



# How to Be a Good Graduate Student (Characteristics of a Successful Researcher)

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This presentation is located at:  
<http://networks.cs.ucdavis.edu/~mukherje/GoodGradStudent.pdf>

**Presented on: May 13, 2010**

**Dedicated to: Professor James S. Meditch, my PhD Advisor**

*The objective of this presentation is to train my graduate students to become better researchers and better citizens. The issues covered are examples and not exhaustive. Utility of this material is limited without the oral presentation. Not everyone may agree with my views.*



## General Comments

- **Marketing**
  - Inbound... are your ears and eyes open? ... are you receptive to (constructive) criticism?
- **Sale(s)**
  - Outbound (marketing)... elevator speech... can you modulate your talk? ... writing skills!
- **Entrepreneurship**
  - Monopolistic elements
- **Creating “value”**
  - Are you a scholar? ... a “philosopher”? ... having “fun”?
- **Industry R&D vs. Academic Research**
- **(Developing) core competency**
  - Does every research work have to be “practical”?
- **Short-term pain + long-term gain**
  - Do you want to “create the wave”, ride the wave, or be at the trailing edge of the wave?
- **Barrier(s) to entry**
  - “Incremental” problems (“low-hanging fruit”) vs. hard/important problems
- **What makes a PhD Dissertation (or MS Thesis)?**
- **2+2 = 4 or 10(?)... the power of collaboration**
  - “cross-layer optimization” ... sharing credit (and pain)
- **10-90-0 (GS model) vs. 90-90-90 (or 33-33-33) (BM rule)**



## Topics

- **Leadership**
- \$5
- **Education**
- **Ethics**
- **Extraordinary (...)**
- Overachiever
- Logbook
- **(Measuring) Progress**
- Reward (-ing Yourself)
- “Ego”
- “Business”
- Social-smartness
- Confidence
- “Mafia”
- **Contrarian**
- **(Level) Playing-field**
- Lazy
- PMA
- Deadlines
- **Self-assessment**
- **Research: Depth + Breadth**
- Publishing
- Divide-and-Conquer
- **Appreciation**
- Communication
- **Writing**
- **Speaking**
- Reading
- Dictionary
- Off-Computer
- Scholarship
- **Philosopher**



## Leadership

- Who is a leader?
- Are you a leader?
- Do you need a title: CEO, etc.?
- Do you “jump in”/volunteer when needed (even before being asked)?
- “I am happy if others around me are happy”
  - Do you “hog” food, space, etc. w/o caring if others got their fair share?
- ...



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## Leadership (contd.)

- Do you understand politics?
  - Is politics a bad word?
- Do you understand diplomacy?
- “(India has an excellent opportunity to demonstrate to its neighbors that...)”
- “... democracy is about dialog... it does not necessarily have to do with friendship... but it has to do with building working relationships among people who differ” – Bill Clinton



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## Leadership (contd.)

- “Treat others as you want others to treat you...”
- When is the last time you showed some random act of kindness?
  - Today, yesterday, past week, past month, ...
- Form “good habits” early...
  - Do you complete the “three-way handshake”?
  - How well do you handle (accept/convey) bad news?
- Call a spade a spade?
  - Communicate clearly (more later)
- ...



## Leadership (contd.)

- Are you heading towards **career middle management?**
  - “Buttering” upper management; and
  - Ruling subordinates with a stick
- Should you rule with a stick or a carrot?
- How can you get things done?
  - ... while keeping others happy...
- Are you always conscious of “hierarchy”?
  - Do you hold the door open for strangers?
- “The truth story”
- ...



## \$5

- Do you always have \$5 in your pocket?
- Are you willing to buy coffee for a friend at any time?
- Are you generous?
- Are you ready to reward yourself at any time?
- ... investing in relationship...
- What is the “bottom line”?
  - ... and “other lines”?



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# Education

- Who is an educated person?
  - Degree holder?
- Meaning of education?
- My grandma was an “educated” person...
- Are you ready to be an educator?
- “Intelligence is uniformly distributed throughout the world... it is the opportunities that are not”
  - Bill Clinton
- ...



