



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

- Biswa@no affiliation

Disclaimer

Personal views

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

Use the “GYAN” with 10K buckets of Salt

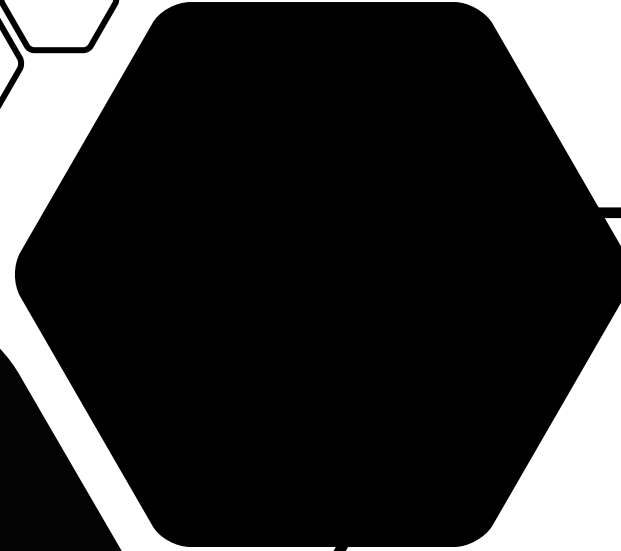
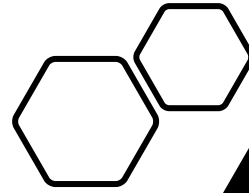
Completely fine if you disagree with me

An open book is shown from a low angle, with its pages fanned out. The pages are a warm, yellowish-brown color, suggesting age. In the center of the book, the pages are folded to create a heart shape. The background is dark and out of focus, with some blue and green hues. A small orange rectangle is visible in the top left corner.

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.



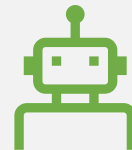
M.S./Ph.D.



Master of Science by **Research**,
Doctor of Philosophy



Ph.D./M.S. = ++M.Tech. ? Got
confused.



Let's use technology (wiki) 😊

M.S./Ph.D. in Summary as per wiki

demonstrating
mastery

advanced
knowledge

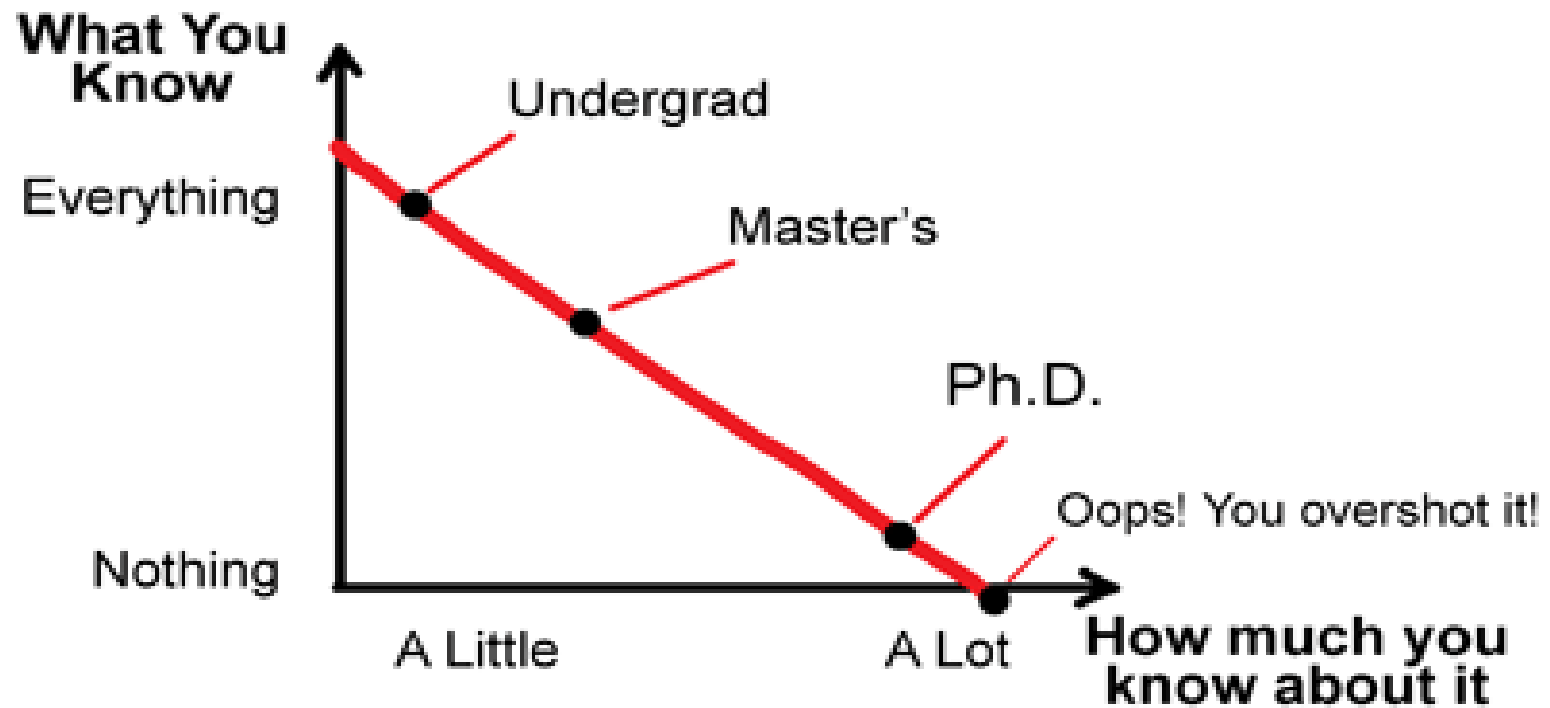
high order skills
in analysis,
critical evaluation

ability to solve
complex
problems

and think
rigorously and
independently

Mastery: Knowing More and More about less and less

What You Know vs How much you know about it





Research



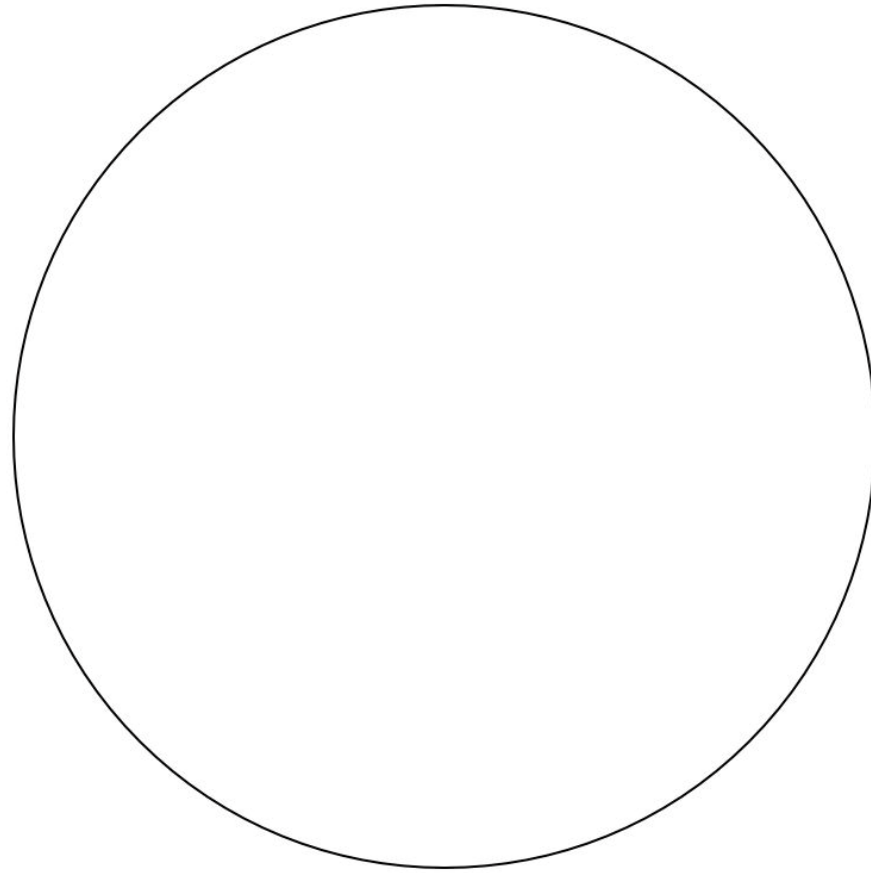
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As per Dictionary

