

平成 25 年度 日本大学理事長特別研究「キャリアウェイ ～理系女子学生のキャリア教育と活躍促進のための環境整備に関する研究」

Nihon University Chairman of the Board of Trustees Grant “CareerWay Project” International Symposium

2013 第5回 日中韓女性科学技術指導者フォーラム

2013 The 5th Japan-China-Korea Women Leaders Forum For Science & Technology

Leadership Education for Women in Science, Technology & Engineering

科学技術分野における女性リーダー育成教育

2013 年 11 月 12 日 (火) 9:00~17:40

日本大学会館 2 階 大講堂

〒102-8275 東京都千代田区九段南 4-8-24

9 : 00~17 : 40, Tuesday, November 12, 2013
Main Hall (2nd floor), Nihon University
4-8-24, kudan-minami, Ichigaya, Chiyoda-ku, Tokyo

主催：日本大学 (Nihon University) / 国際女性技術者・科学者ネットワーク (INWES-Japan)

後援：文部科学省 (MEXT) / 経済産業省 (METI) / 内閣府男女共同参画局 / 独立行政法人 科学技術振興機構 (JST) /
独立行政法人 物質・材料研究機構 (NIMS) / 独立行政法人 宇宙航空研究開発機構 (JAXA) /
独立行政法人 国立女性教育会館 (NVEC) / 公益社団法人 科学技術国際交流センター (JISTEC) /
男女共同参画学協会連絡会 (EPMEWSE) / IEEE Japan Council Women In Engineering /
WiN (Women in Nuclear) - Japan



Opening Ceremony

Welcome Message from Chairperson Chikako YOSHIDA-NORO	19
Hiroki MATSUO	22
Xuhui WEN	24
Hee Young PAIK	26
Opening Remarks by INWES Japan President Kayoko SUGAHARA	30

Session 1 : Exploring Next Generations of Women in STE

Session Chair : Yan LEI (China)	35
Hiroki MATSUO	36
Li ZHANG (China)	44
Hyomin KIM (Korea)	50

Welcome Address by the President of Nihon University

59

Keynote Speech by Hideko KUNII

65

Session 2 : Career Education Programs at the University

Session Chair : Heisook LEE (Korea)	79
Toyoko OCHIAI (Japan)	81
Min HU (China)	86
Jeong-a LEE (Korea)	94

Session 3 : Leadership Programs for Professional Women in STE

Session Chair : Miyoko O. WATANABE (Japan)	109
Shigeko MORI (Japan)	111
Keiko YAMAMOTO / Ryo KIMURA (Japan)	118
EunKyoung LEE (Korea)	126

Closing Remarks

Noriko HIRATA-KOHNO	135
---------------------------	-----

Poster Session

139



Opening Ceremony

Welcome Message (Chairperson, Japan)



Chikako YOSHIDA-NORO

Professor, Department of Applied Molecular Chemistry, College of Industrial Technology, Nihon University

Chairperson of the 5th Japan-China-Korea Women Leaders Forum Organizing Committee

Education

Degree: BS, Description: in Biology, Chiba Univ., Japan, 1979

Degree: PhD, Description: in Science, Kyoto Univ. Grad. Sch., Japan, 1984

Research Field

Developmental Biology, Cell Biology

Career History

Researcher, Group Leader Furusawa MorphoGene Project, ERATO, JRDC, Tsukuba, 1988—1992; Visiting Scientist, Senior Research Associate Wellcome / CRC Institute, University of Cambridge, UK., 1991—1993; Research Fellow, Precursory Research Embryonic Science and Technology. JRDC, Tsukuba, 1993—1996; Researcher, Brainway Group, Brain Science Institute, RIKEN, Wako, 1998—1999; Research Fellow, Senior Research Scientist, Experimental Animal Division, BioResource Center, RIKEN, Tsukuba, 2000—2005; Associate Professor, Advanced Research Institute for Science and Humanities, Nihon University, Tokyo, 2005—2013; Department of Applied Molecular Chemistry, College of Industrial Technology, Nihon University 2008—; Department of Functional Morphology, Division of Cell Regeneration and Transplantation, Nihon University School of Medicine 2008—; Chairperson of Gender-Equality Committee, College of Industrial Technology, 2010—, Professor, 2012-

Certification

Senior Radiation Protection Supervisor

Awards

Educational Contribution to College of Industrial Technology Award 2009

Development Growth & Differentiation Paper Award 2013

Achievements

Achievements include first to identification and characterization of the Cadherin family of cell adhesion molecules; invention of name ‘cadherin’ combining elements from ‘calcium’ and ‘adhere’; invention of shuttle cell culture chamber for in vitro and in vivo stem cell research; development of experimental system for the stem cell research in asexual and sexual reproduction of *Enchytraeus japonensis*;

Civic, Political, and Philanthropic Activities

Member of Japan Inter-Society Liaison Association Committee for Promoting Equal Participation of Men and Women in Science and Engineering (EPMEWSE), 2005—; Chair, Science Summer School for Girls at National Women's Education Center (NVEC), Japan, 2012; Member of Promoting Communication Committee, NVEC Forum, 2008—; Referee of Grants-in-Aid Science Research., 2008—2011, Member of Gender Equality Committee, JST 2011-

Current Memberships

International Society of Developmental Biologists, International Society for Stem Cell Research, Japanese Society of Developmental Biologists (chair. gender-equality working group 2008—2011), Japanese Society for Regenerative Medicine, Japanese Association of Laboratory Animal Science, Japanese Cancer Association, Molecular Biology Society of Japan, Japanese Biochemical Society, Society Japanese Women Scientists (board member 2008-2013.; chair of 9th annual meeting), Japan Women Engineers Forum.

Welcome Message

On behalf of the organizing committee, I am honored and delighted to welcome you to the 5th Japan-China-Korea Women Leaders Forum in Science and Technology held on November 11-13, 2013 in Japan.

Women Leaders Forum started in 2008 and held every year in one of the three countries. The forum 2013 is organized by the special committee on this forum including Nihon University and International Network of Women Engineers and Scientists (INWES-Japan), and held as an international symposium of the “CareerWay Project” of Nihon University Chairman of the Trustees Grant, also supported by Ministry of Education, Culture, Sports, Science and Technology (MEXT) and INWES-Japan.

The full program of the forum is as follows.

Mon. Nov. 11: Yesterday invited speakers from China and Korea attended the Annual Meeting of “the Supporting Activities for Female Researchers” by MEXT in TKP Center, Tokyo.

Tue. Nov. 12: Today we have Main Symposium here at the Main Hall in Nihon University in Tokyo on the theme “Leadership Education of Women in Science, Technology and Engineering (STE)”. We have three sessions.

Session 1: Exploring Next Generations of Women in STE

Session 2: Career Education Programs at the University

Session 3: Leadership Programs for Professional Women in STE

Also we have a keynote speech by Prof. Hideko Kunii, Shibaura Institute of Technology, who is a distinguished female leader in STE. In addition, at the lunchtime, we have poster session of the young female researchers in Nihon University. We plan to give awards for the excellent papers. Please have a look and vote to the one you think best.

Wed. Nov. 13: Tomorrow we will have the satellite meeting on the theme “International Survey for Recruitment and Promotion of Women Researchers in East Asia” in National Institute for Materials Science (NIMS) in Tsukuba. The survey was supported by Japan International Science and Technology Exchange Center (JISTEC). Then the invited speakers will visit Japan Aerospace Exploration Agency (JAXA) Tsukuba Space Center.

I am proud to inform you that we were able to invite distinguished speakers and chairs from China, Korea and Japan. I believe this year’s forum provides a great opportunity to discuss how we strengthen our trilateral cooperation and network among the women scientists in Japan, China and Korea. Thank you.

Message from MEXT, Session 1 Speaker (Japan)



Hiroki MATSUO

Director, Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Education

Degree: M.S., Description: School: Graduate School of Science, the University of Tokyo, Japan, Year: 1986

Career History

1987: Science and Technology Agency

1993: Deputy Director, Office for Regional Relations for R&D Facilities, Atomic Energy Bureau, Science and Technology Agency

1993: Deputy Director, Policy Division, Atomic Energy Bureau, Science and Technology Agency

1995: Deputy Director for General Affairs, Economic Affairs Bureau, Ministry of Foreign Affairs

1997: Specialist, Secretarial Division, Commissioner's Secretariat, Science and Technology Agency

1998: First Secretary, Japanese Embassy to China

2001: Deputy Director, Policy Division, Science and Technology Policy Bureau, Ministry of Education, Culture, Sports, Science and Technology (MEXT)

2002: Director for Personnel Planning, Personnel Division, Minister's Secretariat, MEXT

2005: Director, Life Sciences Division, Research Promotion Bureau, MEXT

2007: Director, International Nuclear and Fusion Energy Affairs Division, Research and Development Bureau, MEXT

2008: Director-General, Research promotion Department, RIKEN Yokohama Institute

2010: Director, Student Support and Exchange Division, Higher Education Bureau, MEXT

2013-: Director, Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau, MEXT

Welcome Message

Good morning, ladies and gentlemen. I am Hiroki MATSUO, Director, Knowledge Infrastructure Policy Division, Ministry of Education, Culture, Sports, Science and Technology.

Please allow me to say a few words of welcome at the opening ceremony of "The 5th Japan-China-Korea Women Leaders Forum For Science & Technology." First of all, I'd like to pay tribute to Mr. Otsuka, Ms. Noro and Ms. Sugahara, who have made every effort to host this forum, and all participants from China, Korea and all over Japan.

We are now facing an aging society with a low birthrate. To maintain durable growth of our society, human resources should be the single solution. So, Japan aims to be an education-oriented nation and a science- and technology-oriented nation.

Abe Cabinet, now, places science and technology innovation as a center of their policies. Particularly, they evaluate supporting females' activities highly important.

If I enumerate three keys for human resource development of Japan, I would list innovation, globalization and diversity. Constructing a diverse society is necessary so that all of its members can live together, work together and play active roles together -- regardless of age, sex, nationality or handicap.

"Leadership Education for Women in Science, Technology and Engineering", that is the title of this year's forum, is an important subject for Japanese policies. Support for female researchers is what we have to promote.

The forum this year is being held on the very next day of "Program to Supporting Research Activities of Female Researchers Symposium by MEXT." Some of participants today also attended it yesterday. I would express my heartfelt gratitude again.

I would anticipate that female leaders here introduce the policies and measures of Japan, China and Korea, acknowledge common problems and find out anything that we can work together.

I, again, sincerely look forward to active and fruitful discussions on every issue today.

Thank you for your kind attention.

Hiroki Matsuo

Opening Remarks (China)



Xuhui WEN

Professor, Institute of Electrical Engineering, Chinese Academy of Sciences

Education

Degree: BS, Description: in EE, School: Tsinghua Univ., China, 1984

Degree: PhD, Description: in En., School: Tsinghua Univ. Grad. En., China, 1993

Research Field

Electrical machine and power electronics

Career History

Professor Wen Xuhui Received PhD degree from Tsinghua University in 1993, since then she joined Institute of Electrical Engineering, Chinese Academy of Sciences. Now she is the chief research fellow, doctoral tutor, vice supervisor of academic degree commission of IEE CAS, vice chief commissioner of EV Affiliate, China Electro-technical Society, commissioner of the EV Technical Commission of Nation Standardization Commission, executive member of the EV Affiliate, SAE, senior member of IEEE, and director of the Chinese Women's Association for Science and Technology Workers.

Awards

The outstanding personal in the 9th Five-Year Plan project of State Ministry of Science and Technology in 2001;

The first round candidates of hundreds and thousands talents project for new century in 2004.

Science and Technology Awards, 2012, China Electrotechnical Society

Achievements

Professor Wen's main research includes motor drive and power electronic technology with the main application areas of electrical vehicle. She has published more than 200 papers.

Current Memberships

Chairperson of Electric Vehicle Committee, China Electro-technical Society;

Member of the EV Technical Commission of Nation Standardization Commission, Senior member of IEEE, and member of the Chinese Women's Association for Science and Technology Workers.

开幕致辞（Opening Remarks）

Dr. Xuhui Wen, Institute of Electrical Engineering, Chinese Academy of Sciences

Dear chair person, Ladies and gentlemen,

Commissioned by my colleagues of the China Women's Association for Science and Technology, I'm pretty honored here to congratulate the convening of the 5th Japan-China-Korea Women Leaders Forum for Science & Technology. Meanwhile, we'd like to express our sincere gratitude to Dr. Chikako YOSHIDA-NORO and her team for the efforts they have done for this meeting!

Thirty years ago, when I was a senior high school student, there were just about 2 to 3 girls in the top ten students of the class. But now, in my daughter's senior class, the situation has turned to the opposite, there are 2 to 3 **boys** in the top ten. Thirty years ago, in Tsinghua University, one of the best universities in china, less than 10% of the undergraduate students were female, but now it has grown to about 30%, and that there are 4 to 5 girls in the top ten students of the class.

How did this happen? Some gave the credit to the development of China's economics; some owed it to the self-improvement of woman; still some said it's the achievement of China's one-child policy. In the last thirty years, the expectations of Chinese family towards their children have been greatly changed by the opening society, the economics development as well as the one-child policy of China. Lots of Chinese families spent plenty of energy and money on their only kid. They also expect that their girls can go to such world-class universities as Tsinghua University, Seoul University, Tokyo University and Harvard University. This is the current situation of China. I think the same may happen in your country.

But while we see more and more vivacious and lovely girls in the university, we have a little bit worried when we look into the labs of institutes, the rostrums of international conferences. And we may become even more anxious when we go to check the proportion of female science and technology leaders. When I was told that the proportion of female academicians of Chinese Academy of Sciences academician and Chinese Academy of Engineering academician was just about 5% and 6% respectively, I couldn't help asking "**where** had those excellent girls gone?"

As the experienced female scientific and technical professionals, what kinds of circumstances we should create, what advises we should give for those young females to make their lives more vivid and benefitted, to benefit their families, as well as to benefit the society? **These are** our topical subjects of this forum. I believe that in the following lectures and discussions, we must be able to get our conclusion. We can work out some insightful suggestions and actionable methods so as to attract more females engaged in science and engineering research.

Finally, I wish the conference a complete success. Thank you all.

Opening Remarks (Korea)



Hee Young PAIK
Professor, Department of Foods and Nutrition, Seoul National University, Seoul, Korea

Education

Degree: BS, Dept. of Foods and Nutrition, Mississippi Univ. for Women, USA, 1974

Degree: MS, Dept. of Nutritional Sciences, Univ. of California Berkeley, USA, 1978

Degree: ScD, Dept. of Nutrition, Harvard School of Public Health, USA, 1981

Research Field

Human Nutrition, Nutritional epidemiology

Career History

Instructor, Dept of Foods and Nutrition, Seoul National U, Seoul, Korea 1981-1984

Assistant and Associate Professor, Dept. of Foods and Nutrition, Sookmyung Women's U. Seoul, Korea 1984-1992

Assistant, Associate, and Professor, Dept of Foods and Nutrition, Seoul National U, Seoul, Korea 1992-Present

Visiting Scientist, Free U. of Berlin, Berlin, Germany, 1990-1991

Adjunct Professor, San Diego State U, San Diego, CA, USA. 1999-2000

President, Korean Home Economics Association (KHEA), 2003

President, Korean Nutrition Society (KNS), 2005

Council Member, International Union of Nutritional Sciences, 2005-2009

Minister of Gender Equality and Family, Republic of Korea, 2009-2011

President-elect, Korean Federation of Women's Science and Technology Associations (KOFWST), 2013

Awards

Humboldt Scholarship, Humboldt Foundation, Germany, 1990-1991
 Award for Outstanding Research, Presented by KNS, 1986, 1994, 1999, 2002
 Outstanding Research Award, Korean Federation of Science and Technology Associations, 2005
 Twenty Leaders in Science and Technology of Korea Award, Korean Foundation of Science and Culture and National Assembly of Korea, 2005
 Science and Technology Promotion Award, Medal of Merit (Pojang), Ministry of Education, Science and Technology, Republic of Korea, 2008
 Asia Pacific Clinical Nutrition Award, Presented by the Asia Pacific Clinical Nutrition Society, 2009
 Order of Service Merit, Blue Medal, Republic of Korea, 2012

Achievements

My major area of research has been developing more accurate and feasible methods of dietary assessment and evaluation for Korean population. Koreans are experiencing rapid changes in diet and lifestyle and chronic diseases are becoming more and more serious problems. I have about 150 papers published in peer-reviewed journals both in Korea and abroad in this area. I have developed and validated several versions of food frequencies questionnaires including one for Korean Health and Nutrition Examination Survey. I also worked as a Committee Chair for the first version of Dietary Reference Intakes for Koreans in 2005 and served on the Council of the International Union of Nutritional Sciences 2005-2009.

Civic, Political, and Philanthropic Activities

I have made several efforts policy development and started activities for enactment of a law for nutrition policy in Korea as the President of the KNS in 2005. The result, of course with efforts of many others involved, is the enactment of “Law for Population Nutrition Management” in 2010. The I also led several activities for family policies since I worked as the President of the KHEA in 2003, including enactment of “Basic Law for Healthy Family,” and foundation of Citizens for Health Family, which is a NGO working to support family policies. I was appointed and served as the Minister of Gender Equality and Family between Sept. 2009 and Sept. 2011 in the Korean Government. I have been involved in Korean Federation of Women’s Science and Technology Associations (KOFWST) since 2004, and now the President-Elect. I hope this would be an opportunity to serve for and work with Women in science and technology fields in Korea, Asia, and worldwide.

Current Memberships

Mem.: National Academy of Medicine of Korea, Korean Home Economics Association, Korean Nutrition Society, Korean Society of Food Science and Nutrition, Korean Federation of Women’s Science and Technology Associations

Opening Remarks

The 5th Japan-China-Korea Women Leaders Forum for Science & Technology

Hee-Young Paik, Sc.D.

President-elect of the KOFWST

Prof. Seoul National University

Former Minister of the Gender Equality and Family, ROK

Good Morning!

It is a great honor and pleasure to join all of you on behalf of the president, Dr. Myung-ja Kim and members of the Korea Federation of Women's Science and Technology Associations (KOFWST). I sincerely welcome such distinguished guests and representatives from Japan, China and Korea on the special occasion of "The 5th Japan-China-Korea Women Leaders Forum for Science & Technology". I also would like to take this opportunity to congratulate and express my sincere appreciation to our hosts in Japan for their successful and wonderful job in preparing this Forum. I look forward to making progress in sharing ideas and insights for promotion of women's leadership in the global community on this occasion and beyond.

The 21st century is facing a tremendous challenge in terms of women's role in society. That is because women's leadership endowed with sensibility and creativity has become an important factor in enhancing the national competitiveness. However, we do not find many successful career women who can serve as role models for girls in Korea, and even for Japan and China. Particularly, women in Korea are not properly represented yet in the field of science and technology even though Korea's scientific competitiveness ranks the 5th in the world.

There is a pressing demand to re-establish the social relevance of science and technology. In an age of knowledge-based societies, a complex relationship between human beings and technology has been created. It is essential that we determine the actual value of scientific innovation in daily life and for human welfare. In doing so, women can reflect on the process of technological evolution in moral terms, because

Opening Remarks

technology should also fall within the purview of moral philosophy.

It is also important to foster an environment where women with exceptional skills and quality can make use of their ability. We need to cultivate positive images of women and their roles in society, particularly women's role in science and technology. Since its establishment in 2003, KOFWST has been proactive in promoting the welfare, rights and interests of women in science and technology in numerous ways. Our theme in 2012-2013 is envisioned in the slogan of "Convergence, Communication, and Scientific Diplomacy", which expands our scope to serve the public in solving social disputes and conflicts related to science, technology and society. We believe that resolution of these societal issues requires the commitment of people with diverse backgrounds, as well as proper social support through conflict mediation and consensus building.

I believe highly trained female scientists and engineers are valuable resources in driving future societal developments in an era of continuous scientific revolution. As the president-elect of the KOFWST, I will keep listening to the experiences of women scientists and engineers in their professions, mentoring future generations, and conveying their voices to various stakeholders and policy makers. Such activities would support women in claiming an equal share of rights, opportunities and power in their professional fields.

With leading women scientists and engineers as session chairs and organizing members, I sincerely hope the 5th Japan-China-Korea Women Leaders Forum for Science and Technology contributes to the career development of women scientists and engineers by sharing our experience and wisdom, and expanding networking capabilities on various success stories which could be applied to future generation. Certainly, we will achieve more if we collaborate together towards synergistic effect, since the role of women is ever expanding in this dynamic field of science and technology. The KOFWST will further effort to promote the trilateral and global collaboration and leadership enhancement of women scientists and engineers.

Thank you very much for your kind attention.

Opening Remarks (Vice-Chairperson, INWES Japan President, Japan)



Kayoko SUGAHARA

President, International Network of Women Engineers & Scientists (INWES) Japan

Visiting Professor of Tokyo University of Agriculture and Technology, IT Advisor for International Christian University

Education

Degree: BS, Physics, School: Ochanomizu Women University, Japan, 1979

Degree: MS, Physics, School: Ochanomizu Women University, Japan, 1981

Career History

Career: Systems Engineer in IBM Japan Corp. 1983—2010, IBM Distinguished Engineer and IBM Academy Member in 2002-2010

Visiting Professor of Tokyo University of Agriculture and Technology in 2010-

IT Advisor for International Christian University in 2011-

Civic, Political, and Philanthropic Activities

Japan Women Engineers Forum(JWEF) Chair in 2006-2008

JWEF Advisory Board Member in 2008-

INWES (International Network of Women Engineer and Scientist) Japan Board Member in 2006 –

INWES Japan President in 2013-

INWES Board Member in 2011-

Current Memberships

JWEF Member, INWES member

Opening Remarks

As the President of INWES Japan (International Network of Women Engineers and Scientists), I am very proud to be a vice-chair of "the 5th Japan-China-Korea Women Leaders Forum for Science and Technology" in Tokyo, Japan.

The Forum started in Seoul, Korea in 2008 and has been held every year. We have the second time experience as 5th in Tokyo today. In the course of conferences, we had proved that it is very effective to solve similar regional women problems, with physically closer face-to-face discussions. I am expecting in the 2013 Forum to become another step for activating women engineers and scientists in three nations of East Asia.

The main theme of 5th Forum is "Leadership Education for Women in Science, Technology and Engineering (STE)", with focusing in teenagers, college students and working adults respectively. We will have three sessions, as of "Exploring Next Generations of Women in STE", "Career Education Programs at the University" and "Leadership Programs for Professional Women in STE". We will share our experiences, our passion and time, energies and ideas, encouraged and empowered, and return to our workplace.

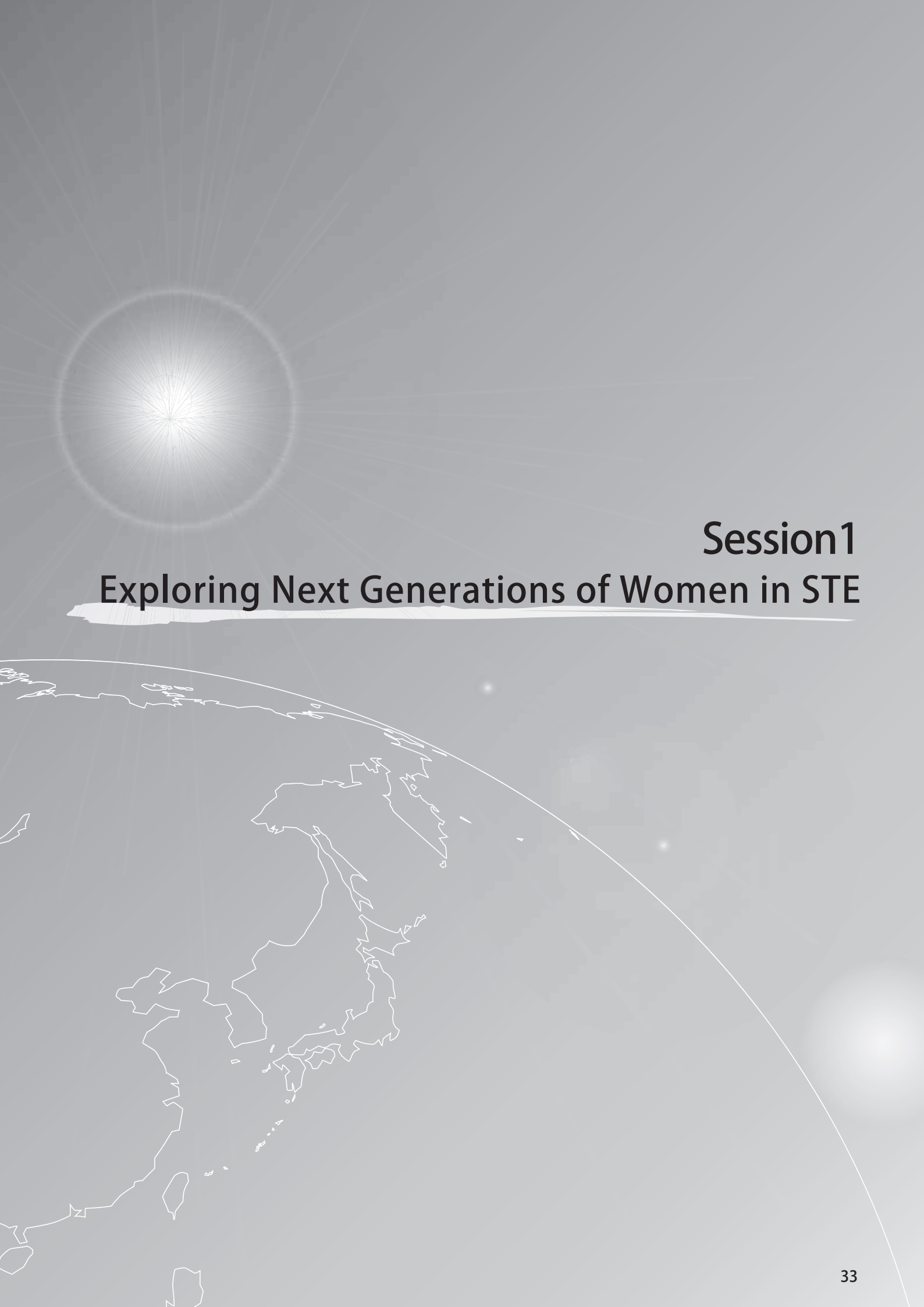
This year, Japanese Prime Minister has committed to support working women and childcare as the most important issues of government, and named it the third arrow. The third arrow would introduce another strong "Quota" discipline, to push companies and institutions to promote women be able to have better opportunities. Although negative attitudes against diversity are still hard to sweep away, we, women scientists and engineers, have enough power to overcome it, because we have expertise and warm heart to share our world together.

The Conference will showcase the achievements of women in these fields and lead the way towards a sustainable future. We hope that women scientists and engineers in three nations of East Asia will be inspired by the helpful and useful information obtained through the meeting.

I would like to express my sincere thanks to all of the speakers, guests and attendees from China, Korea, and Japan. Also my deep thanks to all of our sponsors and supporting organizations, for their generous contributions for ensuring this conference be a great success.

We wish all attendees to have a wonderful and memorable experience.

Kayoko Sugahara
Vice-Chair of the Organizing Committee,
INWES Japan President.



Session1

Exploring Next Generations of Women in STE

Session 1 Chair (China)



Yan LEI

Professor, Experimental Research Center, China Academy of Chinese Medical Sciences

Education

Degree: MSc, Description: in TCM (traditional Chinese medicine), School: Fujian TCM U., Location: FuZhou City, China. Year: 1991

Degree: PhD, Description: in TCM., Research/School: China Academy of Chinese Medical Sciences(CACMS). Grad. CACMS., Location: Beijing, China. Year: 1996

Research Field

Integrative Medicine, on Chinese medicine to prevent and treat cardiovascular diseases.

Career History

Career: Postdoc. rsch. in Beijing TCM U, 1997—1998; assoc. prof. dept of cardiovascular diseases of Xiyuan Hospital of CACMS, 1999—2000; prof., and director of dept. of scientific research management of CACMS, 2001—2011; with vice editor—in—chief of Chinese Journal of Integrated Traditional and Western Medicine; vice chairman of Experimental Research Center ,China Academy of Chinese Medical Sciences 2011—.

Message from MEXT, Session 1 Speaker (Japan)



Hiroki MATSUO

Director, Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Education

Degree: M.S., Description: School: Graduate School of Science, the University of Tokyo, Japan, Year: 1986

Career History

1987: Science and Technology Agency

1993: Deputy Director, Office for Regional Relations for R&D Facilities, Atomic Energy Bureau, Science and Technology Agency

1993: Deputy Director, Policy Division, Atomic Energy Bureau, Science and Technology Agency

1995: Deputy Director for General Affairs, Economic Affairs Bureau, Ministry of Foreign Affairs

1997: Specialist, Secretarial Division, Commissioner's Secretariat, Science and Technology Agency

1998: First Secretary, Japanese Embassy to China

2001: Deputy Director, Policy Division, Science and Technology Policy Bureau, Ministry of Education, Culture, Sports, Science and Technology (MEXT)

2002: Director for Personnel Planning, Personnel Division, Minister's Secretariat, MEXT

2005: Director, Life Sciences Division, Research Promotion Bureau, MEXT

2007: Director, International Nuclear and Fusion Energy Affairs Division, Research and Development Bureau, MEXT

2008: Director-General, Research promotion Department, RIKEN Yokohama Institute

2010: Director, Student Support and Exchange Division, Higher Education Bureau, MEXT

2013-: Director, Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau, MEXT

Promotion of Science Education and Support for Female Students in Choosing Science Courses

Hiroki MATSUO¹

(1. Director, Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau,
Ministry of Education, Culture, Sports, Science and Technology (MEXT), 3-2-2 Kasumigaseki,
Chiyoda-ku, Tokyo, 100-8959, JAPAN. E-mail kiban@mext.go.jp)

Abstract:

Human resources are Japan's greatest resources for putting the economy on a new growth track and the Government of Japan attaches importance to expanding opportunities for diverse human resources including female researchers. However, the proportion of female researchers in Japan is still low.