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# Ethics

- “Just because you can do it, should you?”
- Do you worry about ethics in an age of technology: “green/clean tech”, IT, bio, climate, environment, globalization, etc.?
- Do you think about where will the world be 10, 20, 50, 100, 300, ... years from now?
- What is “tragedy of the commons”?
  - And what are you doing about it?
- No compromises on fairness, morals, law, ...
- ...



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## Extraordinary (...)

- You want extraordinary achievement?
- Are your efforts extraordinary?
  - Think about the efforts of the best people in each discipline (Michael Jordan, Michael Jackson, ...)
  - No compromise on hard work, ... but having fun...
- What are ordinary people doing?
- What is your “competition” doing?
- ...



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## Overachiever

- Are you achieving your true potential?
  - ... and beyond?
- The world dislikes underachievers...
- Are you motivated?
- Can you do thorough self-assessment?
- ...



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# Logbook

- Do you maintain a logbook?
  - Of your research/activity?
  - Time spent (quantity and quality)?
  - And analyze if you are wasting time...
- ...



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# (Measuring) Progress

- How much progress did you make as a (researcher): today, past week, past month, past year, ...?
- How much did you “grow” as a researcher and as a person?
- Was the salary from your employer well spent?
  - By your employer, not by you... ☺
- ...



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# Rewarding Yourself

- Do you celebrate when you have good news?
- ... Buy yourself icecream...
- Celebrate with family and friends...
- Do/should you over-celebrate?
- Conversely, does bad news get you down too much?
  - Are you ready to “fight”? (See good ego... next slide)
- ...



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# “Ego”

- Bad ego: Show others how smart you are...
  - And put them down...
- Good ego: Challenge yourself to do better...
- Are you arrogant?
  - Do you think the world revolves around you?
  - Does the world like arrogant people?
- ...





# “Business”

- Many relationships have a business angle...
- What is a good business deal?
- How/where are business deals done?
- What is successful negotiation: do you get nervous, lose your cool, ... ?
- ...



# Social-smartness

- Can you pick up jargons?
  - C-level executive? North of one million?
  - Valuation? Pre-money? Post-money? ...
- Who is smarter: you (the technically-smart guy, traveling in coach) or the guy in first class?
- Can you speak the language of your “customer” or the person you are communicating with?
- Are you street-smart? (think on your feet, appreciate humor, crack jokes, ...)
  - How many work hours in a year (approx.)?
  - Your hourly wage?



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# Confidence

- Are you confident in your abilities?
  - Are you over-confident?
  - Or do you under-rate yourself?
- ...



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# “Mafia” (Mentality)

- What are good aspects of “mafia” mentality?
- Are you a **team** player?
- Do you support your lab-mates when they are giving talks, need help, etc.?
- ...



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# Contrarian

- Do you think like everyone else?
- Do you have hunches that challenge the establishment?
- Successful ventures generally start from contrarian ideas...
- ...



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# (Level) Playing-Field?

- Is the ref 50-50?
- Is the ref 60-40?
  - Can you succeed even then (by being well prepared)?
- Is the ref 70-30?...
- ...



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# Lazy

- Are you lazy?
- Are lazy people successful?
- Can you go the extra mile?
- "What, me tired?"
- Are you physically (and mentally) fit?
- ...



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# PMA

- Positive Mental Attitude
- Do you have a can-do attitude?
- "Is the cup half full? Or half empty?"
- ...



# Deadlines

- Do you meet/honor your commitments (and deadlines)?
- “Don’t sleep if you cannot afford it... make up for it later”
- ...



# Self-assessment

- Do you know your strengths?
- ... and non-strengths?
- Are you working on improving your non-strengths?
  - And strengths?
- How do you handle good news and bad news?
  - Extreme or guarded/muted or in-between emotions?
- When something goes wrong, do you consider pointing the finger at yourself?
  - Or are you always looking for someone else to blame?
- Your jokes... at yourself? or at others?
- ...

## Extra-Curricular Activities



- Sunday Morning Soccer



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## Extra-Curricular Activities (contd.)