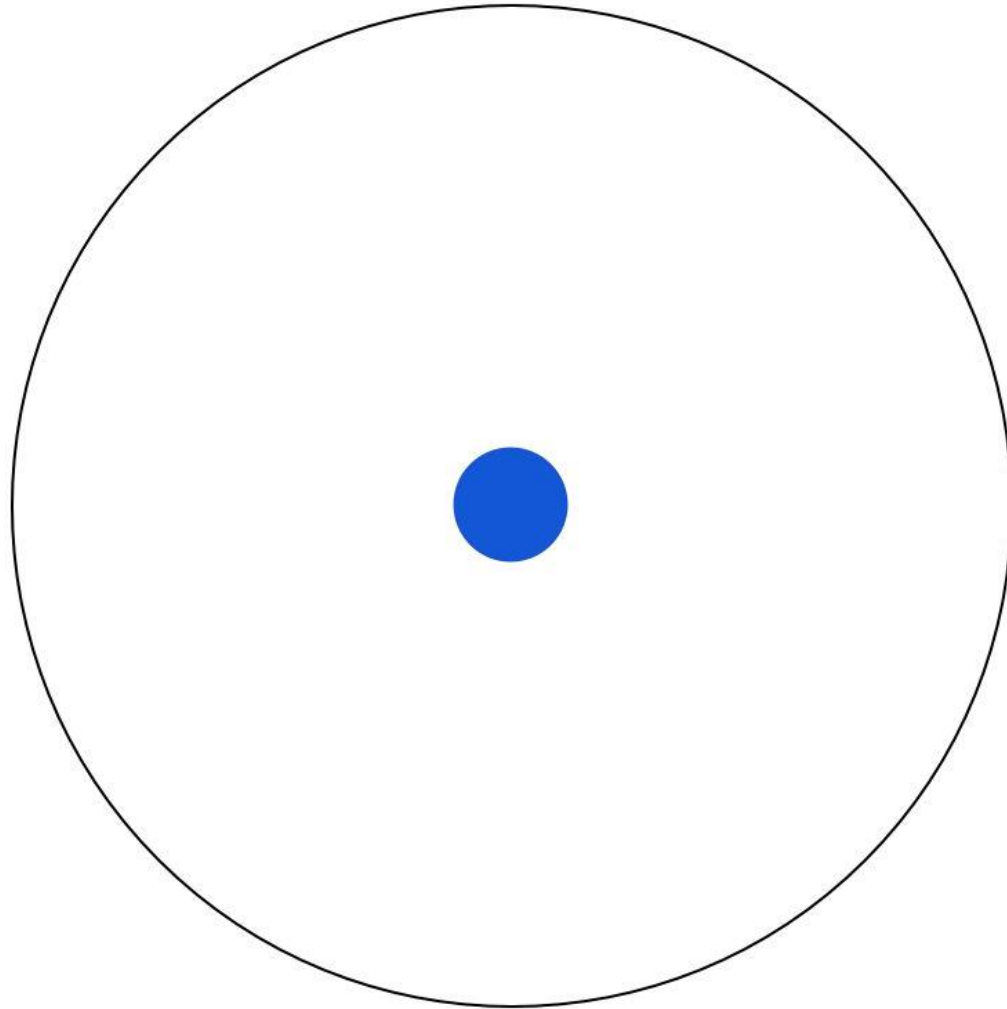
Diligent and systematic inquiry or investigation into a subject in order to discover or revise facts, theories, applications, etc



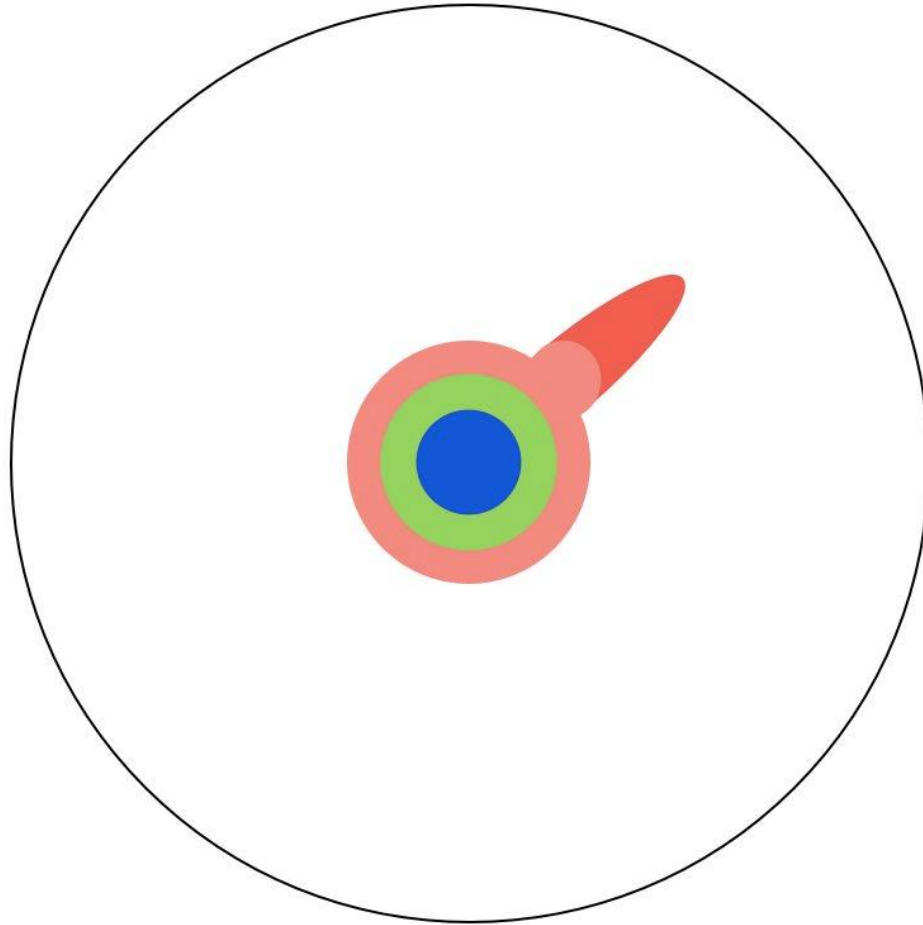
All the Human Knowledge [Courtesy: Matt
Might]



