

A Tale of TWO Speeds: Challenges for Research Universities

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A presentation to the Annual Conference of the Association of Anatomy, Cell Biology, Neurobiology Chairpersons (AACBNC)
Aruba, January 18-21, 2006

Thank you very much, Mr. Chairman, for inviting me to make a few comments about **“How can University Administrations nurture both interdisciplinary and inter-institutional collaboration and cooperation?”**

This is certainly one of the most important issues confronting 21st century research universities. Most of you as Deans and Chairmen are probably far more equipped to answer it than me. So I am humbled by this invitation. I hope that what I am about to say will at least give you some more fruits for thought. I do believe that the proper execution of this for all research universities not only can and will have profound ramifications on universities, but on humanity as a whole.

I should have a word of caution here. The opinions I am about to make here are mine and mine alone. I take full responsibilities for the errors I make here.

If I may be so bold, universities, especially research universities in the 21st century are at a very interesting, and some would call it precarious position, in the societies they serve, in the nations they belong to, and in the world.

This topic, or should I say, this challenge, is indeed timely. It is part of a much bigger challenge. There are truly serious global grand challenging issues confronting humanity: looming of pandemics, energy shortage challenges, ignorance and severe poverty, even in the so-called first world, lack of tolerance and hatred of fellow human beings, to name just a few. Solutions to these grand challenges certainly will come from non-silo thinkers with bold visions and innovative skill sets. Indeed, some would say that research universities are lighthouses dotting this turbulent sea. Is this not the mission of research universities around the globe to nurture such individuals?

Flat Earth and Two Speeds

In my mind, research universities need to respond to what Thomas Friedman called the “flat world”.

I would argue that the flat world is due to two very different speeds.

First, it is the speed of light. As everyone knows, almost to the point of being a cliché, is how the internet, by exploiting the speed of light, has altered the way mankind thinks and operates.

However, there is another speed, which I think is just as important. It is the speed to move large objects like you and me. Here I have a more personal anecdote. In as recent as the early 60's, students going from Asia to the United States to pursue higher education usually took a boat, which took three weeks to get there. You can imagine that in the mind of a student making that trip, it must be that he/she may never see his/her homeland again, and in all likelihood, may never see his/her parents again. I can assure you that at the same period, no students in the United States going off to college would have such a feeling. Surely this was one of the reasons why much tears were shed in the docks at departure. However, with today's transportation speed, while it is still a far cry from "beam me up, Scotty," the 21 day trip is reduced to between 10 to 12 hours of flight, from take-off to touch-down. This is roughly a factor of 40 increase in speed. Tears are certainly not necessary in this paradigm!

Your parents, whether you want them or not, will see you in no time!

So what does this all mean? There is an old Chinese saying: "Studying ten thousand books is not as fruitful as traveling ten thousand miles!" It means that human beings are going to all corners of the globe, and intellectual and economic developments, achievements, and for that matter, failures, are no longer regionally confined. The success or failure of a region or a nation, one may argue, to a large extent will depend on how globally enlightened about and how often and how high a percentage its population travel to all corners of the globe. Indeed, the global grand challenges I mentioned earlier are now the responsibilities of all, not a few.

From an individual research university perspective, it can no longer serve merely a local region, catering to regional needs. I firmly believe that as we move more and more into the 21st century, there will be more and more melting of international boundaries because of these two speeds. Research universities are entities almost force into catering for a wider region, if not global. As such, they will overlap, if not geographically, surely internet-wise and people-wise, with other universities.

Research Questions

Embedded in the two speeds paradigm, I think never before university administrators in the United States need to be cognizant of the global issues I outlined above.

How or should one tackle unsolved problems that has a much broader goal, the ultimate is of course to benefit humanity. I should stress however that this is not to say that one should not do research that is based on curiosity. Indeed, I am quite sure that it was entirely the curiosity of Watson and Crick that DNA was discovered, without which I seriously doubt we will even have a conference like the one here! On the other hand, it is

also true that there is now an explosive knowledge growth, coupled with an ever explosive growth of technologies, so much so that we can ask broader questions. Indeed, if people cannot travel easily, if there is no high speed networks and computers, if the barrier between information technologists and genomists is not lowered, the genome project cannot be completed, and neither can one begin to think about “system biology”, bioinformatics, post-genomic disease research and so on.

Therefore, research administrators like me should be fully alert about fast transformation of the research landscape and encourage researchers to pursue what the late Alan Bromley referred to as “grand challenges.” Research administrators within the university should and must create a comfortable environment whereby working on such grand challenge problems, from funding to infrastructure to seamless communication with other researchers as well as research administrators in other institutions, is highly encouraged.

When I entered graduate school in physics, I had to select a spectrum of “physics problems” to make contributions to. While most of these problems were exciting and unsolved, their scopes could be considered as rather limited and hence would not fall into the definition of “grand challenge.” I am sure that my biology friends, my chemistry friends, my mathematics friends, my civil engineering friends, or whatever field one happens to select, have to make analogous choices. While this paradigm is still quite prevalent today in the silo structures of universities, more often than not one now hears researchers asking questions of a much general and broader nature. Let me give you one example and that is “how can we ensure that transportation of grains in the United States is secure and seamless?” Obviously a plethora of knowledge is needed to deal with this problem, from agriculture to economics to network security to human behavioral science to rail scheduling on a massive scale, and the list goes on and on. However, what is also clear is that problems of this nature can be tackled only because of the interplay of the two speeds we have been discussing earlier. Research of this nature will require individuals possessing different skill sets, probably distributed in different institutions.

Epilogue

The issue here is profound and deep. It is interesting how speed seems to alter human behaviors. Indeed, it was the speed of the “zeros” in WWII that was the determining factor that Japan attacked Pearl Harbor and not San Francisco. Now, the two speeds, for the internet, the speed of light, and travel speed for physical objects which seems to more or less stalled at MACH ONE, or the speed of sound, that is changing human landscape.

I am merely touching the tip of the iceberg here. However, it is nevertheless a very serious problem and I urge all of you to give all you have, your wisdom and your knowledge, to provide the best answer to this problem. Our nation, and indeed, humanity, depend on us coming up with the most appropriate solution.

Thank you so much for your attention.