

Academic Partnerships with Asian Universities

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Abstract – In response to the decline in the quantity and quality of applications from India and China for graduate studies in electrical and computer engineering at Utah State University, an extended recruiting trip to Asia was planned for last fall semester (2006). As plans progressed it was determined that general recruiting alone would not solve the problem; but developing close relationships with Asian universities would be the key to improving our international graduate student population. This paper describes the lessons learned from personal contact with 17 universities in Korea, China, Thailand, Malaysia, and India and the initiatives taken to form better partnerships with these universities. The initiatives include: 1) Cooperative Masters and PhD programs where coursework is split between the home university and Utah State University; 2) An international BSEE degree from USU where students can reside in their country and take courses offered from USU; 3) A pre-engineering curriculum articulated between the home university and USU for students transferring to USU; 4) A visiting-professor summer program for faculty members of international universities to teach specialized courses at USU. These initiatives will soon spread beyond Asia providing global partnerships throughout the world.

Index Terms – academic partnerships, Asian universities, academic initiatives

INTRODUCTION

During the past several years the number and quality of applications for graduate school from China and India have significantly decreased making the selection of graduate students more difficult. Between the fall of 2003 and the fall of 2004 there was a 45% reduction in applications to universities in the United States from China and a 28% reduction from India [1]. As a response to 9/11 there have been documented delays in visa processing for science students and scholars entering the USA. Added effort from Australia, Canada, and the United Kingdom may also have contributed to the decline in applications to the USA [2]. At the beginning of the year 2006, it was suggested that a general recruiting trip to China and India would be helpful in increasing the number of applicants from those countries. Two events occurred while planning the Asian recruitment trip that changed the focus of our recruitment strategy: 1) We were visited by three different Chinese universities with an interest in establishing partnerships; 2) Our new USTAR faculty member visited India to establish contacts for

university technical commercialization. As a result of these events the general recruitment trip to Asia was modified to become an exploration for university partnerships.

Seventeen universities in five Asian countries (Korea, China, Thailand, Malaysia, and India) were identified to visit. These universities were selected based on the programs offered and previous contacts within Utah State University. They included top tier universities, such as KAIST on Korea, Xi'an Jiaotong in China, Chulalongkorn in Thailand, and IITs in India, as well as second tier universities with excellent programs in electrical engineering.

VISITING ASIAN UNIVERSITIES

Seventeen Asian universities were visited over a seven-week period during Fall Semester, 2006. In each case, previous arrangements had been made before the visit. The goals for each university were to: 1) initiate a relationship with key faculty and administrators, 2) present information about USU and our department to faculty and students, 3) discuss the various strategies for potential cooperation with USU, and 4) to determine the appropriateness of future relationships with the university.

The universities visited were:

- Korea:
 1. Changwon National University (CNU) - Changwon
 2. Korea Advanced Institute of Science and Technology (KAIST) - Daejeon
- China
 1. Beijing Institute of Technology (BIT) - Beijing
 2. Xi'an Jiaotong Technical University (XJTU) - Xi'an
 3. Wuhan University of Technology (WUT) - Wuhan
 4. Hangzhou Dianzi University (HDU) - Hangzhou
- Thailand:
 1. Chulalongkorn University - Bangkok
 2. King Mongkut's University of Technology Thonburi (KMUTT) - Bangkok
- Malaysia:
 1. INTI College, Nilai – Kuala Lumpur
 2. INTI College, Subang Jaya – Kuala Lumpur
- India:
 1. Amity University - Delhi
 2. Indian Institute of Technology (IIT) - Delhi

3. Delhi College of Engineering (DCE) - Delhi
4. Anna University - Chennai
5. Indian Institute of Technology (IIT) - Chennai
6. Indian Institute of Science (IISc) - Bangalore
7. Birla Institute of Technology (BITS) - Pilani

Korea: Business etiquette and dress is more formal in Korea than in other Asian countries. Since connections are very important in Korean society, it is essential to have an introduction, such as an email from someone having some association with the institution or person you will be visiting. Gift giving and formal titles are common practice. Business cards are treated with respect, showing you care for the person giving you the card. First meetings are often used to establish a relationship rather than to complete business.

