The Secret Life of a Joyful M.S./Ph.D. Researcher

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Disclaimer

Personal views

Not CSE-IITB or IITB or India or World’s view

Use the “GYAN” with 10K buckets of Salt

Completely fine if you disagree with me
Views/thoughts based on “wisdom”

From all the Gurus: Last 13 Years

ACK: To all the Gurus
10K Feet View on @M.S./Ph.D.
M.S./Ph.D.

Master of Science by Research, Doctor of Philosophy


Let’s use technology (wiki) 😊
M.S./Ph.D. in Summary as per wiki

demonstrating mastery

advanced knowledge

high order skills in analysis, critical evaluation

ability to solve complex problems

and think rigorously and independently
Mastery: Knowing More and More about less and less
Research
Diligent and systematic inquiry or investigation into a subject in order to discover or revise facts, theories, applications, etc.
All the Human Knowledge [Courtesy: Matt Might]
After School
After High School + B.Tech.
After doing courses
Let’s Pause a Bit

What is the problem?

“Why the problem” is a good problem to solve?

What people have done?

What will be an ideal thesis statement?
Push the Boundary till One Fine Day
Thesis Defence (The bigger picture)

Do not compare it with others’
The Dream/Joy

Theorem/law/idea/implementation named after YOU

You are a celebrity overnight
Secret
Dream Big
Courses before Research
Courses vs Research

- **Consumer**
  - Mugging up, Writing answers!! Grades 😊
  - Punished if you fail (FR grades)

- **Producer**
  - Self-learning and thinking. Asking Qs.
  - What if? What may? How? Why not? Grades are not everything
  - Not believing textbooks, You can become famous if you fail successfully
  - *Pride in saying “I DO NOT KNOW”*
Focus on Skills During courses

Reading & Writing

Coding and debugging, faithfully

Performing experiments, faithfully

No to Jugaad 😞

How to fail and fail successfully
Secret

Go for skills and not for grades
(Unlike Mtech/Btech)
Credit courses where you can get the skills of interest
(Do not follow M.Tech. trend)
Ready For Research: 1K Feet View on Researcher
Why Research? “Researcher”? 

1. Find your reason
2. Find your “strong” reason
3. Find your “stongest” reason
If it is weak, then motivation Level 😞
Search for “THE” Idea begins

Usefulness

Novelty

Idea 1

Idea 2

Idea 3
It’s Hard
what it takes to make anything more than mediocre is
an act of will.
Getting into IITB was not easy too?
Before that “The Research Problem”
The Myth

Try to get an idea ASAP

NO

Try to understand the problem
depth, very deep, very very deep
Waiting for the idea
Read, Read, Read,

..................

Question everything Why? How? What if? Give tons of talks@group
Read Top Conference Papers Only

Do not look for low quality IEEE/ACM/xyz conferences
Guide? Yes and No
It is your MS/PhD; Not your advisor(s)

Bug them 24/7 for advice only
Secret: My two cents

If you know the problem well, then you know the solution (idea) too 😊
Crazy

Because the people who are crazy enough to think they can change the world are the ones who do – Steve Jobs.
Be passionate/hungry

99% people quit because they are not passionate about what they are doing for their MS/PhD.

low-quality research 😞
Myth
Talent/Intelligence
for getting “THE” idea
Talent 😊 [Most Over-hyped word on/in the planet]

I am the one with the lowest IQ in this room 😞 and I am fine with it 😊

Talent opens the 1st door
Not the nth door. Hardwork opens even the (n+1)st

You all are talented right?
Time to put the hard yard
Do not run away 😊
The 10,000 Hour Rule

Keep doing what you are doing

It takes time to make something “worth”
Secret: Hardwork with persistence works. Period.
Oh No! It is getting difficult, I am frustrated/stressed
The Stress Myth: Eustress is a necessary evil 😊
Stress From Cricket
Secret

Stress is not stressful until it becomes or you make it distress
It is a Time Taking Journey

Hang in there!
Go back and ask again: “Why are you doing what you are doing”? 
Are you getting stressed? Comfort Zone?
The Other Side: I have so many ideas

Without **commitment** you will never start and more importantly without **consistency** you will never finish - Denzel Washington
Finishing what you have started is more important than ..............
Quantity vs Quality
Quality of Quantity

Go for the kill (top forums)

It is OK if you fail
Go for the next best, but do not aim for mediocre/low quality IEEE/ACM/xyz conferences

It is a sin. Tier-2/private universities may but not IITB for sure !!
Why A/A* forums? Why not some local ones?
The impact is the key
Excellence
Striving for Excellence: Why?

Article 51A: To strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavor and achievement.
Striving for Excellence: Why?

The amount of money spent on one IIT student is sufficient to open $k$ primary schools (this is excluding stipend and PMRF 😞)
Striving for Excellence: Why?

Indian Cricket Team, Indian Army, Indian .....  

Similarly Indian Institute of technology ......
Cricket Trophies:
Winning IPL every year but no ICC trophies (world cups)

Winning matches in India but not abroad 😞
Publish many (quantity) low quality Indian (Kanpur, Nagpur, ...) conferences but the utility is zero 😞

Instead publish just one paper with wonderful insights at a A/A* forum 😊
Myth

Conferences that happen in India are of low quality

NO

Top flagship conferences also happen in India (once in k years), like world cup happening in India, once in k years
Excellence

A teacher is only good as his next class.

Musician: next concert.

