

Report on

Symposium on Korea-US Scientific Collaboration in Changing Times

19-21 October, 2004, Seoul, Korea

to

NSF / KOSEF

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ORGANIZING INSTITUTIONS

George Mason University

Yonsei University

With cooperation from the Korea-US Science Cooperation Center (KUSCO)

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Background and Executive summary

I. Background

A meeting of approximately thirty Korean and American participants was held October 19th through 21st in Seoul, Korea, to discuss effective means to invigorate scientific collaboration between the scientists and engineers of Korea and the United States. The *Symposium on Korea-US Scientific Collaboration in Changing Times* was supported by grants from The National Science Foundation (NSF) and the Korea Science and Engineering Foundation (KOSEF) and a financial contribution from the Korea US Science Cooperation Center (KUSCO). The purpose of the meeting was to develop strategic and tactical plans that would result in more active collaborative activities between Korean and American researchers for mutual benefit and to make appropriate recommendations to the NSF and the KOSEF.¹

The NSF and the KOSEF have a long standing cooperative relationship aimed at the advancement of science. Among their programs are jointly-funded research grants and fellowships, as well as separate programs which support various personnel exchanges and visits between Korea and the United States. Participation in these programs has been marginal and, at this point, seems stagnant—particularly in view of increasing calls for globalization of science and technology. One specific example is the apparent lack of interest on the part of American graduate students in taking advantage of the NSF summer graduate fellowship program in Korea, while the same programs in Japan, Taiwan, China, and Australia are attracting much more interest.

Korea's increasing maturity as a producer of scientific knowledge and a source of significant advancement in applied technology² is evolving. In the past, a donor-recipient relationship existed, but now the two countries' research and education communities are becoming partners on a more equal footing. Korean production of both domestic and US patents, as well as combined government and private R&D expenditures totaling 2.91% of the GDP (2002), reflect a thriving base. In addition, the international co-authorship pattern of Korean scientists demonstrates geographically diverse and productive collaborations in a number of disciplinary areas.³ The level of scientific achievement in Korea, vis-à-vis other Asian countries, is thus not the immediate cause of this lack of interest on the part of Americans seeking international research destinations. Advances in information technology have effectively eliminated the impediments that geographic boundaries might produce and have made it not only possible but also natural for researchers to interact and collaborate globally.

In spite of these factors which could lead to increased collaboration, it seems to be the case that academic, government, and industry establishments in Korea are not putting forth sufficiently effective efforts to attract American scientists to look toward Korea as a potentially productive place to conduct their study and research. There are a number of non-government organizations, for example, the Korea-US Science Cooperation Center (KUSCO), a not-for-profit corporation established in Virginia to promote Korea-US science collaboration, and the Korea Scientists and Engineers Association (KSEA), the largest membership organization of Korean scientists and engineers in America, that have the potential of playing a helpful role in this regard. However, they have not yet developed a coordinated effort to disseminate information about available opportunities for exchange and collaboration and to promote participation in these endeavors. Clearly, we are at a point where we need to examine how existing structures whose mission is to promote effective collaboration among scientists of the two countries are to harness Korea's growth in science and technology toward this end.

The Symposium brought together representatives of government, industry, and academe (See Appendix A.) to discuss effective means to invigorate scientific collaboration between Korea and the United States and to produce a set of recommendations that would influence positively the policies and

¹ Symposium related materials including programs, presentation slides, voice recordings and stenographer's transcripts, recommendations, and photos are available at <http://idc.yonsei.ac.kr/symp/>.

² Caroline Wagner, Anny Wong, SungHo Lee, and Irene Brahmakulam, "Phase Transition in Korea-U.S. Science and Technology Relations," www.rand.org/publications/MR/MR1644/ (ISBN: 0-8330-3333-6), 2003.

³ Sungchul Chung, "An Overview of Korea-US S&T Cooperation," opening remarks from the Symposium, available on the Symposium webpage.

practices of the NSF and the KOSEF in the areas of collaborative programs. It also intended to delineate the means by which various stakeholder establishments, e.g., the KUSCO, KSEA, industry research laboratories, etc., could contribute to the stimulation of a more balanced flow of scientific collaboration. It is hoped that these outcomes will enhance collaboration in the science community as a whole.

II. Executive Summary

Symposium participants agreed that two specific needs must be met if collaboration and exchange between the two countries is to thrive:

- Effective marketing of Korea and Korean science and technology as a desirable destination/partner for research and collaboration
- Development of an infrastructure to support an influx of American scientists and graduate students into Korea

Participants recommended that two follow-up working groups be convened to address these needs:

- One working group to address infrastructure needs and implementation
- A second working group to develop and implement a pilot project based on selection, marketing, and support for collaboration and exchange within one specific area of research from which a generalized functional model can evolve. The area of research chosen should be one in which Korea is particularly strong.

Key concerns within these areas were as follows:

Infrastructure

- Adequate, affordable housing is not available in Korea for visiting researchers and/or graduate students.
- A network of support for Korean mentors of American graduate students needs to be developed.
- Language will remain a continuing problem. Intense short-courses or on-line courses may ease the problem if they can be developed and/or made available.
- These needs are so pressing that the availability of resources is likely to limit what can be accomplished within the near future, particularly with regard to housing.

Marketing:

- Korea is not generally seen by Americans as a desirable travel destination.
- US scientists' knowledge of Korean scientific research capabilities may not be up to date.
- Cultural differences may leave the impression that the Korean scientific community does not welcome the participation of outsiders.

Pilot Effort:

- Selection of one research area where Korea excels as a pilot offers a number of benefits. These include, most importantly, the greater possibility of success that comes with the opportunity to focus efforts and resources and the automatic appeal of first class science to researchers
- Planning for enhanced collaboration within the pilot area must be concurrent with development of the infrastructure necessary to support it.
- Immediacy of response is important. It was thus felt that two working groups should be convened as soon as possible.

Problem definition

Over the past four decades, the United States has been the principal partner in Korea's quest to strengthen its science and technology capability. The US has been the primary source of technologies for Korean industries, and its most frequent partner in international collaboration in research and development (ICRD). US universities have trained thousands of Korean scientists and engineers. Throughout, the bilateral relationship has been a donor-recipient relationship. As the Korean economy and S&T grow, however, a consensus has emerged that it is time that the relationship evolve into one based on mutuality and reciprocity⁴. The primary focus of discussion at the symposium was increasing the number of American scientists (researchers, faculty, graduate students, and post-docs) who travel to Korea to engage in ICRD. However, there is no present indication that the relationship will change at anything like the pace that the capacity for ICRD itself is increasing. Benefits from ongoing ICRD between Korea and the US, both to the individual countries themselves and to the global scientific community as a whole, therefore, remain less than optimal.