Ministry of Education, Culture, Sports, Science and Technology (MEXT) supports female researchers by improving the research environment to promote females' participation.

The proportion of Japanese students who are interested in science and who are willingly studying science is lower than other countries. And the proportion of female students in science courses (esp. faculty of science, engineering) is lower than that of female students who major in cultural or social sciences.

MEXT, in cooperation with Japan Science and Technology Agency (JST), is conducting programs to promote science education and to support female students in choosing science courses. This presentation provides some information on MEXT's policies.

Keywords: female researchers, female students, science education

1. Introduction

The Government of Japan, recognizing that human resources are Japan's greatest resources for putting the economy on a new growth track, attaches importance to the promotion of active participation of female researchers. The 4th Science and Technology Basic Plan, Japan Revitalization Strategy and other plans emphasize the necessity of improving research environment for them.

However, although the proportion of female researchers is rising, it is still only 14%. Some issues to be overcome to expand women's participation are difficulty of their work-life balance and family lives and obstacles to the smooth return after child-rearing.^[1]

Low participation of female researchers leads reluctance by females of younger generations to choose science courses. Female students often face difficulties to find role models for them to specialize in science and technology. Thus, they tend to hesitate to choose science courses since it is hard for them to imagine their future life as researchers. In 2013, the proportion of female undergraduate students in science courses is 32.7%.^[2]

Thus, the government works on science education for female students of next generation and improvement of an environment to expand women's participation in research.

2. Improvement of an Environment to Expand Women's Participation in Research

The Ministry of Education, Culture, Sports, Science and Technology (MEXT), thus, conducts “Supporting Activities for Female Researchers” to support efforts to improve environments in which female researchers can balance childbirth, child-rearing, and nursing care with research so that they can utilize their abilities to the fullest extent. MEXT is also expanding support through Special Fellowship for Young Scientists by the Japan Society for the Promotion of Science so that outstanding researchers can make a smooth return to their research activities after maternity leaves.^[3]

3. Science Education for Female Students of Next Generation

MEXT and Japan Science and Technology Agency (JST) conduct some programs which intend female students in junior and senior high schools to stimulate their interest in science and technology.

One is “Support for female students interested in the science stream”, which encourages female junior and senior high school students to choose science courses. They are provided opportunities to contact with female scientists, engineers and university students active in the science field, to perform scientific experiments, to attend lectures by scientists etc.

Apart from this project, since continuous and systematic education of children as the future scientists and engineers is essential for promotion of innovation, MEXT and JST conduct projects designed for:

- Research and development for fostering next-generation leaders in science and technology
- Extending youngsters' interest in science and fostering their talent
- Supporting science and mathematics teachers in improving teaching capability

These projects also raise female students' awareness about science courses.

4. Conclusion

Since female participation in science field is indispensable for diverse research, MEXT, in collaboration with JST, continues to implement measures to attain gender equality.

REFERENCES

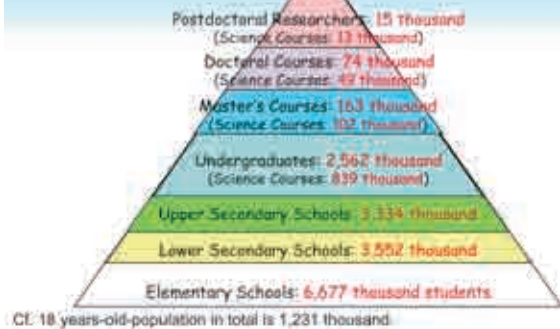
- [1] The 3rd Large-Scale Survey of Actual Conditions of Gender Equality in Scientific and Technological Professions, Japan Inter-Society Liaison Association Committee for Promoting Equal Participation of Men and Women in Science and Engineering, (2013),
- [2] MEXT, School Basic Survey
- [3] Women and Men in Japan 2012, Gender Equality Bureau Cabinet Office, Government of Japan

Promotion of Science Education and Support for Female Students in Choosing Science Courses

Hiroki MATSUO



Strengthening of Human Resource Development for Innovation in Science and Technology



Three Keys of Human Resource Development

1. Innovation
2. Globalization
3. Diversity

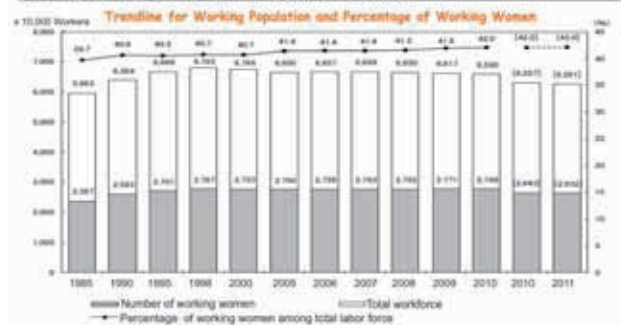
Three Issues to Be Addressed Are...

1. Securing Young Researchers' Career Paths
2. Attracting Young Generation's Interest in Science and Technology
3. Supporting Female Researchers' Activities

1. Improvement of an Environment to Expand Women's Participation in Research

Percentage of Female Workers among Total Number of Workers

Women accounted for 42.0% of the workforce in 2011.



Source: Labour Force Survey by Statistics Bureau of Ministry of Internal Affairs and Communications
Note: The numbers in the brackets () and the percentages for years 2010 and 2011 are the result of a nationwide survey excluding Iwate, Miyagi and Fukushima Prefectures.

Plans and Proposals on Female Researchers in Japan - 1

Extract from **The 4th Science and Technology Basic Plan of Japan** (Cabinet Decision on August 9, 2011)

The government will, in view of the current ratio of female doctoral students, **encourage relevant efforts, aiming to quickly achieve the numerical target under the 3rd Basic Plan for the ratio of female researchers - namely 25 percent of all researchers employed in natural sciences - and further raising that target to 30 percent**. In particular, the government will aim to quickly achieve the targets of 20 percent in science, 15 percent in engineering and 30 percent in agricultural science, and to achieve a combined target in medicine, dentistry and pharmacy of 30 percent.

Plans and Proposals on Female Researchers in Japan - 2

Extract from **The 4th Science and Technology Basic Plan of Japan** (Cabinet Decision on August 9, 2011)

The government will **provide support to universities and public research institutions that develop research support systems, etc. in a way that allows their female researchers to achieve a career in research while also having and raising children**. Moreover, the government will expect universities and public research institutions to make progress in establishing flexible employment systems and personnel and evaluation systems, as well as in improving their systems that support research, including teleworking and shorter working hours.

Plans and Proposals on Female Researchers in Japan - 3

Extract from **Basic Policies for Economic and Fiscal Management and Reform -Ending Deflation and Revitalizing the Economy** (Cabinet Decision on June 14, 2013)

Chapter 2: *Realizing a strong Japan and a strong economy and ensuring a high quality of life with safety and security* 1. Basic design of the Growth Strategy
[(1) Strengthening the infrastructure for technological innovation and other factors to increase productivity (Plan for Revitalization of Japanese Industry).
[(2) Promoting research in science and technology etc.]

In addition, development of the human resources to handle innovation in science and technology, including basic research, is the cornerstone of Japan's growth, and it is necessary to further the development of human resources who can thrive in a variety of situations and creative, outstanding researchers. For this reason, efforts will be advanced including development of career paths for researchers, **promoting the activities of women researchers**, and development of human resources for the next generation.

Plans and Proposals on Female Researchers in Japan - 4

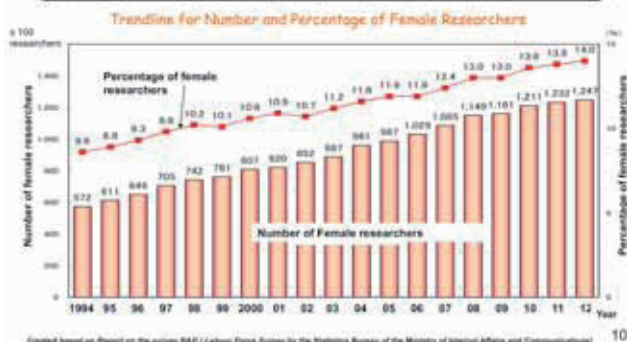
Extract from **Japan Revitalization Strategy -JAPAN is BACK** (Cabinet Decision on June 14, 2013)

2. Reforming the employment system and reinforcing human resources capabilities:
(4) Promoting active participation by women:
Supporting active participation by women according to the lifestyle of women

The government will develop and support a "plan for support of returning work after child-raising leave (provisional name)" and consider extending/enhancing the Act on Advancement of Measures to Support Raising Next-Generation Children that will expire at the end of next year. In addition, the government will **support women researchers in particular who have difficulty in balancing careers and child-raising**. In addition, the government will encourage more men to actively take part in family chores and child-raising.

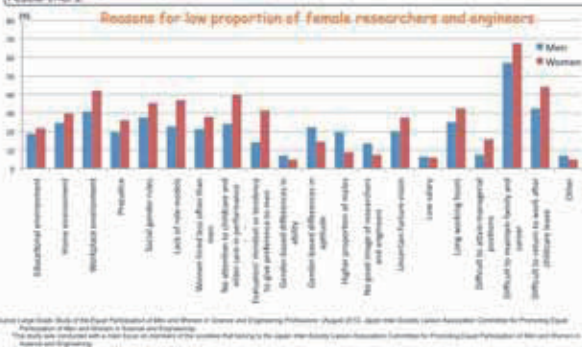
Number and Percentage of Female Researchers

Although the number of female researchers increases each year, female researchers still make up only 14% of all researchers.



Why are there so few female researchers?

Over 40% of female researchers cite the "difficult to maintain family and career" and the "difficult to return to work after childcare leave" as reasons for the low number of female researchers.



Why do few women hold leadership positions?

Men and women both cited "difficult to combine family and career" and "many women leave work or take leave mid-career" as reasons for the low percentage of women in leadership positions.



Source: Large Scale Study of the Career Pathways of Men and Women in Science and Engineering Professions (August 2012, Japan Women Science Career Association) Committee for Promoting Equal Participation of Men and Women in Science and Engineering. This study was conducted with a main focus on equality of the gender participation in the upper-middle-level career pathway. Publication of Men and Women in Science and Engineering. New Researcher Series No. 274 (17th November 2012, 16th November 2012).

12

Supporting Activities for Female Researchers

MEXT conducts "Supporting Activities for Female Researchers" to support efforts to improve environments in which female researchers can balance childbirth, child-rearing, and nursing care with research so that they can utilize their abilities to the fullest extent.

Support for creating environment conducive to promoting activities by female researchers

Eligible institutions: universities, independent research agencies, etc. **Support period:** three years

1. **General-type** -- Number of Grants: about five institutions (15 institutions in 2013). Placement of coordinators, preparation of a consultation office, and creation of an environment conducive to giving birth, raising and caring for children on the one hand and doing research on the other, including placement of research support staff.

2. **Consortium-type** -- Number of Grants: about 8 institutions (new). Formation of a consortium of multiple universities, particularly those already engaged in building an environment to support female researchers. Universities cooperatively increase the research potential of female researchers by holding seminar, sending them to international academic conferences, and promoting joint research.

Support to help young married researchers continue living together after transfers (New)

Number of Grants: about 20 persons (new). In order to help young married researchers continue living together, research funds are provided to the spouse trying to find a new post when his/her wife/husband is transferred to an institution for away.

Publication and Dissemination Projects

1. **Survey/Analysis** (1 institution). Collection and analysis of good examples of support for female researchers.

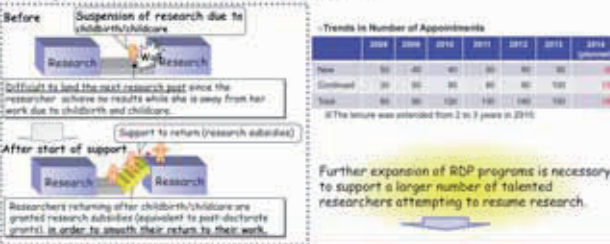
2. **Holding of symposium to promote activities by female researchers (new)**. Exchanges of views among female researchers from around the country, etc.

13

Special Researcher Programs

Special support for the Research Productive Fellowship (RPF) program to enable those who have completed research for the sake of childbirth of children to resume research.

The special researcher RPD program was established in FY 2006 to provide research grants to individual researchers so that highly skilled researchers (both males and females) can return smoothly to their research site after childbirth/childcare.



Special researcher RPD
Eligibility: Those who have completed doctoral courses and are returning after suspending research.
Amount: 362,000 yen per month. **Tenure: 4 years** (extended from 3 years)
Number of fellowships: 150 → 195 (0.52 million yen → 0.47 million yen)

Juggling childbirth/childcare and research → Developing and securing talented and diverse researchers

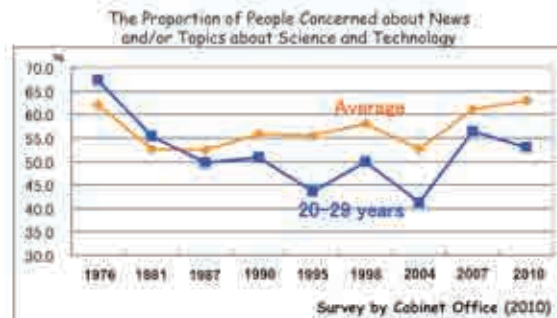
14

2. Current Status of Female Students' Participation in Science and Technology

15

Researcher Interest in Science and Technology

The proportion of people in their 20's interested in science and technology has been always lower than that of the average since 1987.

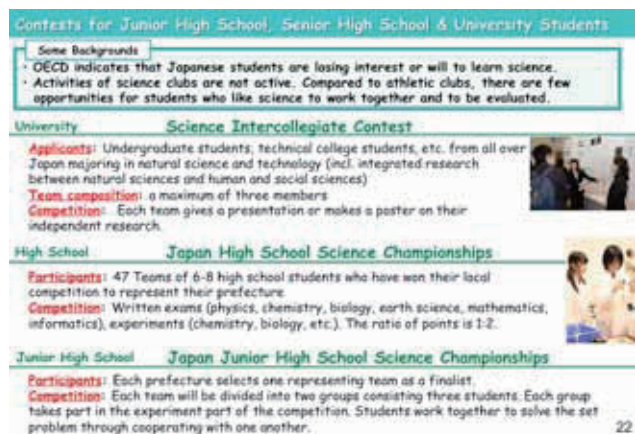
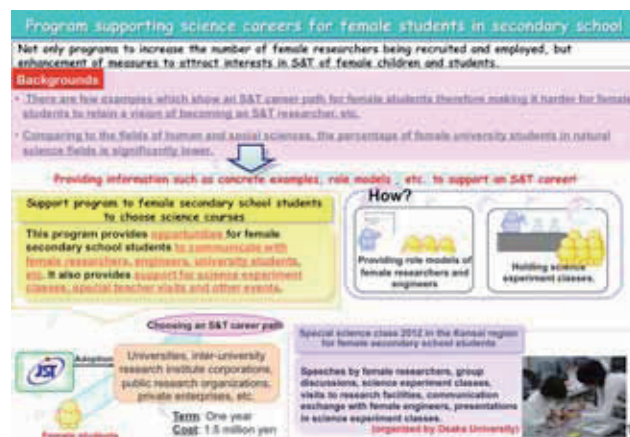
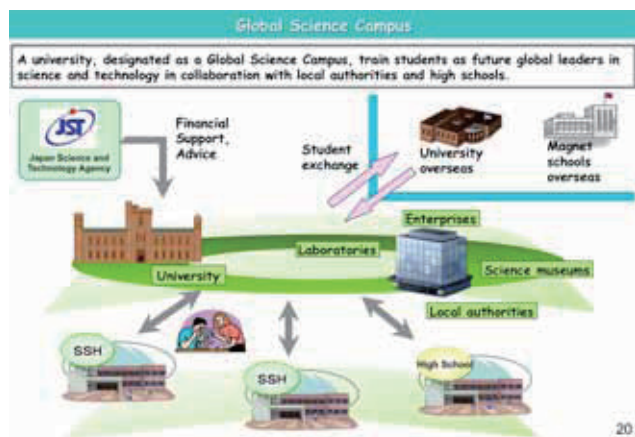
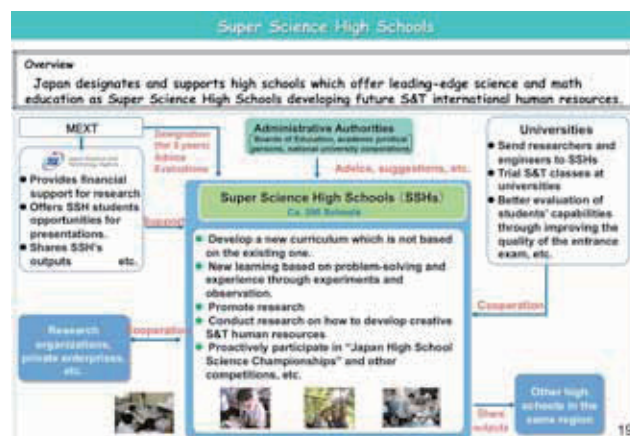
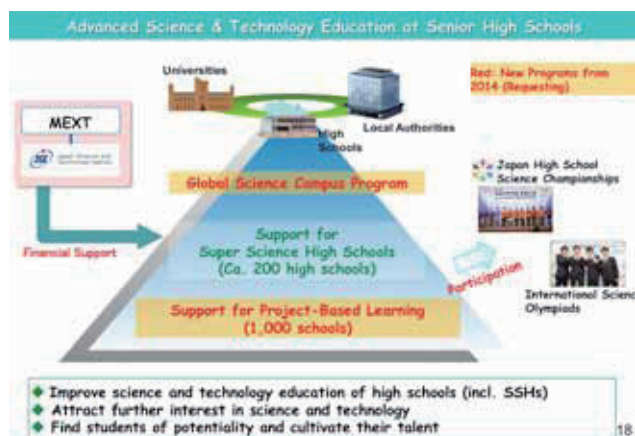


16

Proportion of Female Students in Universities (Japan)



17



Results of International Mathematics Olympiad

	2006	2007	2008	2009	2010	2011	2012	2013
High-Ranking Countries and Regions								
1st	CHN	RUS	CHN	CHN	CHN	CHN	KOR	CHN
2nd	RUS	CHN	RUS	JPN	RUS	USA	CHN	KOR
3rd	KOR	KOR	USA	RUS	USA	SGP	USA	USA
4th	DEU	VNM	KOR	KOR	KOR	RUS	RUS	RUS
5th	USA	USA	IRN	PRK	KAZ THA	THA	CAN THA	PRK
Ranking of Japan, China and Korea								
Japan	7th	6th	11th	2nd	7th	12th	17th	11th
China	1st	2nd	1st	1st	1st	1st	2nd	1st
Korea	3rd	3rd	4th	4th	4th	13th	1st	2nd
Number of Participating Countries and Regions								
	90	93	97	104	97	101	100	97

Results of IChO, IBO and IPhO									
	2006	2007	2008	2009	2010	2011	2012	2013	
International Chemistry Olympiad									
1st	CHN	CHN	CHN	TWN	CHN	CHN	TWN	CHN	
2nd	TWN	RUS	RUS	CHN	THA	KOR	KOR	KOR	
3rd	KOR	TWN	UKR	KOR	KOR	RUS	RUS	TWN	
4th	RUS	POL	KOR	RUS	JPN	CHN	IND	USA	
5th	VNM	KOR	THA	SGP	TWN	USA	CHN	RUS	
Japan	7th	31st	32nd	3th	4th	15th	7th	14th	
	67	66	66	64	68	70	72	73	
International Biology Olympiad									
1st	CHN	USA	KOR	CHN	USA	USA	SGP	USA	
2nd	THA	CHN	TWN	USA	CHN	TWN	USA	SGP	
3rd	TWN	KOR	USA	SGP	TWN	JPN	TWN	DEU	
4th	KOR	THA	THA	TWN	KOR	KOR	KOR	THA	
5th	USA	IND	SGP	AUS	THA	CHN	CHN	RUS	
Japan	27th	17th	14th	5th	10th	3rd	11th	8th	
	48	49	55	54	58	58	59	62	
International Physics Olympiad									
1st	CHN	CHN	CHN	CHN	CHN	CHN	CHN	CHN	
2nd	USA	KOR	TWN	KOR	THA	KOR	TWN	KOR	
3rd	CHN	RUS	KOR	IND	TWN	SGP	SGP	RUS	
4th	KOR	JPN	IND	TWN	DEU	TWN	KOR	SGP	
5th	TWN	USA	USA	USA	SGP	JPN	USA	THA	
Japan	20th	4th	17th	11th	31st	5th	8th	9th	
	93	69	62	72	82	85	81	81	

24

Session 1 Speaker (China)



Li ZHANG

Research Fellow, Development Research Center of China
Association for Science and Technology

Education

Degree: BA, Description: in Economics, School: China Agricultural University, China, 1999~2003

Degree: MSc, Description: in Economics, School: China Agricultural University, China, 2003~2005

Degree: PhD, Description: in Sociology, School: Chinese Academy of Sciences and China Agricultural University, China, 2005~2009

Research Field

Gender Studies, focus on women in Science and Technology

Career History

2006~2007, Research assistant, Chinese Academy of Sciences, China;

2008, Research intern, International Development Research Centre (IDRC), Canada;

2009~now, Research fellow, Development Research Center of China Association for Science and Technology, China

EXPLORING THE NEXT GENERATION IN SCIENCE AND TECHNOLOGY

ZHANG LI

Development and Research Centre of China Association for Science and Technology (CAST), China.
zhangli@cast.org.cn

Abstract: This paper explores female students' constructions of female scientists and S&T professions. It is based on a survey study conducted in China by CWAST during 2011-2012. The survey results found that students hold a positive attitude towards women scientists and S&T professions, but most of them do not want to choose S&T professions. The stereotyped image of women scientists and vague view of S&T professions have a negative impact on their career choice. The paper also presents some cases of building connection between girls and women scientists, as well as girls between scientific work, which aims to capture more girls to continue their study or work in science fields.

Keywords: female students, S&T professions, attractive methods

1. Introduction

Female students are potential human resource in science and technology, future women scientists will come from them. Currently, female students at universities in China take up more than 49%, the percentage of female PhD and MSc graduates increased from 37.1% in 2001 to 45.9% in 2009. Although we can easily see the progress from these statistical data, there are still many constraints for young women to pursue their professional development in science and technology. In recent years, the number of women scientists and engineers suggested a downward trend, and the high level group rate stuck in 5%. The proportion of women academicians is only 5%; there are only 8 women in the 175 chief scientists and 973 national key basic research development programs, accounting for 4.6%; In "Yangtze River Scholar", women accounted for 3.9%; among China Youth Science and technology award winners, women accounted for 8.4%.

On one hand, we can see plenty of potential female human resource in S&T, on the other hand, what we see is the absence of women scientists, especially on the top-level. What made this happen? One of the reasons is that most of the girls who study science related fields did not select professional job in science and technology after they graduated. To understand why, we did a survey on the attitudes towards S&T professions of female students in universities during Nov. 2011 to Apr. 2012. The survey covered 2000 female students from 30 universities, among them PhD students take up 1.2%, MSc students take up 11.8%, and undergraduates take up 87%.

2. Findings from the survey on attitudes towards S&T professions of female students in universities

2.1 Students have only a vague idea and stereotyped image of S&T professions

The survey suggests that students often lack knowledge about what S&T professionals really do. 46.7% female students think that doing science research is boring and dull, 53.3% female students suggest men are better than women in doing science research, S&T professions are men's job. Early in 1957, Mead and Metraux had researched the "stereotyped image" of S&T professions, at that time, scientists were usually portrayed as white men in white coats, and engineers as performing dirty or dull jobs[1]. Sadly, it is not change a lot after 56 years.

2.2 The image of women scientists is positive but S&T professions have become less

attractive

The survey has showed that the perception of women scientists remains largely positive among the female students. The women scientists are considered wise and farsighted, always show a breadth of erudition and subtlety of mind. But when the students were asked “Do you want to be one of them?” More than 75% students say “no” or “not sure”, only less than 25% want to have a try. So we can easily see there is a sharp difference between the positive opinion of female students towards women S&T professions and their actual wish to pursue S&T careers. Many young girls have a negative perception of science careers and lifestyles. Actually few students have a full or accurate understanding of science-related professions, and many are largely unaware of the range of career opportunities opened up by S&T studies. The survey also suggests that having a parent or family member working in S&T increases the chance of a student choosing S&T. 35.9% of the respondents who have a scientist as family member want to choose S&T professions, higher than the 25%.

2.3 Students could not find adequate role models in S&T professions

Female role models are important for girls to understand S&T professions, it will help dispel stereotypes that may prevent female students from eventually considering careers in science[2]. What the students know about science professional female role models often comes from personal interactions (mostly S&T teachers, or someone in the family)[3], or through the media. However, the survey suggested the students have very little chance to contact with female scientists. More than 70% respondents do not pay attention to female scientists, few of them can easily speak out three names of famous female scientists. And among them only 0.75% students mentioned the name of Chinese female scientists, most of them who firstly speak out is Madame Curie. The survey finds that 81.45% female students had no contact with women scientists, 15.8% only have occasional contact; only 2.75% have regular contact with female scientists, and most of these students have family members or supervisors as women scientists.

2.4 Female students eager for contact with women scientists

Although students do not really know about what S&T professions do, we can happily see that they are willing to contact with women scientists and want to know more about science. When asked “Do you have interest to contact with women scientists ?” 67.95% respondents say “yes”, 27.05% students express will not against, only 5% students made clear that they would not like to do. The survey also finds that which group of women scientists they like to contact. Women scientists working in companies are mostly welcomed, followed by female scientists and researchers in research institutes and universities, then women scientists from the associations or other social organizations. And in terms of the ages, students like to contact with young women scientists better than the elders. When talking about the ways of communication, 62% students choose face to face talk, 31.6% select special subject lecture, and 21.1% prefer read articles and books written about women scientists. The survey suggests the students want to know the grow path of women scientists, their daily work, their research content and even their personal life.

3.What we have tried to attract young students?

3.1 Setting Models

Young people have few opportunities to learn what S&T professionals actually do and what their lives are like. Female students always feel confused with their future. China Women’s Association for Science and Technology (CWAIST) launched Go to Campus (GTC) program to increase the contact between students and female scientists. In every Go to Campus program, CWAIST invited 3~5 outstanding female scientists or engineers to have a dialogue with young students at universities, let the girls and boys know that girls could be as excellent as these exemplars. Let them know scientific career is not easy, but it is a

EXPLORING THE NEXT GENERATION IN SCIENCE AND TECHNOLOGY

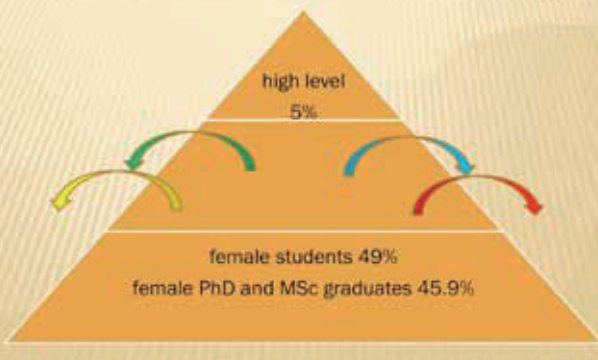
ZHANG LI

Development and Research Centre of China Association for Science and Technology, China.

OUTLINE

- ✦ Survey on attitudes towards S&T professions of female students at universities
- ✦ What we have tried to attract young students?

SURVEY ON ATTITUDES TOWARDS S&T PROFESSIONS OF FEMALE STUDENTS AT UNIVERSITIES



SURVEY ON ATTITUDES TOWARDS S&T PROFESSIONS OF FEMALE STUDENTS AT UNIVERSITIES

- ✦ Respondents:
Female students: Undergraduates 87%, MSc students 11.8%, PhD students 1.2%
- ✦ Sample: 2000 female students from 30 universities
- ✦ Time: Nov. 2011 to Apr. 2012

FINDINGS

- ✦ Students have only a vague idea and stereotyped image of S&T professions.

46.7% female students think that doing science research is boring and dull.

53.3% female students suggest men are better than women in doing science research, S&T professions are men's job.

FINDINGS

- ✦ The image of women scientists is positive but S&T professions have become less attractive.

What do you think about women scientists?

- wise and farsighted,
- always show a breadth of erudition
- subtlety of mind

Do you want to be one of them?

- 75% students say "no" or "not sure"
- 25% want to have a try

FINDINGS

- Students could not find adequate role models in S&T professions.
- 70% respondents do not pay attention to female scientists, most of them who firstly speak out is Madame Curie, 0.75% students mentioned the name of Chinese female scientists.
- 81.45% female students had no contact with women scientists, 15.8% only have occasional contact, 2.75% have regular contact with female scientists.

FINDINGS

- Female students eager for contact with women scientists

Do you have interest to contact with women scientists ?

- 67.95% say "yes"
- 27.05% express will not against
- 5% would not like to do

Which group of women scientists do you like to contact?

