Higher Education: Myths and Reality

Department of Computer Science and Engineering,
Indian Institute of Technology, Bombay

March 2021
Disclaimer: The Goal of the Talk

- The talk will focus on concepts and principles and not on information
Disclaimer: The Goal of the Talk

- The talk will focus on concepts and principles and not on information.
- It will not address questions such as following:
  - What are the top 20 universities in US? Europe?
  - How much is the tuition fees?
  - What is the application fees?
  - What is the procedure of applying?
  - Does CMU offer an MS on Machine Learning?
Disclaimer: The Goal of the Talk

• The talk will focus on concepts and principles and not on information

• It will not address questions such as following
  ○ What are the top 20 universities in US? Europe?
  ○ How much is the tuition fees?
  ○ What is the application fees?
  ○ What is the procedure of applying?
  ○ Does CMU offer an MS on Machine Learning?

• It will address questions such as following
  ○ What is the role and relevance of higher education?
  ○ What are the criteria to be considered while opting for higher education?
  ○ What are some common myths and realities about higher education
Disclaimer: The Scope of the Talk

- The choice of options that can be pursued after BTech is very wide
  - MS, MTech, MBA, PhD, MFA, Civil Services, Job in Industry, Entrepreneurship?
Disclaimer: The Scope of the Talk

- The choice of options that can be pursued after BTech is very wide
  - MS, MTech, MBA, PhD, MFA, Civil Services, Job in Industry, Entrepreneurship?
- The talk is restricted to possibly the closest and the most natural option for you
  - Higher education in Computer Science
    - I have no background, experience, or expertise about most other options
  - I will touch upon MBA at some places in the talk
Disclaimer: The Scope of the Talk

• The choice of options that can be pursued after BTech is very wide
  ○ MS, MTech, MBA, PhD, MFA, Civil Services, Job in Industry, Entrepreneurship?

• The talk is restricted to possibly the closest and the most natural option for you
  ○ Higher education in Computer Science
    I have no background, experience, or expertise about most other options
  ○ I will touch upon MBA at some places in the talk

• The other options are not unnatural or undesirable
  I am not the right person to talk about them
Outline

• The spectrum of higher education
• Planning for higher education
• Life after higher education
• Conclusions
Part 1

The Spectrum of Higher Education
The Relevance of Higher Education

- Strengthening your technical skills
  - Deeper understanding of work area
The Relevance of Higher Education

- Strengthening your technical skills
  - Deeper understanding of work area

- Strengthening your non-technical skills
  - Stretching your limits: succeeding in unfamiliar environment
  - Living away from home, living independently, being responsible for yourself
  - Handling your own financial matters (not just the pocket money)
The Relevance of Higher Education

• Strengthening your technical skills
  ○ Deeper understanding of work area

• Strengthening your non-technical skills
  ○ Stretching your limits: succeeding in unfamiliar environment
  ○ Living away from home, living independently, being responsible for yourself
  ○ Handling your own financial matters (not just the pocket money)

• Better salary, better financial security
  However, it can’t be considered independently of the cost of higher education
The Relevance of Higher Education

• Strengthening your technical skills
  ◦ Deeper understanding of work area

• Strengthening your non-technical skills
  ◦ Stretching your limits: succeeding in unfamiliar environment
  ◦ Living away from home, living independently, being responsible for yourself
  ◦ Handling your own financial matters (not just the pocket money)

• Better salary, better financial security
  However, it can’t be considered independently of the cost of higher education

• More challenging job is a consequence of the above and is not guaranteed
  Depends on many factors including how you use the opportunity of higher education
The Relevance of Higher Education

- Strengthening your technical skills
  - Deeper understanding of work area
- Strengthening your non-technical skills
  - Stretching your limits: succeeding in unfamiliar environment
  - Living away from home, living independently, being responsible for yourself
  - Handling your own financial matters (not just the pocket money)
- Better salary, better financial security
  However, it can’t be considered independently of the cost of higher education
- More challenging job is a consequence of the above and is not guaranteed
  Depends on many factors including how you use the opportunity of higher education

You become a much better learner
The Relevance of Higher Education

- Strengthening your technical skills
  - Deeper understanding of work area
- Strengthening your non-technical skills
  - Stretching your limits: succeeding in unfamiliar environment
  - Living away from home, living independently, being responsible for yourself
  - Handling your own financial matters (not just the pocket money)
- Better salary, better financial security

However, it can’t be considered independently of the cost of higher education.