Problem Source

The source of the problem appears to be multifaceted. Collaborations exist, but have not formed the nuclei of growing circles of exchange. Korean students in great numbers continue to migrate to the US for graduate degrees, but it is not clear that collaborative relationships between students and their American advisors and peers persist beyond completion of the terminal graduate degree. Collaborations for specific purposes, e.g., to meet industrial research needs, are on-going, but these experiences have not generated broader interest in ICRD. What is clear is that existing collaborations have emerged to meet specific needs and have resulted in specific value added for all parties involved. While both governments have supported efforts to promote collaboration for broadly expressed goals and benefits, exchange experiences may well be seen by actual participants more as a disruption of normal activities than as essential or even valuable aspects of research and/or education. In part, then, the task is to structure collaborative arrangements so as to add value that will support normal progress to degree or tenure and promotion for American students and faculty.

Marketing, both of Korea itself and of the Korean S&T establishment's accomplishments and promise, was seen as a critical element in developing broader collaborative relationships with Korea. While being seen as a "vacation spot" is not a primary requirement for being a prime ICRD destination, Korea has not been successfully marketed in the US as a desirable travel destination, and Americans' general awareness of Korea has been overshadowed by their sense that the major player in Asian R&D is Japan and their growing awareness of the emergence of China in the R&D arena. Exacerbating this lack of interest in Korea is an apparent lack of awareness and/or understanding of resources that are currently available for exchanges between the two countries.

Cultural differences present remediable barriers that have yet to be formally addressed. For example, the general lack of Korean language courses in American schools and universities means that not only do Americans lack any basic skill in the language, they lack also any basic knowledge of the culture. Anecdotal evidence suggests that Korean faculty mentors may sometimes not understand the expectations of American students. And American scientists and graduate students planning to spend extended time in another country often have expectations that spousal and family needs for employment, education, and inclusion will be met as well as their own. To a large extent, these needs can be met by a concerted effort to develop an infrastructure to support Americans staying in Korea for extended research experiences. Other differences – academic calendars, faculty salary structures, and the nature of sponsored project support of American graduate students – present situations that will have to be creatively addressed. The difference in faculty contract periods is of particular concern, because it raises the issue of how, whether, and by whom faculty on exchange and/or mentoring exchange students are to be paid,

⁴ Sungchul Chung, "Overview."

Resources Available

Without minimizing the extent of the problem, participants identified a number of resources available and a variety of parties with either direct or indirect interest in enhancing ICRD between Korea and the US. Foremost among resources is the expanding capacity of the Korean scientific community in currently attractive areas: materials, computer science, electronics, chemistry, and life and bio-sciences. A large pool of potential contacts exists in the US-educated Korean workforce and their former advisors. In addition, many second-generation Korean-Americans are both interested in returning to Korea for study and/or research and prepared culturally to do so.

A second locus of potential support was identified in professional societies and industry. Both focus on particular disciplines and areas of expertise; both have a vested interest in bringing together scientists for innovation and discussion of current work. Industry in particular benefits from “collaborative competition.”

Thirdly, both the Korean and US governments understand the imperative to globalize. And though the term may be interpreted differently by the two governments, both provide funding for exchanges and research collaborations. A number of major agencies on both sides as well as almost two dozen interagency agreements currently support and promote collaboration between the two countries.

The resources available, however, seem not to cohere in ways that address what have emerged as the principal requirements for enhanced ICRD, namely creating a clear view of value added, successful marketing of Korea and Korean R&D, and developing the capacity to host Americans visiting for extended research stays. Participants generated an extensive list of specific activities they believe would facilitate the initial contacts seen as necessary to development of successful collaborations (See appendix C), but felt the initial efforts to revitalize ICRD would benefit from focus on a particular disciplinary area and from continued shepherding by the NSF/KOSEF.

Role of the NSF and the KOSEF and Recommendations

I. Role of the NSF and the KOSEF

The task at hand is to shift the current donor-recipient model of US-Korean collaboration to one of mutual participation. It was apparent to participants that a concerted effort must be made to muster existing interest and resources toward a pilot project which can demonstrate that the shift is possible. The NSF and the KOSEF are thus seen as facilitators for a pilot project whose efforts would bridge the disconnect between resources and problem areas. This would be accomplished by the following:

- Undertake a joint effort to develop supporting infrastructure within the Korean research community; this may include the possibility for the KOSEF to establish an incentive program for the Korean mentors who would be hosting American researchers.
- Jointly select a research area appropriate to Korean strengths which will enable the educational and industrial community to participate proactively in developing and marketing exchanges and collaborations within that area.
- Proactively enlist organizations like the KUSCO in marketing existing programs and opportunities, helping to identify research areas for collaboration, and serving as a conduit for flow of ideas toward infrastructure development.

In addition, there needs to be continued discussion and action related to overarching structures:

- Examine and possibly revise policies and regulations affecting both stipend support for collaborating researchers across the Pacific and intellectual property and technology transfer.
- Examine the feasibility of establishing "Pacific basin research centers" for one or more targeted research areas of common interest, modeled after the CERN in Europe.

II. Recommendations

1. Establishment of working groups to address two needs: (1) recommendations regarding elements of the infrastructure required to support an influx of US scientists and graduate students into Korea, including housing and support for effective mentoring (2) selection of a target disciplinary area to use as a pilot effort and initiation of a follow-up proposal for developing a specific action plan to encourage greater collaboration in that area. Results of the working groups would be more specific recommendations to the NSF and the KOSEF and a proposal to NSF/KOSEF/KUSCO to support a pilot effort.

2. The research communities in both countries seem unfamiliar with the funding available from various programs to support Korea-US S&T cooperation. Remedying this will require effort from both sides to disseminate information about currently available funds and programs. Initial efforts should be focused on conveying information to the particular community selected for the pilot effort (1.2 above) and should include (1) NSF presentations at disciplinary professional meetings, (2) communication to graduate deans of schools offering advanced degrees in the focus discipline, and (3) an organized effort to encourage US trained Korean scientists in the focus discipline to contact their former advisors and colleagues in US universities prior to the professional meeting(s).