- 55% companies
- 39.5% research institutes and universities
- 5% social organizations
- 0.5% others

CONCLUSION

- Vague understanding on scientific research and the life of being a scientist
- Little chance to contact with scientists
- Positive view of women scientists
- Eager to know more about women scientists and their research work



WHAT WE HAVE TRIED TO ATTRACT STUDENTS?

- Setting Models

Go to Campus (GTC) program was undertaken by CFAST, which aimed to set exemplars for future women scientists and engineers.



WHAT WE HAVE TRIED TO ATTRACT STUDENTS?

- One girl said: "I changed my impression of the female scientists, before I thought them dull and boring, but today I see them full of wisdom, very elegant, very beautiful."
- Another girl said she regained her confidence in science study, and she wished one day she can stand as an exemplar to share her experience.

Until now, Go to Campus program have been conducted for 5 years, and welcomed by many students and teachers.

WHAT WE HAVE TRIED TO ATTRACT STUDENTS?

- Raise public recognition of women scientists

Chinese Young Women Scientist Award, which was launched together by ACWF, CAST, National Commission of The People's Republic of China for UNESCO and L'Oréal China.



WHAT WE HAVE TRIED TO ATTRACT STUDENTS?

- Hold academic forum for young students.

Academic forum for PhD students, to broaden the doctoral academic vision, inspire PhD students' innovative thinking, and improve the quality of doctoral education.



WHAT WE HAVE TRIED TO ATTRACT STUDENTS?

- Branch meeting of women scientists in 17th international biophysics conference.



WHAT WE HAVE TRIED TO ATTRACT STUDENTS?

- Strengthen the scientific ethics of students

In September 2011 CAST and the Ministry of Education launched a joint program at most universities in China. The aim is to educate students to comply the science ethics, the academic standards.



We would like to exchange information and experience with Japan and Korea, and together to search for more opportunities for women in S&T.

HOPE PERSISTENCE JOINT EFFORT



THANK YOU

Session 1 Speaker (Korea)



Hyomin KIM

Assistant Professor, Ulsan National Institute of Science and Technology

Professional History

Assistant Professor, Ulsan National Institute of Science and Technology

Division of General Studies 2012 December- Current

Visiting Professor, University of California Irvine 2012

Adjunct Professor, Program of Science Journalism, KAIST 2012

Visiting Assistant Professor, Program in Science and Technology Policy, KAIST 2008-2011

Ph.D. from History and Sociology of Science and Technology, UIUC 2011

Dissertation Defended: May 20th, 2008

Professional History

Ph.D. Students- Doctoral studies, Program in Neuroscience, UIUC 2004

Research Assistance and Post-graduate Training, 2004

B.S. in Biological Sciences with Magna Cum Laude, Department of Biological Sciences, Korea Advanced Institute of Science and Technology (KAIST) 2002

Kyungnam Science High School 1997

Combining science/engineering education with gender-analysis in science studies

Hyomin KIM

Assistant Professor, Ulsan National Institute of Science and Technology, Korea

Science and engineering have been male-dominated fields in Korea. Although the number of college female students majoring science and engineering have continuously increased since 2005, the problems of leaky pipeline, career discontinuity, and self-confidence issues are still prevalent. It suggests that we cannot simply supply more women into science/engineering and expect them to feel comfortable in the masculine culture in which science/engineering professionals have been immersed. Instead, it is important to find a way to change the existing practices and institutional structures of science/engineering so that women can not only join the discipline but also can stay comfortably. This presentation suggests a new pedagogical approach which combines discussion of biological “facts” and of the cultural and historical contexts in which the facts were interpreted. Students are encouraged to ask and ponder upon questions such as “who made a particular discovery?”, “were their alternative methods, techniques and tools in tackling a particular research question?”, and “are their different ways to interpret conclusions?” The course is designed to enable students to understand that how the practices of science can be affected by the gendered culture in which scientists are immersed. Previous research suggests that female students in particular perceived greater increase in problem-solving abilities and logical thinking through gaining awareness that science is socially and culturally driven. Further investigation is necessary to understand how teaching the gendered dimension of epistemic culture in science/engineering might benefit female students’ self-appraisal of capabilities.

The 5th Japan-China-Korea Women Leaders Forum For Science & Technology

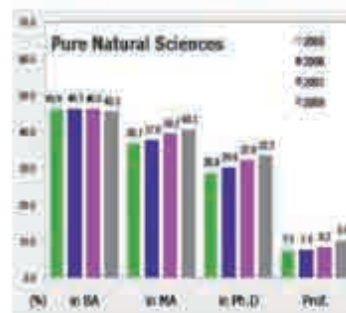
Interdisciplinary Education to Empower Women in STEM

2013-11-12

Ulsan National Institute of Science and Technology,
Korea

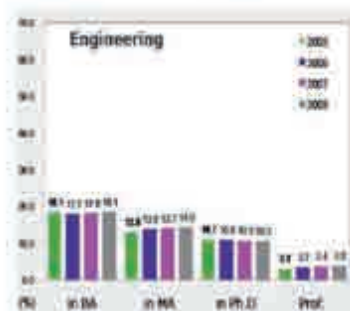
Hyomin Kim

Korean Women in STEM



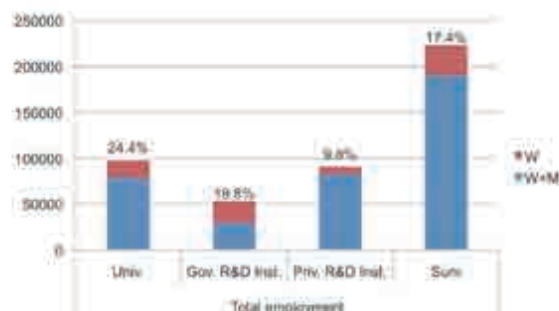
Percentages of women in each academic program and in faculty positions
Source: Educational Statistics
Korean Educational Development Institute (2005-2008)

Korean Women in STEM



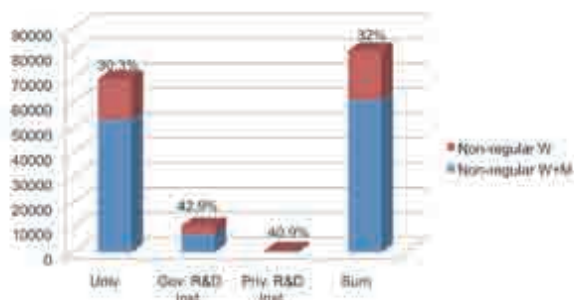
Percentages of women in each academic program and in faculty positions
Source: Educational Statistics
Korean Educational Development Institute (2005-2008)

Korean Women in STEM



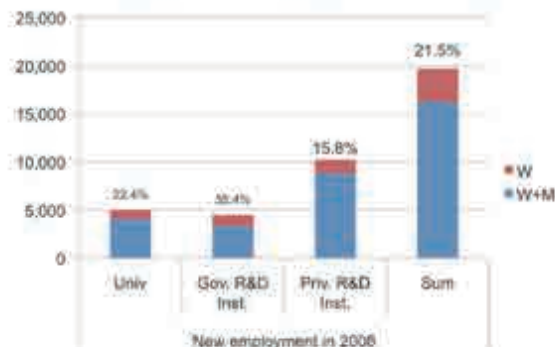
Source: Report on the Status of Women in Science and Engineering, NIS-WIST-M EST (2009)

Korean Women in Non-regular/Unstable STEM Sectors



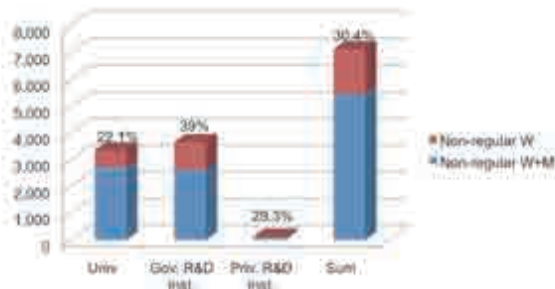
Source: Report on the Status of Women in Science and Engineering, NIS-WIST-M EST (2009)

Korean Women in STEM



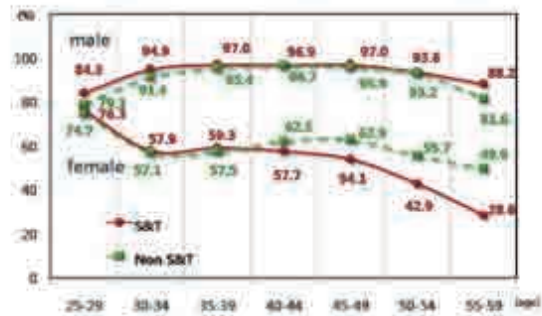
Source: Report on the Status of Women in Science and Engineering, NIS-WIST-M EST (2009)

Korean Women in Non-regular/Unstable STEM Sectors



Source: Report on the Status of Woman in Science and Engineering, NIS-WIST-MEST (2009)

Korean Women in STEM



Economic activity rates of men and women in age
Source: Statistics Korea, Report on Economic Activity Status and Rate (2009)

Problems: Retention & Persistence!

Educational Attainment		
	Rank (out of 135 samples)	Index (Average=0.928)
China	85	0.981
Korea	97	0.948
Japan	80	0.986

Economic Participation and Opportunity		
	Rank (out of 135 samples)	Index (Average=0.588)
China	50	0.683
Korea	117	0.493
Japan	100	0.567

The Global Gender Gap Index (0=inequality, 1=equality)
Source: World Economic Forum (2011)

Previous research

The structure of institutions or the current practices of science need to change before women can comfortably join the ranks of scientists (Schiebinger, 1999).

Science courses that integrate disciplinary information and scientific cultures empower traditionally marginalized students and more clearly understand the field of science in socio-cultural contexts (Gilbert and Fausto-Sterling, 2003; Lederman, 2001, 2005).

An interdisciplinary course for STEM majors (W+M)

- Funded by WISSET (Center for Women In Science, Engineering and Technology), July 2013-Dec 2013.
- Encourage M+W students to understand how the practices of science can be affected by the gendered culture in which scientists are immersed.
- Developed by faculties in STS, anthropology, history and engineering.
- Developed for STEM majors, not for social science majors, in 5-IST (institutes of science and technology: KAIST, GIST, UNIST, DGIST, POSTECH)

Next Generations in Korean STEM



How to Encourage Students in IST to Think of Gender as *Their* Issues



Avoid imposing gender equality as an indisputable norm.

Encourage students (M+V) to think of how gender partnership and S&T development can benefit each other.

To change the structure of S&T institutions so that women will remain comfortable, we need to speak to (mostly) male students.



Biology textbooks use the word "penetrate" to describe the processes of fertilization.

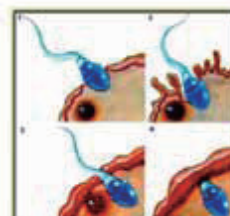
- With a "whiplashlike motion and strong lurches" sperms can "burrow through the egg coat" and "penetrate" it.
- The sperm carry out a "perilous journey" and "survivors" "assault" the egg.
- The egg coat is described as a protective barrier.



Yet since the mid 1980s, researchers found more active roles played by the egg.

"Sperm and egg are mutually active partners." (G. Schatten and H. Schatten, 1984)

"The zona pellucida [egg coat] serves as a sophisticated biological security system that screens incoming sperm, selects only those compatible with fertilization and development, prepares sperm for fusion with the egg and later protects the resulting embryo from polyspermy [fusion of more than one sperm with a single egg]." (P. Wasserman, 1988)



Old metaphors die hard. The sperm penetrates?

"A sperm penetrates an egg, fertilizes it and forms the first cell of a new embryo." (P. Wasserman [1988] *Scientific American*)

Sperm motility ceases at the time of fusion and is not required for sperm entry. Hair-like structures on the surface of the egg cluster around the sperm after the egg-sperm fusion and are drawn into the egg with the sperm. (P. Wasserman [1987] "The Biology and Chemistry of Fertilization," *Science* 235(4788): 553-60.)



ZP3 is the specific molecule in the egg coat that are involved in egg-sperm interaction. However, old metaphors die hard.

"A sperm penetrates an egg, fertilizes it and forms the first cell of a new embryo."

"Each sperm, which has a large number of egg-binding proteins on its surface, binds to many sperm receptors on the egg." (*Scientific American*, 1988)

The molecules on the sperm are proteins and have pocket-like structures. ZP3 on the egg are knob-shaped glyco-proteins, which would normally be called ligands rather than receptors.



Cultural understanding affects further scientific investigation

Much is known about how eggs interact with other reproductive organs/cells to get "transported" ("swept", or "drifted") along the fallopian tube and ripen.

Sperms are described as if they are biologically independent. For example, little is known about the interaction between sperms and other organs to trap the urine in the urethra before ejaculation, which is vital for the protection of the sperm.

Questions for students

How were the roles of sperms and eggs presented in the textbook or other scientific literature and why?

Are there alternative terms, presentations, and conclusions?

Why was the topic of the interaction between eggs and reproductive organs considered to be important? Why was it not the case for sperms?

The course reminds students that science is done by scientists; and scientists are affected by the culture of science in which they work.

Assessments and Implications for Next Generations

Rate gains in this course

- Awareness that science is socially and culturally driven
- Culture of science can change over time due to larger cultural influences
- Willingness to challenge dogmas and venture alternative opinions
- Self-confidence that they can continue the study of science and engineering
- Awareness that S&T can go hand in hand with gender-sensitivity

One previous study suggested that the social studies contents included in a cell biology course improved self-confidence with the subject, particularly among traditionally marginalized students (Sible et al., 2006).



Thank you for your attention!



Welcome Address by the President of Nihon University

Welcome Address (Japan)



Kichibee OTSUKA
President of Nihon University

Education

Department of Dentistry, School of Dentistry, Nihon University, 1969

Basic Course, Graduate School of Dentistry, Nihon University, 1973

Qualification and License

Dentist, 1970

Degree

Doctor of Dental Science, Ph. D., 1973

Research Field

Oral Biochemistry

Career History

1973-1974	Research Assistant, Nihon University
1979-1993	Associate Professor, Nihon University
1993-	Professor, Nihon University
2004-2011	*Dean of Nihon University School of Dentistry *Dean of Graduate School of Dentistry, Nihon University *Director of Dental Research Center (Dentistry)
2004-	Trustee of Nihon University
2010-2011	Director of University Research Center, Nihon University
2011-	*President of Nihon University *President of Nihon University Junior College *Dean of Law School, Nihon University *Dean of Graduate School of Business, Nihon University

Educational Activities

Present	*Managing Director, The Japan Association of Private Universities and Colleges
Consecutive	*Committee Member, Advisory Committee, Council for Science and Technology *Board Member, Standards Board, Japan University Accreditation Association

Academic Activities

Present	*Board Chairman, The Society for Hard Tissue Regenerative Biology *Director, Japanese Dental Education Association *Trustee, Japanese Association for Oral Biology *Trustee, The Japanese Biochemical Society
Consecutive	*President, The 21st General Meeting of the Japanese Association for Dental Science

Research Activities

My major research field is on Oral Biochemistry. I am interested in life sciences of human periodontium, mainly the effects of growth factors and inductive materials on proliferation, differentiation and/or regeneration of various cell populations comprising periodontal tissues. In addition, I have contributed to researches on the remodeling mechanism of alveolar bone, when occlusal force and external force for orthodontics reasons through teeth are added. Molecular and genetic biological techniques should be utilized in order to improve both clinical dentistry and clinical dental research.

Representative Work

Visual Biochemistry and Molecular Biology for Students of Medicine, Dentistry and Pharmacy (joint work, 1st, 2nd and 3rd edition, Nihon Iji Shipo Sha) 17 volumes

Research Theses & Papers

Synthesis of Collagenase and Collagenase Inhibitors by Osteoblast-like Cells in Culture (1984) Eur. J. Biochem. 145, 123-129. (and others, 134 theses)

Social Activity

Present	President of Kanto Universities Rugby Football Association
---------	--

Welcome Address

the 5th Japan-China-Korea Women Leaders Forum in Science and Technology

Kichibee Otsuka

President of Nihon University

Ladies and Gentleman,

On behalf of Nihon University, I am delighted to welcome you to the 5th Japan-China-Korea Women Leaders Forum in Science and Technology. This Forum has been held every year since 2008 in one of the three countries. This year, Nihon University hosts the fifth forum here in Japan. Today, we invited distinguished speakers, chairpersons and participants from three countries in the main symposium. It is a great pleasure for me to have such a large number of enthusiastic audiences. I would like to express my gratitude, in particular to the Ministry of Education, Culture, Sports, Science and Technology, for various supports for this forum, as well as to the organizing committee including INWES Japan for their tremendous efforts.

From 2008 to 2010, Nihon University was adopted "Model Program to Support Female Researchers" in the special coordination funds for promoting science and technology by MEXT. After finishing the funding period, we have continued various gender-equality programs by our own budget. Especially from 2012, we perform the activities such as promotion of science for high school girls, career education for female students and leadership education for young female researchers in the Nihon University Chairman of the Board of Trustees Grant "CareerWay Project". As one of the programs in this project, we today hold the international symposium with the theme of "Leadership Education of Women in Science, Technology and Engineering" in Japan, China and Korea.

In the Web site of Gender Equality Bureau Cabinet Office, it is written that A "gender-equal society" is a "society in which both men and women, as equal members, have the opportunity to participate in all kinds of social activities at will, equally enjoy political, economical and cultural benefits, and share responsibilities." In such a society, the human rights of men and women are equally respected.

In reality, however, even though gender equality has more or less progressed in Japan, women's participation in the policy- and decision-making processes remains insufficient, and women still have less opportunities to maximize their potential. In our country that faces low birthrate and aging, it is necessary to utilize the full potential of both man and women for the sustainable development of our society.

As the University having 80 thousands of students, Nihon University sincerely would like to create gender-equal environment for their education. In order to accomplish our goal, we appointed a board of director in charge of improving gender equality in our incorporated educational institution.

According to the report, in the Global Gender Gap Index 2013 by the World Economic Forum, Japan was ranked 105 out of 136 countries. The index benchmarks national gender gaps on economic, political, education- and health-based criteria and provides country rankings that allow for effective comparison across regions and income groups and over time. Overall, the ranks of East Asian countries are not so high, though EU and US were ranked highly. Japan does not have much gender gap in health and educational participation, but has rather wide gap in political and economical criteria.

Therefore, it is particularly important to have the forum today, discussing about the leadership education for the women in STE to clarify the common problems and characteristic feature of each country to make more women leaders in East Asia. It is also the precious opportunity to make a good cooperative relationship among three countries. I believe that the power of women in science and technology is crucial for the future development.

Today, we are honored to have as our keynote speaker Prof. Hideko Kunii, who is a distinguished women leader in science and technology in the world. I hope that you will find the forum is valuable and enjoyable.



Keynote Speech by Hideko KUNII

Keynote Speech



Hideko S. KUNII

Deputy President, Professor of Graduate School of Engineering Management, Shibaura Institute of Technology

Education

Degree: BS, Description: in Physics, School: Ochanomizu Univ., Japan, 1970

Degree: MS, Description: in Physics, School: Ochanomizu Univ., Japan, 1973

Degree: MS, Description: in Computer and Information Sciences (Computer Software), San Jose State Univ., U.S., 1976

Degree: PhD, Description: in Computer Sciences, Univ. of Texas at Austin, U.S., 1983

Research Field

Database Management, Software Engineering, IT Business Management, Innovation Management

Career History

Programmer & Analyst, SCIP, Stanford Univ., Palo Alto, U.S. 1975; research assistant, Dept. Computer Sciences, Univ., Texas at Austin, Austin, U.S. 1976-1982; President, I. I. I. Inc., Austin, U.S. 1979-1983; General Manager, Software research center, Ricoh Co., Ltd., Tokyo, Japan, 1985-2002; Director, Software R&D Group, Ricoh Co., Ltd., Tokyo, Japan, 2002-2008; Senior Vice President, Ricoh Co., Ltd., Tokyo, Japan, 2000-2005; Corporate Senior Vice President, Ricoh Co., Ltd., Tokyo, Japan, 2005-2008; Chairperson, Ricoh Software Technology (Shanghai) Co., Ltd., Tokyo, Japan 2002-2004; Chairperson, Ricoh Software Research Center (Beijing) Co., Ltd. 2004-2008; Chairperson, Ricoh IT Solutions Co., Ltd. Tokyo, Japan, 2008-2013; Vice chairperson, Japan Information Technology Services Industry Association, Tokyo, Japan, 2011-;

Member of the Innovation Network Committee, the Innovation Network Corporation of Japan, Tokyo, Japan, 2011- ; Vice chairperson, Japan MOT Association, Tokyo, Japan, 2012-; Prof. Graduate School of Engineering Management, Shibaura Institute of Technology, 2012- ; Deputy President Shibaura Institute of Technology, 2013-.

Awards

Women Pioneer Award, IEEE Tokyo Section, March 2006

IPSJ Fellow, 2010

IEICE Fellow, 2010

METI Minister Award for Informatization Promotion Contribution, 2013

Achievements

Published *Graph Data Model and Its Data Language*, Springer-Verlag, 1990; Edited *Conceptual Modling –ER2001*, *Lecture Notes in Computer Science #2224*, Springer-Verlag, Nov., 2001 (Coedit.)

Civic, Political, and Philanthropic Activities

Member: Council for Science and Technology, Ministry of Education, Culture, sports, Science and Technology, 2001-2011; Council on Customs, Tariff, Foreign Exchange and Other Transactions, Ministry of Finance, 2005- ; Science Council of Japan, 2006-; Liaison Conference for the Promotion of Gender Equality, an activity of the Gender Equality Bureau of the Cabinet Office in Japan, 2009- (a vice chair of the organizing committee for the 15th APEC Women Leaders Networking Meeting held in Tokyo 2010; coordinator, activities of the working team on WEPs (women's empowerment principles) in Japan 2012-2013);

Current Memberships

Mem.: IEEE, 1976- (chair, Japan Council Women In Engineering Affinity Group, 2008-2009; senior mem., 2007-); ACM, 1976-; Information Processing Soc. Japan, 1983- ; Japan Soc. Software Science and Technology, 1983- ;Inst. Electronics, Information and Communication Engineers, 1984- ; Database Soc. Japan, 2002- (vice chairperson, 2002-2012); Japan MOT Soc., 2012-.

For More Women to be Leaders in STE

Hideko S. KUNII

(Graduate School of Engineering Management, Shibaura Institute of Technology, 3-7-5 Toyosu
Koto-ku, Tokyo, 135-8548, JAPAN. hkunii@shibaura-it.ac.jp)

Abstract: The mission of the women in Science, Technology and Engineering (STE) has recently become very important than ever because of necessity of human diversity for innovation in changing world. Nevertheless, many countries face the shortage of women in STE, particularly women leaders in STE. Above all, Japan and Korea are very behind in gender equality. The author shows the situation in Japan and suggests an approach to overcome this issue and to bring up women in STE to global leaders. We propose to strengthen R&D collaboration in Northeast Asian countries, particularly China, Korea and Japan. Lastly, the necessity of affirmative actions is emphasized as a tool to accelerate this direction.

Keywords: women in STE, gender equality, R&D collaboration, global leader

1. Mission of the women in STE for changing world

The world has changed dramatically for the last decade. Evolution of ICT such as internet, cloud computing and mobile devices has huge impact on human life and business ever since the industrial revolution, changing work style and life style of people. ICT has accelerated globalization. We have experienced economic crisis among developed countries and economic growth of emerging countries. Sustainability of our planet has been seriously deteriorated.

In spite of remarkable technology advancements, we still face gender bias all over the world. We face regional issues such as imbalance of population with the decreasing number of young population. Japan is, particularly, ahead among three countries in Northeast Asia with many issues. Women are, due to the poor child care systems, discouraged to have children or to work with children.

This situation leads us to a paradigm shift in our society. Every one or every organization needs to adapt the new environment of this era. To maintain our society sustainable, we need to reform the existing schemes and take countermeasures for our healthy growth, which requires definitely innovation. Here, Science, Technology and Engineering (STE) should play important roles than ever. Today women know the needs closely. It could be alleviated if women can take the initiative in policy making. It cannot be implemented without women. Moreover, as Anita Williams Woolley, et al. proved in “Science” [1], participation of women with equal opportunities increases the productivity of intellectual tasks as a team.

2. Shortage of women in STE due to gender bias

As we have seen, the role of women in STE is particularly important today. Traditionally the STE fields have been assumed to be men’s world rather than of both genders. Even now this tradition has been maintained implicitly even in school education in Japan.

The Figure 1 shows the ratio (%) of female students in Ph.D. programs for overall fields and for each field [2]. The horizontal axis denotes year and the vertical axis denotes fields. The ratio for Engineering is the lowest among all the fields. There is a big gap between the needs and its supply of women in Engineering.

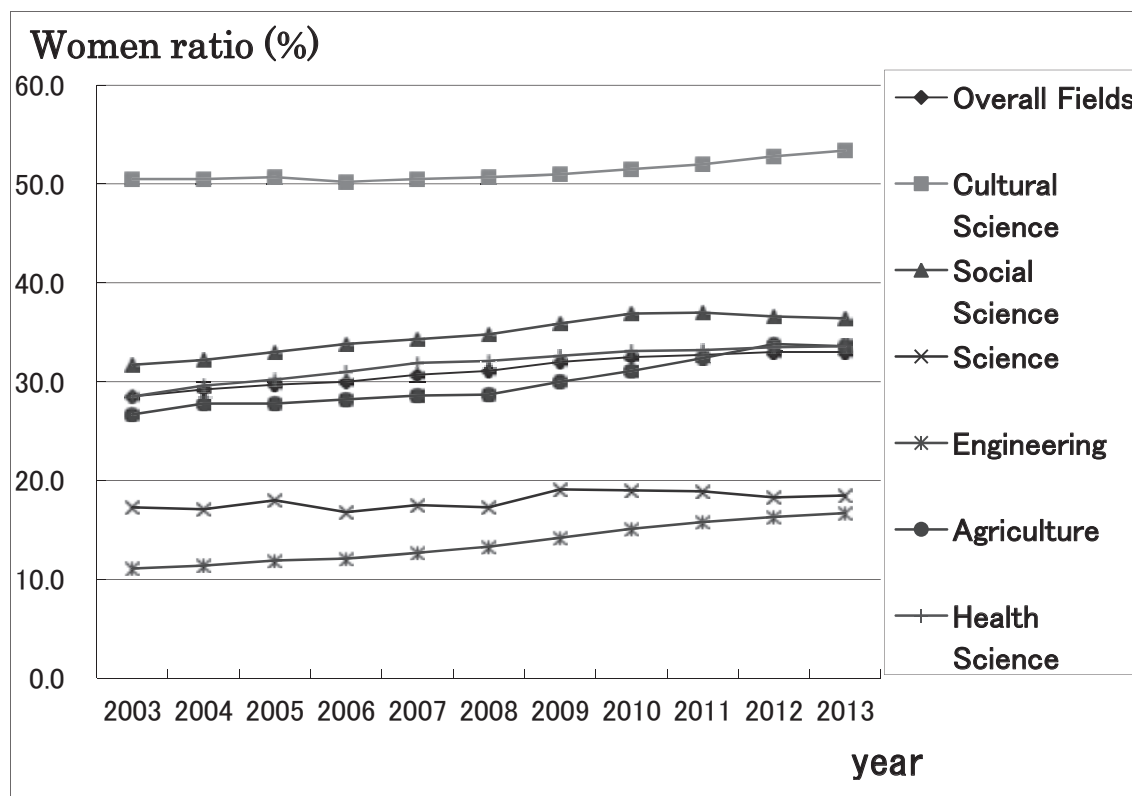


Figure 1 Women ratio (%) by fields in Ph.D. programs in Japan

A good number of Japanese industries of which growths are suffering from the paradigm shifts are now recognizing the seriousness of this problem. It is not simple; it includes the mindset of people, legal matters, and the policies of private or public sectors.

China has remarkably improved gender bias. However, two other countries are still behind although they are trying to improve with the countermeasures against gender bias and established the organization for this mission. Korea has a ministry of gender equality; Japan has a bureau of gender equality. In spite of those activities, the ratio of women in STE does not seem to improve to meet the needs. This problem is very deep and requires a long time effort. We need to continuously encourage and support young women by showing a variety of role models, interesting career, social values and hopes because they feel insecure as they are minority.

3. To raise women to global leaders

The shortage of women leaders is critical as well as that of the women in STE in order to perform innovations. The ratio of women leaders in STE is prominently low worldwide, and particularly in Japan. However, this issue is not well recognized by the people, partially because the fact is not well exposed to the public. Furthermore, they have

not seen examples, namely, contributions by women leaders working in STE. It is difficult to understand it when you have never seen cases.

Now how can we foster the women in STE to leaders? Let us study some experiences in Japanese industries. JISA, Japan Information Technology Services Association, is active to improve the gender equality in the industry association for strengthening the competitiveness of business.

In order to make efficient action plans for countermeasures, in 2010, JISA made a survey within the association to investigate the gender barriers. The figure 2 shows major barriers for women against gender equality in the workplace. This survey was performed for three categories of the targets in the JISA: women and men as individuals, and enterprises. The top 3 factors are gender-biased culture, long and irregular hours and career development. Note that there exists the difference of perceptions between individuals and enterprises. The biggest difference is about top management support. This might be due to the difference of viewpoints, individual or enterprise and expose the difficulties in Japanese organizations.