More challenging job is a consequence of the above and is not guaranteed.
Depends on many factors including how you use the opportunity of higher education.

You become a much better learner

Assuming that you get real higher education and not just a certificate!

Real higher education ⇒
The Relevance of Higher Education

• Strengthening your technical skills
  ◦ Deeper understanding of work area

• Strengthening your non-technical skills
  ◦ Stretching your limits: succeeding in unfamiliar environment
  ◦ Living away from home, living independently, being responsible for yourself
  ◦ Handling your own financial matters (not just the pocket money)

• Better salary, better financial security

However, it can't be considered independently of the cost of higher education

More challenging job is a consequence of the above and is not guaranteed

Depends on many factors including how you use the opportunity of higher education

You become a much better learner

Assuming that you get real higher education and not just a certificate!

Real higher education ⇒

Significant and long-lasting value addition to your expertise, skill set, and the ability to learn
The Spectrum of Higher Education Programmes: Pedagogy

Course Based

Research Based
The Spectrum of Higher Education Programmes: Pedagogy

Course Based

Research Based

MS by course work
The Spectrum of Higher Education Programmes: Pedagogy

Course Based

- MS by course work

Research Based

The Spectrum of Higher Education Programmes: Pedagogy

Course Based

MS by course work


Research Based

MS by research
The Spectrum of Higher Education Programmes: Pedagogy

Course Based

- MS by course work

Research Based

- MS by research
- PhD
The Spectrum of Higher Education Programmes: Funding

You Pay

You Get Paid
The Spectrum of Higher Education Programmes: Funding

You Pay

You Get Paid

MS
The Spectrum of Higher Education Programmes: Funding

You Pay

You Get Paid

MS

MS with RA/TA possibility
The Spectrum of Higher Education Programmes: Funding

- You Pay
- You Get Paid

- MS
- MS with RA/TA possibility
- MTech, MS at IITs, IISc
- PhD at most places

6/24
The Spectrum of Higher Education Programmes: Focus

Specialization  Broad
The Spectrum of Higher Education Programmes: Focus

Specialization

MS in a specific area

Broad
The Spectrum of Higher Education Programmes: Focus

- Specialization
  - MS in a specific area
- Broad
  - MS with streams, thesis
  - M.Tech.
The Spectrum of Higher Education Programmes: Focus

Specialization

- MS in a specific area
- MS with streams, thesis
- M.Tech.
- Other MS programmes (elective courses)

Broad
The Spectrum of Higher Education Programmes: Duration

One Year

Six Years
The Spectrum of Higher Education Programmes: Duration

One Year  MS, MTech  Six Years
The Spectrum of Higher Education Programmes: Duration

One Year

MS, MTech

Six Years

PhD
Part 2

Planning for Higher Education
1. Standardized tests such as GRE, GATE
<table>
<thead>
<tr>
<th></th>
<th>Criteria of Admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Standardized tests such as GRE, GATE</td>
</tr>
</tbody>
</table>
# Criteria of Admission

1. Standardized tests such as GRE, GATE  
   More critical for MS/MTech

2. Grades
## Criteria of Admission

<table>
<thead>
<tr>
<th></th>
<th>Standardized tests such as GRE, GATE</th>
<th>More critical for MS/MTech</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
</tbody>
</table>
### Criteria of Admission

<table>
<thead>
<tr>
<th></th>
<th>Criteria</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2.</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3.</td>
<td>Statement of purpose</td>
<td></td>
</tr>
</tbody>
</table>
## Criteria of Admission

<table>
<thead>
<tr>
<th></th>
<th>Criteria</th>
<th>Importance for</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2.</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3.</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
</tbody>
</table>
### Criteria of Admission

<table>
<thead>
<tr>
<th></th>
<th>Criteria</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2.</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3.</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4.</td>
<td>Letters of recommendation</td>
<td></td>
</tr>
</tbody>
</table>
## Criteria of Admission