Appendices:

Appendix A – Symposium Participants

List of Participants From Korea

Soonja Choe, Professor, Inha University
 Sungchul Chung, Senior Research Fellow, STEPI
 Byung-Whan Ho, Head, Division of International Programs, KOSEF
 Daehyoung Hong, Professor, Sogang University
 Chul Koo Kim, Professor / Advisor, Yonsei University / KOSEF
 Jongwon Kim, Professor, Seoul National University
 Key Hyup Kim, President, KITECH
 Sung Jin Kim, Vice President, Samsung Electronics
 Sung Tae Kim, Vice President, LG Electronics Institute of Technology
 Young Gul Kim, Professor Emeritus, POSTECH
 Gyung-Su Lee, Director-General, Korea Basic Science Institute.
 Jinwoo Park, Professor, Korea University
 Hongil Yoon, Assistant Professor, Yonsei University
 Dae Hee Youn, Professor and Dean, Yonsei University (Program Coordinator - Korea)

List of Participants From the US

Stuart Bolton, Professor, Purdue University
 Milton Charlton, S&T Officer, US Embassy
 Lloyd Griffiths, Professor and Dean, George Mason University (Program Coordinator - US)
 Quiesup Kim, Jet Propulsion Laboratory
 Tschang-Ho Kim, Professor, University of Illinois, Champaign-Urbana
 Sung M. Lee, Visiting Scientist, Carnegie Mellon University and KUSCO Board (Symposium Chair)
 Sung Won Lee, Professor, University of Maryland and President KSEA
 Joan Lorden, Provost and Vice Chancellor, University of North Carolina
 Jeff Offutt, Associate Professor, George Mason University
 Erika Olimpiew, PhD student, George Mason University
 Wayne Patterson, Associate Vice Provost for Research, Howard University
 Jennifer Slimowitz, Program Officer, National Academies
 Marilyn Vogler, Assistant Dean, Michigan Technological University (Symposium Report Writer)
 Larry Weber, Manager, East Asia and Pacific Program, Office of International Science and Engineering, NSF
 John Yop, Senior Scholar, Council of Graduate Schools

Debash Dutta (unable to participate on site), NSF IGERT Program Director
 Dorothy Huston (unable to participate on site), Vice President, Alabama A&M University
 Paul Kang (unable to participate on site), Federal Aviation Administration
 Mike Snyder (unable to participate on site), Advisor, US Department of Education

Appendix B – Final round of suggestions

In closing, the moderators asked each participant to present the one recommendation s/he felt most likely to benefit the effort to enhance collaboration. An edited compilation of those recommendations follows.

To bring more students to Korea, instead of individual applications, I think a group approach might work better. In our school, we opened up one short course between German professors and Korean professors. We brought Korean and German students together for 2 or 3 weeks. It has worked very well.

What do we do when we finish the meeting? I think there has been a call for an action plan. I think whatever it is, we have to agree on something that can be done after the meeting is over.

I think there should be some effort made to let the Korean research community be known to the US community, even things like Jeff Offutt has told us of his experience. Maybe the kind of experience that he had in Korea should be known to the US research community so they will understand what their colleagues have experienced. Secondly, on the Korean side, we should make recommendations to the government that there be some sort of an infrastructure that accept the foreign visitors with much easier access to the living and functioning in Korea.

I would like to suggest a joint symposia and I also agree we need action items. We have a dual symposia, one here in Korea and one in the US, both attended by the same group of people. The objective of these symposia is to go to get the proposals to NSF for continued interaction, and these proposals would include support for summer for faculty, and would serve, I think to help both sides better understand the opportunities.

I would like to find out whether there is some way to survey US students or US faculty members who have some experience in Korea to find out what are really the factors that discomfort them. Then we may find out what can be done from the Korean side. Certainly they are going to Australia, China, Japan, Taiwan much more than Korea in fact, right? So we have to find the real fact.

By establishing that sort of foundation in Korea to promote this kind of more active collaboration between US and Korea, either a new foundation or inside of already existing foundations and just give them the mission for promotion,

I'd like to speak about the infrastructure. What I would like to specifically propose is a working group or a task force. I'd like to propose the KUSCO mobilize its mission to look into essentially start organizing a working group and defining what type of infrastructure would be appropriate.

I really think we need to get closed on an action plan on each side. I think one example is for a kind of project between KOSEF and CNRS. I was invited by CNRS in France. KOSEF supported just the flight fare and all the room and living cost was supported by CNRS. So I'd like to have that kind of program if it's possible between NSF and KOSEF.

The most important element will be the science and the forefront of science. To me the idea is not for students to have a good cultural experience. We would like to have that helping tool, but the science has to be the hook. And the idea that I brought up earlier, a three-week short course in the summer on some key topic, is something that I'd like to suggest again. I think that it brings in more than just one-on-one interactions to bring the whole group together. And I think in order to succeed, there will have to be funding for professors. There is a program run by the institute for advance study in Princeton, a 3 week mathematics summer school. It's done on a much bigger scale than something that would be feasible to do for a first time program, but it's quite successful.

Until I've got involved in this meeting, personally I didn't know between NSF and KOSEF there is such a program. I think in both US and Korean side, it may be similar for many professors and researchers.

Probably the best way is to promote professional-to-professional and to let them know there is this program to better utilize those systems.

I have found my collaboration with colleagues in Korea be very rewarding both professionally and personally. That's why I think it should be encouraged.

I have a suggestion to NSF, that is, like diversity and ethnicity requirements in any proposal in NSF, if you can work in any way of encouraging international education as a part of a proposal, you know that will be a great success, and I think that's probably the way to encourage American students to be engaged in international activities. For the KOSEF side, the KOSEF should work closely with Fulbright. They have great information, booklets and effective marketing already done.

Wayne Patterson: I have an 8-point action plan for myself (wow) not for anybody else. You may share it and you may take from it if you will.

- I will endeavor to get student applications in this program this round.
- I will propose an international conference in a discipline that's closely related to me.
- I will organize team to work towards a specific goal and I will look for such opportunities.
- I will try to develop the relationships that we have been talking about with Korea university and I will be at Seoul National University this afternoon.
- I will propose to aid in the marketing effort. In this year's round of graduate deans' meetings, we should have a panel discussion at either CGS or the regional meetings.
- I will keep talking about the model for student exchange programs that allows for academic credits and no time loss to degree.
- I will work to support any activities of this group in a communal effort.
- I will promise next time we meet, I will give a presentation in Korean.

I think there might be more interest from American students to visit Korean industry than visiting Korean universities. Also I've never heard of a Korean student visiting American industries through any program, so I guess sort of U-2-I to U-2-I crossing program is recommendable.

As a sort of a hosting professor, if I host American students, usually I will have many difficulties in housing. So it's a suggestion or recommendation that we Koreans establish centers in big cities so that we host professors do not hesitate to host American students.

From the point of a university, there are at least three things that we want. One thing I think that we do want is for our students to experience other cultures, cultures that are not just other western hemisphere cultures. I think it really is important to think creatively about ways that we might actually exploit some of the differences, in calendars for example, for advantage. I think, for example, because the Korean spring semester begins in March, we could think about a coordinated course rather than in terms of summer institutes. A coordinated course beginning in January in the US would prepare students to come to Korea in March. But I think there are other places where we can look again and exploit them for advantage.

Another point that's important to universities is that we want to advance our scientific expertise, and so we've looked for places where there are emerging fields. Looking for places where we can find complimentary interest and expertise is critical and I think we need to maybe devote some additional funding to a task force to find ways to do that.