To focus on how to bring up women leaders, career development is essential. First, the key is mentality and perception to recognize their societal mission of the era. As we described earlier, women in STE today are expected to cause innovation with STE to adapt to huge tide of various changes. It is the time for women in STE to take leadership toward innovation, which in turn their achievements make the world admit the importance of gender equality.

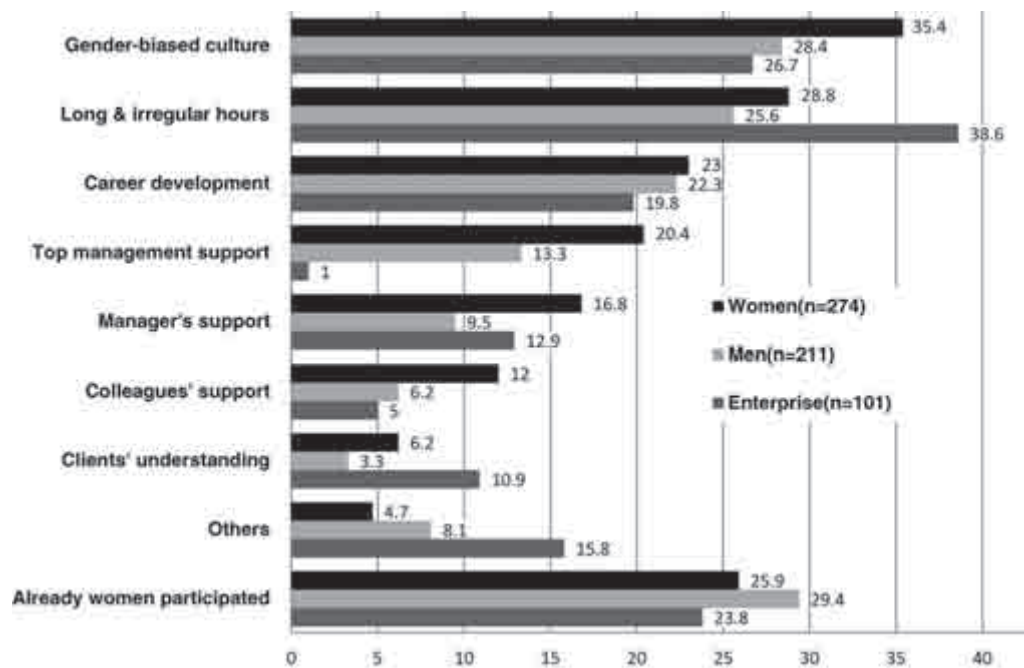


Figure 2 Gender barriers at workplace in JISA

Then, from our experience and analysis on successful women leaders, the following measures are effective:

- 1) adequate job assignments to get reasonable experience, wide enough and deep enough, to be qualified for leaders
- 2) encouragements by their bosses or mentors since women tend to have less confidence than men and are daily exposed to negative opinions against women carrier development
- 3) networking among carrier oriented women in order
 - to share their issues since these are often similar and common,
 - to help each other and
 - to find role models
- 4) joining old boys network to find opportunities

Next let us discuss on how to raise global leaders. Today the mission of leaders is, in many cases, global. The women leaders need to be global. This symposium is a very good place to exchange ideas so as to formulate an education system for fostering women to global leaders.

To educate women in STE and to increase the number of influential competent global women leaders in this region, the author suggests the followings:

- 1) Increase global cooperation with R&D projects in Northeast Asian countries, particularly among China, Korea and Japan.
- 2) Promote open innovation programs for women to solve the common issues.
- 3) Create virtual holistic organizations for women to be able enough to experience management

To draw out their full competence of women, collaboration with women colleagues are very useful. Experience of global activities is the fastest way to bring up more women to global leaders in STE. We can create good opportunities to solve issues as we have so many problems. Hopefully we can show girls wonderful carries in STE fields.

With regard to STE topics, as we see, there are many issues to be investigated and expected to provide innovations and solutions. There are many important themes such as family oriented services that are neglected by men dominated communities. Various tasks in a family can be served as efficient and less expensive social services with aid of ICT such as SNS, cloud computing and mobile devices, using service science.

3. Affirmative actions

The author emphasizes the importance of affirmative actions to accelerate improvement against gender bias. It is because every woman does not always understand it. Gender bias is a social problem and not an each individual's issue. Some women may be lucky enough to succeed or worked very hard to obtain brilliant career in spite of all the hardships. However, this is a social problem and needs to deal with it as a society and a nation. Case study is useful to have insights for solution and our goal is to realize the society that everyone enjoys gender equality.

Some women oppose the affirmative action because they do not want to be considered that they are promoted in terms of the affirmative action such as a quota system. Another opposing comment is that unqualified women could be promoted. The system is to

provide more opportunities with women and to encourage any organization to educate candidates efficiently and quickly. How speedy to reform is a matter and so setting targets is not easy. Nevertheless it should not be an excuse for acceleration of gender equality measures. It is not the system for the women with established career. Hopefully every established woman shows her excellence so that nobody claims against gender equality. Open free environment is indispensable for innovation. Women can contribute and realize innovation for the better society.

REFERENCES

- [1] Anita Williams Woolley, et al., Evidence for a Collective Intelligence Factor in the Performance of Human Groups, Science 330, 686, 2010
- [2] MEXT School Basic Survey, 2003-2013

2013.11.12
The 5th Japan-China-Korea Women Leaders Forum
For Science & Technology

For more women to be leaders in STE

Hideko S. Kunii
Deputy President
Professor
Shibaura Institute of Technology

Outline

- Mission of STE women in the changing world
- Shortage of STE women
- Gender bias in Japan
- To raise women to global leaders

2

Mission of STE women in the Changing World

"Ri-Ke-Jo" needed

3

Changing World

- Evolution of ICT such as internet, cloud computing and mobile devices
 - huge impact on human life and business ever since the industrial revolution
 - changing work style and life style of people
- Globalization accelerated by ICT
- Economic crisis among developed countries and economic growth of emerging countries
- Serious deterioration against sustainable planet

Paradigm shifts

4

Regional issues



- Gender bias, particularly in Japan and Korea in spite of remarkable technology advancements
- Imbalance of population with decrease of young population
- Japan is, particularly, ahead among three countries in Northeast Asia with such issues

5

The Global Gender Gap Report 2013

by World Economic Forum

shows the reality of Japan

The 105th among 136 countries
Is it possible to survive
global competitions?

Rank	Country
1 (1)	Iceland
2 (2)	Norway
3 (3)	Finland
4 (4)	Sweden
5 (8)	Philippines
6 (5)	Ireland
7 (6)	New Zealand
8 (7)	Denmark
23 (22)	U.S.A.
69 (69)	China
105 (101)	Japan
111 (108)	Korea

(2012 Rank)

Year	pos	# of countries
2006	80	115
2007	91	128
2008	98	130
2009	101	134
2010	94	134
2011	98	135
2012	101	135

6

Innovation for reform

- Paradigm shifts in society and economy
- Need to adapt to the new environment
- Need to reform the existing schemes
- Innovation needed for reform
- Heterogeneous culture needed for innovation

Needs diversity and inclusion



Women's initiative needed

- STE (Science, Technology and Engineering) should play important roles
- Today women know the needs closely.
- Women should take initiatives in policy making.
- Cannot be implemented without women.



Women increase performance

- Participation of women with equal opportunities increases the productivity of intellectual tasks as a team

"Evidence for a Collective Intelligence Factor in the Performance of Human Groups", Anita Williams Woolley, et al. *Science* 330, 686(2010).

- Participation of women in STE is particularly important today.



Shortage of STE women

Shortage of STE women

due to gender bias

- Traditionally the STE fields have been assumed to be men's world rather than that of both genders.
- Even now this tradition has been maintained implicitly even in school education in Japan.
- The big gap between the needs and its supply of women in STE.

The number of women researchers in Japan

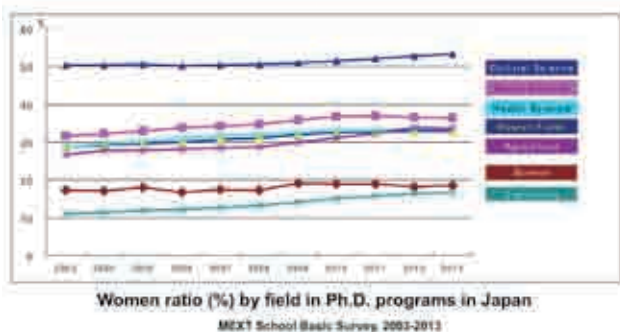
Women researchers in Japan (2011)
No. of Women 123,200
Ratio of Women 13.8%

Governmental goal in Japan (2015)
University
Ratio of Women Faculty 30%

4th Sci. Tech. Basic Plan

Need affirmative action

Low women ratio in STE Ph.D.



15

Gender bias in Japan

Needs more women as workforce, but



16

Poor support for work life balance

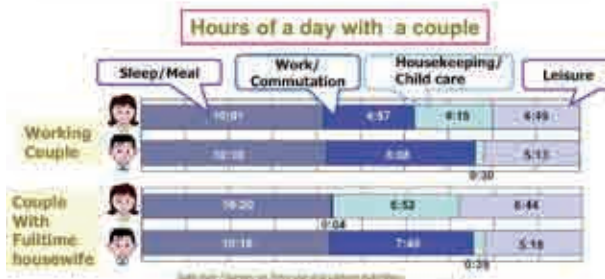
- Poor child care systems, discouraging a family to have children or to work with children
- Prevailing concept of distinct separation of roles by sex:
men work outside and women stay home to take care of children, house chores, etc.



17

Disparity issue at home

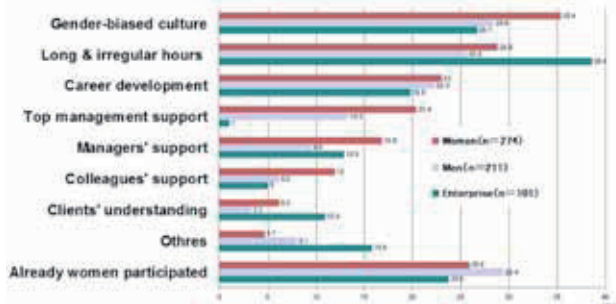
"Men to work outside home, Women to take on domestic duties"



18

Gender barriers at workplace in JISA

JISA: Japan Information Technology Services Association



19

Career path is limited for women

Career Development

- ① Deepen a specialty
 - ② Expand to other specialties
 - ③ Step up a hierarchical organization
- Career Dynamics, 1991
by Edgar H. Schein

Women are often excluded from career development along ② and ③ in Japan!



Few opportunities for women

20

Disadvantageous Promotion: Tournament vs Contest

- **Tournament type**
 - Typical in Japan
 - Fewer chances for higher positions with fewer consolation matches
- **Contest type**
 - Typical in USA
 - As many as chances with the number of positions

Slow women's promotion due to low evaluations during child care leave/ short work hours period

Poor Career Development

- Narrow career path for women
- Poor career planning
- Few role models for women
- Disadvantageous promotion system
- Poor networking



Social issues against gender bias

- Not simple, including
 - the mindset of people,
 - legal matters,
 - the policy of private or public sectors
- Requires to show
 - a variety of role models,
 - interesting careers,
 - social values and hopes



Women feel insecure and less confident

To raise women to global leaders

R&D collaboration in Northeast Asia



To become leaders

Women need to recognize their societal mission

- adequate job assignments to get reasonable experience
- encouragements by their bosses/mentors
- networking among career oriented women
 - to share their issues
 - to help each other and
 - to find role models
- joining old boys networks



To become global leaders in STE

1. Increase **global cooperation in R&D projects** with Northeast Asian countries, particularly, China, South Korea and Japan.
2. Promote open innovation programs for women to **solve the common issues**.
3. Create **virtual organizations** for women to have enough experience in management



Women need networking

- We can learn from other countries Higher motivation
- Many professional and managerial women are isolated at their workplace and their collaboration is weak
- Old boys' networks may provide useful information and facilitate mentoring for career development



Declaration by Japan Society of Technology

Need affirmative actions to promote activities of women engineers (April 2013)

1. Need affirmative actions for empowerment of women
2. Collect and disclose data on women engineers
3. Support for women to enter STE colleges
4. Strengthen the leadership of executives and middle managers for gender equality



Note for affirmative action

202030

- "Affirmative action" is a measure to **accelerate** improvements under the discrimination **until its realization**
- Not every woman **understands** it
- Not only each individual's issue but a **social problem**
- Our goal is to realize the society that **everyone** enjoys gender equality

Opinions against affirmative actions

- "I do not want to be considered that I am promoted because of the affirmative action"
- "Unqualified women could be promoted"

to encourage organizations to search for candidates and educate them efficiently and quickly

Established women should show their contributions so that nobody claims against affirmative actions

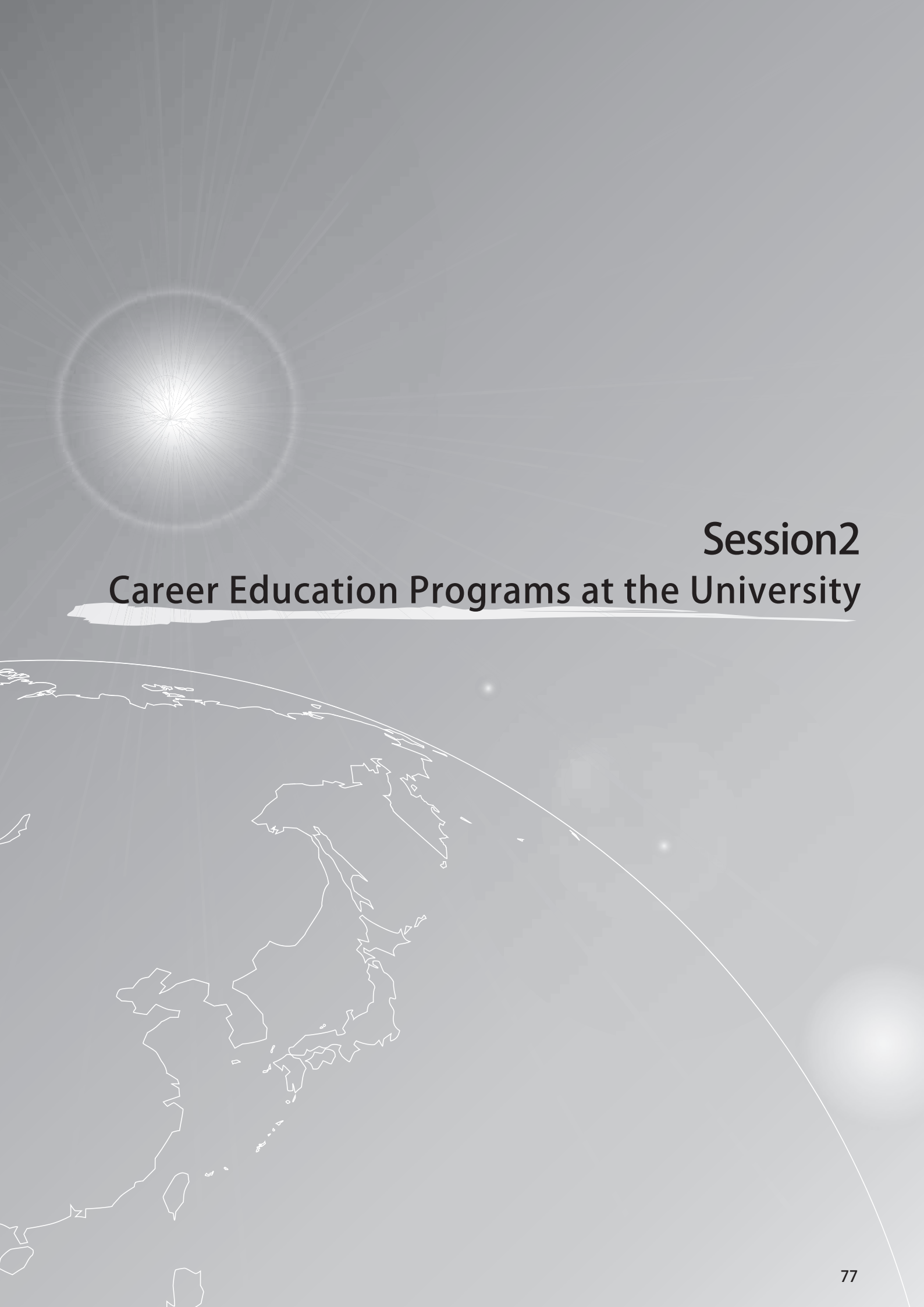
Summary

Women in STE are needed for innovation, but they are in short

- **Gender equality is a serious issue** for the growth of Northeast Asia
- **Women in STE** should **take initiatives** in gender equality activities
- **Global collaboration** in R&D
 - strengthens our career and
 - is an efficient approach to raise global leaders



Thank you



Session2

Career Education Programs at the University

Session 2 Chair (Korea)



Heisook LEE

Center for Women in Science, Engineering & Technology
(WISET)

Professor of Mathematics, Ewha Womans University

Education

Degree: B.S.(With Distinction), Mathematics, Ewha Womans University, Seoul,
Korea, 1971

Degree: M.Sc. in Mathematics, University of British Columbia, Canada, 1974

Degree: PhD, in Mathematics, Queen's University, Kingston, Canada, 1978

Research Field

Associative Algebras, Applied Algebra, Algebraic Coding Theory

HR in Women in Science and Technology, Science Education, Science

Communication

Career History

Major Faculty Appointments at Ewha Womans University

1988-present Professor, Department of Mathematics

2007.8-2010.7 Dean of College of Natural Sciences

2006.8-2008.7 Dean, Graduate School,

2002-2010 Founding Executive Director, Center for WISE

1998-2001.1 Dean, International Educations Institute

1997.3-2001.1 Dean for Research Affairs

1995.9-1997.2 Dean of College of Natural Sciences

Appointments

2013.9 - present. Member of Presidential Advisory Council on Science & Technology

2010.10 - 2013.2. Member of National Science & Technology Commission

2012.7- present. Board Member of KAIST

2012. 7- present. Board Member of KICET

2012. 6- present Science Committee member of Korean National Commission for UNESCO

2009. 6 - 2011. 6. Board member of National Research Foundation

2008.1 - 2011.2. Vice President, Korea Federation of Science & Technology Societies

2006.1 - 2007.12. President, Korean Federation of Women's Science and Technology associations

1994.10 - 1996.12. Chief Editor of Journal of Korean Mathematical Society

1888. 10 - 1990.10. Founding Chief Editor of Communications of KMS

Awards

2008. 10 Achievement Award, Korean Mathematical Society

2007.12 Seoul City Culture (Science Field) Award

2006. 12 Duke of Edinburgh Fellowship, Korea British Society

2003 The Year Award for Woman in Science & Engineering of the year, Minister of Science and Technology

2003 National Science Medal, President of Korea

Current Memberships

Mem.: Korean Mathematical Society, Korean Women in Mathematical Sciences Society, KOFWST (Korean Federation of Women's Science & Technology Associations), KOFST (Korean Federation of Science & Technology Societies)

Session 2 Speaker (Japan)



Toyoko OCHIAI

Professor, Department of Dermatology, Nihon University,
School of Medicine

Project Leader of Nihon University Chairman of the Board of
Trustees Grant

Education

1969-1975 Nihon University, School of Medicine

1975-1979 Nihon University, Postgraduate School of medicine

Research Field

Dermatology

Career History

1979-1986 Fellow in Dermatology, Nihon University, School of Medicine

1986-1996 Assistant Professor in Dermatology, Nihon University, School of
Medicine

1996-2007 Associate Professor in Dermatology, Nihon University, School of
Medicine

2007-present Professor in Dermatology, Nihon University, School of Medicine

2008-2011 Vice Director, Surugadai Nihon University Hospital

Civic, Political, and Philanthropic Activities

2009-present Member of Pharmaceutical Affairs Council, Pharmaceutical Affairs
and Food Sanitation Council, Ministry of Health, Labour and Welfare

2008-2010 member of the Female Scientist Supporting Unit, Nihon University

Current Memberships

Mem.: Japanese Dermatological Association, Society for Investigative Dermatology, Japanese Society for
Investigative Dermatology, Japanese Society of Allergology, Japanese Skin Cancer Society

Career development of female physicians at Nihon University

Toyoko OCHIAI

Project Leader of Nihon University Chairman of the Board of Trustees Grant

Department of Dermatology, Nihon University, School of Medicine

Over 30% of students in medical school in Japan are female, and the promotion of female physicians is of great importance for their future success in clinical medicine. On the other hand, many female physicians leave their full-time positions as physicians due to life events such as childbirth and childrearing, most commonly within 10 years of obtaining a medical license. Moreover, many women who leave their full-time positions are content to return to work as part-timers rather than resuming their duties as full-time physicians. This type of career path is thought to be the cause of the structural problem in which women are not promoted to managerial positions or board members of academic societies. At present, many academic societies hold symposia for the career development of female physicians, thereby gradually raising awareness of this issue. However, not enough progress has been made in reforming the social structure and customs in Japan, and social infrastructure such as nursery schools remains insufficient. It has also become clear that career development of female physicians is difficult with support for continuation of and return to work alone. Preparations for promoting the continuation of work among female physicians are too late if made after they become physicians. It is first necessary to provide career education in order to enable a return to the position of physician and to solve the complex problems faced by physicians. At Nihon University, career education is provided to medical students from an early stage to enable women to overcome their life events and hone their skills as physicians in their 30s, and to develop their careers without interruption insofar as possible. The author's opinion on the problems of female physicians, with a focus on career education, is provided.

2012~2013 Nihon University President Special Research:
Career-way~Career Education for Woman Science Researcher and
Environment Management for Promoting Their Activities

Career Development of Female Physicians at Nihon University



Department of Dermatology, School of Medicine, Nihon University
Toyoko Ochiai, MD, PhD

Actions to Support Female Researchers at Nihon University

For the creation of Innovation :
training and education of researchers and engineers
in different fields is extremely important.

At present, female researchers and engineers
account for approximately 14% in Japan.
It's the lowest among developed countries.



- 1, Training female science researchers
- 2, Promoting their career



Actions at Nihon University

2008~2010

"Universalization of Career-way in Nihon University" to promote a
model for supporting female researchers

with Special Coordination Funds for Promoting Science and
Technology from Ministry of Education, Culture, Sports, Science and
Technology

The results achieved by projects :

- ✓ Improving environment to promote gender equality
within the whole faculty
- ✓ Career guidance for female students
- ✓ Supporting female students in high schools and
junior high schools to help the select a science career
- ✓ Helping female post-graduate and postdoctoral researchers
to establish their careers.

The activities were highly evaluated by people inside and outside the University.

After the Project was Completed at Nihon University



Gender Equality Committee was established
at the university headquarters and some of its departments.

Environment for gender equality has improved , and
activities to help developing the next generation have continued.



2012~2013 Nihon University President Special Research

Career-way~Career Education for Woman
Science Researcher and Environment
Management for Promoting Their Activities

Research Director: Toyoko Ochiai MD.
Prof. School of Medicine

What's career-way?

Carrer-way means Broader and longer process
than career-path
It is a way leading to a variety of professions

Major Issues of Female Doctors in Japan

They leave their profession too early
without established their careers

2012.2 Questionnaire Survey

"Meeting to Consider the Female Dermatologist"
Japanese Dermatological Association

Jpn J Dermatol 2012;122:3851-7

The rate of female dermatologists leaving jobs
at the university within 5~10 years after graduation

Female; 37%

Male; 20%

Issues Related to the Quick Turnover of Female Doctors in their 30's

- ✓ Female doctors do not work full-time at the University Hospital and affiliated hospitals Which results in a talent shortage Female doctors are labeled as unreliable.
- ✓ Young competent female doctors can not grow without overcoming the hurdles during their 30's.
- ✓ For parents, organizations, and the entire country, who made financial assistance, this is a big loss

Why Woman Doctors Leaving the University ?

Questionnaire Results:

Childbirth / Child Care / Education / Care

Jpn J Dermatol 2012;12:2851-7

What is Needed for Them to Return to Work in their 30's ?



1) Strong will to return to their jobs

2) Child care facilities

3) Introduction of working conditions to enable them to continue working



Strong Will to Return to their Career

For female doctors to stay in their jobs, even before graduating from the medical school



Career education should be given to female medical students

School of Medicine, Nihon University

- ✓ For All first-year Students Career Education during the "Introductory Medicine"
- ✓ For 1st to 6th year Female Medical Students Seminar " Role Models of Woman Doctor "

① Importance of Having a Career Vision for their Life

What kind of jobs they want to perform

Imagine own want to be

They should think early on

what they want to achieve through work

② In Order to Build a Career

They know how to learn and

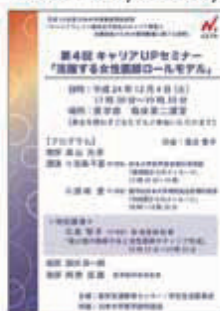
how to become qualified professionals



Career education is needed for that purpose

Career-up Seminars to Female Medical Students at School of Medicine, Nihon University

They are exposed to various role models of female doctor before they actually start their life as a doctor



From 1st to 6th year medical students



Doctors Can Develop and Upgrade their Careers the most during their 30s

What should be done during the 30s ?

- 1) female physicians should upgrade their skill by making necessary investments for themselves
 - Do not rely on easy part-time jobs only
 - Attend academic meetings actively to learn new medical knowledge
- 2) They need to maintain their professional skill as a doctor
 - Maintain the specialist qualification
 - Write academic papers

Point at issue

N. 日本大学

Female faculty members of School of Medicine Nihon University 2013.10.1

	No of Female		Whole Faculty
Professor	3	(5%)	58 peoples
Associate Professor	4	(5%)	70
Lecturer	12	(23%)	52
Assistant Professor	35	(18%)	192
Assistant	28	(26%)	107

Continuation of the work to stay on the job
is important for academic career and promotion for woman

Session 2 Speaker (China)



Min HU

Professor, Department of Environmental Sciences, College of Environmental Sciences and Engineering, Peking University

Education

Degree: BS, Description: in Applied Chemistry, School: Peking University, Location: Beijing, China, Year: 1987

Degree: Master, Description: in Environmental Sciences, School: Peking University, Location: Beijing, China, Year: 1990

Degree: PhD, Description: in Environmental Sciences, School: Peking University, Location: Beijing, China, Year: 1993

Research Field

Atmospheric Environmental Chemistry, air pollution control, Characteristics of fine particles (PM_{2.5}) and their impacts on air quality, haze, climate change and human health

Career History

Min Hu is Professor and Director of State Key Joint Laboratory of Environmental Simulation and Pollution Control (Peking University), College of Environmental Sciences and Engineering, Peking University, China. After she received Ph.D in 1993, she worked as a Lecturer and later an Associate Professor in Peking University. From 1996 to 2005, she visited Energy Research Centre of the Netherlands (ECN, Petten, The Netherlands) twice and Leibniz Institute for Tropospheric Research (Tropos, Leipzig, Germany) three times, and Environmental and Occupational Health Sciences Institute (EOHSI, New Jersey, USA) as a visiting scientist. Since 2001, she has been worked as a professor in the Center for Environmental Sciences (2001-May, 2007) and College of Environmental Sciences and Engineering (June 2007- present) in Peking University. Her research interests spans from aerosol characteristics and its impacts on climate and human health to biogenic sulfur emission from sea - Dimethyl Sulfide (DMS). Recently, she mainly focuses on aerosol chemical and physical characteristics, source identification, secondary aerosol formation, as well as its impact on air quality, local visibility degradation, and health effects.

Awards and Scholars

Changjiang Scholar Chair Professor in 2012

Chinese Young Woman Scientist Award in 2011

China National Natural Science Foundation for Distinguished Young Scholars in 2010

The Second Prize of the National Science and Technology Progress Award in 2010 (Rank No. 2)

The First Prize of the Science and Technology Progress Award from Ministry of Environmental Protection in 2010 (Rank No. 9)

The First Prize of the Science and Technology Progress Award from Ministry of Education in 2009 (Rank No. 2)

Current Memberships

Up to now, she is a member of the Editorial Advisory Board of Tellus B-Chemical and Physical Meteorology, Atmospheric Environment, the Editorial Board of Acta Chimica Sinica, Acta Scientiae Circumstantiae (Chinese). She is also the member of several scientific program, including China SOLAS (the Surface Ocean – Lower Atmosphere Study), China IGAC(International Global Atmospheric Chemistry) China iLEAPS (Integrated Land Ecosystem- Atmosphere Processes Study) , and China ABC (the Atmospheric Brown Cloud).

Career Education Programme in Environmental Sciences at Peking University

Min HU

College of Environmental Sciences and Engineering, Peking University, Beijing

The modern environmental education movement started in the United States mainly because the first Earth Day on April 22, 1970, paved the way for a national teaching about environmental problems. Internationally, environmental education gained recognition when the UN Conference on the Human Environment held in Stockholm, Sweden, in 1972, declared environmental education must be used as a tool to address global environmental problems. The United Nations Education Scientific and Cultural Organization (UNESCO) and United Nations Environment Program (UNEP) created three major declarations (Stockholm Declaration, in 1972, Belgrade Charter in 1975, Tbilisi Declaration in 1977) that have guided the course of environmental education

Broadly environmental education teaches about how natural environments function and, particularly, how human beings can manage their behavior and ecosystems in order to live sustainably. Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, Tbilisi Declaration, 1977).

Environmental Sciences in the universities is a broader academic discipline that is the systematic study of interaction of humans with their environment. It is a broad field of study that includes the natural environment, built environments and social environments. Therefore, there are many majors or research directions, such as environmental chemistry, atmospheric physics, ecology, sustainable development, water pollution control, waste treatment, environmental monitoring, environmental planning, environmental management, environmental impact assessment etc.