Changwon National University (CNU) is located in Changwon, the capital of South Gyeongsang Province in South Korea. As a regional university, CNU has many similarities with USU: having a student-centered, practice-centered and community-centered education. They have separate departments for electrical engineering, electronics engineering, control and instrumentation engineering, and computer engineering. In competition with other universities in Seoul, CNU has difficulty attracting graduate students; therefore cooperative undergraduate programs are more likely.

The Korea Advanced Institute of Science and Technology (KAIST), located in the city of Daejeon in central South Korea, was the first research-oriented science and technology graduate university in Korea. Though small (just over 7,000 students and 400 faculty), KAIST has an international reputation in research, including established cooperation with MIT, Stanford, and Michigan. Research in the School of Electrical Engineering and Computer Science includes a center for building small satellites, a center for testing video displays, a center for instrumentation of brain research, and a nano-fabrication lab to test new technologies. Much of the funding comes from industry, such as Samsung and LG. There is a good potential for a collaborative Ph.D. degree program along with faculty and student exchanges.

Korea is a potential source of good graduate students. The biggest difficulty is the language barrier. Although most Korean students study English as a second language, they still have difficulty in speaking and understanding sufficiently for graduate education. For this reason we are developing a student exchange program that will include intensive English.

China: Meeting with people in China is still formal, but less so than in Korea. Use of gifts, titles with surnames, and small talk before business is still expected. The Chinese are excellent hosts with elaborate business dinners and tours of historical areas. Being able to speak a little Mandarin goes a long way in establishing relationships. Whereas many of the Korean faculty were educated in the United States and spoke English well, this was less the case in China; however every university had qualified translators.

Beijing Institute of Technology (BIT) is a large university with 37,000 students and more than 3,500 faculty members. BIT and USU currently have a cooperative degree

program in business. The purpose of this visit was to determine what programs were possible in electrical and computer engineering. The closest academic entities to our department are the School of Information Science and Technology and the School of Computer Science and Technology. There is also a School of Mechatronic Engineering. The difference in academic organization between US universities and Chinese universities presents two challenges in developing cooperative programs: 1) determining the most appropriate academic unit for the relationship (in this case the deans of Computer Science and Technology and Mechatronics were competing for cooperation), and 2) articulating the curricula between the two institutions where the courses are so different.

Xi'an Jiaotong Technical University (XJTU) is one of the leading universities in China. Our host was a faculty member in Systems Engineering, set up through common associates with a faculty member in our department. Chinese universities have established offices of international education, designed to facilitate visits and agreements with other universities. Since our visit was coordinated on the academic level rather than through the International Office, there has been a delay in forming agreements between the two institutions.

Wuhan University of Technology (WUT), an institution with about 37,000 students, has a mainstay in engineering. A previous visit of their administrators to USU resulted in a Memorandum of Understanding (MOU) between WUT and USU for student exchanges. Their American Program prepares students for studying in the United States. There were three students who had applied for admission to USU who wanted further understanding of the admission process. While working with Chinese universities there is a constant need for explaining the differences between Chinese universities and American universities in processing students.

Hangzhou Dianzi University (HDU) is located in (what the Chinese consider to be) one of the most beautiful cities in China. Previous to our visit, a delegation from HDU visited USU which resulted in an MOU between the two universities. The MOU focused on cooperative graduate program (MS and PhD) in electrical engineering. The purpose of the visit was to establish the contact point at HDU to administer the cooperative program and to finalize the articulation of curricula. Establishing the contact point was difficult because electrical and computer engineering was spread across multiple schools (departments) and there was not one person who could act for several schools, each of which were somewhat independent. This meant that our graduate coordinator at USU would need to work with various deans at HDU. It was difficult to articulate the curricula because the same class could be taught (differently) by different schools. It was also difficult to get sufficient information about the classes to determine equivalence.

