



IIT KANPUR  
Indian Institute of Technology Kanpur

# CS888: Introduction to Profession and Communication

System Research: Introduction

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# Prologue: A mild dose of philosophy!

*“The only thing that interferes with my learning is my education”*



–Albert Einstein

Very confusing! Always thought learning becomes easier with education. No?



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- Research requires keeping an open mind, especially when you are shown to be wrong about something
- Bias is natural to human beings (more educated/experienced → more bias)
  - I have {observed | proved | understood | coded | experimented | written | tested | ...}.  
How can it be wrong?

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- Example: <https://www.cse.iitk.ac.in/users/mainakc/pub/hpca2017dap.pdf>  
(Best paper at a flagship conference in Computer Architecture)
- Conventional knowledge: Caches improve performance ⇒ More cache hits leads to better performance
- Imagine someone saying/demonstrating this is wrong. Reactions?

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- Imagine someone saying/demonstrating this is wrong. Reactions?
  - Just being curious to know “why” is not enough. Passionate exploration can lead to exciting research outcomes



# Assignment - 1



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Q1. Write about at least one instance from your past when your “education” combined with humane bias lead to premature closure of a possible research exploration.

Q2. Write about at least one research idea from your preferred research area in CS that is an outcome of exploring something unusual i.e., some observation which is in contradiction to commonly accepted notions in that field/area.

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How are theory and practice related?

Planning your PhD theory vs. practice

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What about systems where there are hardly any axioms?

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What about systems where there are hardly any axioms?

Fair enough. What if I provide formal guarantees without making assumptions or depending on axioms?



- Thinking assignment: How many things can be proven without making any direct/indirect assumptions?

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Q1. Write about two instances from your life when you realized (and may be shocked) by experiencing something which is very different from your theoretical perspective.

Q2. Write about two alternate methods to build a knowledge system where you can not prove anything.