The other place that is important to us, as particularly public universities is U-2-I partnerships because economic development is one of the areas where public universities get pushed a lot to contribute. I have to say that I don't have a good grip on the U-2-I partnerships that would be possible in a US-Korea partnership and that's something where I think again maybe a task force might be useful.

But to add to an action plan, I am part of the counsel on academic affairs at the National Association of State Universities and Colleges and I think their meetings could be another place to try to highlight some discussion of US-Korea collaboration and partnership across the board in Science and education.

I want to make just one kind of proposal and recommendation to KOSEF side. Yesterday, in Samsung we found that it may be quite good idea to have some kind of a program which supports joint on-going partnership with professors in Korea so that they can develop their relationship not as student and professor, but as a kind of more advanced relationship with colleagues, so in that way we can use that kind of very strong human network to develop collaborations between US and Korea.

I have one request. This is request to NSF. Let's have a separate flier for Korea.

I think the marketing plan should include research on what are the positives for study and research collaboration in Korean universities and Korean institutions. It should include better information and more easily obtainable information on NSF and KOSEF-based funding opportunity. It should include what is available in other countries that have high levels of US students studying abroad that make housing and living and cultural adaptation easier. It should include the advantages and the desirability especially to the younger science and engineering students to experience the Korean culture which is not very well known. The marketing plan should be include appropriate CDs and videos with that. It should be marketed through some of the major meetings that attract students in the United States. And of course there should be sponsorship and funds because marketing is an endeavor to appropriately do this. And I think this can be done by approaching the US and Korean industries that are already collaborating because this is to their mutual benefit.

Asian groups have to emphasize their programs to websites that go to KUSCO as well as KACA and COPST so that they can know what is existing and what is not. Adding to that, we have to know what is not working and why that it is not working since what we do today has to be reported and listed up there. I want to just one last comment backing up the comment that really NASA does very good things for international cooperation. But it seems like a lot of people do not know. We in this program should include those things as an action item.

The things that trouble me about exchanges are not really whether Korea is a nice place to visit. I am a student and I just want to finish my dissertation. And I care about learning more about my research and applying it in different contexts. So my interest in going to other country would be more to get more ideas about my research, to finish my thesis, to get something that's valuable and interesting. And I know there's a research going on in Korea right now actually related to my area and from very famous people in the product line area, but I would still feel uncomfortable coming if I didn't meet these people or get to know them. Those are really the factors that will make me decide whether I want to come live for two months in a foreign country studying for my research, whether I am going to be accepted, whether it's going to be valuable for both me and them, whether it's going to be friendly not competitive, that I am not going to be an intruder or mess up their research, that they are not going to mess up my research. So I think it's really the personal factor getting to know people and understanding, and meeting them face to face.

As an organizer of this program, one thing that I can say is that I can appreciate more funding for this kind of event, certainly to be able to spend more time for this research.

Appendix C – Suggested activities to enhance mutual US-Korean collaboration.

Excerpted and edited from general discussion other than the round of final suggestions summarized in Appendix B. These are included so as not to be lost to follow-up groups.

- Korea really stands out as a place where young people think freely and that's an asset.
- Your job is to make value, so before setting out to do that you need to think carefully, what is that value.

- You will find tremendous affinity between these two societies, namely that underneath that all, is a drive to be an individual. Now, is seeking ways of cross fertilization between this country and the U.S, I'd recommend to all you to think about that dynamic.
- What the Korean side is bringing to the table is access to Asian thought, something that we badly need across the water, especially since the major growth in economies in the world is predicted to be in this part of the world, so called northeast Asia corner.
- Offer courses taught in English; in Yonsei more 25% are being thought in English.
- In graduate schools now more 50% of the lectures are done in English, and then we are going to improve it to 100% in a few years.
- Eighty percent of our faculty members are from U.S, so actually the collaboration is very natural especially with our advisors.
- I think we need to have such an institution that can really facilitate the inflow of U.S scientists in Korea, as the American Foundation did for Koreans over to this day.
- Cultural change in Korea--if disparity remains that implies disruption or interruption of what they normally would do for their research instead of continuing their kind of research. So about this establishment of this US Korea Technology Exchange Foundation; rules like that actually looking to the very broad scheme of things like cultural exchange as well as some details like IPR.
- summer school or extended conferences, but not just one-on-one investigator or three-day conferences, but instead a three-week summer school, a special semester on one particular topic, or a series lectures or visitors dedicated to that topic.
- Invite the department chair and faculty members to Korean campus, and then let them move around our research activities and facilities, and they realized that Korea is something similar to Japan, and not China. But now I realize it is important to invite students, especially young generation to Korea, to make some training sessions.
- Many well-trained scientists and engineers are coming back home; they should maintain contacts in their former college in the US. So even in absence of an agreement, they could come over and spend some time in the faculty level or industry level in graduate schools and so on.
- As individuals, we have to have individual motives. Korean faculty here have much larger numbers of projects than US faculty, and they are very busy, so they have to have some motive. Probably one motive may be publication in international journals. We should get some motives from the Korean side and also from the US side.
- Enhance the unilateral leveraging in the Korean side by taking advantage of sabbaticals.
- The easiest kind of agreement is one that involves exchange of students. Getting agreements that facilitate the exchange of faculty, I've never seen one. What we need to do is think about ways to get individual faculty members from both sides more engaged in this. Sabbaticals may be to finish a book, I don't know.
- I think I know what motivates our faculty. Certainly it is the opportunity to get involved in exciting research programs
- Secondly, the primary motivation two years ago was to pay for their summer salaries. If there's no money available, it would make it much more difficult to have such interaction. One opportunity might be to look at the summer stay. A professor at our school has a former graduate student who is a professor here. So we have the understanding, we have the connections, I think what we don't have quite frankly is the money. And that would be something I would encourage.
- The most difficult part is the housing problem. It's really expensive in Seoul. So we need a meeting with Korean Minister of Education to see if we can have some kind of housing to facilitate that kind of program.
- Any student in Korea when they want to go abroad they practice speaking foreign languages, especially English. But the problem is bringing American students to Korea. Since American students don't know about Korea, if they bring them for long-term projects, I don't think any American students will want to come over here. But if we plan a one-month or one-week or two-week project over summer or winter vacation, I think that's possible. So if NSF also has that kind of program and there is collaboration, it is easier to bring American students for a short period of time.
- We have a large study going on in the US now trying to find ways to encourage US students to study abroad. It's the Abraham Lincoln scholarship program, and it now has a US congressional commission to study it over the next year.