1. **Standardized tests such as GRE, GATE**  More critical for MS/MTech
2. **Grades**  Critical for everything
3. **Statement of purpose**  More critical for PhD
4. **Letters of recommendation**  More critical for PhD
## Criteria of Admission

<table>
<thead>
<tr>
<th></th>
<th>Criteria</th>
<th>Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4</td>
<td>Letters of recommendation (who writes them matters)</td>
<td>More critical for PhD</td>
</tr>
</tbody>
</table>
## Criteria of Admission

<table>
<thead>
<tr>
<th></th>
<th>Criteria</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4</td>
<td>Letters of recommendation</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(who writes them matters)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Work experience after BTech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Criteria of Admission</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2.</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3.</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4.</td>
<td>Letters of recommendation</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(who writes them matters)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Work experience after BTech</td>
<td>In industry</td>
</tr>
</tbody>
</table>

In industry
<table>
<thead>
<tr>
<th></th>
<th>Criteria of Admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Standardized tests such as GRE, GATE</td>
</tr>
<tr>
<td></td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2.</td>
<td>Grades</td>
</tr>
<tr>
<td></td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3.</td>
<td>Statement of purpose</td>
</tr>
<tr>
<td></td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4.</td>
<td>Letters of recommendation</td>
</tr>
<tr>
<td></td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(who writes them matters)</td>
</tr>
<tr>
<td>5.</td>
<td>Work experience after BTech</td>
</tr>
<tr>
<td></td>
<td>More critical for MBA</td>
</tr>
<tr>
<td></td>
<td>In industry</td>
</tr>
</tbody>
</table>
# Criteria of Admission

<table>
<thead>
<tr>
<th></th>
<th>Criteria</th>
<th>Critical for</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4</td>
<td>Letters of recommendation</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(who writes them matters)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Work experience after BTech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In industry</td>
<td>More critical for MBA</td>
</tr>
<tr>
<td></td>
<td>RA position in academia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Criteria of Admission</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4</td>
<td>Letters of recommendation</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(who writes them matters)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Work experience after BTech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In industry</td>
<td>More critical for MBA</td>
</tr>
<tr>
<td></td>
<td>RA position in academia</td>
<td>More useful for MS</td>
</tr>
<tr>
<td></td>
<td>Criteria of Admission</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2.</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3.</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4.</td>
<td>Letters of recommendation</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(who writes them matters)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Work experience after BTech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In industry</td>
<td>More critical for MBA</td>
</tr>
<tr>
<td></td>
<td>RA position in academia</td>
<td>More useful for MS</td>
</tr>
<tr>
<td>6.</td>
<td>Research experience during BTech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Criteria of Admission</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2.</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3.</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4.</td>
<td>Letters of recommendation (who writes them matters)</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>5.</td>
<td>Work experience after BTech</td>
<td>More critical for MBA</td>
</tr>
<tr>
<td></td>
<td>In industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RA position in academia</td>
<td>More useful for MS</td>
</tr>
<tr>
<td>6.</td>
<td>Research experience during BTech</td>
<td>More critical for PhD</td>
</tr>
</tbody>
</table>
# Criteria of Admission

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4</td>
<td>Letters of recommendation</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(who writes them matters)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Work experience after BTech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In industry</td>
<td>More critical for MBA</td>
</tr>
<tr>
<td></td>
<td>RA position in academia</td>
<td>More useful for MS</td>
</tr>
<tr>
<td>6</td>
<td>Research experience during BTech</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(BTP, internship)</td>
<td></td>
</tr>
</tbody>
</table>
# Criteria of Admission

<table>
<thead>
<tr>
<th></th>
<th>Criteria</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standardized tests such as GRE, GATE</td>
<td>More critical for MS/MTech</td>
</tr>
<tr>
<td>2</td>
<td>Grades</td>
<td>Critical for everything</td>
</tr>
<tr>
<td>3</td>
<td>Statement of purpose</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td>4</td>
<td>Letters of recommendation</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(who writes them matters)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Work experience after BTech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In industry</td>
<td>More critical for MBA</td>
</tr>
<tr>
<td></td>
<td>RA position in academia</td>
<td>More useful for MS</td>
</tr>
<tr>
<td>6</td>
<td>Research experience during BTech</td>
<td>More critical for PhD</td>
</tr>
<tr>
<td></td>
<td>(BTP, internship)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoid publishing in predatory journals</td>
<td>More critical for PhD</td>
</tr>
</tbody>
</table>
Criteria of Choosing Future Direction