Working to develop cooperative programs with Chinese universities is challenging, but rewarding. There is a great desire for partnerships with American universities, but the political and administrative challenges need to be overcome. It is very helpful to have someone at USU (Chinese) who

understands the university system in China to help navigate the cultural differences.

Thailand: Visiting universities in Thailand offers an enjoyable experience. The Thais are very friendly (often greeting you with the traditional “wai”, lifting hands together to the chin). Unlike other areas in Asia, Thais commonly use their first names (their surnames often being long) in greeting. In the past our department has had several good students from Thailand. The Civil Engineering Department at USU has been able to maintain close ties with several universities in Thailand. We would like to develop equivalent associations with the Department of Electrical and Computer Engineering.

Chulalongkorn University (CU) in Bangkok (Thailand's first institution of higher learning) is the premiere university for engineering in Thailand. With a student population of more than 37,000, CU integrates research with instruction. Providing quality students, CU offers an opportunity for undergraduate student exchanges as well as cooperative graduate programs.

Across the Chao Phraya River from Bangkok in Thornburi, is King Monkut's University of Technology Thornburi (KMUTT), first public university in Thailand to receive full autonomy. Starting as a school to train technicians, KMUTT grew to include engineering and finally graduate programs. The programs at KMUTT did not match those at USU; however, there was some potential for doctoral research cooperation.

Thailand is a source for good students, but since the numbers are not as large as in China and India, focused relationships must be developed.

Malaysia: Being a multi-ethnic nation, Malaysia brings together influences from the Malay, Chinese, and Indian cultures to their society. Malaysia is a Muslim country which must be respected when visiting universities there. Malaysia was not a focus for student recruitment; however, we have had good students from Malaysia in the past and there were good contacts between USU and several Malaysian institutions, specifically INTI International University College.

INTI is an international education group (with multiple campuses in Malaysia, Indonesia, and China) aimed at preparing students for international educational experiences. The main campus is in Nilai, on the outskirts of Kuala Lumpur. They have an American University program to assist students in placement in the United States. A secondary campus is in Subang Jaya, on the other side of Kuala Lumpur. It is possible for a student to study at INTI for the first two-to-three years in an engineering program then transfer to USU to complete the BSEE degree.

One advantage of Malaysia for recruiting students is that it is an English-speaking country. Since their education is in English, students have an advantage for success in American universities. It has the potential as a source for undergraduate engineering students.

India: For Americans, navigating the Indian university system can be confusing and overwhelming. On the top level

are the seven autonomous IITs, created to train scientists and engineers and to provide the research backbone for the nation. Recently seven second-tier universities were added. Since entrance to the IITs is very competitive, students graduating from the IITs are the best India has to offer. They are welcomed by the top-tier universities in the USA and Europe. Most of the higher education in India is achieved in a multitude of affiliated universities. Each university may have hundreds of colleges, each with engineering programs. In selecting graduate student, it is not enough to know from which university they graduated, but also from which of the many colleges, since the quality of teaching varies from college to college.

Amity University in Delhi is the first and largest private (non-profit) university in India. Part of its strength comes from leadership, employing former generals from the military and directors from IITs. It is highly ranked in business and biotechnology and is first (among private universities) in engineering placement. With new lab facilities, Amity University is an excellent possibility for undergraduate and graduate cooperation.

IIT-Delhi with just under 5000 students is small (by Indian standards). More than 20% of them are graduate students. There was a close match between the ECE department at USU and the corresponding departments at IIT-Delhi. They were very open to general recruiting, but more interested in faculty exchanges, offering on-campus accommodations for faculty teaching short courses at IIT-Delhi.

