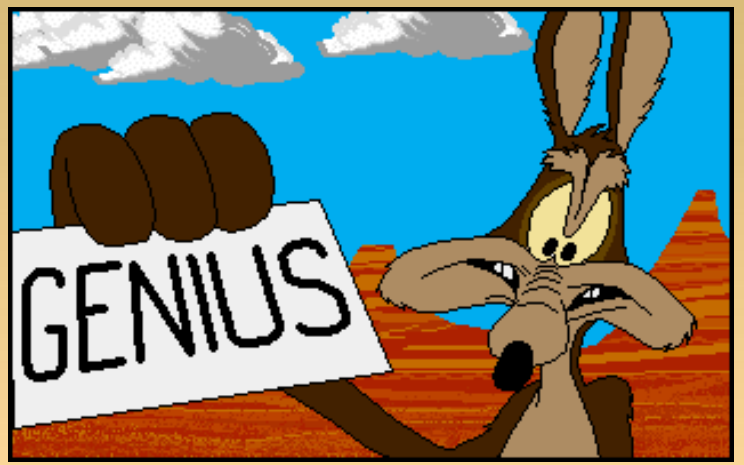
  - *the age of a doctoral process is directly proportional to the flexibility given by the advisor and inversely proportional to the student's motivation*

singularity at m=0

the other 2 laws
(for completeness sake)

- 1st
  - *a PhD student in procrastination tends to stay in procrastination unless an external force is applied to him*
- 3rd
  - *for every action towards PhD there is an equal and opposite distraction*

a recipe



genius is

1% inspiration and

99% perspiration

Thomas Edison

student's helpers

1. work discipline
   - regular working periods
   - plus some extras, when needed
   - self-control time **really** dedicated to research
2. accept criticism
3. research bibliography
   - **a lot!**
4. use advisor as such

student's dismay

- it has been done before
  - helper 3
- lack of ideas
  - helpers 1 and 3
- paper rejection
  - helpers 2 and 4
- is it enough?
  - helper 4

bad modelling happens...

the true (motivated) PhD student

- defends his work!
  - because he has built it in a solid way
  - knowing its limitations – beware of over self-criticism
- always tries to overcome hurdles!
  - a paper was rejected?

    get your act together and then...

    use reviews to improve your paper and resubmit it!

advisor's role

- form student
  - searching & reading refs.
  - conducting research – ask the important questions
  - reviewer activity
- advise
  - help to establish milestones & deadlines
  - support when needed
  - pressure when needed
  - hold back when needed

advisor's helpers

- keep contact
  - meetings (weekly), e-mail
  - quickly answer requests
- maintain a group
  - progress meetings
  - journal club
  - news
- promote external contacts

student & advisor

- **student**
  - search literature
  - produce / explore ideas
    - ask questions
    - **be bold!**
  - be (very) proactive
    - avoid last minute stuff
  - build usable prototypes
    - if needed
- **advisor**
  - suggest sources
  - guide student exploring his ideas
  - avoid “work for the next paper”
    - in favour of continuous solid work

what is an IE thesis?

- original work
  - capable of producing at least one journal paper by the end of the PhD work

in the meantime...