- Quarterly potluck...
  - diverse international cuisine!
- Annual Winter Holiday party
  - With alumni, faculty, students, and family
  - Sponsored by alumni
- Annual travel to OFC (world's #1 conference in our field, usually in SoCal (San Diego, Anaheim, LA))
  - Convoy of 2-3 vans and cars... social bonding



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## Research: Depth

- When will you have full command of all the literature in your field under your belt?
- When can you write the authentic survey or tutorial paper in your field?
- Extend definition of research to include all forms of creative work...
- When can you become the world's leading authority in "blah blah blah" (BBB)?
  - Where BBB is a narrow sub-sub-subfield initially
  - But BBB will become larger and wider with time
- ...



## Research: Breadth

- Theory vs. practice...
  - There is good theory; there is bad theory
  - There is good practice; there is bad practice
  - There is good research; there is bad research
- Academic research vs. industry R&D...
- Can you appreciate other fields?
- Can you appreciate the value of stuff you know little about?
- Are you willing to learn new stuff?
- ...



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# Publishing

- Why publish?
  - Focus on new discoveries/inventions/findings; not on yourself...
- When can you say: I will not publish this work?
- How/when do you know people care about your work?
- ...



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# Divide-and-Conquer

- Writing a PhD Dissertation, writing a chapter/paper: apply divide-and-conquer...
- Our model: Prepare early version, present in group meetings and at conference, get comments, improve, prepare journal version, becomes a chapter of your dissertation, ...
  - Eliminate overlap between various chapters in your dissertation, and cross-reference chapters
- ...





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# Appreciation

- Do you appreciate feedback?
- Do you (really) appreciate feedback?
- Can you appreciate comments from difficult reviewers? ... and colleagues?
- Do you openly acknowledge feedback?
- Do you economize on the use of “thank you”, “sorry”, “smile”, ...
- “It takes months to win a customer, it takes a minute to lose one...”
- ...



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# Communication

- Can you communicate properly: orally and in writing?
- When should you use F2F meeting, phone call, email?
- How are most business deals done?
- ...



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# Writing

- Recall the basics (generally):
  - Actor (subject) and action (verb); like story-telling
  - Avoiding nominalizations
  - Concision
  - Cohesion (first old info., then new info.)
  - Coherence (consistent topic in a passage)
- Managing long sentences?
- ...



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# Writing (contd.)

- BE CONSISTENT in
  - Usage of styles
  - Punctuation
  - References
- Pay attention to the corrections I make...
  - Don't repeat the mistakes
  - And don't get me annoyed...
- ...



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## Writing (contd.)

- Does your writing contain high (or low) “signal-to-noise ratio (SNR)”?
- Are you repeating too much?
- Are you stating irrelevant stuff?
- Are you not stating relevant stuff?
- Can you analyze other people’s writing?
- ...



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## Speaking

- Many of the writing comments apply...
  - Recall story-telling
- Speak up, be concise, be clear, repeat when necessary, practice...
- “Modulate”... depending on audience...
- Do you lecture to the “average” person in the audience? ... or higher up? ... or lower down?
- ...



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# Reading

- Do you read (and enjoy reading): outside of your area? Non-technical stuff?
- Do you read only from the computer screen?
- ...



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# Dictionary

- How often do you consult the dictionary, wiki, etc.?
- Do you look up the dictionary when you encounter a word you don't know?
- Can you pick up one new word every week to use in your writing?
- ...



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# Off-computer

- Is all your work (reading, thinking, experimenting, etc.) done on the computer?
- ...



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# Scholarship

- Are you a scholar?
- Who is a scholar?
- People (faculty and others) have to be scholars as well as hustlers (e.g., for funding)
  - Which comes first: scholarship or hustling?
- ...



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# Philosopher

- Ph in PhD = ? Are you a philosopher?
- Do you have a “thesis”?
- Can you do thorough “self-assessment”?
- Are you at the stage where you know more than your advisor on your research topic?
  - And hence ready to graduate? ☺
- “Keep your feet on the ground and keep reaching for the stars”
- What *have been* (and *will be*) your contributions to society... to make this world a better place?