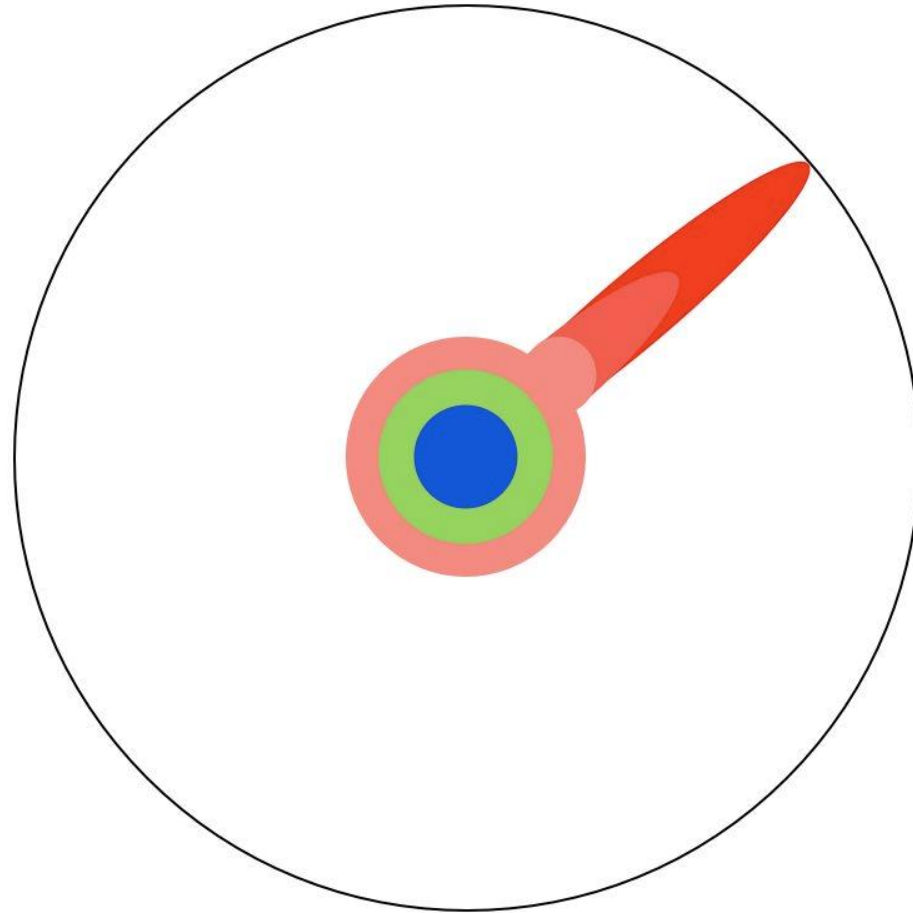
After School



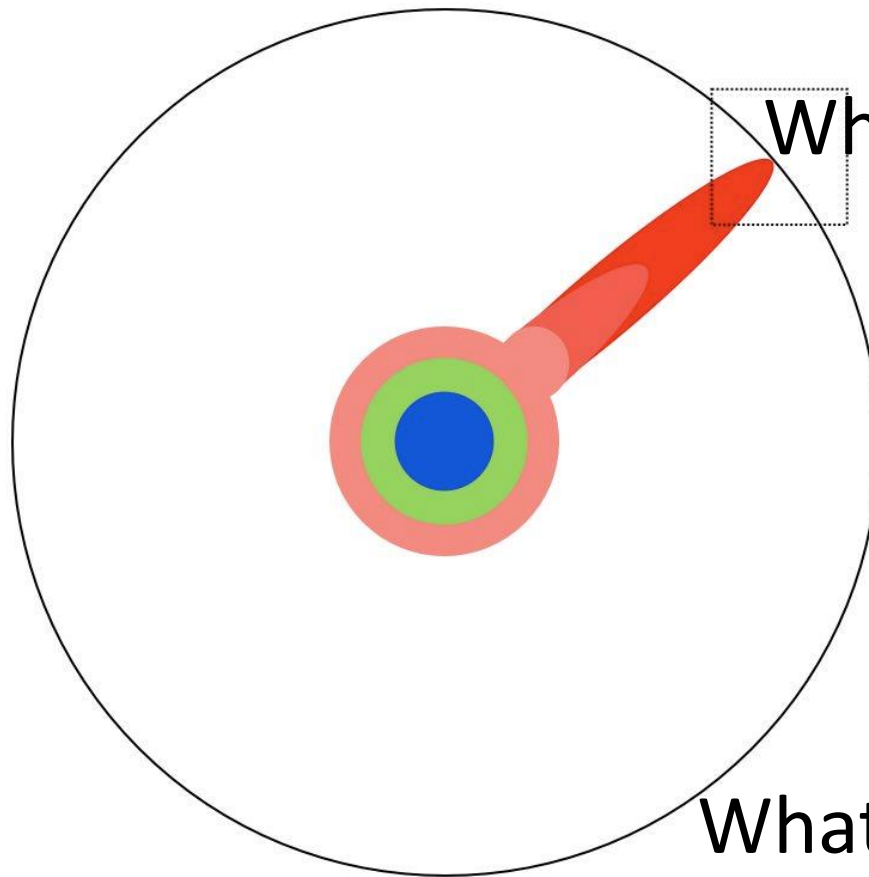
After High School + B.Tech.