Delhi College of Engineering (DCE) started as a technical high school to prepare technicians for India's industrial growth. It developed into a top engineering school with full graduate programs. There is a lot of interest at DCE for cooperative engineering education with American universities.

Anna University in Chennai is an example of an affiliated university, with 225 self-financing engineering colleges located in various parts of Tamil Nadu State. Although there was a lot of interest in collaboration, there was little in common between their department and ours.

IIT-Madras is located in a beautiful nature preserve. In fact, the university director commented that his greatest challenge was keeping the dogs (of faculty and staff living on campus) and deer (wandering around the preserve) from fighting each other. IIT-Madras was established with technical assistance by the German government. There was demonstrated interest in collaboration, especially in faculty exchanges.

IISc in Bangalore is the Indian Institute of Science, paralleling the IITs for technology. Located on a beautiful campus, IISc focuses on research. The purpose of the visit to IISc was to investigate the possibility of providing a Master of Engineering degree through distance education aimed at the large number of working engineers (both Indian and American) in Bangalore. The associate director was very positive about the possibility of the ME program; however the faculty in the engineering departments were less positive, citing common problems of devoting time to teaching rather than research.

BITS-Pilani in Rajasthan is a top university on a beautiful campus with its own temple (made from the same marble as the Taj Mahal) in the middle of nowhere. BITS-Pilani was founded by G. D. Birla, an eminent industrialist, with sister campuses in Goa and Dubai. It has an extensive distance-education network and internships with industries throughout India. With a solid educational program along with distance education capabilities, BITS-Pilani has the potential for a perfect match in a variety of cooperative programs with USU.

It is difficult to recruit graduate students from the IITs (or IISc) in India; however, faculty exchanges could provide the potential for a few Ph.D. students which would be a boost to our department. Close collaboration with Amity University, Delhi College of Engineering, or especially BITS-Pilani are promising.

INSTITUTIONAL SUMMARY

Each university visited expressed interest in developing some level of cooperation with the Electrical and Computer Engineering Department at USU. Nine of the universities have MOUs with USU in some stage of completion. A few of the top universities in India do not see the value of an MOU (they already do exchanges without one), but are willing to sign them.

The top research universities are mostly interested in faculty exchanges. They say that student exchanges are transitory and don't give longevity needed for a relationship. Faculty exchanges will result in student exchanges automatically.

Several of the universities are better suited as feeders to our graduate programs. Articulation is needed between USU and the curricula of partner departments so that little effort will be needed to maintain a supply of transfer students. The biggest problem will be the cost of tuition for international students.

Since they can be difficult to coordinate, cooperative graduate programs should be limited to one or two universities in each country. Undergraduate transfer programs, on the other hand, can be coordinated with careful articulation between USU and curricula from many universities.

There are potentials for delivering our ME program through distance education to Bangalore (or other locations) with cooperation from IISc or BITS-Pilani. Since the ME program targets working engineers, it does not compete with partner universities.

More important than any specific programs will be to develop and nurture relationships with individuals within universities. Most of the programs in Asia are based on relationships, not just the validity of the program. Most of the universities are willing to pass along information about USU and our department to potential students.

INTERNATIONAL EDUCATIONAL INITIATIVES

Taking the bold move to visit many universities in Asia and to talk to students, faculty, and administrators face-to-face has improved the image of the Electrical and Computer

Engineering Department on campus as well as abroad. Institutions not part of this project have come forward to investigate possible cooperation. Lessons learned from this experience led the department to develop several initiatives for the internationalization of education within the department. It is too early to tell which of the initiatives will bear fruit, but if we are successful in any, it will make a difference in the department.

Undergraduate initiatives: Our undergraduate curriculum is divided into two programs, the pre-professional program (first two years) followed by the professional program (final two years). Students are admitted separately to each of the two programs. The easiest undergraduate initiative to develop is the 2+2 model where pre-professional courses are taken at the local university upon which students apply for the professional program at USU. Courses in the pre-professional program includes math, science, and beginning engineering which are universally taught. This model is ideal for schools such as INTI College.