- Should I do MBA? Should I do MS?
Criteria of Choosing Future Direction

- Should I do MBA? Should I do MS?
- Neither of them is decidedly better than the other
- The answer depends on your heart’s calling
Criteria of Choosing Future Direction

• Should I do MBA? Should I do MS?
• Neither of them is decidedly better than the other
• The answer depends on your heart’s calling
  ○ Do you want to build technology?
  
  MS
Criteria of Choosing Future Direction

- Should I do MBA? Should I do MS?
- Neither of them is decidedly better than the other
- The answer depends on your heart’s calling
  - Do you want to build technology?
  - Deploy technology?

[MS] [MS/MBA?]
Criteria of Choosing Future Direction

- Should I do MBA? Should I do MS?
- Neither of them is decidedly better than the other
- The answer depends on your heart’s calling
  - Do you want to build technology?
  - Deploy technology?
  - Become a user of technology and manage things?
Criteria of Choosing Future Direction

- Should I do MBA? Should I do MS?
- Neither of them is decidedly better than the other
- The answer depends on your heart’s calling
  - Do you want to build technology? [MS]
  - Deploy technology? [MS/MBA?]
  - Become a user of technology and manage things? [MBA]
  - Do you want to do business using technology? [MBA]
• Q. Is it necessary to do PhD after MS?

Only if you want to join academia or a research job in industry
• Q. Is it necessary to do PhD after MS?
  Only if you want to join academia or a research job in industry

• Q. Would I get industry jobs after Ph.D.? Or do I have openings only in academia?
  ◦ Many companies have a thriving research division: Microsoft, IBM, Google, Intel, Facebook, Amazon, Uber, TCS etc.
  ◦ Many other companies welcome PhDs and consider PhD as a value addition
  ◦ In general, specific positions for PhDs are much fewer in industry than other positions
Criteria of Choosing Area

• Should I choose current “trending” areas? Should I choose stable areas?
Criteria of Choosing Area

• Should I choose current “trending” areas? Should I choose stable areas?

Life decisions cannot be based on counting the number of 👍
Criteria of Choosing Area

• Should I choose current “trending” areas? Should I choose stable areas?

Life decisions cannot be based on counting the number of 👍

Be careful when you blindly follow the masses.

Sometimes the M is silent.
Criteria of Choosing Area

• Should I choose current “trending” areas? Should I choose stable areas?
  Life decisions cannot be based on counting the number of 😊

• The area does not matter much so long as you do well whatever you do
Criteria of Choosing Area

• Should I choose current “trending” areas? Should I choose stable areas?
  Life decisions cannot be based on counting the number of 🌟

• The area does not matter much so long as you do well whatever you do

  The particular thing you do, is a matter of luck. That you do something well, is not.

  Richard Hamming
Criteria of Choosing Area

- Should I choose current “trending” areas? Should I choose stable areas?
  Life decisions cannot be based on counting the number of 👍

- The area does not matter much so long as you do well whatever you do

  The particular thing you do, is a matter of luck. That you do something well, is not.

  Richard Hamming

- If you have done something well, there is always a good chance that you will be useful
Find Your Ikigai

Image Credit: Downloaded from internet
Q. Does a programme focussed on a specialization restrict my chances?
Q. Does a programme focussed on a specialization restrict my chances?

- For an MS/MTech programme, in general no, unless the focus is too narrow

- For PhD, the situation is somewhat different
Q. Does a programme focussed on a specialization restrict my chances?

- For an MS/MTech programme, in general no, unless the focus is too narrow
  - An MS/MTech in Machine Learning would not be helpful for a job in compilers
    You may have to rely on your BTech degree for such a job
  - An MS/MTech with a thesis on machine learning can expect to get a job in compilers
  - Basically you need to show a list of courses that go beyond a very narrow domain

- For PhD, the situation is somewhat different
Q. Does a programme focussed on a specialization restrict my chances?