Researcher: next paper

A* paper 😊
Secret: You should not say

I want to be a mediocre researcher because some “xyz” is doing mediocre work
There is nothing called mediocre researcher

Either you are a good researcher or NOT. It is Binary. Period.
Speed of the Researcher (Do not compare)

There will be a phase when you will lose track of time 😊

Sprint  Marathon  Be careful: the potholes (Mumbai Road)
Speed of the Researcher (but)

Sprint

Marathon

Be careful: the potholes (Mumbai Road)

World is not waiting for you. There are MS/PhD@Rest of the World
AI/ML vs Systems [Aritra Bagchi@Purdue]

My Systems Papers (N > 1) vs My NeurIPS paper (N = 1)

Example: Usenix ATC-2020, Usenix Sec-2020

(For each paper)
• 3 students, total 3,000 man hours of implementation and experimentation
• 3 math formulae, all understandable by a high school graduate
• 10+ result figures
• 5000+ lines of code (LOC)
• 1.5 years from idea to paper accept
• Had to understand design and replicate 3 prior papers
• 16-18 pages
• One of 65 and 157 accepted papers

NeurIPS-2020

• 1 student, total 200 man hours of implementation and experimentation
• One super cool intuition
• Three formulae, none of which is understandable by a high school graduate, one I barely understand and only because my ML faculty co-author explained it at length
• 2 result plots, 1 result table
• 200 LOC
• 6 months from idea to paper accept
• Had to understand math and replicate 3 prior papers
• 10 pages
• One of 1428 accepted papers
Love your research
If you are already loving

<table>
<thead>
<tr>
<th>Go</th>
<th>Go for the kill</th>
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<tbody>
<tr>
<td>Go</td>
<td>Go for a conversion to PhD.</td>
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<tr>
<td></td>
<td>It took just 2.x years for my PhD</td>
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<td></td>
<td>☺ three for my MS</td>
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<tr>
<td>Thanks</td>
<td>You will thank yourself later</td>
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Myth: Big University
PhDs matter
What you do in MS/PhDs matters. Period.

Your work should speak for yourself, not your advisor, institution, .....  

Yes, big tags help, but only to a certain extent
I am a student researcher,
What about advisor?
Guide/Advisor (Meet him/her regularly)

“The best friend and the worst enemy” to make you a better researcher

Who can push you for your best version 😊
How Often?
Depends, where you are

What are the skills that you need to develop over next $k$ months/years

Have a clear agenda and take the feedback(s) 100% seriously

Help your advisor so that he/she can help you
Secret:
Know Your Advisor
(Communication is the key)

A GOOD ADVISOR GIVES ADVICE
(FEEDBACK), FREQUENTLY

ON HOW TO READ, WRITE, PERFORM
EXPERIMENTS, COMMUNICATE
CLEARLY

GIVES YOU A LOTS AND LOTS OF
CRITIQUE, DO NOT RESIST IF YOU WANT
TO LEARN ELSE IT IS YOUR (OUR) LOSS
Some Do not like Advice (feedback)

“Advice is a dangerous gift, even from the wise .... “ J R R Tolkein
Weekly Meetings

1. Help/motivate your advisor so that he/she can help/motivate you

2. If you put chill, then advisor will be demotivated

3. Work for five days and just not one day before the weekly meeting 😊
It is all about Trust

You have to trust your advisor’s intent
What’s the price of being the best player in history? After her injury, Olympic champion Carolina Marín faces the most crucial and demanding period in her life. A year on film, with unprecedented access, in which Carolina will have to prove, to her coach and to herself, that she’s extraordinary.
Million Dollar Baby

Million Dollar Baby

2h 12m | Dramas

When a cantankerous trainer mentors a persistent amateur boxer determined to go pro, deep-seated emotions become their strongest opponents.

Starring: Clint Eastwood, Hilary Swank, Morgan Freeman
Thick Skin

Top forum reviewers will not go easy because you are doing MS/PhD at IITB

Learn to take feedback from “all”
Myth and secret

You = Your work

Feedback on your work is a personal attack

NO
Learn from Peers

JOIN READING GROUPS/BRAIN-STORMING SESSIONS

DISCUSS/DEBATE

THROW YOUR PROBLEM AT OTHERS, IF THEY CAN HELP IN SOLVING, INCLUDE THEM AS CO-AUTHORS
Few More Secrets
World of distractions

On average, an MS/PhD student spends 3 hours/day on smartphones

3 hours/day * 30 days/month * 12 months/year = 45 days
Secret

Use your smart devices smartly before it makes you ..... 

Completely involve with your research 
so that “smart” ..... 

PAUSE so that your mind will help you .....
Talk/Write about your work

Talk about your success, failures, insights, ..........

Have a webpage, github, and a blog account

Do not wait for the right day and the right time. The best day and the time is NOW 😊
Final Secret:

Hard Break along with Hard work

Small breaks everyday
Summary: Research teaches you

- How to read
- How to write
- How to think clearly, communicate and present
- Perseverance and tenacity
- Have a very thick skin
- The sheer joy of solving a problem!
  - (hopefully something that others care about as well)
Reality Check

You will be frustrated, dejected, ........

You will fail ....

Just bounce back before sunrise 😊

This is part of the process. Everyone has gone through it. The more you fail, the more you learn then you become a Prof. 😊
All the best for your journey (miracles)

Looking forward to some insightful MS/PhD theses
DO NOT TAKE THESE SLIDES ON FACE VALUE.

ABSORB IT AND THEN PROCESS IT.

IF THESE SECRETS DO NOT MAKE SENSE AND IF YOU HAVE BETTER “SECRETS” ..

PING ME, AND I WILL ADD THEM.
कौन कहता है आसमां में सुराख नहीं हो सकता एक पत्थर तो तबियत से उछालो यारों
- Dushyant Kumar.
Thanks

Reach out:
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