→ publish ideas in workshops

→ publish intermediate results in conferences

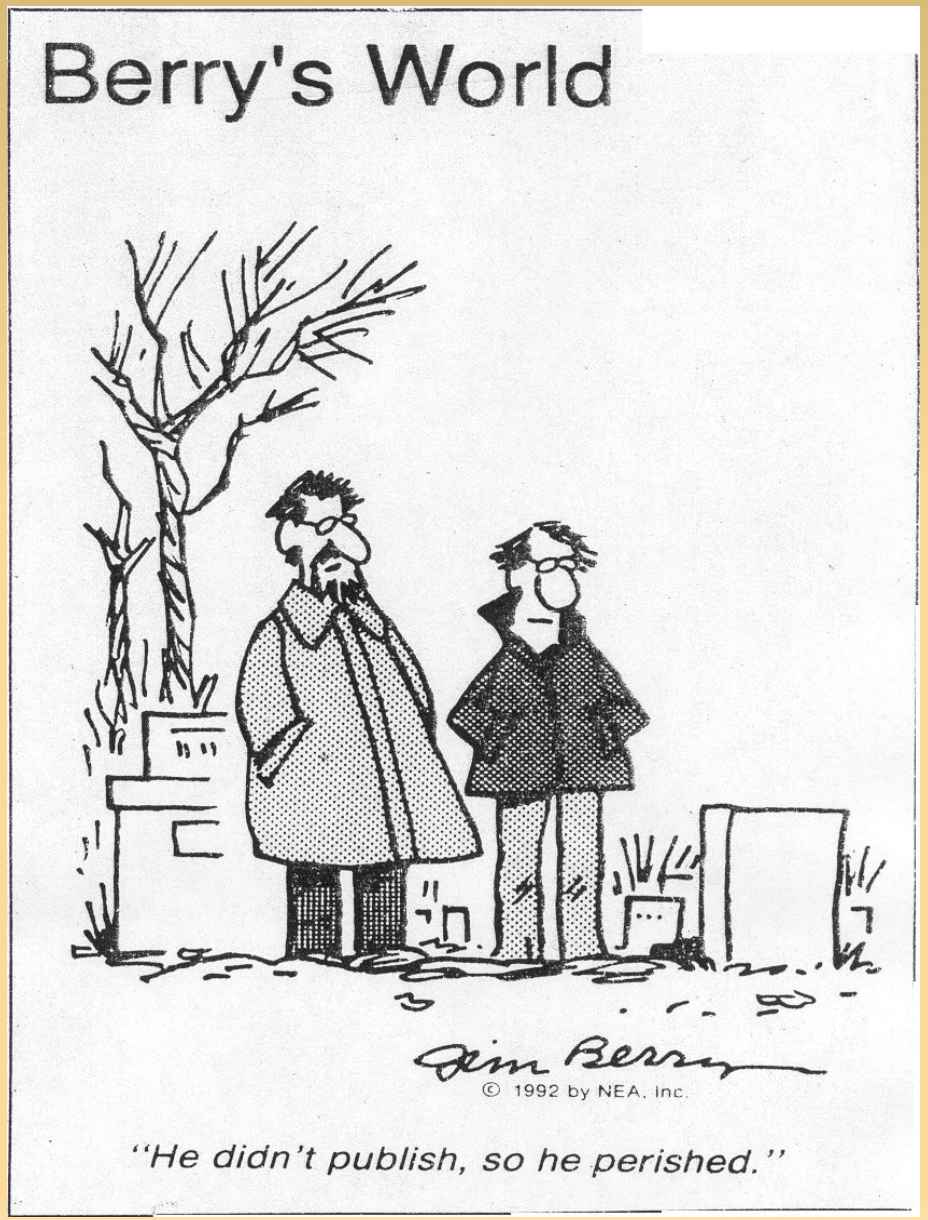
→ get known in the international community

research report

- write down all your research
  - in one single document – **research report**
  - it may become your PhD dissertation
  - even if not:

    several papers will spin off from it

publish or... perish



publishing - where?

- avoid scientific tourism
- publish in the really important conferences
  - specific of the PhD theme
  - harder, but better return
- publish in good specific Portuguese conferences
  - important to place yourself in the community

