

**Korea Advanced Institute of Science and
Technology:**
Ascension of Asia's Rise in Higher Education

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A memorable photo with President Steve Kang of KAIST

Preamble

In my six years of working at the ground level of higher education in Asia, I was extraordinarily fortunate that I came at the right moment, namely the 21st century, to observe a palpable ascension of Asian higher education. Besides the two universities I had and have served, namely National Cheng Kung University in Tainan and National Tsing Hua University in Hsinchu, I also have had in depth interactions with several other universities throughout Asia Pacific region. I believe these institutions serve well as anecdotes in an ascension landscape. These universities included the following:

1. **Macau University.** This university is reinventing itself in every sense of the word: financially, intellectually, and even “politically”! Currently, the new \$1 billion (U.S.) campus, funded by Macau’s SAR, is situated on a new Macau Territory on Mainland China’s land.
2. **Shantou University.** This university, situated in Shantou, China, is the baby of one of Asia’s wealthiest men Sir Li Ka-Shing (李嘉誠爵士.) Shantou is the home town of Li. For seven years now, I am fortunate to serve on the Board of Directors of this university and observed firsthand the its transformation. The latest breathtaking collaboration between Shantou University and Technion of Israel, standing on the underpinning of \$120 Million (U.S) donation of LKS Foundation will surely propel both universities to new height.
3. **Binus University.** This ambitious private university in Jakarta, for which I became its academic advisory board member, is the largest and most comprehensive university in Indonesia. Indonesia is the fastest rising, the largest in land mass and population and politically rapidly maturing country in Southeast Asia. Indeed, anything happening in Indonesia is worth keeping an eye on.

4. **Petronas Teknologi Universiti.** Petronas, Malaysia's national oil corporation, sponsored this university. Situated in Ipoh, some 200 kms north of the capitol Kuala Lumpur, and for which I am on its Academic Advisory Board, this university is becoming the fastest growing private technological institution in Malaysia.

While the above mentioned universities do provide for me with a broad sense of how Asian higher education is ascending, but not including the understanding of how fast Korean universities are progressing is akin to what we Chinese say in the Mahjong lingo, signifying fundamental incompleteness, namely “three and one short” (三缺一.)

Founded in 1971, today Korea Advanced Institute of Science and Technology (KAIST) has emerged unquestionably to be one of the top research intensive universities in Asia, and is making significant stride in blinking on the global higher education radar screen. Thus it seems to me that a good appreciation of this university greatly value add to my understanding of Asian universities' ways and means.

Hence, when my good friend Sung-Mo "Steve" Kang, former Chancellor of the University of California Merced was inaugurated as the new president of Korea Advanced Institute of Science and Technology (KAIST) in the Spring of this year and announced that he would be organizing the 2013 International Presidential Forum on Global Research Universities (IPFGRU,) I said to myself that I absolutely must go to observe how this university is doing.

Some information about KAIST

It is very interesting to note that both Korea and Taiwan have one “over powering city” in the nation. They are Seoul and Taipei respectively. Just like NTHU is in the middle of Taiwan's science city of Hsinchu which is 100 kilometers south of Taipei, KAIST is situated in the science town of Daejeon, which is about 160 kilometers south of Seoul. Not being in the major metropolitan area of the country presented to NTHU and KAIST similar challenges, as far as undergraduate recruitment is concerned. From several sources, I learned that a

large percentage of KAIST undergraduates originated from a nationwide set of special science high schools. Students who studied in these high schools were specially chosen for their science and mathematics talents. Since KAIST has a pipeline to such schools, the challenge of recruitment not being in Seoul is probably less severe than that of NTHU not being in Taipei.

KAIST has six colleges. They are

- College of Natural Sciences
- College of Life Science and Bio Engineering
- College of Engineering
- College of Information Science & Technology
- College of Liberal Arts and Convergence Science
- College of Business

A cursory examination of the academic programs would give one the impression, which is probably not far from reality, that the university is heavily science and technology centric.

By any definition, KAIST, just like my university (National Tsing Hua University) is a small school. Just as NTHU, KAIST has about 10,000 students, of which only 4,000 are undergraduates. Also, just as NTHU, the number of faculty members of KAIST is around 600. It is worth underscoring that while the number of students and faculty of KAIST and NTHU (12,000 and 600 respectively) are similar, the annual budget of KAIST is \$750 million U.S., which is a factor of three larger than NTHU. I learned in this trip that KAIST is within the portfolio of the newly established (by its current and new President Park Geun-hye) Ministry of Science, ICT and Future Planning, and not the Ministry of Education. Clearly by placing this university within a Ministry with “Future Planning of the Nation” must have profound implications for the development of the university.

