**Some Thoughts about *You and Your Research***

时迎琰

17212020037

School of Microelectronics, Fudan University

The other day I read *You and Your Research*, a transcription of the Bell Communications Research Colloquium Seminar, which was given by the renowned and distinguished American mathematician Richard W. Hamming whose work had many implications for computer engineering and telecommunications. As a graduate student specialized in the field of computer engineering, I highly favor and appreciate his profound motto, *The purpose of computing is insight, not numbers*.

Since Hamming’s talk was attempting to answer the question “Why do so few scientist make significant contributions and so many are forgotten in the long run?”, I deeply introspect and comprehensively check what I lack or possess in terms of the properties of the great scientists, their abilities, traits, working habits, attitudes, and philosophy. Here are my detailed results and some thoughts.

At the beginning of this talk, Hamming mentioned dropping modesty and owning aspirations to do first-class work or something significant. I agree with the statement that the major objection is that people think great science is done by luck. Of course, luck is necessary to make some achievement, namely a great deal of influential discoveries and innovations accomplished accompanied with good fortune. Nevertheless as the well-known French chemist and microbiologist Pasteur said, Luck favors the prepared mind.

I recall what I have experienced during my second semester of the third year of the undergraduate college. Then I firmly aspired to choose a more prestigious academic institute such as Tsinghua University or Fudan University as my graduate school to study further and pursue excellence. When I realized several months ahead of schedule that I would not get admission to both of the institutes above through the recommendation channel according to my GPA, ranking and other related characteristics, I resolved to entirely give up the recommendation qualification and fully prepare for the graduate entrance examination held on December of that year. After eight-month-long preparation and concentration, I finally made it and got the second place among all the examination attendees. Today I am a graduate student pursuing my master’s degree at School of Microelectronics, Fudan University. Furthermore, I cherish this adventuresome experience all the time from which I often acquire much courage and power so that I can confidently confront big and tough challenges and difficulties.

When you get early recognition it seems to sterilize you[1]. That’s true, I think. Take us postgraduates in Fudan University for example. All of us are required to conduct excellent academic research and publish papers of high quality, especially in School of Microelectronics which represents top level of the field in mainland China. As a result, we graduates are supposed to learn how to efficiently use the requirement for degrees of master or doctor to push, drive and motivate ourselves in order to work out prominent research since we are young and energetic in the prime of life.

Knowledge and productivity are like compound interest.[1] The more you know, the more you learn; the more you learn, the more you can do; the more you can do, the more the opportunity – it is very much like compound interest.[1] I have the same viewpoint with Bode and Hamming. To conduct scientific experiments in the field of computer vision and pattern recognition, it is natural to read much more papers to know existing diverse methods and the-state-of-art performance so that you can propose one or more original and feasible approaches to surpass those.

Creativity comes out of your subconscious.[1] When I are completely committed to one thing such as playing badminton or watching TV series excitedly in the daytime, I am always inclined to dream about it in night, imagining something unrealistic and unreasonable. Therefore, I’m gratified by this sentence as well, keep your subconscious starved so it has to work on your problem, so you can sleep peacefully and get the answer in the morning, free[1]. The subconscious always surprisingly produces something novel and different somehow.

Just hard work is not enough – it must be applied sensibly.[1] As newbies in academy, we graduate students are supervised by professors or associate professors who offer to give us some feedback about what we do on the process of research. Similarly, those scientists have to keep door open so that they can get clues as what the world is and what might be important in spite of all kinds of interruptions. It is familiar to us that choice is more important than effort.

I have to admit that selling your ideas or what you have done to others is crucial and necessary, because you won’t get credit no matter how significant your work is if you do not have others know it on purpose. There are three dimensions in which we had better do well. First, write clearly and well so that people will read it.[1] Next, give reasonably formal talks.[1] Finally, give informal talks.[1] Hamming said when he first started, he got practically physically ill while giving a speech, and he was very, very nervous. So do I even today. Anyway I continue to learn to give speeches smoothly and enjoy the process of writing and presenting, since I am introvert and dislike talking in front of the crowd, which is undoubtedly harmful to my career development.

During the discussions from the question and answer period, to respond the question how much effort should go into library work, Hamming said “If you read all the time what other people have done you will think the way they thought. If you want to think new thoughts that are different, then do what a lot of creative people do – get the problem reasonably clear and then refuse to look at any answers until you have change the problem through carefully how you would do it, how you could slightly need to keep up more to find out what the problems are than to read to find the solutions. The reading is necessary to know what is going on and what is possible. But reading to get the solutions does not seem to be the way to do great research. So I’ll give you two answers. You read; but it is not the amount, it is the way you read that counts.” Apparently this paragraph is greatly enlightening and stimulating. I used to be sticky to reading large amounts of papers and incapable to get the point of literature. Fortunately Hamming’s opinion has directed me to the essence of reading papers, which will facilitate my research work to a large extent.

There is no doubt that Richard W. Hamming is the world-class scientist and his observation and summary about how to do first-class research individually is of a great inspiration to both graduates and scientists. Above all, go forth, then, and do great work.

**Reference:**

1. Hamming R, Kaiser JF (1986) You and your research. Transcription of the Bell Communications Research Colloquium Seminar. Available: <http://www.cs.virginia.edu/~robins/YouAndYourResearch.html>.
2. Morgan C. Giddings (2008) On the process of becoming a great scientist. PLoS Comput Biol 4(2): e33.