After doing courses



Let's Pause a Bit



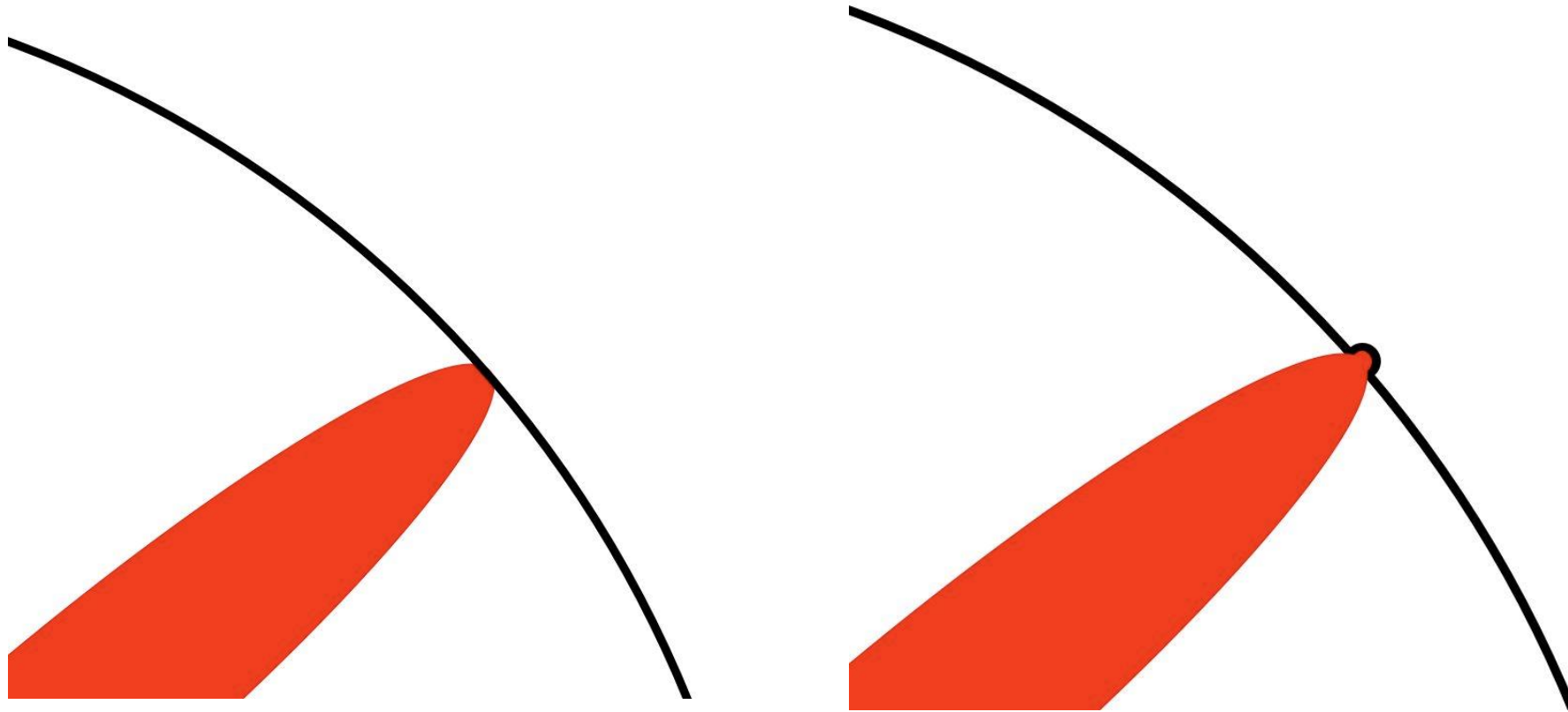
What is the problem?

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

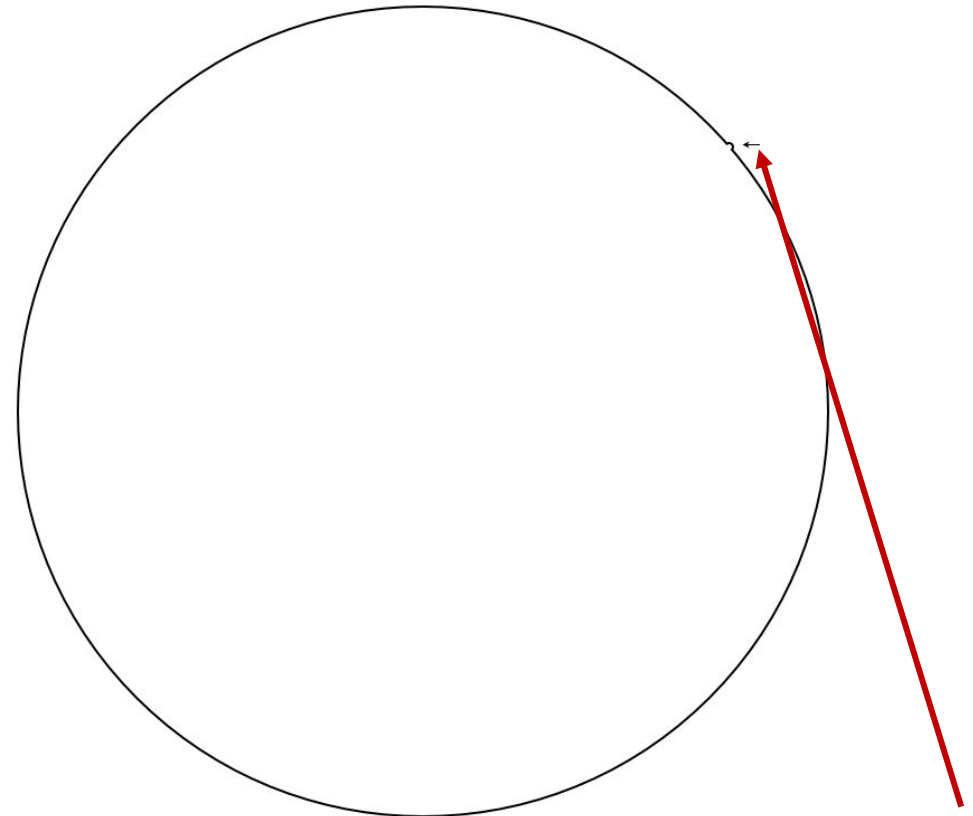
What people have done?

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

The background of the slide is a vibrant underwater scene featuring a coral reef. Various types of coral, including branching and brain corals, are visible in shades of brown, orange, and red. Small, colorful fish are scattered throughout the water. The lighting is dim, creating a deep-sea atmosphere. A white rectangular border frames the central text area.

Secret

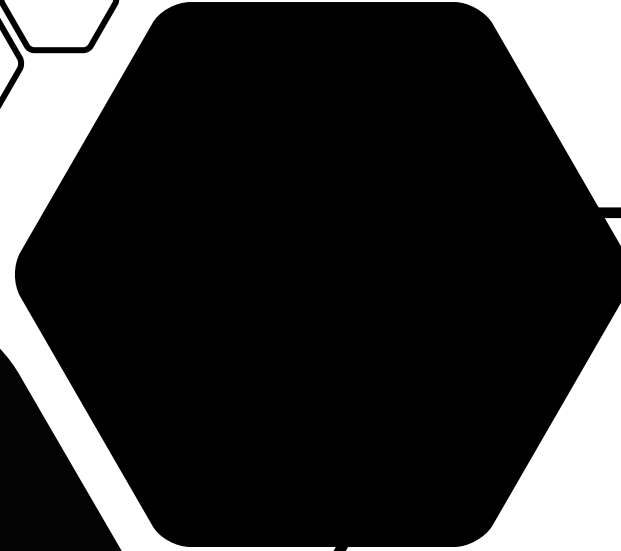
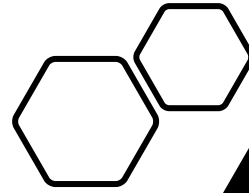
Go for skills and not for grades
(Unlike Mtech/Btech)

The background of the slide is an underwater photograph of a coral reef. The water is dark blue, and the coral is in various shades of brown, orange, and red. Small fish are visible swimming in the water. The text is overlaid on this background.