• For an MS/MTech programme, in general no, unless the focus is too narrow
  ○ An MS/MTech in Machine Learning would not be helpful for a job in compilers
    You may have to rely on your BTech degree for such a job
  ○ An MS/MTech with a thesis on machine learning can expect to get a job in compilers
  ○ Basically you need to show a list of courses that go beyond a very narrow domain

• For PhD, the situation is somewhat different
  ○ A case for suitability of the background for some other area needs to be made
    The process of having gone through PhD can be useful in exploring other areas too
  ○ People are known to switch areas over time even after PhD
How to I Find Out My Aptitude and Passion?

- Explore your interests to some depth

  In the worst case, you would know convincingly whether you want to ditch it in future 😊
How to I Find Out My Aptitude and Passion?

• Explore your interests to some depth

  In the worst case, you would know convincingly whether you want to ditch it in future 😇

• In most cases, the beauty of an area emerges only after putting in a lot of effort
  Need to discover finer nuances of ideas and subtle connections between them
How to I Find Out My Aptitude and Passion?

• Explore your interests to some depth

  In the worst case, you would know convincingly whether you want to ditch it in future 😊

• In most cases, the beauty of an area emerges only after putting in a lot of effort
  Need to discover finer nuances of ideas and subtle connections between them

• Talk to the experts in the area, ask them why they find it interesting
How to I Find Out My Aptitude and Passion?

- Explore your interests to some depth
  
  In the worst case, you would know convincingly whether you want to ditch it in future 😊
- In most cases, the beauty of an area emerges only after putting in a lot of effort
  
  Need to discover finer nuances of ideas and subtle connections between them
- Talk to the experts in the area, ask them why they find it interesting
- Try to work closely with people who are passionate, observe and learn through osmosis
  
  Get good internships, projects with such people
How to I Find Out My Aptitude and Passion?

- Explore your interests to some depth
  - In the worst case, you would know convincingly whether you want to ditch it in future 😊
  - In most cases, the beauty of an area emerges only after putting in a lot of effort
  - Need to discover finer nuances of ideas and subtle connections between them
  - Talk to the experts in the area, ask them why they find it interesting
  - Try to work closely with people who are passionate, observe and learn through osmosis

The beauty of an area doesn’t matter unless it resonates with you within!

It’s a joint discovery of an area and yourself

Don’t look at them in isolation from each other

Get good internships, projects with such people
Approaching a Professor Outside of Your College

You should approach experts but to elicit a response, please keep the following points in mind.
Approaching a Professor Outside of Your College

You should approach experts but to elicit a response, please keep the following points in mind

- If your local teachers know them, approach them through your teachers
Approaching a Professor Outside of Your College

You should approach experts but to elicit a response, please keep the following points in mind:

- If your local teachers know them, approach them through your teachers
- If you cold email them
  - Check their area of work, don’t approach them for anything else
  - Make sure your email sounds authentic (“I am excited about your work” is conceited)
Approaching a Professor Outside of Your College

You should approach experts but to elicit a response, please keep the following points in mind:

- If your local teachers know them, approach them through your teachers.
- If you cold email them:
  - Check their area of work, don’t approach them for anything else.
  - Make sure your email sounds authentic (“I am excited about your work” is conceited).
  - Ask genuine questions about their research papers (or the subject matter).
Approaching a Professor Outside of Your College

You should approach experts but to elicit a response, please keep the following points in mind

- If your local teachers know them, approach them through your teachers
- If you cold email them
  - Check their area of work, don’t approach them for anything else
  - Make sure your email sounds authentic (“I am excited about your work” is conceited)
  - Ask genuine questions about their research papers (or the subject matter)
  - You should be able to justify why you are approaching them
    - Seeking internship? Asking for advice? Trying to find your heart’s calling?
    - Just because they are experts? Or because you are interested in the subject?
Approaching a Professor Outside of Your College

You should approach experts but to elicit a response, please keep the following points in mind