In China Environmental Sciences Education started in the beginning of 1970s since environmental problems were attracted more attentions. The publications, such as *Silent Spring* by Rachel Carson, 1962; *The Limits of Growth* by D. H. Meadows, 1972; *Global Warming, the Complete Briefing* by J. Houghton, 1994, have been very well known among the students at that time. Several environmental issues becoming very public, such as the photochemical smog, acid rain and dust storm, and helped increase the visibility of environmental issues and create this new field of study. Along with rapid economic development and urbanization environmental pollution becomes more and more important; the requirements of solving environmental problems have strongly pushed the development of environmental sciences.

The environmental education in Peking University since 1972, as one of earliest universities in China, started from environmental chemistry. In 1982 the Center for Environmental

Sciences had been established, master degree education in 1985, and Ph. D degree education in 1987. The Center promoted as the College of Environmental Sciences and Engineering in 2007, including three departments of Environmental Sciences, Environmental Engineering and Environmental Management. The College focuses on three major directions: Regional air pollution and climate change, Water pollution control and environmental recovery, Theory and strategy of sustainable development.

The environmental sciences education faces challenges to solve environmental problems from urban to global issues. It needs to reform and improve both the curricular and institutional aspects of environmental higher education. Problem-based learning scenarios are suggested: Questioning to learn and learning to question. Through this process the students learn how to identify their knowledge in relation to a discerned problem, to identify their learning needs and to identify how to best acquire the relevant knowledge.

Environmental Sciences are rooted from fundamental sciences, including but not limited. Environmental sciences are driven by severe environmental problems and the growing public awareness. It needs a multi-disciplinary approach to analyze complex environmental problems.



Career Education Programme in Environmental Sciences at Peking University


College of Environmental Sciences and Engineering
Min HU 胡敏
Email: minhu@pku.edu.cn




OUTLINE



- Environmental Education
- Environmental Sciences
- Environmental Sciences Education in China
- College of Environmental Sciences and Engineering at PKU
- Challenges
- Conclusions



Modern environmental education movement

- The first Earth Day on April 22, 1970, paved the way for a national teaching about environmental problems in the U.S.
- **Internationally**, environmental education gained recognition when the UN Conference on the Human Environment held in Stockholm, Sweden, in 1972, declared environmental education must be used as a tool to address global environmental problems.
- The United Nations Education Scientific and Cultural Organization (UNESCO) and United Nations Environment Program (UNEP) created three major declarations (Stockholm Declaration, in 1972, Belgrade Charter in 1975, Tbilisi Declaration in 1977) that have guided the course of environmental education.



Environmental education


- Teaching about how natural environments function and, particularly, how human beings can manage their behavior and ecosystems in order to live sustainably.
- A learning process **increases people's knowledge and awareness about the environment and associated challenges**, develops the necessary skills and expertise to address the challenges, and **fosters attitudes, motivations, and commitments to make informed decisions and take responsible action** (UNESCO, Tbilisi Declaration, 1977).



OUTLINE



- Environmental Education
- **Environmental Sciences**
- Environmental Sciences Education in China
- College of Environmental Sciences and Engineering at PKU
- Challenges
- Conclusions



Environmental Sciences

- Environmental sciences in the universities is a **broader academic discipline** that is the systematic study of interaction of humans with their environment.
- It is a broad field of study that includes
 - natural environments
 - built environments
 - social environments



Environmental Sciences

There are many majors or research directions

- environmental chemistry
- atmospheric physics
- ecology
- sustainable development
- water pollution control
- waste treatment
- environmental monitoring
- environmental planning
- environmental management
- environmental impact assessment
-



OUTLINE



- Environmental Education
- Environmental Sciences
- Environmental Sciences Education in China
- College of Environmental Sciences and Engineering at PKU
- Challenges
- Conclusions

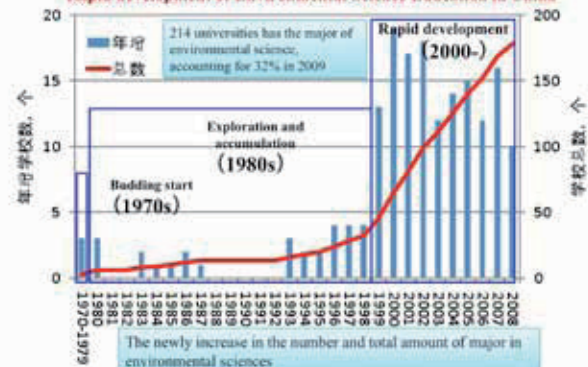


Environmental Sciences Education in China

- It started in the beginning of 1970s since environmental problems were attracted more attentions.
- The publications, such as Silent Spring by Rachel Carson, 1962; The Limits of Growth by D. H. Meadows, 1972; Global Warming, the Complete Briefing by J. Houghton, 1994, have been very well known among the students at that time.
- Several environmental issues become very public, such as the photochemical smog, acid rain and dust storm, helped increase the visibility of environmental issues and created this new field of study.
- Along with rapid economic development and urbanization environmental pollution becomes more and more important; the requirements of solving environmental problems have strongly pushed the development of environmental sciences.

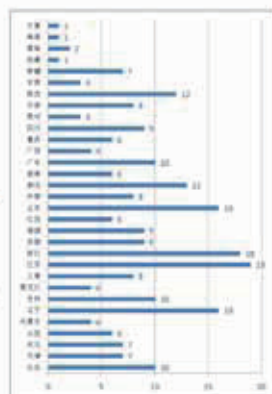


Rapid development of Environmental Science Education in China



Spatial distribution

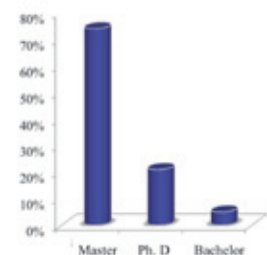
- China's 31 provinces, autonomous regions and municipalities have set up the major in environmental science.
- East China accounted for 32%, South China 18%, Northeast 14%, North China 13%, Northwest 13%, Southwest 10%, respectively.
- Top two provinces are Jiangsu and Zhejiang, 8% and 7%, respectively.
- Tibet, Xinjiang, Qinghai, Ningxia have 1-2 universities with the major in environmental science.



Distributions of Ph.D, Master and Bachelor degrees

The overall educational level is high, most universities have master degree, some colleges and universities have doctoral degree.

Ph. D+Master+Bachelor : 21%
Master+Bachelor : 74%
Bachelor : 5%



OUTLINE

- Environmental Education
- Environmental Sciences
- Environmental Sciences Education in China
- College of Environmental Sciences and Engineering at PKU
- Challenges
- Conclusions

History

Environmental education in PKU started from environmental chemistry in 1972, as one of earliest universities in China.

Center for Environmental Sciences

Founded as "Imperial University of Peking" Disciplinary Relocation Merged with Beijing Medical University Interdisciplinary Research Institutes

1908 1912 1952 1952 1959 2006 2007 2009

"Peking University" Centennial Anniversary Defined the goal to be world-class university in the 21st century "985" College of Environmental Science and Engineering CSEE

master degree in 1985, Ph. D in 1987, bachelor degree in 1997

College of Environmental Science and Engineering @ PKU

- Faculties: 53
- Specialties: 3
 - Undergraduate majors: 2
 - Environmental Science, Environmental Engineering
 - Master majors: 3
 - Environmental Science, Environmental Engineering, atmospheric physics and atmospheric environment
 - PhD majors: 2
 - Environmental Science, Environmental Engineering
- Student Recruitment from 1982
- PhD Student for 3-5 years: 100
- Graduate student for 3 years: 150
- Undergraduate student for 4 years: 150

Using advantages in existing basic disciplines, integrating and developing discipline construction of the university

Destination of PKU

Cultivating leading talents with broad fields of vision, leading ability in various fields as well as a spirit of innovation

Research directions

环境科学系 Environmental Sciences

环境工程系 Environmental Engineering

环境管理系 Environmental Management

Social development Management tools

Study on the "whole process" of environmental problems

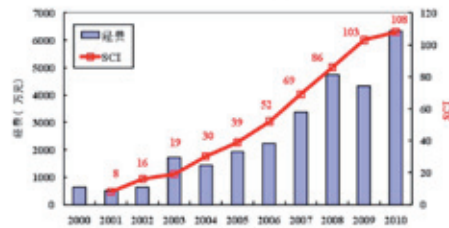
1. 区域大气污染与全球变化
Regional air pollution and climate change

2. 水污染控制与环境修复
Water pollution control and environmental recovery

3. 可持续发展的理论与决策
Theory and strategy of sustainable development



Research funding and paper publications



High quality papers

- Science : 2 in 2009, 1 in 2010, 1 in 2011
- JAMA in 2012; Chemical Review in 2012



OUTLINE

- Environmental Education
- Environmental Sciences
- Environmental Sciences Education in China
- College of Environmental Sciences and Engineering at PKU
- Challenges
- Conclusions



Challenges – needs - suggestions

- The environmental sciences education faces **challenges** to solve environmental problems from urban to global issues.
- It **needs** to reform and improve both the curricular and institutional aspects of environmental higher education.
- Problem-based learning scenarios are **suggested**: Questioning to learn and learning to question. Through this process the students learn how to identify their knowledge in relation to a discerned problem, to identify their learning needs and to identify how to best acquire the relevant knowledge.



Conclusions

- Environmental Sciences are rooted from fundamental sciences, including but not limited.
- Environmental sciences are driven by severe environmental problems and the growing public awareness.
- It needs a multi-disciplinary approach to analyze complex environmental problem.



Session 2 Speaker (Korea)



Jeong-A LEE

Professor, Department of Computer Engineering, College of Computing, Chosun University

Education

Degree: BS, Description: in Computer Engineering, School: Seoul National Univ., Korea, 1982

Degree: MS, Description: in Computer Science, School: Indiana University, Blomington, U.S.A., 1985

Degree: PhD, Description: in Computer Sci., School: UCLA, U.S.A., 1990

Research Field

Computer Science, Computer System Architecture

Career History

1995 ~ Present Professor Department of Computer Engineering, Chosun University

2008/2~2009/12 Program Director EECS Division, National Research Foundation of Korea

1990~ 1995 Assistant Professor, Department of Electrical Engineering, University of Houston, U.S.A.

Certification

N/A

Awards

Year of the Woman Engineer in academic field, Award 2011

Achievements

Achievements include fast CORDIC algorithms for Matrix Computations;

Self-healing FPGA architecture; Self-checking ALU design; Adaptive arithmetic and configurable arithmetic unit design; Design Space exploration for embedded system

Civic, Political, and Philanthropic Activities

Member of Committee, Internet Policy of Korea (2004~present)

Current Memberships

IEEE Senior Member (2001~ present)

Member of National Academy of Engineering, Korea (2011~ present)

Programs in Korea to Support Women Scientists and Engineers in the Universities

Jeong-A LEE

Department of Computer Engineering, College of Electronics and Information Engineering,
Chosun University 375 Seosuk-Dong, Dong-Gu, Gwangju, 501-759, REPUBLIC OF KOREA.
jalee@chosun.ac.kr

Abstract: “Where is the best place to be a woman?” This is a pertinent question to be asked by any woman seeking a role in the male dominated science and engineering profession. This talk will show that highly industrialized countries have not fared as well as expected and it will discuss the metrics that should be taken into account while answering this question. It will identify the challenges that have contributed to the low annual ranking of Asian countries as ideal destinations for a woman seeking a career in science and engineering. It will also include a detailed presentation of the current status and future plans of the key programs that are positively changing the outlook of women scientists and Engineers in Korea.

Keywords: women in science and engineering, work-home balance, gender gap

1. Introduction

There are over 7 billion people in the world and approximately 49.8% of these are women [1]. However, even though there are almost as many women as there are men, careers in Science and Engineering (S&E) are traditionally considered to be biased towards the male gender in many countries. Women usually face challenges when competing for S&E positions with their male counterparts. As such a pertinent question worth asking can be “Where is the best place to be a woman?” when choosing to pursue a career in science and engineering.

In order to answer this question one needs to analyze the Gender Gap Report of selected countries. The World Economic Forum Global Gender Gap Report 2013 [2] gives an assessment of the gender gaps in terms of the following metrics:

1. Economic participation and opportunity
2. Educational attainment
3. Health and survival
4. Political empowerment

This gives an idea of the general level of empowerment of women in the different countries and this level of empowerment should also reflect the ability of women to be part of traditionally male-dominated careers like S&E. The data suggests that none of the G20 highly industrialized countries would be an ideal destination for such women.

Similarly, with the exception of Philippines, Asian destinations do not fare any better, as several of the Asian countries rank low in the gender gap list. For example out of 135 countries surveyed Korea, China and Japan ranked 111, 69 and 101 and this has been the trend for a number of years as shown in Fig. 1. Fig 2 shows a similar comparison of the score (ratio of females to males).

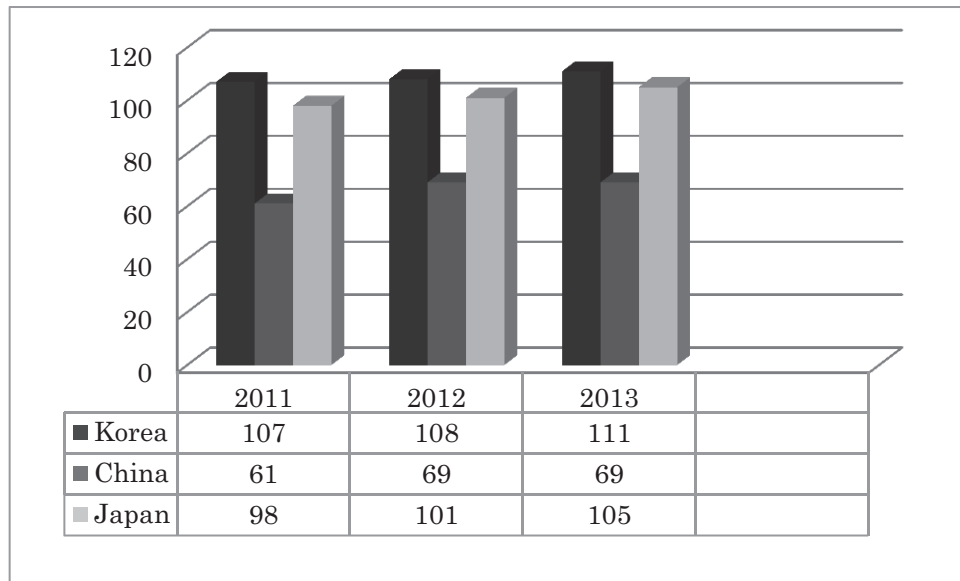


Fig. 1: Gender Gap Ranking of Korea, China and Japan from 2011-2013

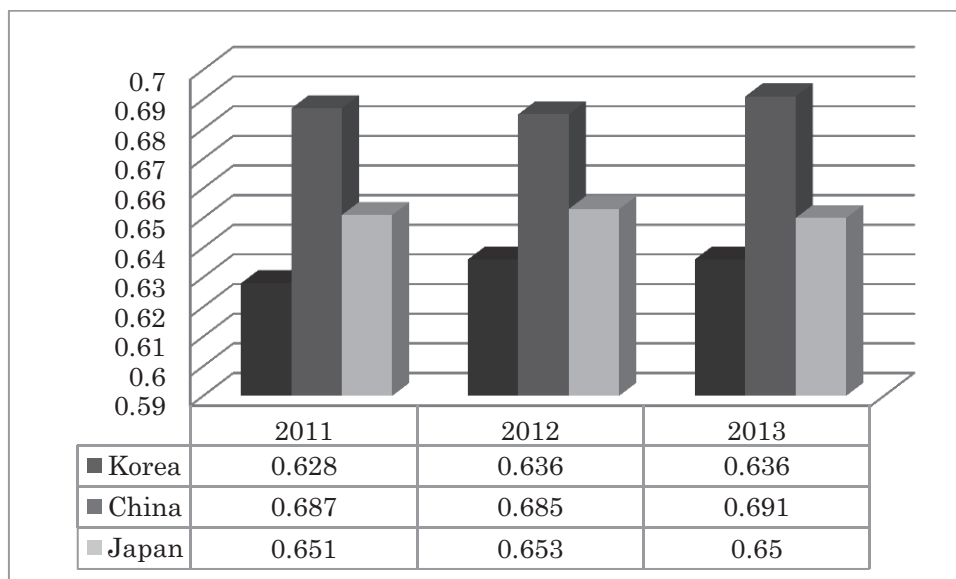


Fig. 2: Gender Gap Score of Korea, China and Japan from 2011-2013

2. Key Programs in Korea

Korea is a country with limited natural resources and this has placed a lot of emphasis on the development of its human resources. There are approximately as many women as there are men in Korea [3] and just like it is on the global stage, these women face challenges when competing with men for S&E positions. Science, Engineering and Technology provide a major component of the Korean GDP and there is a high level of competition for positions in the Science & Engineering sector of the country.

Korea began concerted efforts aimed at bridging the gender gap in 2002 and this

culminated in the establishment of a legally backed organization to oversee the implementation. The first stage of the program took place between 2004 and 2008, while the second stage began in 2009 and will run till 2013. An analysis of the first stage and the current status of the current stage will be discussed.

Key programs that have formed part of the Korean strategy include the Korean Advanced Institute for Women in Science Engineering and Technology (WISET) [4] and programs by the National Research Foundation (NRF). WISET is an organization commissioned by the Korean Ministry of Education, Science and Technology (MEST) to develop a support policy for fostering and utilization of women in Science, Engineering and Technology (SET). The support is to enable women to fully develop and apply capabilities in the field and it provides a total support system for fostering and utilizing women in S&E.

A comprehensive study was carried out on the status of utilizing women in the science and technology research and development workforce in Korea [5]. The study focused on the following aspects:

1. Employment status
 - a. General status
 - b. Status in science and engineering universities
 - c. Status in public research institutes
 - d. Status in private research institutes with over 100 employees
 - e. Status by major and area of specialization
 - f. Status by region
2. New recruitment status
3. Status of women in executive positions
4. Promotion status
5. Status of research and development activities
6. Status of work-family balance assistance policies
7. Employment status in private research institutions with under 100 employees

Some excerpts of the data from this study are presented below.

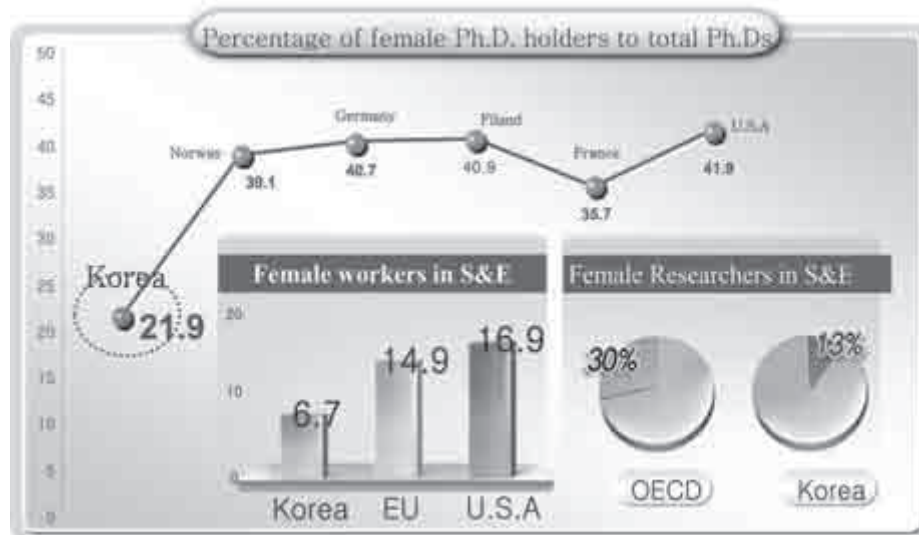


Fig. 3: Percentage of Female PhD Holders in Korea and Europe

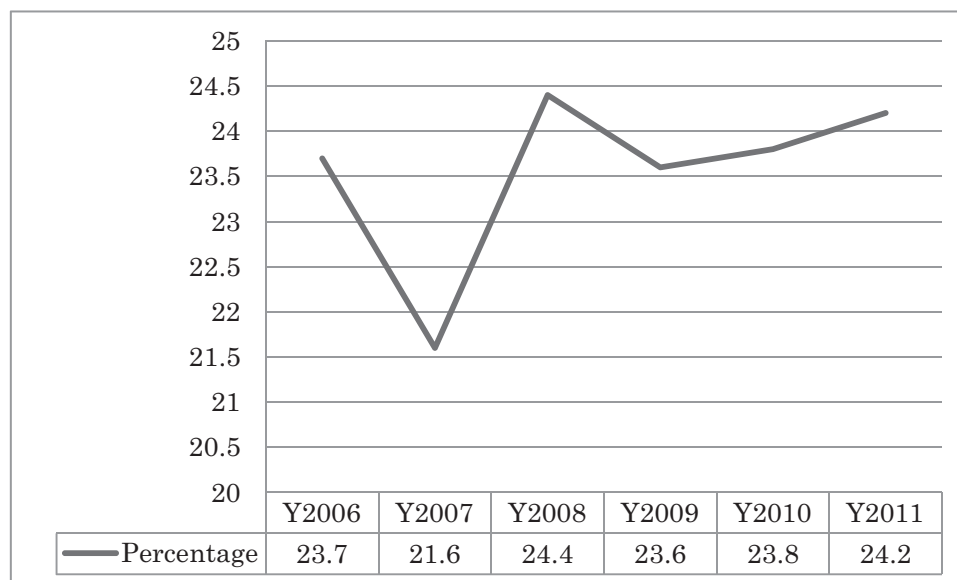


Fig. 4: Changes in Overall Ratio of Female S&T R&D Workforce in S&E Universities (2006-2011) [5]

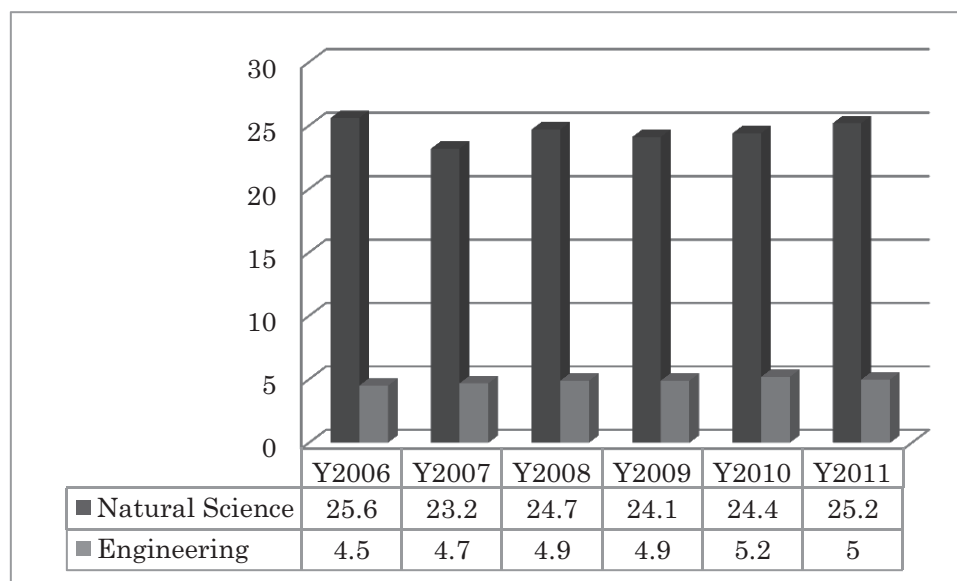


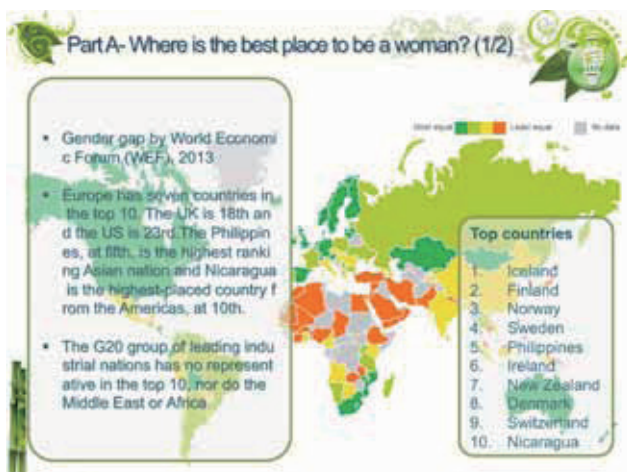
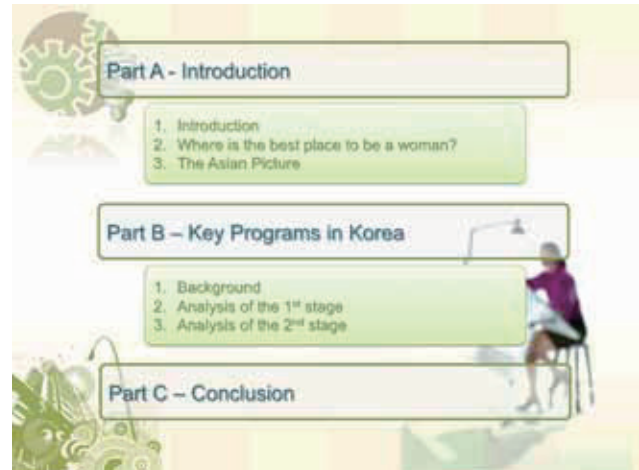
Fig. 5: Changes in Overall Ratio of Fulltime Female Professors in S&E (2006-2011) [5]

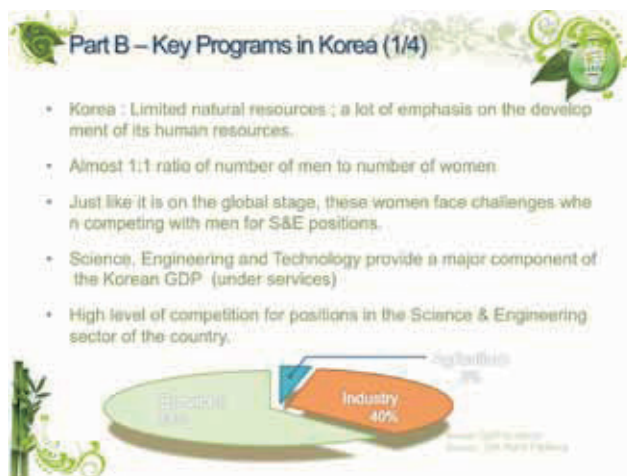
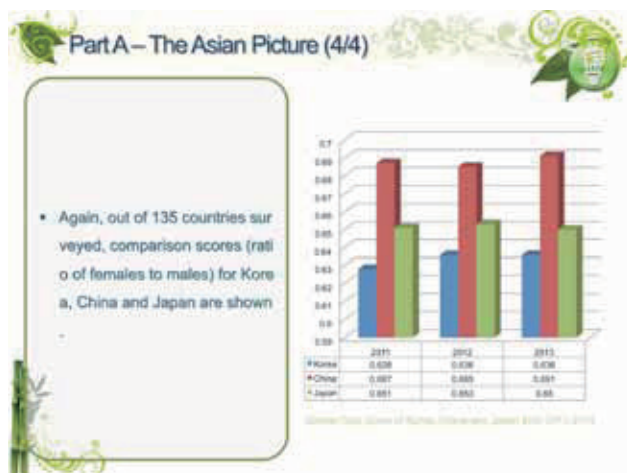
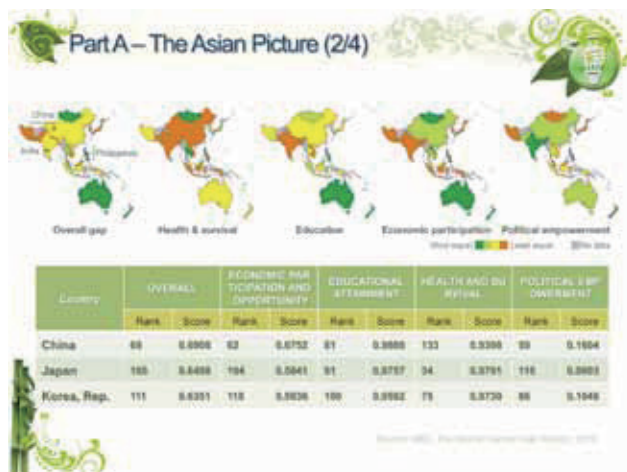
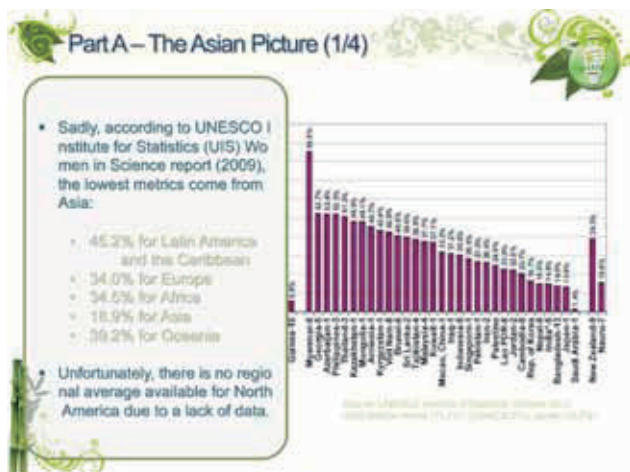
3. Conclusion

Women have the potential to contribute to the science, engineering and technology sectors of their respective countries. As expected there are a number of challenges that have prevented women from competing with their male counterparts in this sector. However, the experience in Korea shows that these challenges are surmountable and a focused approach can positively transform the metrics and reduce the gender gap.