Secret

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

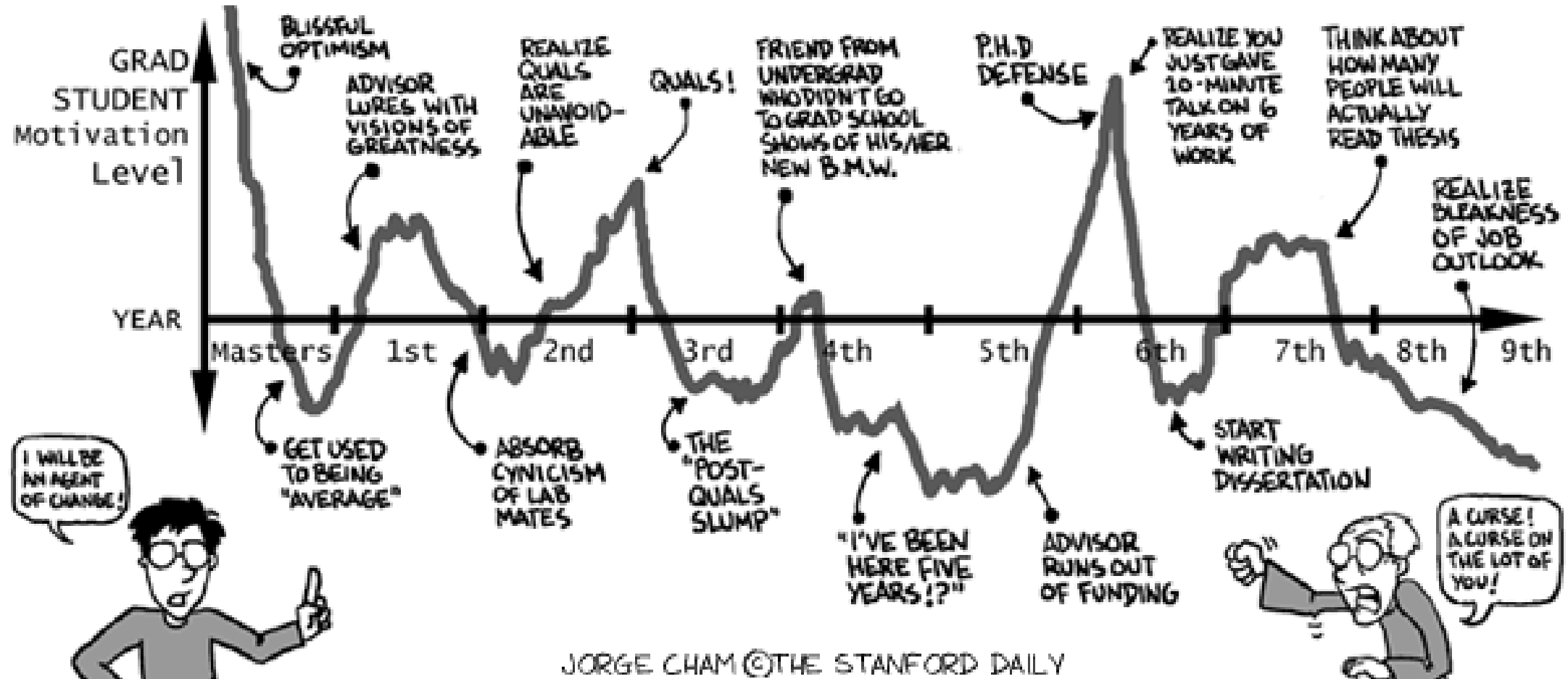
2

Find your “strong”
reason

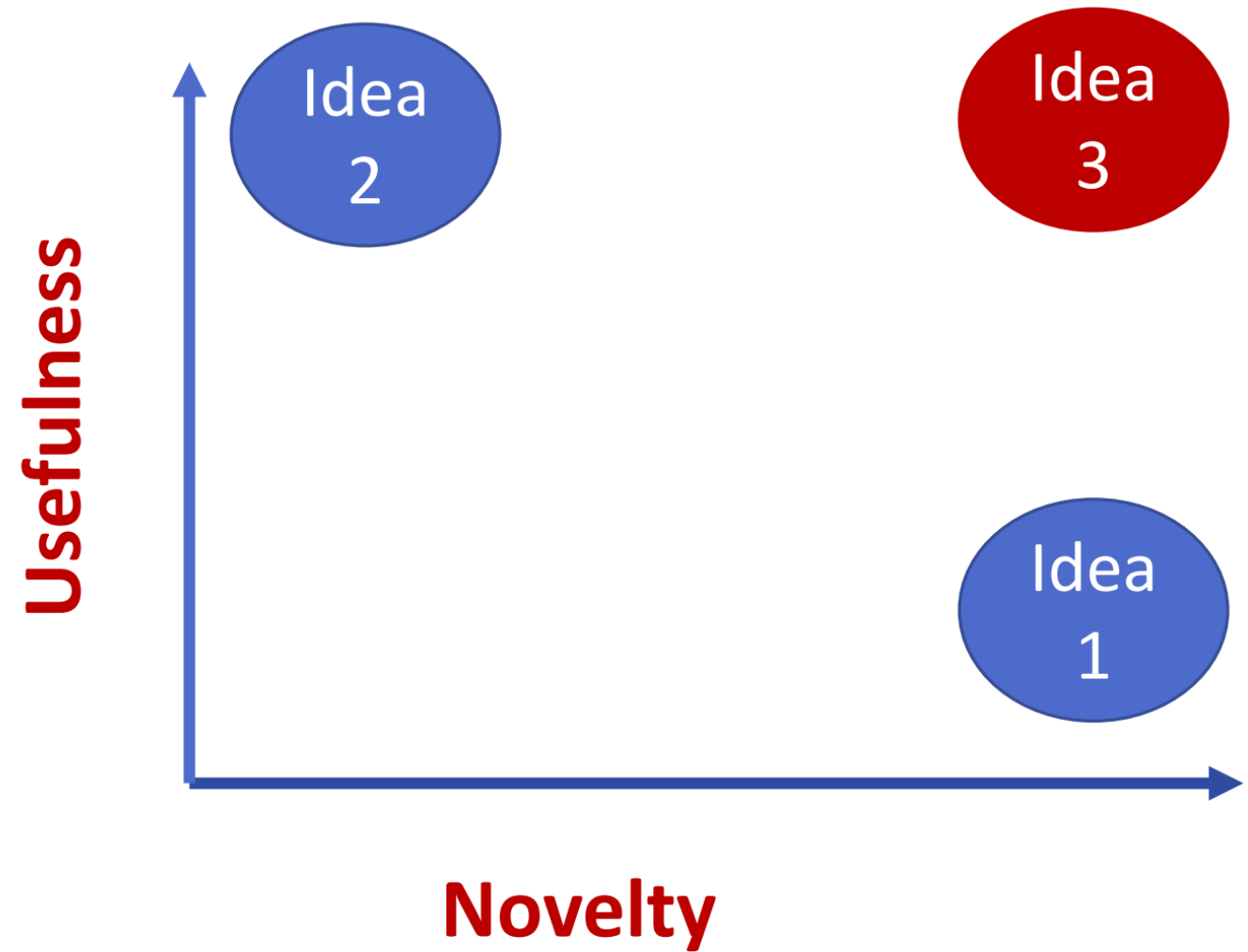
3

Find your “strongest”
reason

If it is weak, then motivation Level ☹️




Search for “THE”
Idea begins





It's Hard

what it takes to make anything
more than mediocre *is*
an act of will.

A person wearing a bright green jacket and dark pants is walking away from the camera on a gravel path that stretches into the distance. The path is flanked by snow-covered fields and a body of water. In the background, there are some buildings and a dark, cloudy sky. The overall mood is somber and reflective.