Several of the universities requested a 3+1 model. Since the junior year contains most of the core classes for electrical and computer engineering, it is more difficult to assure the courses taught at the local universities meet the requirements for ABET accreditation at USU. It would require extensive lab inspections as well as assuring that faculty are teaching equivalent material. It may be possible to teach the third year through distance education, however.

There is also a model for a full BSEE degree delivered from USU to Northeast Dianli University (NEDU) in Jilin, China. NEDU and USU have had a cooperative BS degree program in general studies for a number of years. This has now been expanded to include electrical engineering. Courses are developed at USU then delivered over the internet using BREEZE software. This allows faculty to teach courses on campus during the normally appointed time while allowing students to participate in the course through the internet. The lecture is archived so students not able to participate during class time can watch the full transaction at a later time. Faculty members from NEDU are used as local facilitators to work with the students and explain material from the course.

Graduate Initiatives: Three graduate initiatives have developed from this international experience. The first is a Master of Engineering (ME) degree aimed at working engineers. The ME degree couples coursework with practical experience. An internship is a vital part of the degree. Courses are delivered from the USU campus through BREEZE (like the full BSEE degree); however, there are no facilitators. Students are typically working in engineering positions and not available for a classroom activity.

The Cooperative Masters Program (CMP) and Cooperative Doctoral Program (CDP) are research degrees offered in cooperation with Hangzhou Dianzi University (HDU) in Hangzhou, China. For the CMP degree, graduates from HDU apply for an MS at USU. They take one year of coursework (12 credits of which are transferable to USU) at HDU from courses that are articulated between HDU and USU. Following the first year, students arrive on the USU

campus to complete courses and perform their research projects. One advantage of the CMP is that it allows students to take courses for a year after being accepted at USU while waiting for their visas to the USA.

The CDP degree is similar to the CMP. Students take one to two years at HDU of pre-selected courses. At this point students take the Ph.D. qualifying exams. Students must pass the qualifying exams in China before they come to USU for further coursework and research.

Faculty initiatives: The Asian tour demonstrated a strong desire for faculty exchanges between USU and universities in Asia. Research exchanges are common place at USU and at other institutions. Research also depends upon extensive external funding for both institutions. We determined that the quickest way to initiate faculty involvement from other universities with the Department of Electrical and Computer Engineering at USU is to develop a summer faculty teaching program. Our regular curriculum is taught during two semesters; fall and spring. Many of our students work during the summer; however there are several who remain on campus that would like to take summer courses. Typically our own faculty are involved with summer research projects and don't want to teach, even though there is additional funding for summer teaching.

Last summer a visiting professor from Finland agreed to teach a specialty course for our students. His topic was related to our curriculum, but not a duplicate of any course we teach; therefore it expanded the topics available for our students. As a result of the Asian tour, it was decided to invite two faculty members each summer from other universities to give special-topics courses at USU. The topics will be in their specialty area, but not subjects we teach as part of our normal curriculum. They will target the senior, beginning graduate student level. This will help start the faculty exchange program at USU. The two visiting professors chosen for the summer 2007 were from China and Slovakia.

CONCLUSIONS

What started out to be an extensive Asian recruitment trip turned into an opportunity to establish relationships with selected Asian universities. Each country presented different challenges and opportunities. It is too early to see the visits to Asian universities result in an increase in the number of applications to graduate school, but there has been an increase in communication with universities from the five countries visited. There is a need to nurture the contacts made as well as to expand the contacts to other universities throughout the world. Since this Asian tour, additional universities in Asia have been added to our contact list as well as universities in Europe and the Americas. With the initiatives commenced we should see the quality and quantity of applications improve. Since face-to-face contact is essential in establishing relationships, more focused trips of shorter duration will be planned in the future.

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