REFERENCES

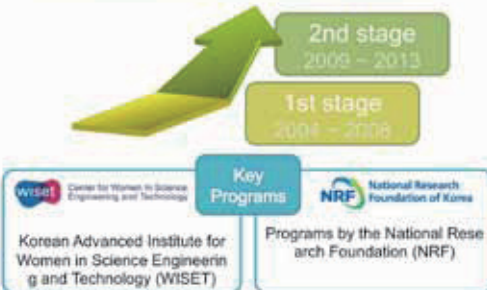
- [1] http://en.wikipedia.org/wiki/Demographics_of_the_world
- [2] The Global Gender Gap Report 2013; http://www3.weforum.org/docs/WEF_GenderGap_Report_2013.pdf
- [3] http://en.wikipedia.org/wiki/Demographics_of_South_Korea
- [4] Center for Women in Science, Engineering and Technology; <http://wiset.re.kr>
- [5] Women in Science, Engineering and Technology (WISET) 2012 Report;
http://www.wiset.re.kr/www/center/publication_view.jsp?sc_webzine_master_seq=1&sc_display_yn=Y&pk_seq=760





Part B – Key Programs in Korea (2/4)

- Gender gap bridging efforts began in 2002
- Led to establishment of legally backed organization



Part B – Key Programs in Korea (3/4)

National Assembly

- Established Law for Supporting Women in Science and Engineering (2002)

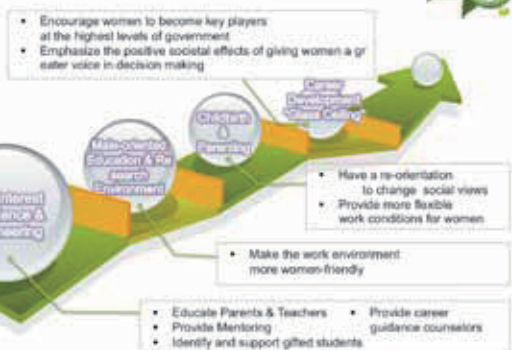
Ministry of Education, Science & Technology

- Developed a National Strategy For Women in S&E (2003)
- 1st Stage (2004-2008) & Outcome
 - Infrastructure – 4 W
 - Special Research Funding Allocation for Women in S&E
 - Set Hiring Quota for Women in S&E (ex. Nat. Research Institute)
- 2nd Stage (2009-2013) & Outcome
 - Korean Advanced Institute for Women in Science Engineering and Technology (WISET)

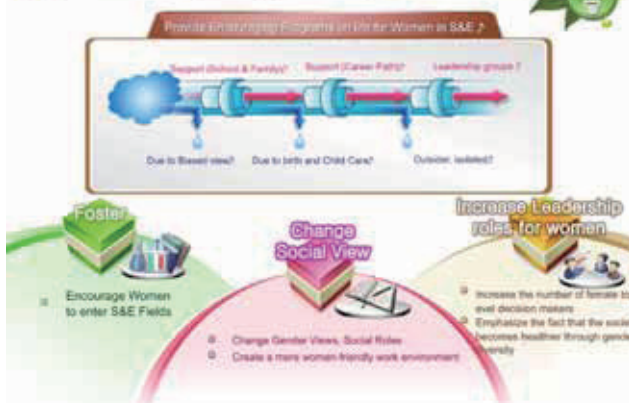
Part B – Key Programs in Korea (4/4)



Part B - Strategies



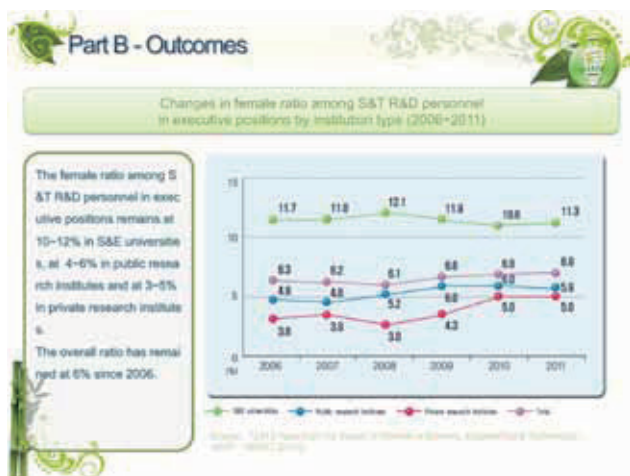
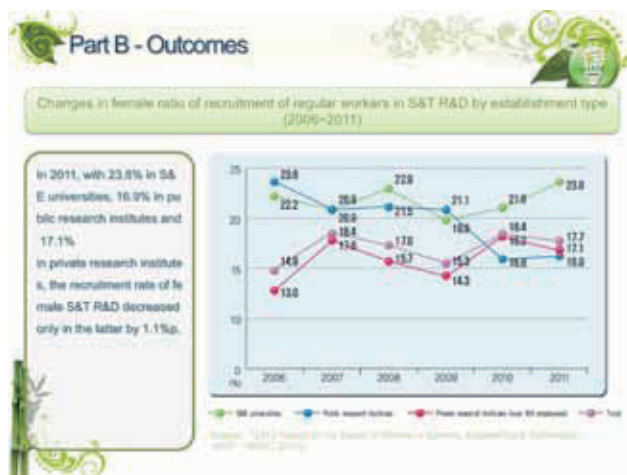
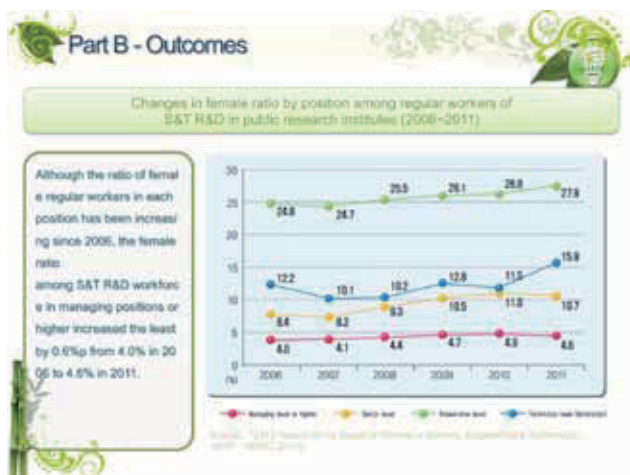
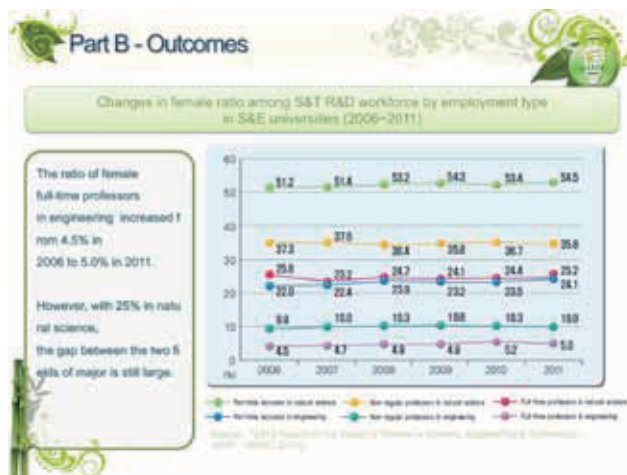
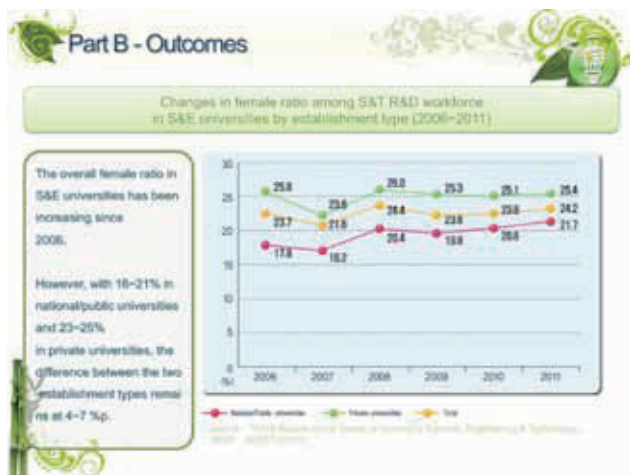
Part B – Keeps the pipes running

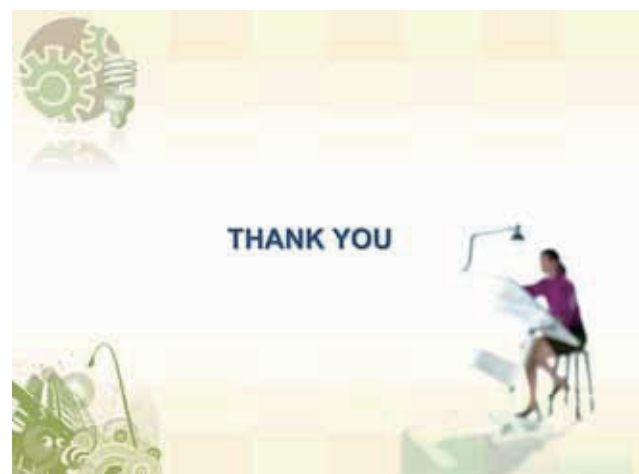
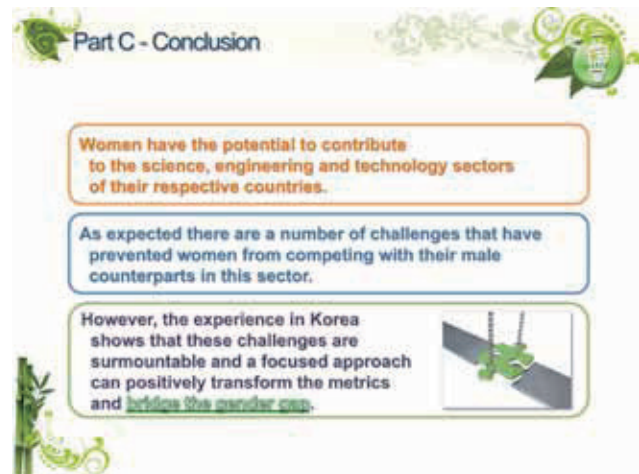
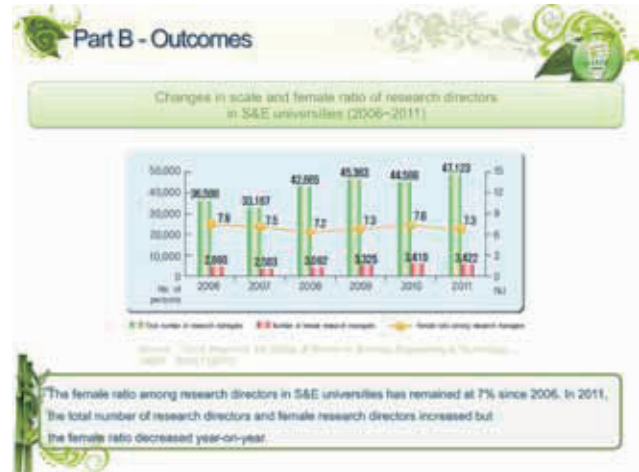
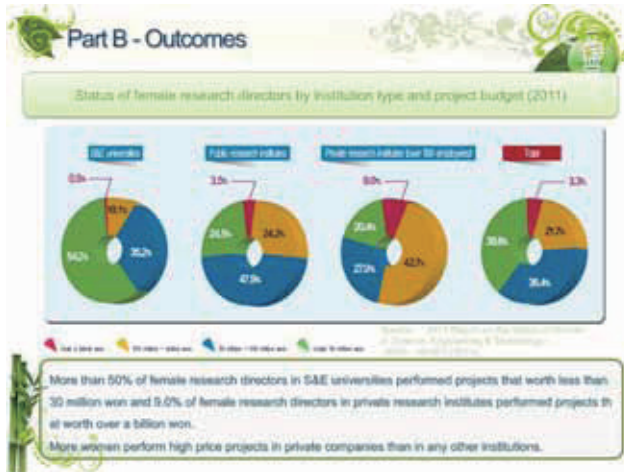


Part B - Outcomes

Study on the status of utilizing women in the science and technology research and development workforce in Korea.
The study focused on the following aspects:

- Employment status
 - General status, Status in science and engineering universities, Status in public research institutes, Status in private research institutes with over 100 employees, Status by major and area of specialization, Status by region
- New recruitment status
- Status of women in executive positions
- Promotion status
- Status of research and development activities
- Status of work-family balance assistance policies
- Employment status in private research institutions with under 100 employees







Session3

Leadership Programs for Professional Women in STE

Session 3 Chair (Japan)



Miyoko O. WATANABE

Fellow and Program Director, Center for Research and Development Strategy, Japan Science and Technology Agency

Education

Degree: BS, Description: of Physics Science University of Tokyo, Location: Japan, Year: 1979

Degree: PhD, Description: in Sci., Science University of Tokyo, Location: Japan, Year: 1986

Research Field

Semiconductor Physics, Innovation, Science and Technology Policy

Career History

Since joining Toshiba in 1979, she worked as a researcher of semiconductor physics for 20 years. Since she was appointed a manager in research and development center in Toshiba, she had held positions at various departments including technology administration department, material analysis department, innovation promotion division, and audit division in Toshiba. Previously, Dr. Watanabe had been responsible for leading innovation as Executive Quality Leader at headquarters in Toshiba. She had worked internationally over the world in Toshiba group. She is Assistant to General Manager at Corporate Government and External Relations Division in Toshiba at present, and work for relation between companies and government in Japan.

Certification

Innovation Leader Training at London Business School

Innovation Leader Program at Tuck School of Business (USA)

Awards

Ban memorial award for encouragement, 1991

JRCAT special award, 1999

Fellow at The Japan Society of Applied Physics, 2007

Female researcher award at The Japan Society of Applied Physics, 2011

Achievements

Achievements include many academic papers more than 40 for first author, management performance at Toshiba, and activities in Science Council of Japan and so on.

Civic, Political, and Philanthropic Activities

She was appointed Auditor at National Institute for Environmental Studies in Japan. Dr. Watanabe has hold positions of government including a member of Science Council of Japan, and a member of Science and Technology Council at Ministry of Education, Culture, Sports, Science and Technology in Japan. As chair of Japan Women Engineers Forum and chair of Liaison Association Committee for

Promoting Equal Participation of Men & Women in Physics, she is responsible for promotion of female engineers' activities.

Current Memberships

A member of Science Council of Japan, and a member of Science and Technology Council at Ministry of Education, Culture, Sports, Science and Technology in Japan. Chair of Japan Women Engineers Forum and chair of Liaison Association Committee for Promoting Equal Participation of Men & Women in Physics

Session 3 Speaker (Japan)



Shigeko MORI

Senior Software Engineer, Tokyo Software Development Laboratory, IBM Japan

Education

Degree: B.E, Description: in Computer Science, School: University of Electro Communications, Japan, 1985

Research Field

Database Management

Career History

Career: System's Engineer of IBM Japan, 1985-1990; Software Development Engineer of IBM Japan 1990—; Assignment to IBM Silicon Valley Laboratory, California, US, 1990;

Certification

Certified Senior Programmer of Japan Information Technology Engineers Examination Center;

Awards

President's Award of IBM Japan, 2001

Outstanding Technical Achievement Award of IBM Corporation, 2005

Achievements

Played a software architect role and development project leader and released several IBM software products including Enterprise Information Network Management system, Information processing framework software for Japan Banking system, and Database Management software products. Through these activities, nine inventions were published. Received Outstanding Technical Achievement Award from IBM Corporation, against high performance database scanning and analysis technology.

Civic, Political, and Philanthropic Activities

Mem. Woman ICT Engineer Career Development Exploratory Committee, Information-technology Promotion Agency, Japan, 2010; Mem. Steering Committee of Japan Woman's Engineers Forum, 2010—;

Developing Woman Leaders in Engineering Companies in Japan

Shigeko MORI ¹

(1. Tokyo Software Laboratory, IBM Japan, 5-6-52, Toyosu, Koto-ku Tokyo, 135-8511, JAPAN.
Japan Women Engineers Forum, 2-1-30, Kudan-Minami, Chiyoda-ku, Tokyo 102-0074, JAPAN,
E-mail moris@jp.ibm.com)

Abstract: Although promoting Japanese female labors and managers is emphasised as one of the key factors for Japan's Economic Revitalization, the ratios are small. In this situation, some companies and organizations have been trying to develop female leadership. This article presents four cases in the engineering area, -- IBM Japan, Toshiba, Japan Women Engineer's Forum (JWEF), and a consultant that achieve certain results. From the cases, long-term and various activities could change the mind-set of executives, managements, and women, and develop female leaders.

Keywords: Women in Engineering, Female Leadership Development, Diversity and Inclusion

1. Introduction

As described in "Japan Revitalization Strategy – Japan is Back", the power of women is a key enabler for Japan growth, and the short to mid term progress schedule^[1] proposes increasing the proportion of female workers in leading positions to at least around 30% by 2020. It has been over 25 years since the Equal Employment Operation Law was promulgated in Japan, however, Japanese female labor and leaders ratios are still small^[2]. Two reasons for this include executives and managements do not fully understand women's capability for leadership, and a lack of opportunities for women to realize worthwhile and fulfilling of responsible job role. In the engineering area, some companies and organizations have continued long-term activities to develop female engineer's leaders. This article presents four cases that suggest long-term and various activities considering difference of target layers could change people's mind-set and develop female leaders.

2. Case studies for increasing the woman engineer leaders

As successful references, the cases of IBM Japan, Toshiba, JWEF, and the act of consultant are described below.

2.1 IBM Japan

Since the middle of 1990's, IBM determined "Diversity and Inclusion" as a significant business strategy. According to this strategy, IBM Japan set the goal to increase female leader's ratio to the same as that of males, and adopted this ratio as manager's performance evaluation. IBM Japan's CEO organized a women community. The community members are women and selected from section chiefs or higher. The community has been performing several activities, which include a women conference, mentoring, career development seminar, and work life balance seminar. Through these activities, the community members could gain strong leadership and perceive the need of helping younger women. As a result, from 2011 to 2013, IBM Japan has been ranked the number one company where women play an active role

by Nikkei-Woman Magazine. In 2013, IBM Fellow Chieko Asakawa was awarded the Medal of Honor with Purple Ribbon in the Japan's Emperor's name for her outstanding contributions to accessibility research in Information Technology.

2.2 Toshiba

In 2004 Toshiba started “Kirameki Life & Career Promotion” project to promote gender equality under the direct control of the president. The project team started a training course for developing female leaders. Over 200 women participated in the course. In addition, the Kirameki project provides new manager education for developing female leaders. Furthermore, the Kirameki project now focuses on younger women education to promote leadership candidates. As a result, new innovative products were developed by female leaders. Rieko Fukushima, the innovator of the glasses-free 3-D television, received the APEC Women Innovator Award in 2011. In 2012, Toshiba was selected as one of “Diversity Management Selection 100” by the Ministry of Economy, Trade and Industry of Japan.

2.3 JWEF

JWEF was established 1992 with the aim of aiding women engineer’s social progress. The signature event is the “JWEF Encouragement Award” which honors young female professionals whose remarkable leadership changed the mind-set of colleagues, company, and society. “The award was the starting point of my active career development.” says the winner of 2011, Kiriko Chosokabe who is an engineer at Ricoh. After the award, she was recognized as a role model both inside and outside of her company. The situation strengthened her self awareness, and expanded her knowledge, experiences, and networks.

2.4 The act of consultant to support baby-care leave

One of the major reasons of small ratio of female leaders is that they tend to leave the work place upon childbirth. To change this, it is essential to create a workplace environment that allows woman to return from baby-care leave without undue worries. The career consultant, Rie Yamaguchi, supports company executives and managers to utilize working mothers, and also encourages mothers to develop their career. Her activity is particularly useful for companies which do not have the experience of supporting baby-care leave.

3. Conclusion

These case studies show that long-term and continuous activities could increase the number of female leaders. Particularly, the company’s cases suggested the strong strategies brought the understandings of managements and further leaderships of women. Now that Japan Revitalization Strategy began, women must further strengthen their leaderships. The activities, such as the reference cases, become more and more important.

REFERENCES

- [1] Japan’s Prime Minister and His Cabinet, June 2013, “Japan Revitalization Strategy: Short- to Mid-term Progress Schedule”, 6, (June 2013) http://www.kantei.go.jp/jp/singi/keizaisaisei/pdf/koutei_en.pdf
- [2] Chad Steinberg and Masato Nakane, “Can Women Save Japan?” IMF Working Paper, 7-11(2012), <http://www.imf.org/external/pubs/cat/longres.aspx?sk=40048.0>

Developing Woman Leaders in Engineering Companies in Japan

November, 12, 2013

Shigeko Mori

Senior Software Engineer, Tokyo Software Laboratory, IBM Japan
Management Committee Member of Japan Women Engineers Forum (JWEF)

Copyright (C) 2013 Japan Women Engineers Forum

1

Presenter Profile

Shigeko Mori

- Job role in IBM
 - Software Development team leader of Database Administration products
 - Member of IBM Japan Women Engineers Community (COSMOS)
- Community activities outside IBM
 - Member of "ICT Women Engineers Career Development Committee" of Information Technology Promotion Agency (IPA), Japan (2010)
 - Management committee member of Japan Women Engineers Forum (2010-)



■ My private life

- Having a husband and 22/16 yrs old daughters
- Taking one year child care leave after the first child



■ My hobby : Serving Japanese tea ceremony



Copyright (C) 2013 Japan Women Engineers Forum

2

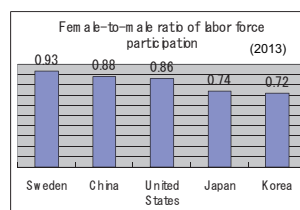
Contents

- Issues on Labor Environment of Japanese Women
- Japan Revitalization Strategy
- Case Studies
- Conclusion – Let's strengthen our leadership!!

Copyright (C) 2013 Japan Women Engineers Forum

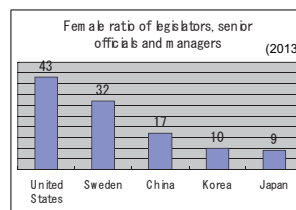
3

Issues on Labor Environment of Japanese Women



Labor force participation of Japan		
Female	Male	Female-to-male ratio
63	85	0.74

The labor participation rate for females is 0.74 compare to males.



Female and Male ratios of leader position		
Female	Male	Female-to-male ratio
9	91	0.10

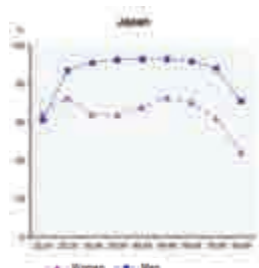
The ratio of female leaders is just 9 percent.

Source: The Global Gender Gap Report 2013, World Economic Forum (WEF)
Copyright (C) 2013 Japan Women Engineers Forum

4

"M" curve

Age-employment profiles by gender, 2011



"M" curve since female employment rates traditionally declined noticeably during the prime years of family formation, around the age-cohort 25 to 35, to increase again as children grow up.

One of the major reasons of small ratio of female leaders is that they tend to leave the work place upon childbirth.

Source: OECD

Copyright (C) 2013 Japan Women Engineers Forum

5

Japan Revitalization Strategy -JAPAN is BACK

- Over 2% labor productivity improvement in the medium- to long-term.
- Around 3% nominal GDP growth and Around 2% real GDP growth, on average, over the next ten years.

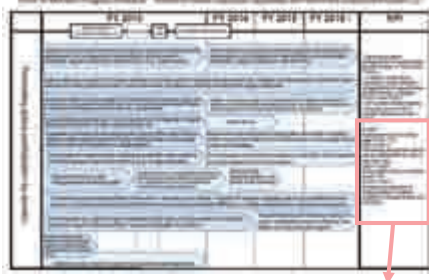
Published in June 18, 2013

1. Three Action Plans
 1. Industry Revitalization Plan
 1. Accelerating structural reform program(vitalizing industries)
 2. Reforming the employment system and reinforcing human resource capabilities
 2. Policy change from excessive employment stability to labor fluidity
 3. Promoting active participation by women
2. Strengthening human resource capabilities
3. Promoting Science, Technology and Innovation
4. Becoming the world's leading IT society
5. Further strengthening Japan's international competitiveness as a business hub
6. Innovation of small and medium-sized enterprises (SMEs)
7. Strategic Market Creation Plan
8. Strategy of Global Outreach



6

Schedule of Promoting Active Participation by Women



Employment rate for women aged 25-44: 73% (68% in 2012)
Continuous employment rate for women before/after the birth of first child: 55% (38% in 2010)
Male workers taking a childcare leave: 13% (2.63% in 2011)
Increase the proportion of female workers in leading positions to at least around 30% until 2020.

Copyright (C) 2013 Japan Women Engineers Forum

7

Case studies

- IBM Japan
- Toshiba
- Japan Women Engineers Forum (JWEF)
- Consulting for Diversity and Inclusion



Copyright (C) 2013 Japan Women Engineers Forum

8

IBM Japan

Since the middle of 1990's-
"Diversity and Inclusion" is one of IBM business strategies

Diversity Challenge of IBM Japan : started with women's issues

- Message from the top executive
- Personnel management system
- Work Place Environment
- Recruiting
- and
- Women Community



Virginia M. Rometty
Chairman, President and CEO of IBM

Copyright (C) 2013 Japan Women Engineers Forum

© 2013 IBM Corporation

9

Aspire to Female Technical Leaders!

Issue at 2005

- Percentage of the technical leaders and candidates in women was very small in IBM Japan.

Needed to inspire women to be technical leaders !

- Improve awareness of women for technical leaders
- Build a technical women's networking



Technical women community **COSMOS** started in 2005.
All members were candidates of female technical leader.

Goal: Female technical leaders and candidates ratios to be as same as male within four years!!

Copyright (C) 2013 Japan Women Engineers Forum

© 2013 IBM Corporation

10

COSMOS Activities

Based on surveys of engineers and managers,
delivered actions against factors inhibiting technical women's growing.

Activities for younger technical women

Top down approaching is effective

Bottom up approaching is effective

Activities for managements

Through these activities,
COSMOS members gained strong leadership and perceived the need of helping younger women.

Copyright (C) 2013 Japan Women Engineers Forum

© 2013 IBM Corporation

11

Achievements

Achieved!!

Female technical leader and candidates ratio became as same as male's!!



Chieko Asakawa:
IBM fellow and COSMOS leader
2010 Leadership award of Anita Borg Institute
2010 Achievement award of SWE
2013 Awarded in Japan's Emperor's name,
the **Medal of Honor with Purple Ribbon** for her contribution of accessibility research, including the development of a voice browser for the visually impaired.

- IBM Japan has selected as **most developing female leaders company** in Japan for three consecutive years (Nikkei Woman 2013)
- IBM Japan has selected as **the highest ratio of female senior managers company** in Japan. (Toyo Keizai 2013)
 - Ratio of women : senior managements 9.5%, managements 11.1%, executives 8.5%

Copyright (C) 2013 Japan Women Engineers Forum

© 2013 IBM Corporation

12

Toshiba

- Background
 - In the early of 2000's, as shifting to worldwide market, required to enhance its international competitiveness
- Activities
 - **"Kirameki (Twinkling) Life & Career Promotion Office"**
 - Direct control of the president and started in 2004
 - Promote work-life balance support and female employees' career formation
 - **"Mamagokoro (mother and cordiality) Promotion Office"**
 - Started in 2009
 - "Mamagokoro" home appliances, derived from combination of "mother (mama)" and "cordiality (magokoro)", integrates ideas from the point of women who are heavy users of home electronic products.
 - Mamagokoro home appliances' encouraging sales contributed to expand the company's market share.

Copyright (C) 2013 Japan Women Engineers Forum

13

Activities of Kirameki (Twinkling) Life & Career Promotion Office

- **"Kirameki School"** – training course for **developing female leaders**
 - Over 200 women participated
- Provides diversity education for **newly promoted managers**
- Currently, focuses on younger women education to **promote leadership candidates**.

Copyright (C) 2013 Japan Women Engineers Forum

14

Achievements

- Rieko Fukushima,
 - One of female employees to undergo leader training
 - **Innovator of the glasses-free 3-D television**
 - **Woman of the Year 2011** from Nikkei Woman
 - **APEC Women Innovator Award 2011**
- "Mamagokoro Promotion Office" has developed **a series of white goods electrical appliances**.
- Toshiba corporation is selected to **"Diversity Management Selection 100"** of Ministry of Economy, Trade, and Industry of Japan



Rieko Fukushima, Toshiba



Copyright (C) 2013 Japan Women Engineers Forum

15

Japan Women Engineers Forum

Networking beyond job and company



What is JWEF?

It is a community where women engineers and related persons can participate, and was established in 1992.

Objectives:

- Development of women engineers ability
- Improvement of working & social environment
- Social contribution to increase the number of women engineers

Activities:



Copyright (C) 2013 Japan Women Engineers Forum

16

Discussion with Ministry of Economy, Trade and Industry (METI) in JWEF Conference 2013

- **"What should companies and women do to realize economic growth?"** June, 2013
 - Lectured by Keita Nishiyama who is the deputy director-general, economic and industrial policy bureau
 - Panel discussion by Nishiyama and Watanabe who is the JWEF chairperson
 - 60 women participated
- Key messages and discussion
 - Women activities are the core of the Japan growth strategy.
 - Need to expand both labor force participants and responsibility activities of women.
 - Women should challenge higher-level positions.