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
deep, very deep, very very deep*



Waiting for
the idea






Read, Read, Read,

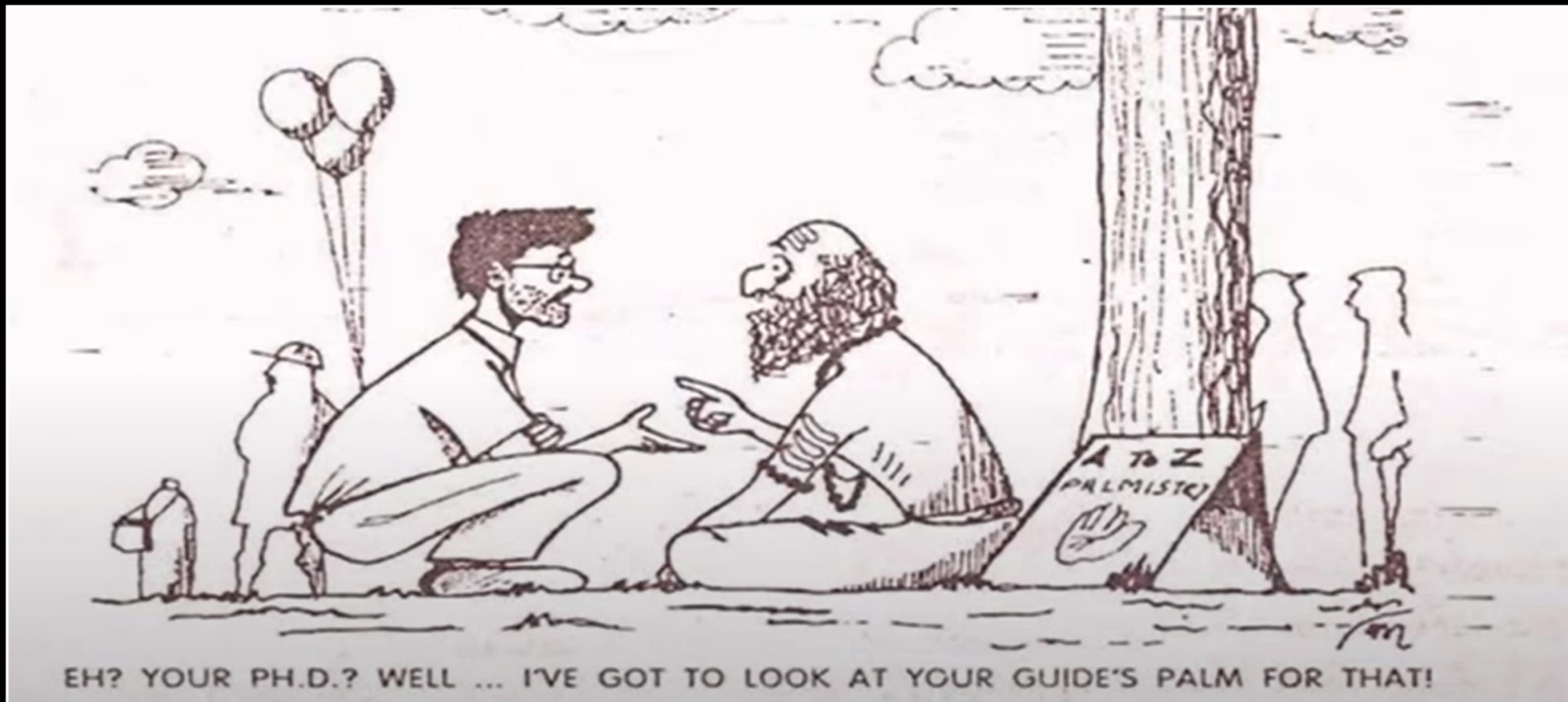
.....

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

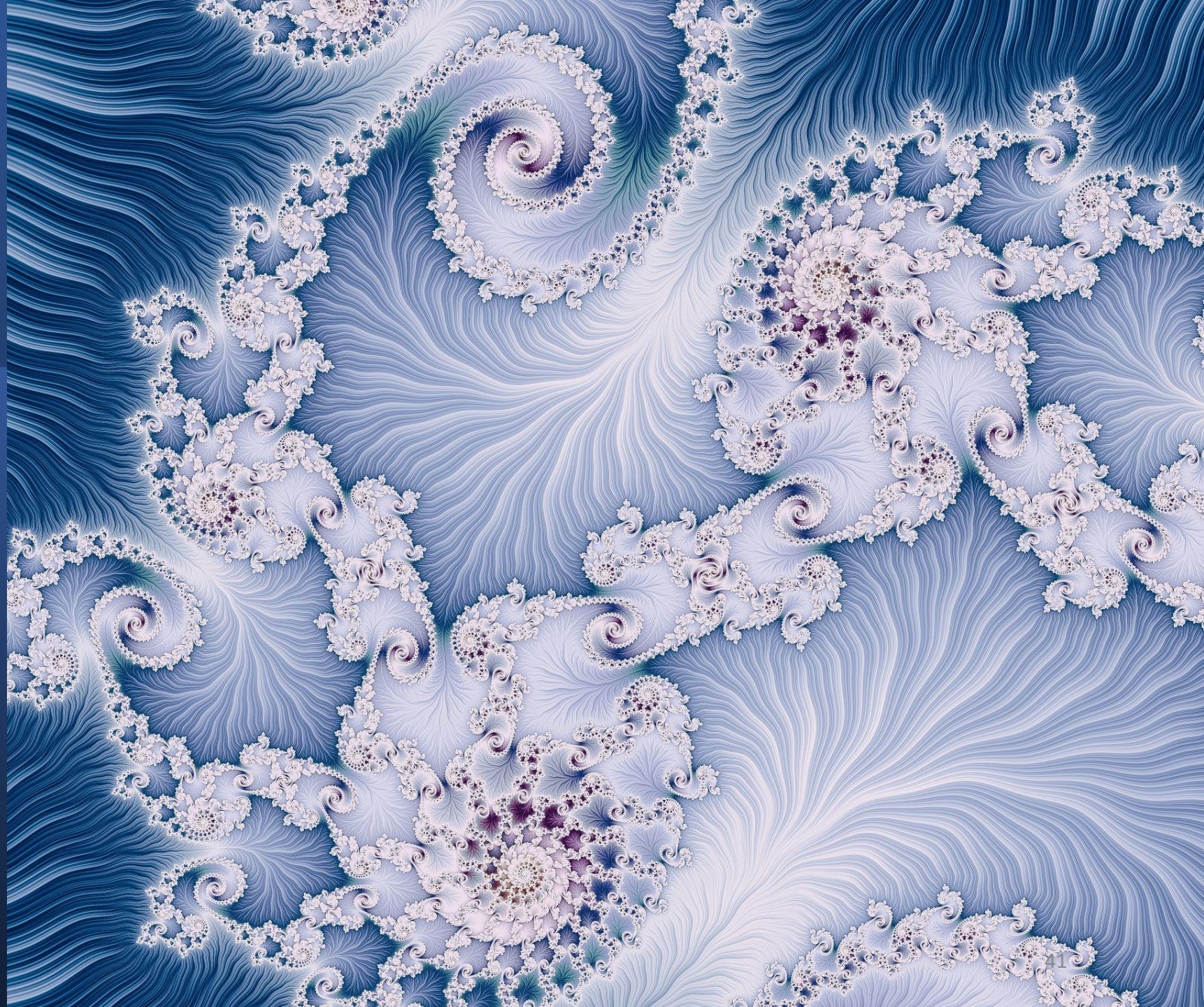
Be passionate/hungry

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 n^{th} door. Hardwork
opens even the $(n+1)^{\text{st}}$*

*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”