- The Korean language program is an excellent program and one that our US students need to know more about if they want a long-term type of study. This university is doing much in the US and Europe to advertise this program. There will be a small number of students, but generally those are not in the sciences. And the major stumbling block is that US students only speak English. To what extent is the development going on in Korea in terms of the Ministry of Education putting in to developing programs in S&T that are offered in English. In the short term, this is probably the only way US students will be encouraged to come.
- Some kind of summer school for students involved in both countries,
- Make time with communication beyond sitting in the classroom or a meeting where we're focusing on technical points. There has to be some discussion. Having lunch on a regular basis with exchange students is the best way to include them in communication.
- It also is important that there be some very specific goals. One of the students that I hosted was from KAIST, and when she first walked in, she said "I have to write a paper log." That was required for graduation, required by her advisor, and that helped us have a goal and help us know when we're finished.
- One of the issues is what we do after the student leaves to continue the collaboration. I talk on a regular basis with several visitors I've had through MSN. That's a technology that is more comfortable to students.
- Faculty has to have contact. One of the students I hosted was from KAIST. I've met her advisor several times at conferences and that's helped because we've been able to talk about the student as well as about future school visits.
- I'd like to see more support for post-doc.
- Students tend to be more mobile. They're less likely to have families, or at least smaller families. It's harder for somebody more established to travel for a long period of time.
- A short term visit really doesn't work. For a student to visit and work in three months is not enough. It takes three months just to feel comfortable in a different environment. Without that they can't get any work done. So I think the semester visit works better although then there's a time issue.
- Coordinate or plan around calendar differences. One student had to come in the middle of our semester, had to finish a term at her university, and then leave in the semester to return to take exams.
- It was much more productive to send e-mail from my office to the lab than for us to discuss in person.
- I think it's important for the host university to help with language in any direction.
- Two exchange students totally wasted their time because they hooked up with professors that did not spend any time with them.
- The available pool of students is small. I think a majority of S&T students in the US are not US citizens. Many of the US citizens are part time students. They work full-time, so to go abroad for some time is difficult. At my university, the pool gets narrowed down to the weaker students, who I think are less deserving of such opportunities.
- I think the NSF programs will only support US citizens. That's a blockage I've seen in many grants.
- There are other things, like tourism. Even when the point is work, people want to go to interesting places. Another is kind of the ease of life of living in a foreign country, and we all know there are always things to deal with that are sometimes uncomfortable sometimes peculiar. And of course, English, US citizens seldom speak a second language.
- There is very little support for professors, I give my time, university donates some computing equipment, which is really not that much, but there's no real obvious benefits. We mentioned there is no money available. I wish there was a small, even a very small matching grant.
- You have to use Korean-Americans. Second generation Americans wanted to come. I have involved Korean Americans saying they want to come. But they fear using an internship to come here, the reason being usually that an internship, like NASA or any industries, they directly tie to a jobs. Here they can come, but that is not really happening there. We can start this kind of cooperation using them as a model group for other American scientists.
- NSF and programs for interns should be better, should be more offered to them to compete with American internship programs.
- This is a question of money issue. Government research grant in Korea as a rule does not include salaries for professors. That is the key ingredient for US grants. By policy, it is very difficult, the maneuvering we have to do, if Korean scientists and US scientists have a joint grant program. We

have to sort these things out. It was practically impossible between US and Japan. So policy, I think we need to look at the two governments' positions.

- We need to come up recommendations to the government: I would like for at least the Korean side to establish an infrastructure that makes it easy for university people to invite students for even a year's visit from the US. Where is the housing project on the same level as the 'I-house' that you have in US in some large cities (international house). If the US government is very serious about inviting young American students to come and spend a substantial amount of time, then it's essential that there be some sort of international house type accommodation.
- US students are not interested in here. But if they can be hired by Samsung Electronics or LG Electronics for internships, maybe. We have to make sure that they will not be pencil-pushers and make copies and just translating.
- A colleague sends out mail: "I have a short term two-months away two week seminar in Korea. Please recommend students." He does it every year, but there is no American student interested in coming here. We have to provide some attraction for them to do so.
- Make a program for a short time period; summer vacation or a seminar for a week between two faculties.
- I think the reason many students don't want to come here is because coming here for any length of time is a distraction of their progress. A higher degree is very important for students, so we must create a program where visiting students are doing research contributing to their degrees, as if they were doing the same thing at home.
- Most of my graduate students are funded through industrial support, and to send people to Korea for any length in time is not attractive at all in terms of meeting commitments to sponsors and so forth.
- Korea cannot be better than the US in many areas at the moment, but one thing that comes to mind is stem-cell research.
- There has to be a meaningful experience for the student to attract them. And it has to be very early communicated to the potential students. For example, the experience should lead to credit. It shouldn't be something that adds time to a degree. It has to be very much a professor-to-professor approved arrangement where this is part of the program that incurs that kind of credit, so that it's not impossible.
- This really gets down into communication within the universities and reform within the US universities that will allow a credit and no loss of time degree.
- Four critical words: language, trust, culture and marketing.
- Given the low level of presence of persons from the United States here in higher education both faculty and students, probably in the initial efforts should be at the faculty level because in the long run faculty will influence their students.
- I would urge students that if they wish to come here they must gain some appreciation of the Korean language and its culture before embarking on such an exchange.
- One small step is to encourage the teaching of Korean as a language.
- If there is any common factor in developing a successful relationship, it is developing trust between partners. And every time you enter into a collaboration you have to have something to gain and you have something to give.
- Model program: U.S- Brazil Mobility Program. Our particular component of it will have 50 students spending 1 full semester in either Brazil or the United States and they must have the opportunity to receive all the academic credit that they would in a normal semester at their home institution. They are given stipends to do so and so far everyone of the students has successfully completed the academic credit, and they have not lost time on their degree. They must be prepared to study with sufficient capability in Portuguese that they can attend lectures and successfully complete their programs.
- Technology is not going to replace the F2F, face to face necessary to build trust relationships. Video conference and the internet and other forms of electronic communications can be very helpful in bringing a relationship along but it is simply not going to happen without the initial establishment of a relationship through face to face contact.
- Model program: Global joint lecture, which is between the University of Michigan, Seoul National University, and the Technical University of Berlin. It would be a good show case indicating a real collaboration in education between the United States and Korea.
- This is a wonderful project and really a model for us all but it also looks like a very expensive

