

## **ADVICE FOR GRADUATE STUDENTS**

**By Daniel Lemire**

If, you are a graduate student and you don't mind biased information meant to help you out? Read on!

### **Research is art**

Research is art, there is no right way to do research. So far, I only believe in three general rules:

- 1. don't be isolated... be part of a network*
- 2. be open minded*
- 3. don't copy or try to be fashionable, always try to go further and lead*

You might want to compare them with the Three Dijkstra Rules for Successful Scientific Research:

- 1. "Raise your quality standards as high as you can live with, avoid wasting your time on routine problems, and always try to work as closely as possible at the boundary of your abilities. Do this, because it is the only way of discovering how that boundary should be moved forward."*
- 2. "We all like our work to be socially relevant and scientifically sound. If we can find a topic satisfying both desires, we are lucky; if the two targets are in conflict with each other, let the requirement of scientific soundness prevail."*
- 3. "Never tackle a problem of which you can be pretty sure that (now or in the near future) it will be tackled by others who are, in relation to that problem, at least as competent and well-equipped as you."*

### **Success is completion**

Brian Bialkowski says it best:

It won't be easy and it won't be pretty, but eventually you will finish. Sure, some of your work may be unreadable, but other parts will surprise you at their quality, and will be more concise and polished than anything you ever expected. It won't be perfect, it might not even be good, but it won't matter. In the end, you'll have words on paper and your degree in hand.

To be clear, at some point, in any research project, you have to sit down and write. Whether what you write is great or just ok, matters less than you think. You need to get a passing grade, but most of your work will not be insanely great. You need to know what the rules are so that your work is acceptable, but that's it.

### **Research is a business**

It doesn't work like other businesses, but research is a business of sort. It is not free of politics, it doesn't happen in an ivory tower, it is full of nasty people and extremely competitive. It is not about getting passing grades. It is not about doing what you are told. It is really like starting a small business in a crazy but not always nice universe.

Peter Feibelman in “a Ph.D. is Not Enough” warns you that there are bean-counters who think the number of paper matters. This means you are compelled to demonstrate some level of scientific activity. Notice that scientific activity is not the same as greatness. In other words, a great scientist who hasn't published in a while, will lose out to a mediocre scientist who publishes routinely. It is not so bleak as it seems: you should feel free to offer your own measures to the bean-counters, so that if you gave 20 invited talks in the last 2 years but published only one paper, you can stress that the total number of communications was 21. But you have to be able to count something, anything, and show that there is a constant flow of something (publications, talks, citations, etc.).

### **Choosing a research topic is a puzzle**

Scott describes the act of choosing a research topic as a puzzle. I believe he is right! Don't despair!

### **References are your friend**

People cite each others in papers often not because they have to, but as way to cast their paper in a context. This establishes a web of trust: pay attention to often-cited papers and authors.

### **Search, search and search again**

Keyword searching is a potent tool. Try the ACM library, Google, and Google Scholar. Not everything is on the web and not everything can be found through keywords, but if it can be found and you didn't find it, shame on you.

Don't underestimate tools like wikipedia.

In a given field, seek existing bibliographies like the OLAP bibliography or the collaborative filtering bibliography.

### **Become a member!**

While not all societies are useful, join the important societies related to your field.

### **Setup a web site! Be visible on the web!**

People may come across your name and they may Google you: make sure that they find the information you want them to find. Make sure that all your publications are available on the web as freely as is possible.

### **Work on your presentation!**

Presenting well is an important skill. There is a lot of advice out there on the web. There are several great pages of advice. Stephen Downes suggests the old “Winging it” book, maybe you can find it in a library. I like Bob Geroch's suggestions for giving talks.

Remember that there are lightweight solutions for preparing slides these days: PowerPoint is not your only option. For example, you can use plain HTML together with some scripts and it even supports TeX.

### **Get all the advice you can get!**

Whether you like it or not, working toward a graduate degree means that you have to worry about life in academia and in particular, you must listen to what others have to say about what makes good research; make sure you read what the experts have to say about it:

- \* Networking on the Network: A Guide to Professional Skills for PhD Students
- \* Principles of Effective Research by Michael A. Nielsen (a must!)
- \* You and your research (by Richard Hamming)
- \* Advice compiled by Michael Ernst
- \* The Ph.D. experience
- \* Yuhong's tips
- \* Non-Technical Talks by David Patterson including How to Have a Bad Career in Research/Academia
- \* Advice on research and writing
- \* A Ph.D. is not enough (book)
- \* The changing art of Computer Research
- \* Advice for students starting into research work

When in doubt, ask for advice! You can't get advice? Change supervisor!

### **Be a good student**

You know you are a bad student if

- \* you cannot keep track of tasks assigned to you and be responsible for such tasks;
- \* you lie about what has been done and what hasn't been done;
- \* you repeatedly ignore phone calls or emails.

### **Don't do like I do, travel smartly**

You'll have to travel, eventually, if only to present a paper in a conference. Presenting your work outside your school is important: try to do it once. Michael Nielsen has a nice page of tips on how to organize your trips.

*Link to the full article is here: <http://www.daniel-lemire.com/blog/advice-for-graduate-students/>*