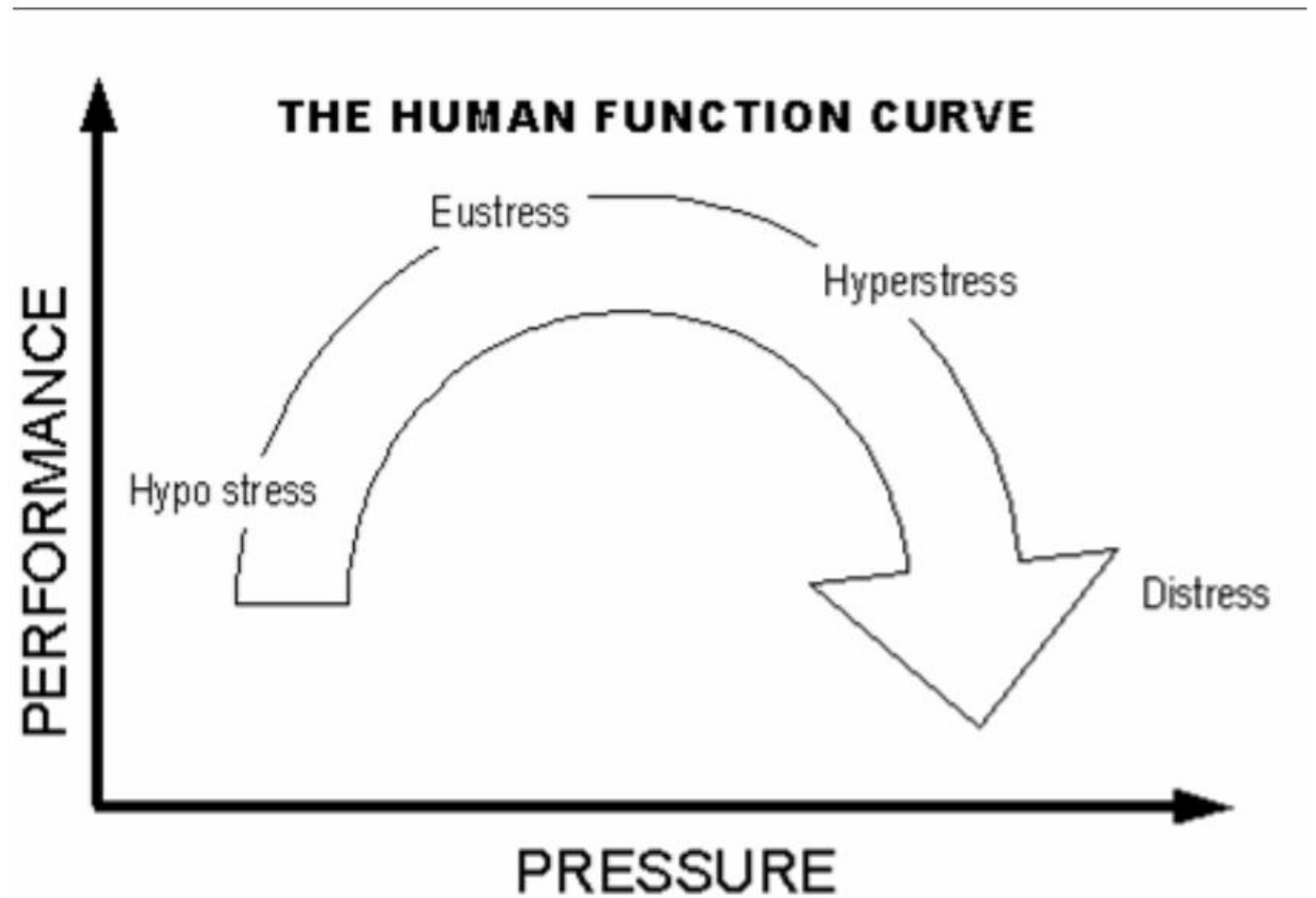




Secret:
Hardwork with persistence works.
Period.

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

Secret

Finishing what you have started is
more important than

Quantity vs Quality



Quality of Quantity

Go for the kill (top forums)

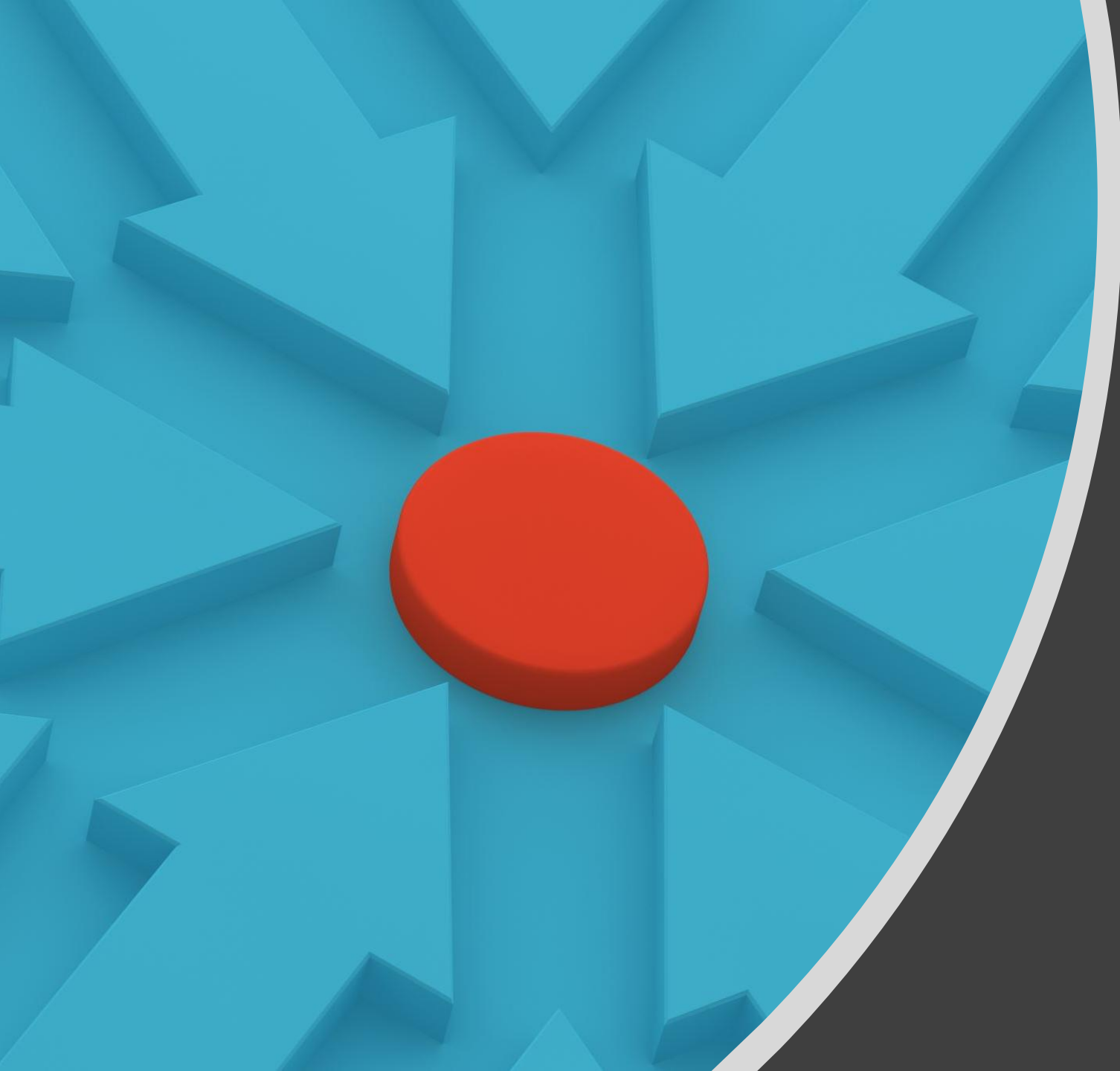
It is OK if you fail

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 😞



Same Analogy



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*

Mediocre Researcher

There is nothing
called mediocre
researcher



Either you are a
good researcher or
NOT. It is Binary.
Period.