- We can talk about finding some global product developmental institute. We have manpower so industry from each country are giving us some design project and we can ask them to do it generating some fresh ideas from the students. There are many discussions to expand. The planning stage is very difficult because there are so many differences among the schools
- I'm working at Inha university a private school, and it's constructing a second dormitory and guest house this year. So any school in Korea who provides room and board for foreigners, I think that it will be one way of solving this problem.
- Canadian embassy produced a huge number of CDs that they distributed very widely in U.S higher education, advertising the all of the attractive aspects particularly of graduate education in Canada and I would think Korea could do the same thing.
- Americans need a product that was automatically downloadable. Going to Korean Universities' websites, would be easier for me if I had something running in my system that automatically loaded things, and your embassy could do that.
- Part of the difficulty is having the correct perception and information in our research and education communities and our NSF program are being misunderstood.
- Korean universities had some international programs. We invited over 50 faculty members for the program, and we recruited some 200 students from many countries including the US, Japan and then some Far East Asian and European countries. That project has been very successful. However, it includes lots of effort from many professors and we had to spend a lot of money on the project.
- A suggestion is to build on strengths, to actually focus your marketing. I'm certain there is more than one area in this country that has that that level of expertise, and it's probably just not very well known outside of the country. So if we advertise outside, strengths attracts strengths.
- A lot of activities are generated around international conferences. Concentrate on a few conferences and convince the organizers to hold their meetings here, again in these areas of strengths, and utilize that as an opportunity to have associated workshops and for students and faculty.
- Utilize the sabbatical of faculty members of the US. The typical US sabbatical arrangement is that the university gives only 50% of the salary. If any university in Korea or industry can support the other 50% percent, and provide housing and facilities, I think that would be very attractive to US faculty members.
- European universities can be very good at finding money to support visiting on a sabbatical.
- To build an S&T relationship, we really need to focus on areas of expertise.
- A problem-based approach links into the expertise of the institution that is participating. An interdisciplinary program also allows you to built a critical mass of students and generate some excitement.
- The other point I'll make is that you need infrastructure.
- Use existing programs: NSFGRFP students can get additional funds to go abroad. Market to those students. There are bigger programs at the graduate level. The NSF grant program for interdisciplinary graduates researching education will support an international component, and there have been some Trans-Atlantic grant programs.
- We may not understand what the benefits are for us if we bring more students from the US to Korea.
- Go to industry and ask what problems in their particular areas really require massive intellectual power to solve. Industries very often are interested in a multi-cultural, multinational approach; it not only relates to their business, but they are increasingly appreciating the approach that comes from different perspectives.
- Marketing is not only the universities, it's also to the industries.
- Look for ways to make sure these experiences for the students lead to credit-bearing experience. It's really important that the students see what they get out of it, not only from the standpoint of cutting edge research, but how it will supplement their program, make the program more than what they have right now.
- Perhaps NSF could look at the US-Brazil program and reshape it for the NSF mission.
- Address the lack of coordination of academic calendars
- There is potential for disruption for doctorate students if they go abroad, if it's not carefully coordinated with their progress of study. All study abroad programs need to be credit based so students don't lose time for their degree.

- Highlight Korean expertise in particular areas and look for opportunities for funded internships for students with Korean industries, and opportunities for summer salaries for US faculty to come to Korea.
- We need to look at potentially new models, including kind of a European model, which is the model of doing summer school or short workshops and bringing the students and faculty to Korea.
- The role of the disciplinary society: improving familiarity with Korea by hosting more meetings in Korea, and it's the disciplinary societies that do a tremendous amount of that.
- Use the kind of model that identifies areas that are problem-driven and build courses, short courses around them to bring people together, because I think one of the pieces of infrastructure building is building familiarity between students and faculty from different countries.
- Face-to-face short courses to build familiarity is one idea. Another one is using the existing NSF programs both in the international areas but broadly across the foundation to look at opportunities to build infrastructure, to build programs that bring a larger number of people together.
- The prospect of having US faculty and students engaged with Korean companies can be very attractive. Thinking about ways to engage industry in the process would serve as a strong attraction, certainly in engineering.
- It's very active already: professors are visiting Korea, those professors are visiting Korea very often, and Samsung during the summer time, organized a big international forum.
- If one simply provides an opportunity for the first meeting to occur, it is very useful. Things can take their natural course after that, but facilitating the kind of first contact is something that is very important.
- It is imperative for us to do more marketing of the opportunities the US side is providing
- One way of effective marketing is through the disciplinary society, because almost all US scientists are members and are known to each of them. And they send out numerous opportunities for students, opportunities for fellowships, for example, and that would be an excellent resource.
- I'm not sure if there would be a role for the National Academies in the US or the National Academies of Sciences in the Republic of Korea or the Korean Academy of Science and Technology in any kind of process that we would recommend, but I wanted to offer that as an idea.
- It would be interesting to consider convening a conference and proposing it to NSF, a conference that would be held in Seoul, or let's say Korea, on a special topic. I wonder if KUSCO, for example, could be helpful in recruiting American scientists to participate, and if that could also be followed by a Korean-sponsored meeting with Americans participating, who came over thanks to NSF's conference funding for a more extended opportunity for the US and Korean scientists to get to know each other and develop collaborations.
- One good example of an arrangement is CERN in Europe. The scientists and students that conduct their research in CERN, it's really irrelevant whether they go there or stay home. So the somewhat out of the box suggestion is to develop the concept of the foundation, perhaps in some area, some sort of CERN-like facility, which may not be limited in Korea, but maybe expand to include China and so on, maybe with industry support.
- One of the time-honored successful strategies in universities has been to employ advisory, industry advisory committees.
- We have to establish some system for the collaboration. NSF and KOSEF have funds for the collaboration already. But the problem is that they are not on the same page. I'm thinking about establishing some global organization or task force team, and then in that team set up programs for collaboration between the US and Korea. They do the marketing for the program, and they have the funds, which is provided by NSF and KOSEF. If we have a very concentrated team who is building every stage of the collaboration program, then that would be more effective.
- The most successful marketing would be one that shows a clear example of a success. Picking a specific area and focusing the agenda around that technical area would be advisable. Pick the one that has the highest probability. I think if we tried to hold a general meeting, it's probably not going to succeed.
- Organize a joint workshop or symposium with Korea and the US. Model program: The first one was back in 1987. My area of specialty is catalysts, and I teamed up with a professor at Stanford University. He would get the US side organized. I would get the Korean side. We had our first meeting in Seoul in '87. It works very well. And it doesn't require any new infrastructure, any new funding. Just existing funding can be utilized for this kind of thing. And we followed up two years later

for our second meeting which was held in Detroit Michigan. This is the kind of thing that hinges on the key personnel on two sides.