In some case, take risks!!



Keita Nishiyama, Vice-Minister of METI, speaking at JWEF conference



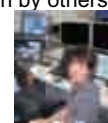
Discussion by K. Nishiyama, METI & M. O. Watanabe, JWEF

Copyright (C) 2013 Japan Women Engineers Forum

17

JWEF Encouragement Award (JWEF award)

- JWEF award honors young female professionals whose remarkable leadership changed the mind-set of colleagues, company, and society.
 - A prize for under 40 years old
 - Annual award, started in 2009
 - Candidates are applied for the award in self-recommendation or a recommendation by others.



2010 Winner, Aiko Nagamatsu, Japan Aerospace Exploration Agency (JAXA)

Copyright (C) 2013 Japan Women Engineers Forum

18

Interview with a Winner

- 2011 Winner : Kiriko Chosokabe
 - An engineer of Ricoh
 - She is working for Multi-Function Printer (MFP) development.
 - She has been contributing to energy saving of MFP in the office using the knowledge of electrical circuit design.



Kiriko Chosokabe, Ricoh.
Chosokabe became a JWEF management committee member since 2012. Her areas of activity are more expanding.

"The award was the starting point of my active career development."

After the award, she was recognized as a role model both inside and outside her company.

The situation strengthened her self awareness, and expanded her knowledge, experiences, and networks.

Copyright (C) 2013 Japan Women Engineers Forum

19

Winners of 2012 and 2013



Four of the five winners were nominated by their manager's recommendation.

Manager's understanding and support are key factors for success of woman engineer!!

Copyright (C) 2013 Japan Women Engineers Forum

20

Consulting for diversity and inclusion

- When returning to job from baby care leave, many Japanese women feel difficulty to continue working
 - Time management for job and child care
 - Keeping the job quality as same as before child born
 - Hesitate for not working over-time
- If woman overcomes the issues that are particularly for having little children, she could grew up remarkably. And the valuable experiences would be helpful for her career development.
- ... However, Japanese women tend to leave the workplace.
- It is essential to improve the workplace environment
- Rie Yamaguchi,
 - Background: software engineer and manager
 - Has experiences of diversity promotion activities in Japanese company
 - **Supports companies and managers to utilize working mothers, and also encourages mothers to develop their career.**
- Her unique activity is useful for companies which do not have the experience of supporting baby-care leave.



Rie Yamaguchi,
Career consultant

JWEF management committee member

Copyright (C) 2013 Japan Women Engineers Forum

21

Conclusion

- Lessons and learned from the case studies
 - Long-term and continuous activities could increase the number of female leaders.
 - Key points for women engineers success
 - Business Requirements
 - Executive's commitments and directions
 - Changing mind-sets of managements
 - Improving women's self awareness
 - The strong strategies brought the understandings of managements and further leaderships of women.
- **Now that Japan Revitalization Strategy began, let's strengthen our leadership!!**

Copyright (C) 2013 Japan Women Engineers Forum

22

Session 3 Speaker (Japan)



Keiko YAMAMOTO

Representative of Water Quality Asian Cooperation Network
(WaQuAC-NET)

Professional Engineer for water supply

Educational background

1970 graduated from Faculty of Engineering (Sanitary engineering), Hokkaido University

Career

1970-1990: Chiba Prefecture Waterworks Bureau

1992-1993: JICA Expert for water supply and sanitation in Bolivia

1995-2012: JICA senior adviser for water supply and sanitation

Advice, study and training for ODA project for Bolivia, Guatemala, Cuba, Kenya, Tanzania,
Morocco, Bulgaria, Cambodia, Laos, Vietnam and etc.

2008-now: Representative of WaQuAC-NET(Water Quality Asian Cooperation Network)

*JICA: Japan International Cooperation Agency

Session 3 Speaker (Japan)



Ryo KIMURA

President of professional women engineer (PE-LADY) Japan
Co., Sakae Design

Tokyo University Agriculture and Technology

Qualification

Professional Engineer for Agriculture 「Rural Environment」

First-class architect

First-class landscaping construction management engineer

Educational background

1976 graduated from Architectural course Musasino Art University

Career

1976-1978: Co., Central consultant (Building Department)

1978-: Co., Sakae Design Environmental improvement section

- Public buildings design

 - Community- center. Pump station, Individual residence

- Various Parks design

 - Children's park, City park, Botanical garden, Disaster evacuation park

- Rural environment improvement

 - Rural Environment Management Project

- Rural planning

 - Village development Rural activation KI

Women Engineers in Japanese Society

-Their role and activities-

RYO KIMURA¹, KEIKO YAMAMOTO²

(1. President of Professional Women Engineers(NPO): r-kimura@sakae-sekkei.co.jp,

2. Representative of Water Quality Asian Cooperation Network : yamake53@yahoo.co.jp)

Abstract: Proportion of women engineers among the whole engineers is only 8.6%. For increasing women engineers, group of professional women engineers (NPO: Nonprofit Organization) started following activities, education to female students and supporting to acquire the national qualification “Professional Engineers” for young women engineers.

Keywords: Professional Engineers, National qualification, Role model

1. Introduction

Women who work for science and engineering field are not so many in Japan. Proportion of women engineers among the whole engineers is only 8.6 percent^[1]. Women engineers should be given the opportunity to social activity through evaluating their career and ability purely. They should not be evaluated by gender biased. However, it is difficult for Japanese society to recognize the ability of women.

There are several reasons why women engineers do not increase in Japan. For instance, these are nature of Japanese society and the thinking of parents. Long working hour system is common in Japanese companies. Moreover 99.7% of companies are small and medium size. (The 75 percent is small size companies). Therefore, they cannot have margin to employ women who cannot work overtime and go to business trip anytime. Women engineers are often evaluated as lower ability than men engineers.

Women must take care of children and aged parents at home. Even if women are employed in a company, they have to quit their job when they have a baby or aged parents who need care.

While, many parents who know the difficulty which women work equally with men in the society do not want that their daughters go to science and engineering department of university. By their influence, many girls have no choice to be engineers from small children. It is one of obstacle which women engineers increase.

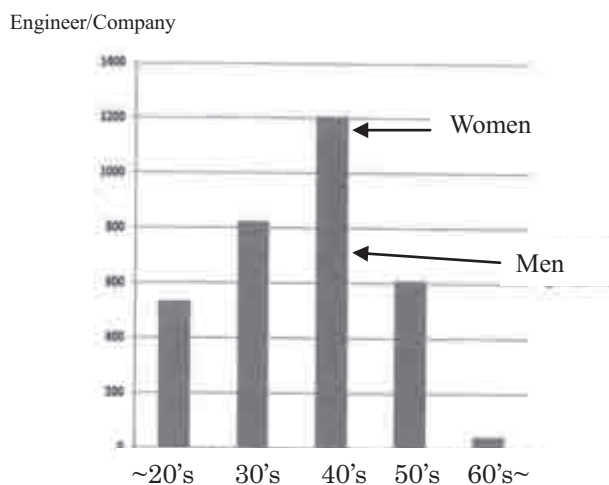


Figure1 Number of women engineers and men engineers by generation^[2]

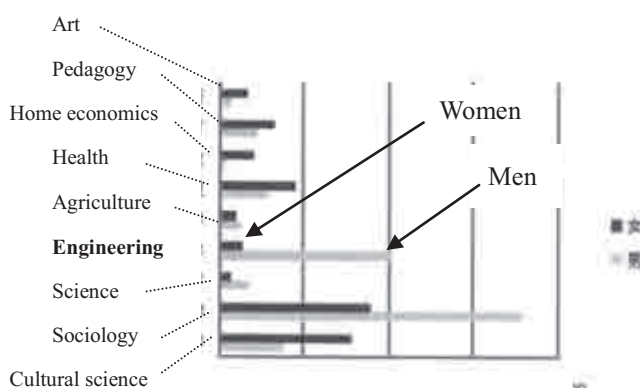


Figure 2 Number of university enrollment by each department^[3]

2. Professional Women Engineers

In the context of sever Japanese society for working women, the women who are working as engineers after studied the science or engineering at university have been helped by national qualification of ‘Professional Engineer’. Professional Engineer is authorized by the government to engineers who have enough experience and ability. They are leaders in engineering field also.

Professional Women Engineers is a group that the members are Professional Engineers and have contributed for engineering in Japan. Main members have overcome the several difficulties and widen the range which women engineers could work. The purposes are promotion and education for developing the science and engineering, supporting the women engineers and scientists for advance to society, establishing the society of gender equality and so on. ^[4]

3. Importance of education to children and qualification

One of most important activity is to increase women engineers. For that, we work for increasing the children who want to be engineers. We sometimes go to high schools to tell the fun of science and engineering field. When we asked questions to female students in several high schools, “What is science or engineering job?” They always answered “Science teacher”, “Pharmacist” and “doctor”. When we asked another questions to them “If you go to science or engineering department of university, your parents and teachers are pleased?” More than 80 percent of female students answered “No”. We thought that it was the knowledge influenced by adults nearby and a reason why they do not want to become engineers and scientist.

Moreover, it is also our important activity to support young women engineers for becoming Professional Engineer. Qualification in Japan proves individual ability. And also enterprises which have several qualified engineers have advantage in their business. As national qualifications, there are patent lawyer, professional engineer, electric chief engineer, authorized architect, landscape construction maintenance engineer, system analyst and so on. Professional engineer is AA rank and top class. We asked a question to women engineers “Qualification became a trump in your job?” A half of answers are “YES”.

4. Activities

Based on the above situation, we are working in several activities as follows.

✧ Lecture at high schools and universities (For widening the entrance)

We introduce kinds and fun of science and engineering jobs using role model in order to promote female student to science and engineering university. .

✧ Salon of Engineering (For continuation)

Opening the tea party style meeting every three months for bringing up women’s leaders in Japanese society, supporting female students who want to work in engineering field and supporting to acquire qualification of Professional Engineer.

✧ Symposium (Raising social consciousness)



Figure 3 Salon of Engineering

We are working as engineers. Therefore, we have to open the lectures for several professional engineer and exchange knowledge and information with people for aiming the better local society.

✧ Portfolio (Be continuing)

We introduce the role model of elderly women engineers in order to aid women who work at engineering field.

✧ Others

International exchange of technology and information, publishing the newsletter.

5. Conclusion

Many teachers and parents still hesitate that female students go to science and engineering department in university in Japan. However, there are many women engineers who contribute for society. It is important to show the practical roadmap to young women engineers and university students like role model in order to push their advance.

Mission of our activities is to renovate whole social thinking through recognizing the several difficulties of young engineers and helping their overcome. We hope many women engineers and readers will be born in Japan near future by continuing our activities.

REFERENCES

- [1] Recommendation on positive action toward women engineers activities 2013, (Japan Soc. for Technology), Page15, Original source: National Census 2010, Ministry of Public Management, Home Affairs, Posts and Telecommunications
- [2] The same as the above, Page 41、 *Result of questionnaire, 41 companies answered, target companies information page 31
- [3] The same as the above. Page 15, Original source: School Basic Survey 2010, Ministry of Education, Culture, Sport, Science and Technology
- [4] Homepage of Professional Women Engineers: <http://www.pej-lady.org/shushi.pdf>

Women Engineers -Their role and activities-



Contents

- Background
- Professional Engineers
- Importance of education to students and qualification
- Activities
- Conclusion

Background

Woman Engineer is only 8.6%

Source: National Census 2010

Why? women engineers do not increase.

- Reason-1
Long working hours culture/system ?
- Reason-2
Girls parents/teachers are negative ?

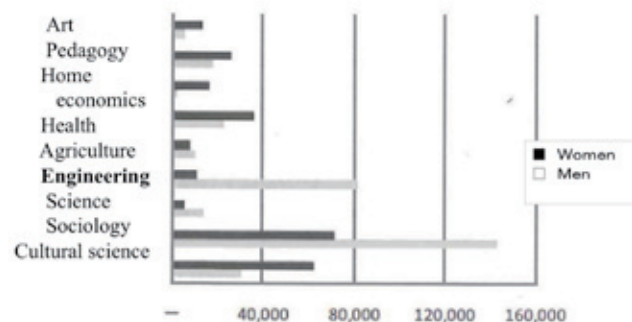


Figure 2 Number of enrollment at each department in universities 1

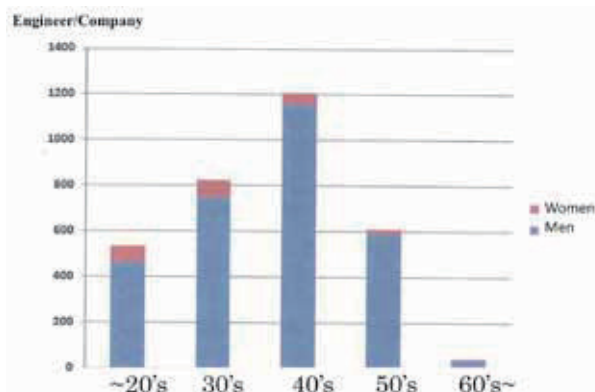


Figure3 Number of women engineers and men engineers by generation 2

Professional Engineer (PE)

It is a national qualification

PE has to have extensive scientific and technical expertise and ability of applying the expertise to actual fields (21 fields)

PE is given by examination

PE is used as evaluation of company's ability

77,394 PE (1958~2013)

1,120 Women PE (") 1.44%

Professional Women Engineers

Established in 1993

NPO (Non Profitable Organization) in 2007

Objectives

Contribution for development of science and engineering in Japan

Education and Support for the women engineers and scientists, students

Establishing the society of gender equality

Importance of education to students and qualification

- Disseminate *the fun of Science / Engineering* to students
- Show the role model →
We are women engineers!!
- Tell the benefit of *Professional Engineer*
Support to get the qualification of *Professional Engineer*

Activities

- Lecture at high schools /universities
- Engineering saloon
- Symposium
- Publishing portfolio
- International exchange of technology and information
- Publishing the newsletter.



Let's go to science and engineering field in 2006

-You can do anything!-

Answers of questionnaires: 89

■ Was it good reference for selecting job ?

Yes 81
No 2
Neither 6

■ Which corner had interest?

1 Cosmetic corner 22
2 Bio•Medical supplies 12
3 Machine and tool•Universe•Water environment 11 each

■ Do you want to participate in this kind of event?

Yes 68
No 1
Neither 16

Engineering saloon



Conclusion

Our Mission

To change the thinking of whole society
To overcome several difficulties
by continuing our activities



Near future

A lot of women engineers
and leaders in Japan

ICWES 15 July 22, 2011, Adelaide, Australia



References

1. School Basic Survey 2010,
Ministry of Education, Culture, Sport,
Science and technology
2. Recommendation on positive action toward women
engineers activities 2013
Japan Soc, for Technology
3. Institution of Professional Engineers
Annual Report 2012
4. Homepage of professional Women Engineers:
<http://www.pej-lady.org/> (Japanese)

Session 3 Speaker (Korea)



Eunkyong LEE
Professor,
Department of Science Studies, College of Natural Science,
Chonbuk National University

Education

Degree: BS, Description: in Physics, School: Seoul National University, Korea, 1989

Degree: MA, Description: in History of Science, School: Seoul National University, Korea, 1991

Degree: PhD, Description: in Science Studies, School: Seoul National University, Korea, 1997

Research Field

Science, Technology and Society, Science Policy, Science and Gender

Career History

Postdoc Researcher, Science Culture Research Center, POSTECH, Korea, 2001

Research Fellow, Science Technology Policy Institute(STEPI), Korea, Oct. 2001-Feb. 2004

Professor, Department of Science Studies, Chonbuk National University, 2004-Present

Director, Science Culture Research Studies, Chonbuk National University, 2012-Present

Korean Focal Point on Gender and Science, OECD, 2006-2007

Achievements

Papers on policy for women in ST

Papers on Public Acceptance of New Technology in Society

Current Memberships

Mem.: Korean Society of History of Science; Korean Society of Science, Technology and Society; Korean Society of British History

Leadership of Women in S&T, Why Important and How?

Eunkyoung LEE¹

(1. Department of Science Studies, Natural Science College, Chonbuk National University, 567 Baekje-daero, Dukjun-gu, Jeonju, 561-756, KOREA, eklee@jbnu.ac.kr)

Abstract: To fix the women's problems in S&T, many measures and programs have been designed and carried out in many countries. Among them, girl friendly science education and programs for promoting and keeping more women in S&T are common. Despite of these efforts and programs, the progress has been gradually and the women in S&T are still suffering from the similar problems. It is partly because women have been excluded from the decision making and the positions in charge of managing research projects and institutions in S&T. As the result, Women in S&T have remained as the beneficiaries of support and help from the above.

This paper argues that we need to have more women leaders in S&T to make decisions in S&T policy to change the rules of the game. Based on the idea that leadership is a kind of ability to acquire by means of learning and experience, this paper also makes suggestions about how to develop the leadership of women in S&T.

Keywords: leadership, women in science and technology, decision making, Korea

1. Introduction

Since 1990s, various efforts to support women in S&T have been focused on the number of women in S&T and the breakdown of the entry barrier at institutional level in EU, the US and some Asian countries; for example, girl-friendly science education programs or the affirmative action in the US.

Although those policies have been getting things better gradually, women are still minor in S&T and still suffering from “leaky pipe”, “glass ceiling”, and “work-family balance”. Why? It is partly because few women can participate in the policy decision making. In the planning and carrying out the support policies, women in S&T have been regarded as beneficiaries by the policy makers, mostly men. Therefore policies for women in S&T have not been effective enough to make fundamental changes.

To change the rules of the game, this paper argues that we need to have women leaders in S&T to make decision in S&T policy. Based on the idea that leadership is a kind of ability to acquire by means of learning and experience, this paper also makes suggestions about how to raise the leadership of women in S&T.

2. Why Leadership?

Due to the efforts of women leaders in S&T, the policy for women in S&T was institutionalized in the early 2000s in Korea and has been carried on. How could they do it in the strongly male dominating society like Korea? And what are the results of the policy and how to get beyond the limits of the policy?

2.1 As Advocates and Advisors for the Policy for Women in S&T

Since the mid 1990s, some women scientists and engineers raised women's issues in S&T and argued that the government should take a policy action to solve them. Most of them were professional researchers at universities or public research institutions and recognized minority status of women in S&T at every level. They formed a separate organization to represent women only in 1993, the Association of Korean Women Scientists and Engineers(KWSE). Leaders of KWSE and other women scientists and engineers claimed for the support of women in S&T by means of forums to invite policy makers, participation in the government committees, policy researches, public lectures, and etc.

In 2002, the most important thing happened for the development of the policy for women in S&T in Korea: the enactment of the Act for Fostering and Supporting Women in S&T. According to the Act, the 1st Basic Plan for Fostering & Supporting Women in S&T(2004-2008) was begun in 2004, which is a national plan for the systematic support policy machinery. Although there were some political considerations in this enactment, however, women leaders in S&T, especially KWSE played a very important role for it. They persuaded parliament members and government officials to introduce the bill and cooperated with policy makers at the government to make the policy more organized and systematic. For example, they argued the necessity of an agency for support of women in S&T which resulted in the Center for Women in Science, Engineering and Technology(WISET, reorganized in 2011 from the National Institute for Supporting Women in S&T founded in 2004). The Recruitment Target System(RTS), which strongly recommends the public research institutions to recruit women at the designated rate, was also suggested for the first time by women scientists and engineers[1].

In spite of their contributions, once the policy platform was settled down, the policy for women in S&T became very administrative. The role and participation of women scientists and engineers moved from designing and planning to becoming recipients of grants or running policy programs.

2.2 Participation in Decision Making

The experience during the establishment of the policy for women in S&T led women leaders to recognize the influence of organized activities and the policy decision making. In addition to the KWSE, several women's organizations in S&T were formed to represent individual fields in the early 2000s. Among them, the Korea Federation of Women's Science and Technology Associations(KOFWST) is to network all of the women's organizations in S&T. Playing the role of the president of such organizations, women scientists and engineers showed and, at the same time, developed the ability to manage organizations and to make a S&T policy. They also built the academic-policy network.

That is how we had the women leaders in S&T at higher positions in the mid 2000s. For example, 2 women scientists were elected as presidents of the government-supported public institutions, and another women scientist in 2011. Those 3 institutions were established in the 1970s and they were the first female presidents. In 2008, a female physicist was elected as a Member of the National Assembly and in 2012, a female researcher entered the National Assembly as a vocational representative. Both of them contributed to the development of the

policy for women in S&T.

With those women leaders who transferred from academia to management or politics, we learned how important the participation in the decision making or management is for the better situation of women in S&T. This is why I emphasize the leadership of women in S&T[2].

3. How to Get More Women Leaders in S&T

In the history of science and technology, there are 3 different types of leaders: an individual hero like A. Einstein, a school builder with pupils like J.J. Thomson, and a manager or policy maker like Vannevar Bush. Individual heroes can play a role model for young students. However, this kind of leadership is not very common in this age of the organized big science. To be a school builder or an eminent teacher, scientists should have the ability to manage different kinds of research resources as well as the ability to discover the talent of his/her pupils. Unlike J.J. Thomson about 100 years ago, a scientific leader today is required to be not only an excellent researcher himself/herself but also a good manager or organizer. To be a scientist-manager or a scientist-policy maker, scientists need to gain the experience and ability to analyze various information and then to integrate them into a policy.

Leadership is a kind of ability, rather than talent, to acquire through learning and experience. Considering the abilities necessary for different kinds of leadership, the education or training programs for women in S&T at every level should include the curriculums about how to manage humans and other resources and how the research is connected to the wider society. In Korea, for example, some research projects provide graduate students to design research and lead small research teams consisting of high school students and undergraduate students. WISSET offers regularly the workshops or leadership trainings for the established women scientists and engineers to be prepared for the job at higher or managerial positions.

4. Conclusion

Leadership is one of the effective means to solve the women's problem in S&T because leaders in charge of decision making can change the rules of the game. To be an excellent researcher is not the sufficient condition to be a good leader because leadership today requires different kinds of abilities at the same time.

REFERENCES

- [1] Eunkyong Lee, Boundary Agenda between Gender Equality and Human Resource, Asian Women, Seoul, 2009, vol.25no.2 29-47.
- [2] Eunkyong Lee, From Gender to Human Resource: the Growth of Korea Policy for women in S&T and its Limit(in Korean), Gender&Culture, Seoul, 2012 vol.5no.2, 7-33.

Leadership of Women in S&T, Why Important and How

Eunkyoung Lee (李恩京)
Chonbuk National University, Korea

Why Leadership?

- Awareness of Women's Problems in S&T
- Solutions: policies, measures, programs
- Achievements but NOT enough
 - Participation in Decision Making
 - Not Beneficiary, But Progressive Actor

Problems of Women in S&T

1. So Few
→ Fix the Number
2. Entry Barriers & Glass Ceiling
→ Fix the Institution
3. Gendered Nature, Ungendered Knowledge
→ Fix the Knowledge

Policies & Programs

- More Women into S&T to Fix the Number
 - Girl-friendly Science Programs, Role Models, Mentoring, Girls' Science Camp, etc.
- Fix the Institution
 - Gender Mainstreaming in S&T in the 6th Framework Program (EU, 2001)
 - ADVANCE(NSE, US, 2001), Recruitment Target System(Korea, 2002)
- Fix the Knowledge
 - Gendered Innovation(<http://genderedinnovations.stanford.edu/>)

Some Progress but NOT Enough

- Progress
 - Institutionalization of Supporting Policy: Enactment, Master Plan, etc.
 - Growth of Women in S&T: Students, Researchers, Professors, etc.
 - Reducing the prejudice about women and S&T
 - Experience of Participation of Decision Making
- But Still Women in S&T are.....
 - Only about 10-15% of academic positions
 - Populated at lower positions and unstable status than men
 - Alienated in S&T, esp. in engineering
 - Suffering from the work-family balance

Why Leadership?

- Excluded from the decision making
 - Policies and measures from the above
 - Women in S&T are regarded as passive beneficiaries
 - Only a few women in S&T as advocates and advisor
 - Gap between what women in S&T need and what the government provides
- Need to become policy makers, decision makers, and managers

3 Different Types of Leaders in S&T

• A. Einstein

- Great physicist, but individual
- Few Collaboration



• J.J. Thomson

- Great physicist & teacher & research leader
- Director of the Cavendish Lab, Cambridge Univ. for 35 years
- 7 Nobel Prize Winners ex. E. Rutherford, Charles Wilson.



3 Different Types of Leaders in S&T

• Vannevar Bush

- Engineer **researcher**
- Professor of the Department of Electrical Engineering, MIT
- Vice President of MIT & Dean of the MIT School of Engineering **manager**
- President of the Carnegie Institute of Washington
- Chairman, National Committee for Aeronautics
- Chairman, National Defense Research Committee **administrator**
- Director, Office of Scientific Research and Development



3 Different Types of Leaders in S&T

• Vannevar Bush

- Founding the Research Policy for Basic Science in the US
"Science, Endless Frontier"
- Establishing National Science Foundation

How to Get More Women Leaders in S&T

• Leadership?

- Some talent
- Ability by training and experience
- Integrating various information into agenda
- Networking

How to Get More Women Leaders in S&T

• Korean Women Leaders in S&T

- Successful research career
 - Experience of government committee, networking with policy makers, founding and directing organizations, managing big projects and laboratories
 - Contributing to the making of policy for women in S&T in Korea
- ministers, member of the National Assembly, presidents of government-supported research institutes, Presidential Advisor

How to Get More Women Leaders in S&T

• Programs to help women in S&T get experience?

- To share experience of women leaders
- To participate in networking
- To get knowledge and information
- To manage different kinds of resources



Closing Remarks

Closing Remarks



Noriko HIRATA-KOHNO

Professor, College of Science and Technology, Nihon University
Chairperson of Japan Inter-Society Liaison Association
Committee for Promoting Equal Participation of Men and
Women in Science and Engineering (EPMEWSE)

Education

Degree: BS, Description: in Mathematics,

School: Ochanomizu University, Year: 1979

Degree: PhD, Description: in Mathematics,

School: University of Paris 6, Year: 1989

Research Field

Number Theory, Mathematics

Career History

High School Teacher,

Assistant at Nara Womens' University,

Assistant at Tokyo Institute of Technology,

Lecturer at Nihon University,

Associate Professor at Nihon University,

Professor at Nihon University,

Achievements

Diophantine new methods

Current Memberships

Mathematical Society of Japan,

Societe mathematique de France



Poster Session

Research Poster Presentation by Young Woman Researchers

1. Mayumi Uchida

Nihon University School of Medicine

Diallyl trisulfide enhances TRAIL-induced apoptosis in human melanoma cells through endoplasmic reticulum response

2. Mitsuho Seki

Nihon University school of Dentistry

The Enhanced Pneumococcal LAMP Assay: A Clinical Tool for the Diagnosis of Meningitis Due to *Streptococcus pneumoniae*

3. Yoko Tanaka

Nihon University School of Dentistry at Matsudo

IL-1 β gene expression and NF-kappaB activation in gingival fibroblasts from Down syndrome

4. Seiko Yamamoto

Nihon University School of Dentistry at Matsudo

Gene therapy for hypophosphatasia.

5. Megumi Yokoyama

Nihon University School of Dentistry at Matsudo

Precursor cell markers of salivary glands

6. Kyoko Takahashi

College of Bioresource Sciences, Nihon University

Epigenetic control of host genes in intestinal epithelial cells by commensal bacteria

7. Megumi Fukuzawa

College of Bioresource Sciences, Nihon University

Influence of exercise setting on heart rate response and body activity in dogs (*Canis familiaris*)

8. Fumie Shinmachi

Department of Bioresource Science, Junior College, Nihon University

Cd accumulation and detoxification system in the Cd-tolerant plant *Polygonum thunbergii*

9. Kimino Kawaguchi

School of Pharmacy, Nihon University

Experimental model of neuroleptism: role of heme oxygenase-1 in the vascular insult associated with hind-leg paraparesis.

10. Maki Minakawa

College of Humanity and Science

Driving an Equilibrium Acetalization to Completion in the Presence of Water

11. Miki Aoyagi

College of Science and Technology, Nihon University

Learning theory and singularities

12. Noriko Hirata-Kohno

College of Science and Technology, Nihon University

Diophantine problems

13. Tomoe Komoriya

College of Industrial Technology, Nihon university

Development of High Sensitive Latex Reagent for C-reactive protein by Epitope Analysis in Monoclonal Antibody

14. Akiko Kobayashi

College of Humanity and Science, Nihon University

Magnetic Single-component Molecular Conductors Exhibiting Strong π -d Interactions

15. Yumiko Nagoh

Japan Women Engineers Forum, University of Tokyo

Major activities of Japan Women Engineers Forum

16. Kiriko Chosogabe

Japan Women Engineers Forum, Rico Co. Ltd.

Finding role models in Japan Women Engineers Forum

17. Ikuko Imoto

Japanese Women Professional Engineer

Recent Trend of Japanese Female Professional Engineers

18. Yoshiko Ishida

Japan Women Engineers Forum, Rico Co. Ltd.