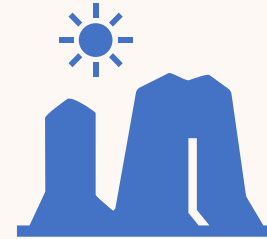
Speed of the Researcher (Do not compare)



Sprint



Marathon



Be careful: the potholes
(Mumbai Road)

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

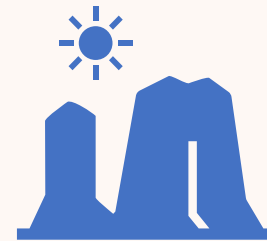
Speed of the Researcher (but)



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

A close-up photograph of a purple padlock with a gold heart-shaped metal plate on its front. The padlock is attached to a metal railing. The background is blurred, showing more of the railing and some greenery.

Love your research

If you are already loving

Go

Go for the kill

Go

Go for a conversion to PhD.

It took just 2.x years for my PhD 😊 three for my MS

Thanks

You will thank yourself later

Myth: Big University PhDs matter

The background of the slide is an underwater scene featuring a diverse coral reef. In the foreground, there are various types of coral, including branching corals and large, rounded brain corals. The water is dark blue, and the lighting is somewhat dim, creating a serene and mysterious atmosphere. The text is overlaid on this background in a clean, white, sans-serif font.

What you do in MS/PhDs matters. Period.

Secret

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



Carolina Marín

Season 1 2020   

prime Watch for ₹0 with Prime

Watch with Prime
Start your 30-day free trial



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.

The Netflix logo is displayed in its characteristic red, bold, sans-serif font.

UNLIMITED TV SHOWS & MOVIES

JOIN NOW

The background of the slide is a movie poster for 'Million Dollar Baby'. It features Clint Eastwood as a stern, older trainer and Hilary Swank as a determined young woman in a boxing ring. Morgan Freeman is also present, though less prominent. The scene is set in a dimly lit boxing arena with spectators in the background.

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



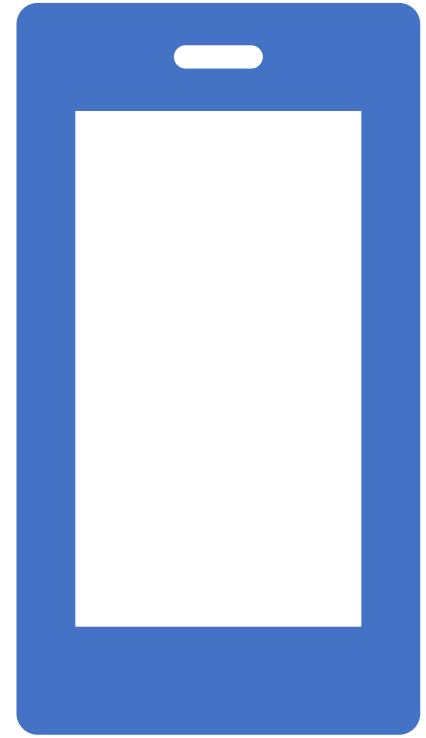
THROW YOUR PROBLEM AT OTHERS,
IF THEY CAN HELP IN SOLVING,
INCLUDE THEM AS CO-AUTHORS



Few More Secrets

World of distractions

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



$3 \text{ hours/day} * 30 \text{ days/month} * 12 \text{ months/year} = 45 \text{ days}$

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 😊*

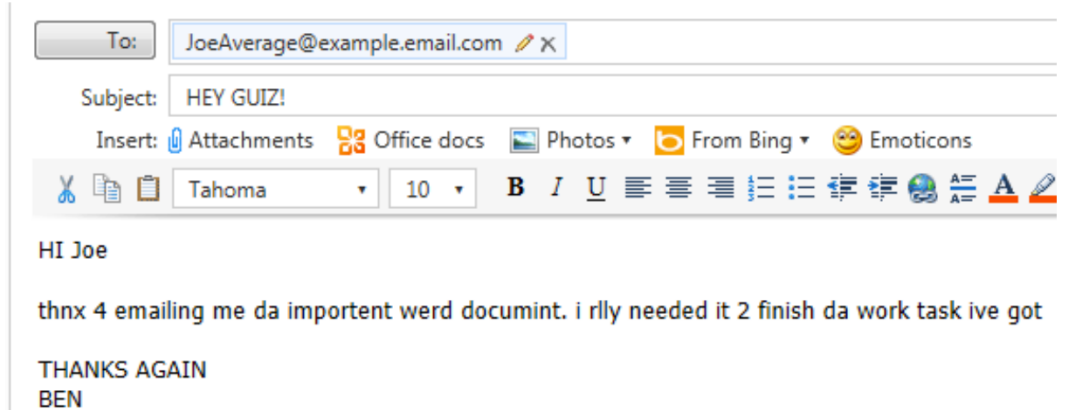


Final Secret:

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)



How NOT to write an email!

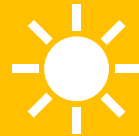
Reality Check



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 Forget

DO NOT TAKE THESE SLIDES ON FACE VALUE.

An orange rectangular box with rounded corners containing the text "DO NOT TAKE THESE SLIDES ON FACE VALUE." in white, uppercase letters. A light orange arrow points downwards from the bottom right corner of the box.

ABSORB IT AND THEN PROCESS IT.

A brown rectangular box with rounded corners containing the text "ABSORB IT AND THEN PROCESS IT." in white, uppercase letters. A light brown arrow points downwards from the bottom right corner of the box.

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

A dark brown rectangular box with rounded corners containing the text "IF THESE SECRETS DO NOT MAKE SENSE AND IF YOU HAVE BETTER 'SECRETS' .." in white, uppercase letters. A dark brown arrow points downwards from the bottom right corner of the box.

PING ME, AND I WILL ADD THEM.

A gray rectangular box with rounded corners containing the text "PING ME, AND I WILL ADD THEM." in white, uppercase letters. A gray arrow points downwards from the bottom right corner of the box.

कौन कहता है आसमां में सुराख नहीं हो सकता एक
पत्थर तो तबियत से उछालो यारों
- Dushyant Kumar.

Go for it!

A close-up photograph of a Moroccan tagine dish. The dish is served in a shallow, wide, earthenware bowl. It features a base of yellow quinoa, topped with several long, bright orange carrot sticks and green beans. The dish is garnished with sliced almonds and small pieces of dark, possibly dried meat or raisins. In the background, another similar tagine dish is visible, and a small, teal-colored ceramic container sits on a dark, patterned cloth. The overall setting is a warm, red-toned tablecloth.

Thanks

Reach out:
biswa@cse.iitb. and/or #CC 217