- Model program: We organized the science policy symposium in Arlington, and the funding was done by NSF for US participants, and for the Korean participants by KOSEF. And that meeting also led to the second meeting in Korea two years later. And this is something that requires people to know the right kinds of persons, and understand that this can help for a continuing service.
- Model arrangement: The arrangement is that I spend about two weeks a year at the university, and essentially co-advise several PhD students, and provide most of the technical direction from my perspective. And on a couple of occasions, the students have visited the US, although only a couple of times. But it's an arrangement that works very well because it's not a huge time commitment, as far as travel goes, but it's a way to foster the kind of collaboration that we're talking about.
- There are some areas of cooperation between US and Korean companies, product supply, part supply, co-development, technology cooperation, joint purchase. And there are some needs for strategic alliances and business ties because we are in the era of limitless competition.
- Companies can gain from the partnership when the goal is focused on creating value. Interaction should not just settle on simple technology transfers and know-how exchanges, but partnership companies should closely interact and learn from each other.
- When you interact daily with your counterparts at GE and Maytag, I was just wondering how you carry those out. Do you use video conferences, telephone, just emailing back and forth? Sung Jin Kim: The number of emails per day is more than 20 at least and we here are using t-con mostly. Tele-conference. Video cons? Yes, we can do it, but we are not doing it. Bad outcome. Very rarely. But usually if there is some kind of serious thing, then we need to have face-to-face meeting. We just travel a lot. These days, we are traveling too much. Every other week, we are traveling to see each other.
- Model collaboration: A number of his technical staff are visiting a plant in the US for three months. That will be followed by a number of US counterparts coming over here. He explained that's need driven. That both sides' assets can be helpful. Some lessons to be learnt, that sort of identifying where the commons are so that collaboration among like-minded institutions can be carried out.
- The point from which we can talk that is very important for us is bilateral complementarities to create new value. That's the key thing.
- In the beginning we just say we would like to develop this product, definition phase. And then we just work together to apply new technology. It is continuous cooperation if both companies' goal is creating a value and creating money.
- IP is kind of a key issue. If there is a product, then we decide the IP issues before collaboration.
- Win-win situation will be key factor.
- American students coming to Korean companies, yes, we are quite open, but the chances are very slim. We have Korean students as summer intern mostly. Some Russians and some Indians, but I cannot find many Americans. But I think the chance are quite open.
- One possibility is the area of nano-science. There is ample work between the two countries not only in academia but also at the corporate R&D level.
- If both sides are in the forefront or in the beginning stage, certainly there is work that can be mutually in the same equal level for collaboration. But if one side is too far ahead, it's very difficult.
- Bidirectional, university to university can happen in various levels, undergraduate, graduate, doctoral or post-doctoral level. I just want to present recommendations for policy in both KOSEF and NSF and recommend the use of electronic tools such as the SNU example.
- Try to have some kind of summer camp in certain areas, a certain number of Korean students and certain number of American students invited to a certain place or university dormitory.
- Link with industry. Korean students to American companies and American students to Korean companies which I think we all have great interest for.
- NSF and KOSEF should work with the North Korean S&T community, in other words, find some ways both NSF and KOSEF can work together with North Korea using this science power because after all, they do need science for their future. Eventually they will open up and they will come out from the shell. Using this soft power, in other words, the science, we may be able to gradually work together with them.

- The cooperative activities I really want to promote and support will have to be based on the simple desire among scientists and engineers to advance knowledge. I would like to bring that aspect back to our fundamental issue.
- What I found in hosting foreign visiting students is that it works when the student comes in with a very specific goal and primarily that has been 'I am here to write a paper that will be published and/or I am here to develop the key component of my Ph. D dissertation proposals. And times when students come to visit without such strict goal, it hasn't worked very well. It should start with some very specific requirement and commitment on the part of both the visitors and the host.
- Make an action plan for the future. NSF and KOSEF should have an agreement what we're going to have an action plan, and then check what we have done after one year or two years and then plan what's the next program.
- How is very simple. Increase the funding, particularly from the NSF side. We have to provide some motive for American scholars to be engaged in bilateral research and that is funding.
- The best way to increase collaboration is to have more money.
- KOSEF if a student is visiting Korea, or NSF if a student visiting the US, could offer some very small matching grant to the host institution. It's not just that I've got a grant to host student. It's actually a commitment on the part of the host that I've got some money on the assumption that I will do something with the student.
- It will be really helpful if academic calendars were lined out.
- The biggest obstacle for me to send my students to Korea is the restriction on the grants for US citizens and that's a policy decision that may not even be the NSF.
- If Korea's tourism organization wanted to help they could really put out some good public relations. But I think that is beyond the scope of KOSEF or NSF. If KOSEF and NSF did some small amount of the advertising, sending to email lists just some facts, some facts that we have seen in the past couple of days, I think that could make a major difference.
- If we go back and we tell our colleagues, 'you know Korea is a good to visit and NSF does not use all of its money to send students over,' I think that can make a difference. That's a sort of a grass-roots thing.
- If KOSEF was able to provide some support for the hosts in Korea, and the NSF in the US, it help.
- You have to help the exchange person in many ways, find housing, find transportation, find just how to live here for some time, like food, etc. Sometimes it's simple and sometimes it's more difficult. It really depends on where the university is. But that overhead could be amortized over a number of students. If programs try to somehow coordinate to support 5 students or 10 students at the same time in roughly the same place, that might make some the difficulties a little easier to deal with. That's probably easier on the Korea side because there are a lot of universities in Seoul, so if the visitors came at the same time could stay in the same place or see each other or learn how to do things like use the subway together so only one person have to teach them all.
- Have some sort of classes where students from Korea and students from the US are brought together in Korea or the US. They could alternate in different years and have a series of lectures over a week from professors from both countries on some specific targeted topics.
- Have more discussions at conferences.
- Whenever you have a program like the NSF graduate research fellowships to Korea, it may be a good idea to ask KOSEF to advertise this to the Korean community. I personally can contact with my friends in the US and some colleagues that I know quite well, and ask them try to find someone who wants to join this kind of program in Korea.
- Model program: One that might work is a group approach. In our school, we had one program with a German institute. We opened up one short course between German professors and Korean professors and we brought Korean and German students together for 2 or 3 weeks.

Appendix D – Schedule of Events

| DAY 1 OCT 19, 2004 (18:00-20:30) | | |
|---|---|----------------------|
| CHAIR: Sung M. Lee (CMU) | | |
| CHECK-IN & RECEPTION | | 18:00 – 18:30 |
| INTRODUCTION | Sung M. Lee (CMU) | 18:30 – 18:40 |
| WELCOME | Oh-Kab Kwon (KOSEF) & Larry H. Weber (NSF) | 18:40 – 18:50 |
| KEYNOTE SPEECH | Robert Laughlin (KAIST) | 18:50 – 19:15 |
| ANNOUNCEMENT | Dae Hee Youn (Yonsei Univ.) & Lloyd Griffiths (GMU) | 19:15 – 19:30 |
| DAY 2 OCT 20, 2004 (9:00-21:00) | | |
| SESSION I (BACKGROUND AND CURRENT STATUS) MODERATORS: Key Hyup Kim (KITECH) & Joan Lorden (UNC) | | |
| OPENING PRESENTATION | Sungchul Chung (STEPI) | 09:00 – 09:15 |
| DISCUSSION/QUESTION | <ul style="list-style-type: none"> ● Summary of the present status of Korea-US collaborative activities ● At the present time, what works well and why; what doesn't and why? ● From the standpoint of policies and their implementation, what are the key factors that would influence positive results? | 09:15 – 10:30 |
| SESSION II (UNIVERSITY PERSPECTIVE) MODERATORS: Sung Won Lee (Univ. of Maryland) & Young Gul Kim (POSTECH) | | |
| OPENING PRESENTATION 1 | Wayne Patterson (Howard Univ.) | 10:45 – 11:00 |
| OPENING PRESENTATION 2 | Jongwon Kim (Seoul Nat'l Univ.) | 11:00 – 11:15 |
| DISCUSSION/QUESTIONS | <ul style="list-style-type: none"> ● Summary of the present status of Korea-US collaborative activities on Korean university campuses ● Is the low level of activities unique to the Korea-US interaction, or is it common to other collaborating countries? ● What are the key factors that would make Korean universities attractive to American students and researchers? ● What can professors and administrators do to promote active collaboration? What similar activities are they currently engaged in? What are other institutions/countries doing in this regard? ● What are the most effective means of taking advantage of information technology to further productive scientific collaboration? | 11:15 – 12:15 |

