Who Am I?

2000
2008
2014
2015

Technion
Israel Institute of Technology

LogicBlox

IBM

(Ph.D.)

The Hebrew University of Jerusalem
On the Principles of Joyful Research
[in Computer Science]

Benny Kimelfeld
Technion, Israel
A Selfish Viewpoint

Doing research as a profession?

You better enjoy it!

Excitement in problem solving

Impact

Recognition

Building, engineering, theorem proving, social interactions

Uses of my results / software, citations

Accepted papers, awards, invitations, job offers, casual nicety

Balance is key, personal, art

Correlated, not the same!
Necessities of “Good” Research

- Motivation
- Novelty
- Challenge
- Measurability
Necessities of “Good” Research

Do I believe that success will do good?

Any “formal” indication (e.g., study) of a need?

Am I defending my project not just because it is mine?

Can I convince my non-scientist fellows?

Actually, very useful to carefully prepare an elevator pitch for every project
Necessities of “Good” Research

What has been done for solving the problem?

• Nothing?
  ▪ Be careful with the motivation and/or search methodology!

• A lot?
  ▪ Motivated problem; but why hasn’t your angle been studied?
    (recent use cases, recent developments, etc.)

Common mistake: “Central contribution is X; delta from existing work is Y”
  “A et al. [A+14] also studied this problem, but they considered only inches; we also do cm”
Necessities of “Good” Research

Should be clear that there is an a-priori chance of **failure**!

*Or else, why academic research to deal with the problem?*

“Interesting solution” is **not interesting** if there is a much simpler one *(usually)*

*Clear away any obvious simpler algorithm / proof*

On the other hand, there should be convincing reasons for optimism!

*A substantial approach overlooked, recent developments, ...*

- “Our goal is to remove comments from latex files”
- “Our goal is to auto-produce the body of the paper, given the intro”
Necessities of “Good” Research

Theoretical work has built in measurability

- How well does the framework capture the motivation?
- Does the framework lead to useful & nontrivial insights?
  - In other words, is there more than formalism for formality?
- How difficult is it to establish the results?
  - Historical attempts?

In empirical/systems it is harder

- Would things look any different were your hypothesis wrong?
- Benchmarks/cases to show numbers (quality/cost)? Standard fake-data generators? Convincing user study?
- Take it seriously! Measurement methodology is often a (valuable) contribution by itself (highlight it)
Risk Management

For fruitfulness and happiness, ≥ 2 directions:

Highly challenging problem with low progress/effort rate

“I know ± what to do, optimistic about expected obstacles”

But, do not maintain too many threads!
Or else, quality will be compromised
Crisis Management

My past projects

- Didn’t involve any crisis
- Crisis was a showstopper
- Crisis resolved; I went on
- Crisis led to strong insights, shift of focus, much better work

“Oh man... the minor issue we kept ignoring casts the whole system useless!”

“Damn! A bug in the proof 😒... Does it all collapse?”

Crisis is part of the game; try to leverage!