- If your local teachers know them, approach them through your teachers
- If you cold email them
  - Check their area of work, don’t approach them for anything else
  - Make sure your email sounds authentic (“I am excited about your work” is conceited)
  - Ask genuine questions about their research papers (or the subject matter)
  - You should be able to justify why you are approaching them
    - Seeking internship? Asking for advice? Trying to find your heart’s calling?
    - Just because they are experts? Or because you are interested in the subject?
  - Ask further reading or programming work you can do before you approach them next
  - Ask if there is some way in which you can contribute to their work
Approaching a Professor Outside of Your College

You should approach experts but to elicit a response, please keep the following points in mind

- If your local teachers know them, approach them through your teachers
- If you cold email them
  - Check their area of work, don’t approach them for anything else
  - Make sure your email sounds authentic (“I am excited about your work” is conceited)
  - Ask genuine questions about their research papers (or the subject matter)
  - You should be able to justify why you are approaching them
    - Seeking internship? Asking for advice? Trying to find your heart’s calling?
    - Just because they are experts? Or because you are interested in the subject?
  - Ask further reading or programming work you can do before you approach them next
  - Ask if there is some way in which you can contribute to their work
  - Don’t bombard them with a succession of emails
Approaching a Professor Outside of Your College

You should approach experts but to elicit a response, please keep the following points in mind:

- If your local teachers know them, approach them through your teachers.
- If you cold email them:
  - Check their area of work, don't approach them for anything else.
  - Make sure your email sounds authentic (“I am excited about your work” is conceited).
  - Ask genuine questions about their research papers (or the subject matter).
  - You should be able to justify why you are approaching them.
    - Seeking internship? Asking for advice? Trying to find your heart’s calling?
    - Just because they are experts? Or because you are interested in the subject?
  - Ask further reading or programming work you can do before you approach them next.
  - Ask if there is some way in which you can contribute to their work.
  - Don’t bombard them with a succession of emails.

The moral of the story:
Do your homework on why they should be interested in responding to you.
No chance unless you sound authentic.
The statement of purpose is very critical in your application process, whether formal or informal.
The statement of purpose is very critical in your application process, whether formal or informal.

The key is authenticity, honesty, and personalization.
Statement of Purpose

- The statement of purpose is very critical in your application process, whether formal or informal.
- The key is authenticity, honesty, and personalization.
- Focus should be on why something matters to you:
  - How does this interest arise out of your experiences?
  - What have you done about it in the past?
  - What is your dream about it?
Statement of Purpose

- The statement of purpose is very critical in your application process, whether formal or informal
- The key is authenticity, honesty, and personalization
- Focus should be on why something matters to you
  - How does this interest arise out of your experiences
  - What have you done about it in past
  - What is your dream about it
- The moral of the story
  - Do a lot of soul-searching, be brutally honest in convincing yourself
  - Use it as a tool of self-discovery
Choosing an Institute of Higher Learning

• More critical for PhD, less so for Masters
  - Any of the good universities is good enough for Masters
  - A rank of 20 is not much different from a rank of 50 for Masters
  - What may vary is alumni network and it may matter if you wish to start a company

So choose what seems closest to your interests and finances
Choosing an Institute of Higher Learning

- More critical for PhD, less so for Masters
  - Any of the good universities is good enough for Masters
  - A rank of 20 is not much different from a rank of 50 for Masters
  - What may vary is alumni network and it may matter if you wish to start a company

So choose what seems closest to your interests and finances

- For PhD
  - Your Interest
    - Active research group with good focus
    - How much time does your advisor have for you
    - How much interest does your advisor have in your project
    - If other things match, ranking may not matter much
Do I have to go to US for Higher Education?

Not necessarily

- Europe offers equally good options
  - UK, France, Germany, Netherlands, Switzerland, Austria, Sweden, Denmark
  - No tuition fees in Germany, UK is expensive with very little funding for outside people

- India offers equally good options
  - IITs, IISc, CMI, IMSc, TIFR, IIITs
  - IIMs for MBA
  - Most Engg/CS institutions need GATE/JEST, interviews
  - Most places offer generous scholarship
  - Very good placements
Part 3

Life After Higher Education
Research in Industry Vs. Research in Academia
Research in Industry Vs. Research in Academia

- **Research in industry** driven by a product

- **Research in academia** is driven by an idea
Research in Industry Vs. Research in Academia

- **Research in industry** driven by a product
  - Needs to combine results of many idea driven research efforts
  - Must work with a series of well-defined short term goals
- **Research in academia** is driven by an idea
Research in Industry Vs. Research in Academia

- **Research in industry** driven by a product
  - Needs to combine results of many idea driven research efforts
  - Must work with a series of well-defined short term goals

- **Research in academia** is driven by an idea
  - Typically not bound by a particular product
  - Can work with ill-defined long terms goals
  - Deliverables exist but of a different nature
  - Deadlines are usually as strict
What Does a Job in Academia Involve?