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| SUMMARY OF SESSIONS I & II | Led by all four moderators | 13:15 – 14:15 |
| SITE VISIT (SAMSUNG ELECTRONICS, SUWON) COORDINATOR: Dae Hee Youn | | |
| Site Tour | | 16:00 – 17:00 |
| Discussion with Foreign Scientists & Engineers | | 17:00 – 18:00 |
| DAY 3 OCT 21, 2004 (09:00-13:30) | | |
| SESSION III (INDUSTRY PERSPECTIVE) MODERATORS: Sung Tae Kim (LG Electronics Inst. of Tech.) & Lloyd Griffiths (George Mason Univ.) | | |
| OPENING PRESENTATION | Sung Jin Kim (Samsung Electronics) | 09:00 – 09:15 |
| DISCUSSION/QUESTION | <ul style="list-style-type: none"> ● In what way can industry facilitate and provide support to active Korea-US collaboration? ● Summary of the present status of Korea-US collaborative activities on Korean industry research laboratories ● To what extent are intellectual property issues and proprietary information constraints becoming an impediment to scientific collaboration? ● What are some specific examples of existing collaborative programs that are succeeding in spite of intellectual property issues? ● How can organization such as KUSCO and KSEA, among others, work to promote participation by scientists in cooperative programs? | 09:15 – 10:30 |
| DISCUSSION | <ul style="list-style-type: none"> ● 15-min. KOSEF presentation: “Strategic plan for KOSEF development” by Prof. Hah-Zoong Song (Kyung Hee Univ.) ● Delineation of the essential points made during the discussions. What policy recommendations should be made to the NSF and the KOSEF? ● Summarize discussions; list recommendations and action items ● Reach consensus on the outcome | 10:45 – 12:00 |

Appendix E – Symposium Pre-Meeting Minutes

Submitted by Hongil Yoon

Time: 10/7/2004 18:30-21:00

Place: Ho Kyung Jeon, Westin Chosun Hotel, Seoul

Participants (12):

Dae Hee Youn (Yonsei Univ.), Jinwoo Park (Korea Univ.), Daehyoung Hong (Sogang Univ.), Soonja Choe (Inha Univ.), Young Gul Kim (POSTECH), Hongil Yoon (Yonsei Univ.), Jang Hee Lee (Korea Univ. of Tech. and Edu.), Key Hyup Kim (KICOS), Gyung-Su Lee (Korea Basic Sci. Inst.), Chul Koo Kim (Yonsei Univ. / KOSEF),
Sung Tae Kim (LG Electronics Inst of Tech), Jang Yun Kim (KOSEF)

18:30-18:50 Review of the symposium objectives & program details (Dae Hee Youn)

18:50-19:00 Highlights of past ideas for Korea-US collaboration (Hongil Yoon)

19:00-21:00 Free discussions

- Find successful stories on Korea-US collaboration and let their cases be known.
- Find areas of strong competence in Korea (e.g., stem cells) to receive outsourcing from the US and to take part in practical and realistic collaboration on equal partnership. Establish a communication channel to promote inflow of US outsourcing.
- Being separate entities, US foundations/institutes (DOE, NIH, NSF, NASA, etc.) cannot be effectively dealt with a single “package” of generic proposals from our side. Collaboration efforts only with carefully tailored proposals in context with a specific counterpart in mind will be meaningful.
- KOSEF provides funding for collaboration through international academic meetings or joint seminars, exchange of scientists and engineers, and collaborative research projects, primarily serving the academic needs.
- NSF does not set aside extra funds for international collaboration; it is the will of the research investigator to allocate international funding.
- The amount of funding in aid for international collaboration is much too small, and the regulations are too constraining although increased flexibility is allowed in large-scale projects.
- The lack of interest for US students to participate in the KOSEF’s cooperative program is evidenced by the low number of applicants; this is the case also for students from France and Germany. Most of the students participating in the programs came to be aware of the program by the professor’s referral.
- Activities to exchange students in providing more aptitude training are currently increasing. It is important to identify the status and to assess the program’s effectiveness.
- Some renowned fields of industry (semiconductor, display, etc) have attracted international collaborators and the number of foreign workers is increasing.
- Though burdensome, collaboration on a short-term and frequent visit basis can be sought for the goals of maintaining good relationship and acquiring science and technology manpower from the industry perspective.
- For sustained collaboration, mutual and tangible benefit to both parties must be present.
- Heterogeneous exchange of collaborators (e.g., US students coming to Korean industry and Korean industrial engineer going to US universities) may be beneficial.
- Collaboration among Korean and US universities may be expedited if much of the institutional

constraints are deregulated and the details are left for the schools to work out. This is based on mutual faith and assumed responsibility.

- Compared to Korea-US collaborative implementation, Korea-Russia collaborative implementation has been on a different platform. Korea-Russia collaboration may be based on equal and balanced responsibility (both in the budget spending and in the administrator's role) by two countries, while Korea-US collaboration is based on one-sided "love call." Agreement in the higher administration (maybe presidential) level may change this "unbalanced" responsibility.
- Is Korea an IT super-power? For special fields such as mobile communications, domestic research activities are well-recognized and have attracted international collaborators and investors (Intel and so on). Most importantly, Korea with a high ratio of early adaptors and the wide spread of internet and mobile technology is an excellent "test-bed" and a high-potential market for emerging IT technology.
- University infrastructures to receive foreign students/researchers/faculties are still under-developed; and there are only a handful of universities that can accept foreigners. Administrative matters involved in the initial settlement of visitors have to be handled more efficiently and systematically.
- Provision of convenient and attractive housing facilities is of prime importance. Pohang cyclotron facility with container housing is a bad idea. On the contrary, a common guest house in a multi-university area (like Shinchon) will provide a shared benefit.

KOSEF action items:

- 1) Summary of past and present KOSEF/MOST/institutional collaboration efforts/programs/projects and their outcomes
- 2) A list of KOSEF's ideas/programs to be recommended to the MOST through this delegation.