My interactions with KAIST

My first interaction with KAIST occurred in 2004. That year I led a delegation of 9 Vice Presidents for Research from Texas, Oklahoma, Louisiana and the Republic of Mexico to visit Asia Pacific. KAIST was one of our stops. At

that visit, we met with the then KAIST president, Professor Robert B. Laughlin. Professor Laughlin was the 1998 recipient of the Nobel Prize in physics and that year he was appointed KAIST president. Since he was both foreign born and a Nobel laureate, his appointment as KAIST's President indeed generated quite a bit of stir both in and out of Korea. It was deemed a bold move of Korea. I have to admit that meeting with Laughlin that day in KAIST had given me with a great deal of memorable moments.

I also met Laughlin's successor, President Nam-pyo Suh in 2009 when I attended the IPFGRU 2009 in Seoul. President Suh, an MITer all his life, served as KAIST president between 2006 until 2013. During his tenure, KAIST made much dramatic transformations. Without any question, Suh moved KAIST further along with his well known tenacity.

What is the lesson of KAIST for me?

As an outsider, while both presidents had pushed KAIST into a multitude of intellectual disciplines and administrative changes, my perception of Laughlin and Suh is that both were highly research-oriented leaders. To this end, I thought it would be interesting to find a "scale" to measure its research growth rate.

As we all know in the 21st century, ranking of universities is prevalent globally, especially in Asia Pacific. There are three rankings which are often quoted and they are Shanghai Jiaotong University ARWU (Academic Ranking of World Universities,) QS ranking and Times Higher Education ranking.

While all three ranking systems have significant pros and cons, in my personal opinion, ARWU is probably the one that is best, although not without flaws, to indicate the research propensities and qualities of a university that it is ranking. It is also very transparent with the rules it sets up to carry out the ranking are less dependent on the nebulous concept of "personal impressions." It would therefore be interesting to see how in the ten years from 2003 to 2013, during the Laughlin-Suh eras did KAIST faired in ARWU ranking. The result is given in the following table.

2003	301-350
2004	302-403
2005	301-400
2006	201-300
2007	203-304
2008	201-302
2009	201-302
2010	201-300
2011	201-300
2012	201-300
2013	201-300

If one goes by the ARWU ranking, the growth of KAIST in the ten years was indeed significant. Its ranking has gone from 300-400 range to 200-300 range.

I would be remiss in my analysis if I did not point out that there is a great deal of discrepancy between AWRU ranking with the other two commonly mentioned rankings: QS and THE. For KAIST and the other two top Korean institutions in 2013, the difference between the three is as follows:

	ARWU	QS	THE
KAIST	201-300	60	68
Seoul National U	101-150	35	59
Postech	301-400	107	50

This discrepancy is not confined to Korean universities only and seems to be quite universal for most outstanding Asian universities:

	ARWU	QS	THE
HKUST	201-300	34	57
Beijing Tsinghua University	151-200	48	68
National Taiwan University	101-150	82	134
National University of Singapore	101-150	24	29

I am not sure how one should understand such a discrepancy between ARWU and the other two ranking systems for Asian top research universities. The fact that ARWU is such a globally well known and probably well regarded ranking

system, one probably could not and should not ignore it. After all, if one were to take the top three ARWU universities ranking, there is no such discrepancy among the three (slight tongue and cheek for UC Berkeley.)

	ARWU	QS	THE
Harvard	1	2	4
Stanford	2	7	2
Berkeley	3	25	9
Tokyo U	21	32	27

I have also listed Tokyo University in the above ranking. It is obvious that the discrepancy which existed in the other Asian universities I listed does not exist for Tokyo University.

One should recognize that “ranking” *per se* is a “measurement.” As any physical experimentalists would know well, a measurement without the associated “error bar” constitutes only half the story. Granted, to provide a ranking error bar for each measurement is probably a near impossibility. However, perhaps one could boldly say that the discrepancy between the three rankings may be considered as an error bar. If this interpretation is reasonable, then the error bar associated with Harvard is something like + or – 1, for Tokyo University it is + or – 5, whereas for KAIST could be much larger. I suspect the truth about KAIST and other Asian universities is probably somewhere between these extremes.

So, perhaps while Asian universities need to take seriously the rankings (after all, their societies and governments certainly do,) they should take it with a large grain of salt.

Nevertheless, it seems to me the interesting question for now for KAIST and other Asian universities is to seek a blueprint to significantly uplift the quality of universities, in teaching, education and service to the communities, regions, nations and the world. For example, what National University of Singapore is doing by deeply developing “liberal arts education” is certainly something one could cheer about.

As Asia becomes more and more important, in fact some may even call it pivotal, in its economic position in the world, Asian universities responsibilities to make the world a better place for humanity are equally heavy. I am confident that if and when such a path is located, higher rankings of Asian universities will naturally be uplifted to hitherto unachieved level of height!