THE TOP 10
LESSONS OF
GRAD SCHOOL

Bruce Jacob

University of
Maryland

The Top 10 Lessons
I Learned in Grad School

Bruce Jacob

Electrical & Computer Engineering
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UNIVERSITY OF MARYLAND

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11. Sow Some Wild Oats

**Don't have to jump into thesis;
take a few years to explore other areas
(even completely unrelated ones)**

Provides good *background & perspective*

You might find something *interesting*

You might find *related problems* *to solve*

You might have *fun*

*You will not get bored of your PhD topic
quite as quickly as otherwise*

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10. Extracurriculars: Do Them

Learn to play an instrument;
Play sports (contact & non-contact);
Learn a foreign language

Being busy forces *prioritization & focus*

Non-research activities are *therapeutic*
(especially contact sports)

HOWEVER: When you're old & complaining about joints, you won't play much football

Become an interesting person

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9. Collaborate with Others

**Most people see advisor once/week,
but need feedback => COLLABORATION
(it also gets the work done faster)**

Bounce *ideas* *off people*

Finish research papers 2-3 times *faster*

Have someone to go to *lunch* *with ... :)*

Not easy to start late in the PhD process

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8. Old vs. Young Advisor

OLDER ADVISOR:

Typically has more money, more students, more contacts, less time. Perhaps better job opportunities after graduation? Perhaps less direction?

YOUNGER ADVISOR:

Typically has less money, more energy, more time, fewer job contacts, less perspective. Perhaps more direction and personal interaction?

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7. Job Market: PhD vs. MS

In Computer Engineering:

> **Ph.D. — Design**
>
> **M.S. — Implementation**
>
> **B.S. — Coffee-fetching**

PhD's are paid to THINK;
MS's are paid to DO

PhD's do not make MUCH more than MS's

MS's start making the money 2-5 years early

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6. Read a Paper a Day*

Your job as a grad student is to ABSORB KNOWLEDGE like a SPONGE

Borrow & read **textbooks**

Read **conference proceedings** *(good ones)*

Read **journals** *(good ones)*

(For Computer Architecture:)

- *Join ACM SIGARCH, SIGMICRO, SIGOPS*

- *Good research delivered to your door*

* Thanks to Don Yeung

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5. Do Excellent Research

Point of Research: ask & answer questions, NOT build & evaluate implementations

Asking & answering questions is **SCIENCE**

Building & evaluating implementations is **ENGINEERING**

You will be remembered mainly for your contributions to **SCIENCE**
(there are many counterexamples, however)

EXCELLENT RESEARCH ≠   COOL IDEA
EXCELLENT RESEARCH =   ANY IDEA
                          DONE WELL

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4. Give Excellent Talks

Your presentation of ideas is how many will judge you, so do it well.

Begin AT LEAST one month before date

Give a practice talk

   Take suggestions

   Rewrite the talk

   Repeat

Big fonts, diagrams wherever possible, use of COLOR seems to work well

(Normally, I use LOTS OF DIAGRAMS)

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3. Write Excellent Papers

Your presentation of ideas is how many will judge you, so do it well. Remember: your papers will last forever.
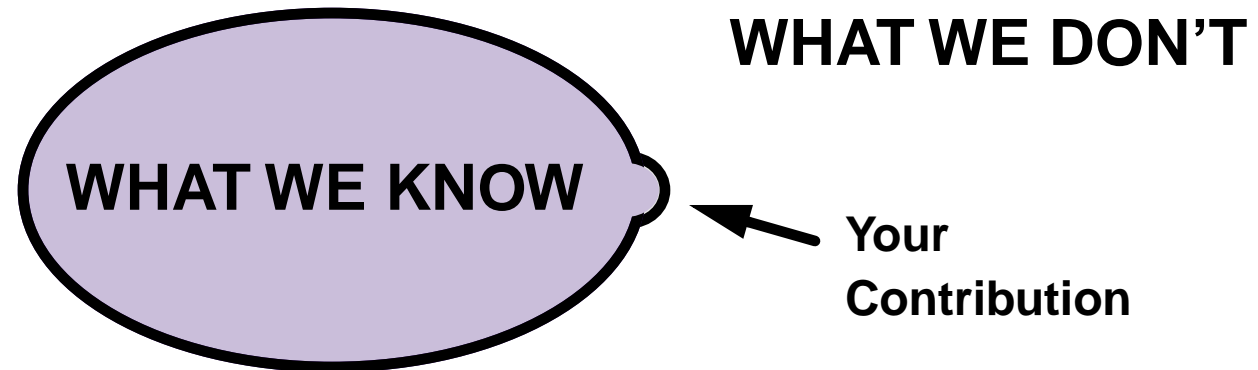
What papers do you cite frequently?
What papers do you re-read?
EMULATE THESE PAPERS

Aim high, but have fun (Banff, Ireland, etc.)

- *Chance to travel on advisor's tab*

- *Don't do too many workshops (or if you do, don't list them all)*

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2. The Point of the PhD

WHAT WE DON'T

WHAT WE KNOW

Your
Contribution

To push the boundaries of what we know
[Requires looking at one topic
in excruciating detail]

RESULT: you can distinguish between what
is known and what is not known—you are
able to ask questions that are not answered

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1. PhD Thesis = Paper++

Your thesis will not save/conquer the world; you will be lucky if 10 people read it. DO THE MINIMUM NECESSARY.

*Your **research** is disseminated through **your papers**, not your dissertation*

*Treat your dissertation like a **BIG paper***

That's it.

If you try to conquer/save the world, you will graduate in roughly 15 years, or drop out in frustration

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What to Expect:

It is **not COLLEGE++**

COLLEGE
Here is what you should know. Learn it.
GRAD SCHOOL
Here is what we know. Find out more.

Focus: LEARNING/DOING ON YOUR OWN

IMPORTANT ITEMS:

- Your **advisor** — time? direction?

- Your **research area** — interesting?

- Your **research group** — collaborators?

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In Review:

11. Sow Some Wild Oats

10. Extracurriculars: Do Them

9.   Collaborate with Others

8.   Old vs. Young Advisor

7.   Job Market: PhD v. MS

6.   Read a Paper a Day

5.   Do Excellent Research

4.   Give Excellent Talks

3.   Write Excellent Papers

2.   The Point of the PhD

1.   PhD Thesis = Paper++

0.   It is not COLLEGE++   (it's better :)