Assumption: Post-PhD jobs in prestigious institutes of higher learning
What Does a Job in Academia Involve?

• Teaching

• Research

• Administration

• Extension and outreach activities
What Does a Job in Academia Involve?

• Teaching
  ◦ Teaching courses, guiding students for projects
  ◦ Pioneering new teaching material, new teaching methodologies for specific subjects

• Research

• Administration

• Extension and outreach activities
What Does a Job in Academia Involve?

- **Teaching**
  - Teaching courses, guiding students for projects
  - Pioneering new teaching material, new teaching methodologies for specific subjects
- **Research**
  - Working on research problems of interest, publishing papers
  - Guiding PhD and Masters students
  - Funded research (for industry as well as government), Providing consultancy
- **Administration**
- **Extension and outreach activities**
What Does a Job in Academia Involve?

• Teaching
  ◦ Teaching courses, guiding students for projects
  ◦ Pioneering new teaching material, new teaching methodologies for specific subjects

• Research
  ◦ Working on research problems of interest, publishing papers
  ◦ Guiding PhD and Masters students
  ◦ Funded research (for industry as well as government), Providing consultancy

• Administration

• Extension and outreach activities
  ◦ Serving on Board of Governors, Board of Studies, Technology advisory boards,
  ◦ PhD examiners, conference PCs, reviewing papers, giving talks, influencing policy decisions through popular articles
What Does a Job in Academia Involve?

• Teaching
  ◦ Teaching courses, guiding students for projects
  ◦ Pioneering new teaching material, new teaching methodologies for specific subjects

• Research
  ◦ Working on research problems of interest, publishing papers
  ◦ Guiding PhD and Masters students
  ◦ Funded research (for industry as well as government), providing consultancy

• Administration

• Extension and outreach activities
  ◦ Serving on Board of Governors, Board of Studies, Technology advisory boards,
  ◦ PhD examiners, conference PCs, reviewing papers, giving talks, influencing policy decisions through popular articles

Initially, most effort is spent on research
When you reach a steady state, mix and match as per your liking
Do the minimal quantum in any one and focus on others
What Does a Job in Academia Involve?

• Teaching
  o Teaching courses, guiding students for projects
  o Pioneering new teaching material, new teaching methodologies for specific subjects

• Research
  o Working on research problems of interest, publishing papers
  o Guiding PhD and Masters students
  o Funded research (for industry as well as government), providing consultancy

• Administration

• Extension and outreach activities
  o Serving on Board of Governors, Board of Studies, Technology advisory boards,
  o PhD examiners, conference PCs, reviewing papers, giving talks, influencing policy decisions through popular articles

Interaction with curious, energetic, young persons keeps an academic young!
Industry Vs Academic Jobs: Myths and Reality

• We are considering jobs after higher education
  ○ In better known companies and institutions of higher learning
Industry Vs Academic Jobs: Myths and Reality

- We are considering jobs after higher education
  - In better known companies and institutions of higher learning
  - Time and effort for entry are usually different
Industry Vs Academic Jobs: Myths and Reality

- We are considering jobs after higher education
  - In better known companies and institutions of higher learning
  - Time and effort for entry are usually different

- We compare the two by creating a multi-dimensional spectrum of value addition
Industry Vs Academic Jobs: Myths and Reality

- We are considering jobs after higher education
  - In better known companies and institutions of higher learning
  - Time and effort for entry are usually different

