Why Do a PhD and How to Pick an Area
(Be afraid. Be very afraid.)

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What is a PhD?

• An advanced graduate degree awarded for demonstrable ability to do research
  – research = the production of new knowledge
Why Do a PhD?

• A lot of bad reasons
  – financially, it may not make sense
  – some people do it just because being a student is fun

• Only one good reason: be a Jedi knight!

  *Luke! You must complete the training…*
  *Only a fully trained Jedi Knight with the force as his ally will conquer Vader and his Emperor.*

if you are fascinated by CS and want to go deep, then a PhD is the right thing for you

  *A Jedi must have the deepest commitment, the most serious mind.*
PhD years: the time of disillusionment

Yoda: He is not ready.


[Trying to see Ben, Luke starts to get up but hits his head on the low ceiling.]

Yoda: Ready, are you? What knows you? Ready!
At first…

• New students typically think they know everything
  
  *Luke: But I’ve learned so much*
  *Yoda: (sighs) Will he finish what he begins?*

• I have yet to see anyone with just a bachelor’s who is able to make a contribution right away
  – and I’ve had students with many years of industrial experience
Time of Disillusionment

• I have bad news for you. During your PhD you will find out:
  – there are people who are better than you
  – you are not good at everything. Play to your strengths!
  – life is unfair
  • people who are not as smart or hard-working will be luckier and end up with better results
  • people who have done worse work will end up with better jobs because of their field/advisor
Time of Disillusionment

• More bad news:
  – being good at courses is not enough
  – doing what you are told may not be enough
PhD years: the time of insecurity

*Luke:* I won’t fail you—I’m not afraid.

*Yoda:* Oh, you will be. You will be.
Insecurity

• You may often wonder:
  – am I good enough?
    • are you here for the right reason?
  – can I do research?
    • yes, you can
  – why do all the people around me publish and I don’t?
    • concentrate on what you do and do not try to evaluate yourselves with post-PhD criteria
When Will I Finish?

• Here are some good news: time stops during your PhD
  – nobody will ask you why you took $n$ years and not $n-k$ to finish
  – you have a good excuse to hide from society and do your thing. You are fully justified!
  – good thing too, because the timeline is very uncertain
Keep Concerns Away

• To do this, you must ignore some real-world concerns

• Easier said than done:
  – stipend is enough to live on, but does not compare to a salary
    • perhaps ok if you are 23, but even then, for how long?
  – friends will start careers, buy cars and houses
  – you will be spending the best part of a decade in a time warp
Good News: You Control Your Fate

Luke: What’s in there?

Yoda: Only what you take with you...
      Your weapons...you will not need them.
Some Good News

• You have (some) control of your destiny
• If you do great work, you may be noticed
  – no pre-set boundaries: your peer group is the entire community, not people in the same university
Advice

• Strive to improve yourself!
  – if time is not an object, this will eventually pay off

• You are in the ideal position to make significant contributions
  – professors are not!
“Survivor Story” Warning

• Of course, this is survivor advice
• Don’t ask survivors for advice
  – “Russian roulette is a great way to make money!”
• Take what I say with a grain of salt, but take everything anyone says with a grain of salt
  – doubt everyone, and start with me
The Real Good News

The Force will be with you
PhD Life is Fun

• If you are here for the right reason, a PhD can be tremendous fun
• You are a student, but can support yourself
• You will work on interesting things
  – a lot of freedom, few obligations
  – think of yourself as a freelancer
• “The only time in your life you will be paid to learn.”
How to Pick an Area

Luke: Is the dark side stronger?
Yoda: No...no...no. Quicker, easier, more seductive
Research in CS

• Different kinds of research
  – *scientific research* = research based on *analysis*
    • analyze until you find the most fundamental parts, even if working with them does not resemble working on the original problem
  – *engineering research* = research based on *synthesis*
    • compose many small solutions into a single big one
Picking an Area Is Hugely Important

• Your area will follow you
  – if not for all your career, at least for its first part

  *Yoda: Once you start down the dark path, forever will dominate your destiny, consume you it will, as it did Obi Wan’s apprentice*

  *Luke: Vader!*
Predicting the Future

• Future employability should not be your primary criterion
  – it is impossible to predict the future very accurately
  – in the 80s AI was hot; in the early 90s it was multimedia; now it is security and biocomputing
  – many students find that the area that was hot when they started is saturated when they graduate
Importance in the Real World

• Many people use the potential impact in the real world as their criterion
  – but big real-world problems are big because they are hard, multi-faceted
  – if you want to work on something important and make no difference, be a politician
  – as scientists, we focus on technical problems
    • often only on those we have a hope of solving
Concentrate on Mode of Research

- Many research areas are defined by problem and not by solution approach
  - E.g., networking, SE
- Make sure you like the mode of research in an area
  - is it theoretical or applied?
  - what flavor do the intellectual results have? Does this inspire you?
  - what do you have to do every day?
Don’t Trust Big Results

• I like the big results in every area of CS
• We will all be happy if one of you gets one such result in his/her lifetime
• To pick an area: be sure you like the incremental results
  – you should consider them important, or at least fun!
  • or you can just talk yourself into believing that incremental results are big
Fall in love with your cows!