PhD in IE

- IE is a scientific area

  ⇒ requires scientific approach

problem

hypothesis

validation

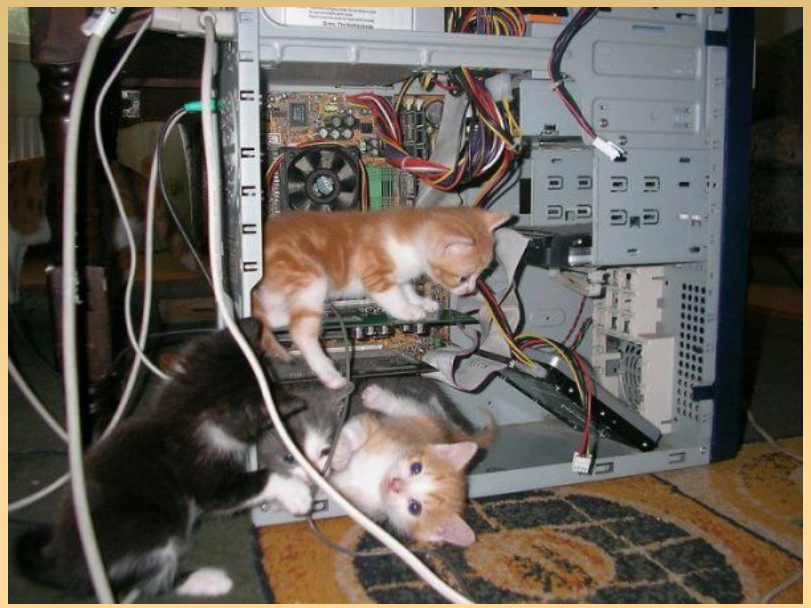
IE work

- theoretical – mathematics, natural sciences
  - prove some new theoretical results
  - produce a new model / theory (tested with data)
- technique - engineering
  - new / improved / applied to new type of problems
  - results of its application better than previous

experiences supported by sound statistics

IE work – getting fishy...

- framework
  - combination of techniques (?)
    - more a subject of MSc thesis
- methodology
  - this is really fishy stuff...
  - are there others to compare?
  - does it provide an advancement in solving some problem?
    - how to measure?



AVOID!

institutional role I

- maintain a PhD program
  - similar requirements for all areas
    - tends to smooth things
- PhD students' seminars
  - students presence mandatory
  - significant faculty presence
  - promote discussion

institutional role II

- yearly open progress evaluation
  - by faculty
- with specific recommendations
  - for students
- assessment of advisor's activity
  - restrictions in case of bad results
    - low production (publications, projection)
    - long duration of PhD supervision

institutional role III

- advisory committee
  - to approve PhD proposal
  - to follow and advise on a yearly basis, at least
- committee assessment
  - thesis should list the committee members
  - public responsibility towards community

post-doc

- can also be a post-doc!...
  - but resources are scarce
- industry in Portugal
  - has incipient research, if any!
    - will not employ you
- “go abroad”
  - statement in the line of “poor but proud”...
  - we used to export unqualified labour
    - now, several steps ahead, we can export PhDs!...

post-doc proactive

- consider entrepreneurship
  - underdeveloped in Portugal
  - own company
    - or in a society
  - IE is a hot area
    - intelligent systems / communications / multimedia / ...
  - for the global market!
  - look for venture capital
- remain creative
  - “stay hungry, stay foolish” Steve Jobs

PhD in the end

- is hardly ever an historical break-through
- a PhD should be a world class expert on his subject
- and he must be able to put his work in perspective
  - understanding limitations is important to define future research lines

PhD student requirements

- must be able to carry independent in-depth research
  - critical analysis capability
  - look for additional knowledge
  - situate among other researchers
  - write a lot
- in the absence of these, should not continue with PhD

advisor's check-list

- can student be a good reviewer?
- can student supervise post-graduate students?
- would I like to have him as a colleague?
- would I like to have him as advisor?

- *break the mediocrity cycle:*
  mediocre PhD students will produce even more mediocre PhD students

Michael Athans

some references

- R.T. Azuma, So long, and thanks for the Ph.D.!

  http://www.cs.unc.edu/~azuma/hitch4.html
- Alan Bundy – Univ. Edinburgh

  http://homepages.inf.ed.ac.uk/bundy/
- Manuel Bloom

  http://www.cs.cmu.edu/~mblum/research/pdf/grad.html
- How to do Research at the MIT AI Lab

  http://www.cs.indiana.edu/mit.research.how.to/mit.research.how.to.html
- Michael Athans, Reflections on Doctoral Research, 2000, SPDDI, UNL

keep up the good work!

lame!!!

who am I?

- 5 PhD students advised, 2 in progress
- 18 MSc students advised, 1 in progress
- responsible for PhD seminar in informatics at UL, 2010-
- coordinator of the PhD program in informatics at UL, 2007-2009
- co-organiser of the first two PhD in informatics seminars of UNL, in 1999 and 2000
- PhD,1995 in behaviour based robotics - UNL