The institution of Professional Engineers, Japan

19. Toyoko Ochiai

Nihon University School of Medicine

CareerWay Project, Nihon University Chairman of the Board of Trustees Grant

CareerWay Project Members Nihon University



Chair Opening Ceremony, Closing Remarks

Hitomi KUMAGAI

Professor, College of Bioresource Sciences (CBS), Nihon University



Chair Poster Session

Junko FUJITA-YOSHIGAKI

Professor, Nihon University School of Dentistry at Matsudo



Chair Poster Session

Megumi SATO

Lecturer, Nihon University School of Dentistry



Chair Keynote Speech

Hisako OHTSUBO

Senior Researcher, Nihon University School of Pharmacy



Welcome Reception

Mariko TACHIKAWA

Professor, Nihon University School of Pharmacy



Poster Session

Akiko KOBAYASHI

Professor, College of Humanity and Science

2009 L'ORÉAL-UNESCO Awards for Women in Science



Poster Session

Fumie SHINMACHI

Associate Professor, Nihon University Junior College (Fujisawa Campus)



Yasuko YOSHINO

Professor, Nihon University Junior College (Funabashi Campus)

The 5th JCK WLF Organizing Committee

Chairperson Chikako YOSHIDA-NORO

Professor, College of Industrial Technology (CIT), Nihon University, Japan

Vice-Chair Kayoko SUGAHARA

President, International Network of Women Engineers & Scientists (INWES) Japan
Tokyo University of Agriculture and Technology

Committee Toyoko OCHIAI

Leader of the CareerWay Project, Nihon University
Professor, Nihon University School of Medicine

Miyoko O. WATANABE

Chairperson of Japan Women Engineers Forum (JWEF),
Fellow & Program Director, Center for Research and Development Strategy,
Japan Science and Technology Agency (JST)

Ryo KIMURA

Not-for profit Organization, The Professional Women Engineers (PE-LADY), Japan
Co. Sakae Design.

Minoru KUNIYA

Executive Director, Japan International Science and Technology Exchange Center (JISTEC)

Akiko N. ITAKURA

National Institute for Materials Science (NIMS)

Executive secretary Hiroko KUDO

Japan International Science and Technology Exchange Center (JISTEC)

Hiroyo WATANABE

Nihon University, Japan

**The 5th Japan-China-Korea Women
Leaders Forum for Science & Technology:
Leadership Education for Women in Science,
Technology & Engineering
(Summary)**

Date: 12 November 2013

Venue: Nihon University, Tokyo

Opening Ceremony

Welcome address

Dr. Chikako Yoshida-Noro, Chairperson of the 5th Japan-China-Korea Women Leaders Forum (JCK WLF) Organizing Committee, Professor, College of Industrial Technology, Nihon University, Japan, opened the symposium and welcomed the participants on behalf of the organizing committee. She pointed out that the first WLF was held in 2008, and that a forum had been held each year since. Dr. Yoshida-Noro explained that the day's meeting was an international symposium of the CareerWay Project of Nihon University, supported by the Ministry of Education, Culture, Sports, Science & Technology (MEXT) and INWES Japan, before outlining the program for the day. Finally, Dr. Yoshida-Noro mentioned that distinguished speakers had been invited from China, Japan, and Korea, and believed that the symposium would be a valuable venue for productive discussions, and provide an opportunity to further trilateral cooperation and build networks among leaders in science and technology across the three countries.

Message from MEXT

Mr. Hiroki Matsuo, Director, Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau, MEXT, offered words of welcome and thanked the organizers and participants. He said that Japan was facing an aging society and the solution to this problem lay in developing diverse and talented human resources. Furthermore, Mr. Matsuo explained that the Japanese Cabinet had placed innovation in science and technology at the center of its strategy for growth, and highlighted the emphasis being placed on innovation, globalization, and diversity in the development of human resources. In this context, Mr. Matsuo stated that leadership education for women in science, technology and engineering (STE) was a core issue for the Japanese government, and believed the 5th JCK WLF would help further the research activities of women.

Opening remarks

Dr. Xuhui Wen

Dr. Xuhui Wen, Professor and Research Fellow, Institute of Electrical Engineering, Chinese Academy of Sciences, congratulated the convening of the 5th JCK WLF and expressed her gratitude to the organizing committee for their hard work. First off, Dr. Wen shared examples of the dramatic turnaround in the number of women among the top students in science at the high school and university levels, compared to the past, and believed that, in this regard, a level of gender balance had been achieved. She said that many reasons had been proposed for this change, but believed that a significant

factor was the attitude of Chinese parents towards the education of their children, regardless of whether they had a boy or a girl. Nevertheless, despite the growing number of women in STE, Dr. Wen declared that the proportion of women leaders and female leading academicians in the field was still very low. To this end, she hoped that fruitful discussions would be held on the subject and that the participants would identify insightful suggestions and actionable items for addressing the issue of the low level of women leaders in STE.

Dr. Hee Young Paik

Dr. Hee Young Paik, President-elect, Korea Federation of Women's Science and Technology Associations, began by welcoming the participants, and expressing her congratulations and gratitude to the organizing committee. She first discussed the fact that the role of women leaders was a key issue of the 21st century, particularly in light of the fact that women's leadership is endowed with sensibility and creativity, and has become an important factor in enhancing national competitiveness. However, she pointed out that there were not enough successful career women who could serve as role models for girls in Korea, or even for Japan and China and stressed the need to cultivate positive images of women in leadership roles, especially, in STE. In this regard, Dr. Paik voiced her commitment to supporting women in claiming an equal share of rights, opportunities and power in their professional fields. Finally, she hoped that the 5th JCK WLF would contribute to the career development of women scientists and engineers by sharing experience and success stories, and helping to establish networks between women leaders in STE across China, Japan, and Korea.

Dr. Kayoko Sugahara

Dr. Kayoko Sugahara, President, International Network of Women Engineers & Scientists Japan, thanked the audience for their participation and expressed her gratitude for the support of Nihon University. She opened her remarks by sharing the achievements of Dr. Akiko Tsugawa, former President of INWES Japan and her reception of the Prime Minister's Award. Dr. Sugahara explained that Dr. Tsugawa had since retired and expressed her own pride at taking over as the new President. Next Dr. Sugahara spoke of how, over the course of the annual JCK WLF, the forum had served as a valuable venue for sharing the good and bad experiences faced by women leaders in China, Japan and Korea. Dr. Sugahara also pointed out that she was particularly excited about this year's topic of women leaders in technical areas. Dr. Sugahara also mentioned that Prime Minister Abe was making efforts to promote the role of women and had promised 3 billion dollars to support women around the world. Finally she

thanked all the organizing staff involved for their efforts in making the meeting a success.

Session 1: Exploring Next Generations of Women in STE

(Session Chair: Dr. Yan Lei, Professor and Deputy Director of Medical Experimental Center, Chinese Academy of Medical Sciences)

Presentations

Japan

Mr. Hiroki Matsuo gave a presentation entitled “Promotion of Science Education and Support for Female Students in Choosing Science Courses”. He began by presenting a breakdown of the population at various levels of education, highlighting the fact that Japan’s population was shrinking and pointing out the need to focus on human resource development. In particular, Mr. Matsuo cited the importance of innovation, globalization, and diversity in human resource development efforts. He also shared three issues that needed to be addressed, which were the need to secure young researchers’ career paths, attract young generation’s interest in science and technology, and support female researchers’ activities.

Next, Mr. Matsuo shared statistics of the percentage of female workers among the total number of workers in Japan, pointing out in particular the fact that the percentage of women in the workforce declined at the upper levels of organizations. While the percentage of female researchers is growing in Japan, this number is still only 14% and lags behind the rest of the world. Mr. Matsuo then discussed possible reasons why there were so few female researchers in Japan, and shared results of a questionnaire conducted among women about leadership positions. The most frequently cited reasons were the difficulties to maintain family and career, and the difficulty to return to work after childbirth.

Moving on, Mr. Matsuo addressed the issue of raising interest in science and technology among young people, which has been on the decline. He provided examples of the government’s measures to deal with this problem, such as the Super Science High School or the Global Science Campus initiatives. Furthermore, Mr. Matsuo also outlined programs designed to support the science careers for female students in secondary school, including efforts to promote science and technology contests.

Finally, Mr. Matsuo hoped that the efforts of the participants in the JCK WLF would promote the cultivation of role models for young women in science and technology and aid their career development.

China

Dr. Li Zhang, Development Research Center of China Association for Science and Technology, opened by expressing her gratitude for the opportunity to speak at the JCK WLF. She then proceeded to give a presentation on exploring the next generation in science and technology. As background, Dr. Zhang explained that she had conducted a survey on the attitudes of female university students towards science and technology professions in order to explore the “leaking pipeline” phenomenon, whereby only 5% of female students remained at the highest level of science and technology, despite the fact 45.9% of PhD and MSc graduates were women.

Presenting her findings, Dr. Zhang said that students had vague and stereotyped ideas about science and technology professions. In particular, she pointed out that 46.7% female students felt doing science research was boring and dull and that 53.3% female students suggested that men were better than women in doing science research. In addition, while the image of women scientists is positive, professions in the field have become less attractive. Furthermore, students could not find adequate role models in such professions, and were unable to name any famous Chinese female scientists, nor did they have much contact with female scientists. That being said, female students were eager for contact with women scientists, but the majority were more interested in contacting those in companies, over those in research institutions and universities.

To conclude, Dr. Zhang stressed the need to share information and experiences with other countries to explore opportunities to promote the percentage of women in science and technology. Finally, she shared examples of efforts made by the Development Research Center of China Association for Science and Technology to attract female students such as organizing campus visits by exemplar female scientists, measures to raise public recognition of women scientists, and the holding of academic fora for young students. In closing, Dr. Zhang expressed her desire to work together with others from China, Japan and Korea to address this issue.

Korea

Dr. Hyomin Kim, Professor at Ulsan National Institute of Science and Technology, opened by providing an overview of the percentages of women in academia in STE, and highlighted the sudden drop off in women at the highest levels. Dr. Kim pointed out that this phenomenon was occurring across all economic sectors. She then proceeded to discuss the need to change the gendered culture and attitudes surrounding science and technology and described the interdisciplinary course she held to encouraged students to understand how the practices of science can be affected by the gendered culture in which scientists are immersed.

In terms of the assessments and implications for next generations, Dr. Kim explained that the course was designed to raise awareness that science was socially and culturally driven, but that the culture of science could be changed over time. Furthermore, the course aimed to foster a willingness to challenge dogmas and venture alternative opinions and raise the self-confidence of female students to encourage them to continue to study science and engineering.

QA & Discussion

Dr. Yoshida-Noro opened the discussions and pointed out the shared experience across China, Japan, and Korea of low percentages of female scientists at the highest levels, and wondered what some of the most effective policies or tools were in China and Korea.

Dr. Min Hu, Peking University, shared her own experience and believed that women who wanted to work in STE fields needed very strong wills and confidence and asked Mr. Matsuo about some of the initiatives being implemented at the university and governmental levels. Mr. Matsuo explained that while men and women both worked hard in these fields, there were inevitably a number of obstacles facing women, and the difficulty for the government was to determine how best to support women. However, personally he believed that useful efforts included demonstrating the contributions and importance of women, and initiatives to change the mindset of men.

Dr. Hu expressed her agreement with Dr. Kim's presentation and the need to deepen understanding of the effect on gendered cultures on science and technology, particularly in China, Japan and Korea, where there was a strong association between women's roles and raising families. Mr. Matsuo pointed out that while administrative support systems were in place, social support was needed in terms of a favorable societal mindset. Dr. Kim commented that in addition to raising the total number of women in STE and

therefore the probability of women making it to the highest level, gender awareness raising activities needed to be conducted among both men and women.

Dr. Sugahara spoke of her experience visiting a Super Science High School and described her amazement at the great opportunities provided to students participating in this program. She wondered how much having such an experience at an early age could have impacted her own life and career.

Mr. Matsuo also discussed the low percentage of Japanese students studying abroad compared to China and Korea, and said that the government was aiming to double this number by 2020. He also noted that rather than the US, more Japanese students were interested in China and Korea, and hoped that this too would contribute to building ties between the three countries.

Dr. Heisook Lee, Director, Korea Advanced Institute for Supporting Women in Science, Engineering and Technology, discussed some examples of Korean policies. She first described the introduction of a recruitment quota system for government-sponsored research institutions, but expressed frustration however, at the fact that there was no set deadline for when these quotas had to be achieved. Dr. Lee also mentioned the publication of gender diversity data for individual institutions, which had helped raise awareness of gender inequality in various organizations. In addition she cited research funding schemes for young female researchers, and the formulation of a legal act for women's development, whereby 30% of the members of public committees have to be women by 2017.

Dr. Hisako Ohtsubo, Nihon University, talked about her efforts to disseminate information in English about the gender disparity in science and technology in Japan and stressed the importance of sharing such information with the rest of the world and of establishing global networks.

One participant raised a question about the low interest in science and technology among young students and asked Dr. Zhang if there was any evidence that interest was growing among young scientists in China. Dr. Zhang admitted that obvious results were not readily available. Dr. Heisook Lee pointed out the difficulty of seeing concrete results over a short period of time, however, she did highlight that in 2009, the academic results of female students in science was higher than those of boys, in Korea.

Next a question was directed to Dr. Zhang about the preference of young female scientists to work in companies over research institutes. Dr. Zhang clarified that the Chinese government was investing in companies to promote innovation and the increased funding was perhaps attracting students.

A question was then asked about efforts to raise awareness among men as well as women. Dr. Kim commented that male students and professors often attended her course, Dr. Yoshida-Noro added that she also held seminars about the benefits of both men and women having careers, which was attended both sexes.

Dr. Matsuo commented that parents were hesitant to allow their female children to pursue careers in STE, and highlighted the importance of changing parents' mindsets in order to change the mindset of society.

Dr. Lee shared the experience in Korea, where recently, it was found that 50% of students chose their career based on the recommendations of their parents, whereas in the past, teachers played a bigger role. She explained that efforts were being made to support career development teachers and help them explain the merits of science and technology to parents.

Poster Session

A poster session was held concurrently with lunch. Participants were asked to vote for two research papers that they thought were the most excellent.

Welcome Address

Dr. Kichibee Otsuka, President, Nihon University, expressed his delight at welcoming the participants of the JCK WLF. He also thanked MEXT and INWES-Japan for all their support in organizing the 5th JCK WLF. Dr. Otsuka also spoke about how Nihon University was selected to participate in a government funding program designed to promote women in academia and said that the university had continued to conduct gender equality efforts on its own after funding ended. Next, Dr. Otsuka noted that while constitutionally, there were equal rights for men and women, in practice, women had less opportunities to maximize their potential. Furthermore, Dr. Otsuka emphasized the importance of maximizing the potential of both men and women in light of Japan's aging population and declining birthrate. He then mentioned the low global ranking of Japan in the Global Gender Gap Report in Japan in politics and economics, pointing out that China and Korea had also ranked relatively low. Dr. Otsuka concluded that

cooperation between these three countries would be crucial for addressing this issue and believed that the efforts of the JCK WLF would contribute to these efforts.

Keynote Speech

Dr. Hideko Kunii, Professor, Graduate School of Engineering Management, Shibaura Institute of Technology, delivered the keynote speech, speaking about the need for more women to be leaders in STE. She began by highlighting the important mission of women in STE in the changing world. With regard to the changing world, Dr. Kunii cited the evolution of ICT and its impact on society and its effect of accelerating globalization, the economic crises among developed countries contrasted with the economic growth of emerging countries, and serious deterioration against sustainable planet. Amidst these paradigm shifts, Dr. Kunii believed that the importance of STE was growing.

Moving onto regional issues, Dr. Kunii spoke of the strong gender bias in China, Japan and Korea, in spite of remarkable technology advancements, and the aging of the populations in these countries. In particular, she noted that Japan ranked 105th out of 136 countries on the 2013 Global Gender Gap Report.

Then, Dr. Kunii discussed the role of innovation in bringing about social and economic reform. Moreover, she pointed out the need for diversity in culture to foster innovation, and in particular emphasized the need for women to take initiatives in policy-making and participating in STE.

However, there is a shortage of women in STE and Dr. Kunii stated that this was due to social gender biases. STE fields have been traditionally treated as part of men's world and even now, this mindset has been retained in education in Japan, contributing to the large gap between the demand for women in STE and the actual supply available. To address, Dr. Kunii explained that the government had introduced a target of raising the percentage of female faculty members to 30%.

Next, Dr. Kunii shared examples of gender bias in Japan. Firstly, there are poor supports for work life balance, such as a lack of child care systems, and a prevailing concept of the separation of gender roles, where men work outside the home, and women have to take care of domestic duties. Furthermore the career path for women is limited and often it is simply assumed that women will leave the company eventually to start a family so less is invested in their careers. This is also reflected in career planning.

Socially, issues exist in terms of the mindset of the people, legal matters, and the policies of the private and public sectors, leading to a sense of insecurity and lack of confidence among women.

To combat these issues, the emergence of global women leaders is required and recognize their societal mission. To achieve this women need adequate job assignments and experience, encouragement from their mentors and superiors, networking among career-oriented women, and participation in old boys' networks.

Dr. Kunii then discussed the suggestion of the Japan Society of Technology, which has called for affirmative action for the empowerment of women, collection and dissemination of data on women engineers, support for women to enter STE colleges, and greater leadership among executives and middle managers towards achieving gender equality. However, she noted that the existence of a lack of understanding for affirmative action among the public, and resistance from women in particular. Still, Dr. Kunii argued that the issue of affirmative action extended beyond the individual but was a matter of society-wide importance aimed at ensuring everyone can enjoy gender equality.

To summarize, Dr. Kunii concluded that women in STE were urgently needed for innovation but were in short supply. Furthermore, gender equality is a serious issue for the growth of Northeast Asia and women in STE should take initiative in gender equality activities. Finally, Dr. Kunii called for global collaboration in R&D and acceptance of diversity to strengthen careers and promote gender equality.

Q&A

Dr. Heisook Lee had a question about the target of women making up 30% of faculties. She wanted to know if there were specific implementation methods for achieving this. In response, Dr. Kunii explained that the Shibaura Institute of Technology had established an internal organization to promote gender equality, providing support for female researchers with children in particular. She also shared other examples of institutions implementing effective measures to promote the participation of women in STE, but admitted that in general, it was likely that not enough was being done.

Session 2: Career Education Programs at the University

(Session Chair: Dr. Heisook Lee, Director, Korea Advanced Institute for Supporting Women in Science Engineering and Technology)

Presentations

Japan

Dr. Toyoko Ochiai, Leader of the CareerWay Project, Nihon University, Professor, Nihon University School of Medicine, presented on the career development of female physicians at Nihon University. She began by pointing out the low level of female researchers in Japan, compared to other developed countries, and said that greater efforts were needed for training female science researchers and to promote their careers.

In terms of actions at Nihon University, Dr. Ochiai discussed the 2008-2010 project, “Universalization of Career-way in Nihon University” to promote a model for supporting female researchers. The project helped improve the environment for gender equality at the university and activities to help develop the next generation have continued.

She then discussed major issues faced by female doctors in Japan. In particular, women leave their profession too early without establishing their careers. To address this issue, the School of Medicine at Nihon University provides all first-year students with career education and multiple seminars for female medical students to introduce them to female doctors who can be their role models. This can help teach the importance of having a career vision and how to build a career.

Furthermore, Dr. Ochiai believed that doctors could develop and upgrade their careers the most during the 30s and recommended that female physicians upgrade their skills by investing in themselves, while also maintaining their qualifications and writing academic papers.

Finally, Dr. Ochiai presented figures on the number of female faculty members at the School of Medicine and the drop-off at the associate professor and professor levels, and concluded that continuation of work and staying on the job was important for women’s academic careers and the promotion of women.

China

Dr. Min Hu, Professor and Dean of the State Key Joint Laboratory of Environmental Simulation and Pollution Control, College of Environmental Sciences and Engineering,

Peking University, began by providing an overview of the history of the modern environmental education movement and its importance for achieving sustainable societies in a changing world.

Dr. Hu also described the rapid growth of the field, highlighting the growing number of researchers in the field and their high level of education.

Next, Dr. Hu provided an overview of Peking University and its history, before discussing the future vision of the university. In particular, she mentioned the cultivating of leading talents with broad fields of vision, leading ability in various fields as well as a spirit of innovation, and described how the study of environmental sciences matched this vision.

Finally, Dr. Hu concluded that environmental sciences were rooted in fundamental sciences and were driven by severe environmental problems and growing public awareness.

Korea

Dr. Jeong-a Lee, Professor, Chosun University, presented on programs in Korea to support women scientists and engineers in Korean universities. As an introduction, Dr. Lee pointed out that women usually faced challenges when competing for science and engineering positions with their male counterparts, which brought her to the question of where the best place in the world was to be a woman. To answer this, Dr. Lee presented data from the World Economic Forum and highlighted the strong performance of Europe, as well as the fact that none of the G20 countries ranked in the top 10.

Unfortunately, the lowest metrics for women in science come from Asia, although overall China is performing better than Japan. Dr. Lee also pointed out that political empowerment of women in Japan was particularly poor, while the economic participation and opportunity of women in Korea was very low.

Dr. Lee proceeded to discuss key programs in Korea. As background she described the emphasis placed on the development of human resources in Korea, due to its limited natural resources, and noted that STE was a major component of Korean GDP. Dr. Lee discussed efforts to bridge the gender gap that were initiated in 2002 and led to the establishment of a legally-backed organization for promoting the careers of women. Additionally, various laws and ministry-led measures have been introduced to support

women in STE. Dr. Lee also mentioned the 4W programs which were National Institute for Supporting Women in Science and Technology, Women in Science and Engineering, College Education Support for Women in Engineering, and Women's Academy for Technology Changers in the 21st Century.

With regard to strategies to tackle the obstacles in women's careers, Dr. Lee mentioned the need to combat the dwindling interest in science and engineering among young students, to make the male-oriented education and research environment more women-friendly, to change social views and provide more flexible work conditions in relation to childbirth and parenting, and to encourage women to become key players at the highest levels of government to overcome the career development glass ceiling. Overall, to keep women in careers in STE, women need to be encouraged to enter STE fields, social views need to be changed, and greater leadership roles need to be made available for women.

Dr. Lee then shared some outcomes. A study on the status of utilizing women in the science and technology research and development workforce in Korea has shown that the overall female ratio in STE universities has been increasing since 2006, the ratio of female full-time professors in engineering has increased slightly, and the ratio of female regular workers in R&D in public research institutes has been increasing, among other developments. On the other hand, although the total number of research directors and female research directors has increased, the female ratio has actually decreased year-on-year.

To conclude, Dr. Lee believed that women had the potential to contribute to the science, engineering and technology sectors of their respective countries. As expected, a number of obstacles exist, but the experience in Korea shows that these challenges are surmountable and a focused approach can positively transform the metrics and bridge the gender gap.

QA & Discussion

Dr. Heisook Lee opened the discussion by pointing out the low ranking of China, Japan, and Korea on the Global Gender Gap Report. Dr. Yoshida-Noro raised the question of how to raise the economic participation of women and pointed out the relatively better performance of China in this regard. Dr. Hu answered that the Chinese government placed importance on gender equality, citing the celebration of women's day in China, as well as the existence of the China Association of Women. In addition, Dr. Hu

mentioned governmental programs designed to support women in economically underdeveloped areas.

Dr. Heisook Lee commented on the difficulty of women in East Asia resuming their careers after childbirth. Dr. Kunii agreed and believed similar problems were being faced by Japan and Korea.

Dr. Kunii then asked why private universities in Korea were less conservative than public universities. Dr. Jeong-a Lee replied that private universities were more aware of the positive effects of women faculty members on the university's overall competitiveness.

A Chinese participant from Tokyo University of Marine Sciences and Technology, asked about the situation in Korea with regard to home and work balance. Dr. Jeong-a Lee answered that many female researchers she knew sacrificed social time to make room for their careers and their families.

Next a question was raised by Dr. Noriko Shiomitsu, JAXA, requesting suggestions on how to accelerate the bridging of the gender gap. In response, Dr. Jeong-a Lee suggested benchmarking the top countries in this area as a starting point, but admitted that she did not have any concrete answers.

Dr. Yoshida-Noro asked about the general attitude of men toward domestic affairs. Dr. Hu answered that China was still a developing country, and therefore there was great disparity in attitudes and experiences of people across the country, including on the subject of gender roles.

Dr. Kunii commented that learning from the experiences of Norway, women's political involvement was very important, as well as the image of women portrayed by the media.

Session 3: Leadership Programs for Professional Women in STE

(Session Chair: Dr. Miyoko O. Watanabe, Chairperson of Japan Women Engineers Forum, Fellow & Program Director, Center for Research and Development Strategy, Japan Science and Technology Agency)

Presentations

Japan

Ms. Shigeko Mori, Japan Women Engineers Forum, Senior Software Engineer, Tokyo Software Development Laboratory, IBM Japan, gave a presentation entitled “Developing Woman Leaders in Engineering Companies in Japan.” To begin Ms. Mori briefly introduced herself, and highlighted the fact that she was the first member of the software lab to take childcare leave.

Next, Ms. Mori discussed labor environment issues faced by Japanese women, pointing out the low ratio of labor force participation of women compared to men, the even lower ratio of those in leadership positions, and also the major drop in employment of women between the ages of 25 and 35 due to childbirth.

However, Ms. Mori believed that things were changing as a key part of Japan’s revitalization strategy involved promoting the active participation of women towards raising labor productivity and fostering economic growth.

Ms. Mori then shared a number of case studies from IBM, Toshiba, Japan Women Engineers Forum, and consulting for diversity and inclusion. Efforts included building communities of technical women; establishment of life and career promotion offices; holding discussions with the Ministry of Economy, Trade and Industry; awards for women leaders; and the promotion of the utilization of working mothers and encouraging the development of their careers.

In conclusion, Ms. Mori believed the important lessons to take away from the case studies were that female leaders were a must for businesses and to this end, executive commitment, changing mindsets among management, and improved self-awareness among women were required.

Japan

Ms. Keiko Yamamoto, Representative of Water Quality Asian Cooperation Network, NPO Professional Women Engineers, presented next and briefly outlined her own background and her reasons for becoming an engineer, before expressing her desire to share her experiences with younger generations.

Ms. Yamamoto then addressed the low percentage of engineers that were women. As possible reasons for this, Ms. Yamamoto cited the working culture and system in Japan,

as well as the negative attitude of parents and teachers to women looking to pursue careers in STE.

That said, Ms. Yamamoto showed data suggesting that the number of women engineers was slowly rising. One driver of this is the establishment of the national Professional Engineer qualification which can be used as an objective means of evaluating a woman's ability. Despite this, Ms. Yamamoto explained that very few women were engineers and very few had this qualification and it was in this context that the NPO Professional Women Engineers was begun. The NPO disseminates information about the fun of science and engineering to students, shares role models, and evangelizes the benefit of the Professional Engineer qualification.

Finally, Ms. Yamamoto declared that the mission of Professional Women Engineers was to change the thinking of society, overcome difficulties by continuing activities, and foster many women engineers and leaders in Japan in the near future.

Korea

Dr. Eun-Kyoung Lee, Professor, Chonbuk National University, spoke about the importance of leadership of women in science and technology, and how leadership of women could be fostered.

Dr. Lee believed that the main problems were the low numbers of women in science and technology, institutional entry barriers and glass ceilings, and ungendered knowledge. She then shared examples of policies and programs targeted at addressing these specific issues. Furthermore, Dr. Lee expressed her belief that some progress was being made.

Nonetheless, not enough is being done. Dr. Lee argued that the lack of women in leadership positions was a major contributing factor to the slow progress, as this meant women were excluded from the decision-making process, particularly at the policy and management levels.

Dr. Lee then presented a few different types of leaders in science and technology before describing ways to foster leadership, such as training and experience, and networking. Next, she shared examples of qualities and experiences of Korean women leaders in science and technology, such as having a successful research career, experience in government committees and networking with policy-makers, and experience managing big projects and laboratories. She therefore concluded that in order to help women in

science and technology gain experience and become leaders, it was necessary to share the experience of women leaders, participate in networking, to gain knowledge and information, and to manage different kinds of resources.

QA & Discussion

The first question of the QA session concerned how to foster women leaders. In reply, Ms. Mori said that women can become leaders through exposure to on-the-job training that is conducted in a well-planned and continuous manner. Dr. Yoshida-Noro thought providing opportunities to young scientists to manage large projects was beneficial. Dr. Watanabe added that having a higher number of female scientists would help. Dr. Ohtsubo also believed that in East Asia female scientists tended to underestimate themselves and in such instances, mentoring and awareness among their supervisors was vital.

Dr. Shiomitsu asked what measures or policies should be prioritized to promote the leadership of women. Dr. Eun-Kyoung Lee replied that it was difficult to identify specific priorities, but advised that, in a policy-making context, women needed to be prepared to step into a leadership position whenever such an opportunity presented itself.

Dr. Watanabe pointed out that all three presenters had cited the importance of networking and asked for comments about ways to strengthen networking among women in STE. Dr. Shiomitsu suggested conducting international comparative studies and holding symposia and other fora for information-sharing. Finally, she also believed that having a clear vision was important. Dr. Sugahara mentioned the Asia-Pacific Nations Network. Ms. Yamamoto pointed out the importance of identifying groups of women in different fields and advocated setting up loose networks at various levels from grassroots to the policy-making level.

Dr. Hu proposed that for the next JCK WLF, male leaders should be invited to participate, and, citing the importance of the changing world, and experts from outside East Asia should be invited to speak as well.

Closing remarks

Dr. Noriko Hirata-Kohno Professor, College of Science and Technology, Nihon University, Chairperson, Japan Inter-Society Liaison Association Committee for Promoting Equal Participation of Men and Women in Science and Engineering,

expressed her honor at the opportunity to close the 5th JCK WLF. She said that she had learned a lot from the presentations and fruitful discussions of the day, and hoped that such trilateral cooperation would continue in the future. Finally she expressed her gratitude to the organizers and participants and thanked them for their cooperation.