- We compare the two by creating a multi-dimensional spectrum of value addition
  - Identify relevant parameters of comparison
  - Create a different dimension for each parameter
  - Indicate the magnitude of possible value addition along each dimension
Money earned brings in financial security which is essential
Leisure or free time is essential to refresh and recharge to get back to work.
It is as important as sleep.
Freedom to do what one likes to do is a great motivator
It enables going the extra mile
Intellectual challenge triggers deep thinking and sharpens intellectual abilities.
If there is no challenge, boredom sets in lowering the performance.
Job satisfaction gives meaning and purpose to life. It facilitates perseverance and allows overcoming frustrations.
Social respect and prestige add dignity to life and bring in the “feel good” factor. This feel good factor motivates people to continue doing good things.
We now compare jobs in industry and academia along the chosen parameters using this framework. We mark a position on each axis to indicate the magnitude of the possible value addition along the parameter.
Industry Vs Academic Jobs: Myths and Reality

Industry

Money
Leisure
Social Respect
Job Satisfaction
Intellectual Challenge
Freedom

Academia

Money
Leisure
Social Respect
Job Satisfaction
Intellectual Challenge
Freedom
Industry Vs Academic Jobs: Myths and Reality

- Money
- Leisure
- Social
- Respect
- Job
- Satisfaction
- Freedom
- Intellectual Challenge

Comparison between Industry (I) and Academic (A) jobs.
Industry Vs Academic Jobs: Myths and Reality

- Money
- Leisure
- Social Respect
- Job Satisfaction
- Intellectual Challenge
- Freedom

I (Industry) vs A (Academic)

- Money
- Leisure
- Social Respect
- Job Satisfaction
- Intellectual Challenge
- Freedom
Industry Vs Academic Jobs: Myths and Reality

Money

Social Respect

Job Satisfaction

Intellectual Challenge

Leisure

Freedom

Money

Social Respect

Job Satisfaction

Intellectual Challenge
Industry Vs Academic Jobs: Myths and Reality
Industry Vs Academic Jobs: Myths and Reality

- Money
- Leisure
- Freedom
- Intellectual Challenge
- Job Satisfaction
- Social Respect
- Money
- Leisure
- Freedom
- Intellectual Challenge
- Job Satisfaction
- Social Respect

I (Industry)

A (Academia)

Diagram showing the comparison between Industry (I) and Academic (A) jobs with different criteria.
Industry Vs Academic Jobs: Myths and Reality
Industry Vs Academic Jobs: Myths and Reality

Money

Leisure

Social Respect

Job Satisfaction

Intellectual Challenge

Money

Leisure

Social Respect

Job Satisfaction

Intellectual Challenge

I

A

Job Satisfaction

Freedom
Industry Vs Academic Jobs: Myths and Reality
Industry Vs Academic Jobs: Myths and Reality

Money
Leisure

Social
Respect

Job
Satisfaction

Intellectual
Challenge

Respect
Social

Freedom

Job
Satisfaction

Intellectual
Challenge

Money
Leisure

Social
Respect

Job
Satisfaction

Intellectual
Challenge
Industry Vs Academic Jobs: Myths and Reality

Money vs Leisure

Freedom vs Intellectual Challenge

Social Respect vs Job Satisfaction

Respect vs Social

Money vs Leisure

Freedom vs Intellectual Challenge

Job Satisfaction vs Social Respect
Industry Vs Academic Jobs: Myths and Reality

- Money
- Leisure
- Social Respect
- Job Satisfaction
- Intellectual Challenge
- Freedom

I: Industry
A: Academic
Industry Vs Academic Jobs: Myths and Reality

Money

Leisure

Social Respect

Job Satisfaction

Intellectual Challenge

Money

Leisure

Social Respect

Job Satisfaction

Intellectual Challenge
Industry Vs Academic Jobs: Myths and Reality

The biggest survival skill

- **Industry.** Diligence
  
  You don’t have to like your work to do it properly

- **Academia.** Independent thinking
  
  You don’t have to accept anything unless you are convinced
At the time of decision making, many people take a rather unidimensional view of the world!

They miss many important things in their decision making.
Industry Vs Academic Jobs: Myths and Reality

Strive to look for the full picture!
Part 4

Conclusions
Conclusions

• Growth in life is a pre-requisite for fulfillment
• Learning how to learn is becoming more and more critical
• Higher education is a good stepping stone for learning how to grow
Thank You!

http://www.cse.iitb.ac.in/~uday

uday@cse.iitb.ac.in