米国工学教育協会第121回年次大会に参加して

Report on American Society for Engineering Education Annual Conference

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米国工学教育協会の121回年次大会がインディアナポリスで開かれ、招待されて、参加する機会を得た。

米国工学教育協会のDr. Norman L. Fortenberryから

It is with great pleasure that, on behalf of the ASEE Board of Directors and ASEE President Kenneth Galloway, I invite your participation in ASEE's 121st Annual Conference and Exposition to be held June 15–18, 2014 in Indianapolis, IN. I particularly wish to extend to you an opportunity to make remarks, along with other special representatives of ASEE partner societies around the globe, at a special “Global Views of Engineering Education” session to be held.

We greatly look forward to your attendance at the ASEE Annual Conference in June, and to our continued collaboration as we strive to enhance the quality of Engineering Education.

とする手紙を頂き、例年出席出来ていなかったが、今後の協力関係を構築・強化する意味でもお受けすることとした。上記の内容にもあるように、依頼に従って、国際組織（IGIP）、ヨーロッパ（SEFI）、韓国（KSEE）などの工学教育協会の代表とともに講演をし、情報交換を行った。その内容を含め、ここに紹介する。

多くの会員の方々は既にご存じのように、日本工学教育協会は、1951年の米国からの工学教育に関する調査団の報告（Hazen Report）を受けて1952年に、「工学教育機関、産業団体、その他関係団体との連携及び協力の下に、我が国における工学教育の振興をはかり、産業の発展に寄与すること」を目的に設立され、長年にわたって活動を続けてきた。

一方、米国工学教育協会は、1893年に設立され、その目的として、工学における教育法の実践・開発・研究などにおける卓越性の促進、世界での指導的役割の発揮、この分野の発展、会員へのサービスの提供が挙げられている。同時に国際的な協調、工学教育政策の国民、政府への発信、工学教育関係者の生涯教育の提供、工学教育への社会の様々なリソースの活用・顕彰、若者への工学・技術分野の勉学、就職の推奨、若手教

員への工学教育奨励を役割としている。職能団体としての機能もあり、これらの目的の実現のため、会員へのさらなるサービスの向上、教育機関、企業との工学教育の改革のための協働、教員の教育力の向上、産官学のさらなる連携、そのための国際的な連携の深化、などが謳われている。

米国工学教育協会の年会は、参加者千人規模の大きな学会で、400を超える様々なセッションが開かれていた。分科会活動も盛んで、土木、機械、電気、物理、化学の各分野の教育手法、幼稚園から初等中等教育における工学教育（K-12 Education）、工学教育における高大接続、工学分野への女性の進出、工学教育における教養教育、工学倫理教育、工学教育における産学連携、工学教育と公共政策などの分科会があり、それぞれが多様なセッションを開催し、熱心な討論が行われていた。また、工学教育に関連する企業展示、多くの関係者による特別講演、特に、高校生への工学教育に関連して高校生による技術開発コンテストの表彰など大々的に開催されており、如何に次世代に工学分野に興味を持たせるかに腐心しているかが実感された。

会期中、米国工学教育協会専務理事のFortenberry氏と懇談をし、今後の協力の方向性などを議論した。その中で、相互の大会参加者の参加費を会員価格にする方向で検討するなど、関係強化を図ることとした。会員諸氏の当大会への積極的な参加をお願いしたい。

大会最終日の午前中に、Distinguished Lectureとしてパネルセッションが開かれ、Northern Arizona UniversityのProf. Eck Doerry氏の司会でヨーロッパ工学教育協会会長のProf. Kamel Hawwash、韓国工学教育協会会長のProf. Euy Soo Lee、Dublin Institute of TechnologyのDr. Mike Murphy、国際工学教育学協会のMr. Danilo Zutinらとパネルを行った。講演内容は次ページにその資料を示すが、その中で話した教育士（工学・技術）の話は興味を引いた。工学教育協会の今後の活動の大きな柱になるものと考えられる。

以上、米国工学教育協会の大会の様子を報告したが、極めて活発に活動しており、もっと多くの関係者が日本からの参加があっても良いのではないかと思った次第である。今後の関係強化と情報共有に向けて国際連携活動を強化して行くべきであるとの思いを強くした。皆様の益々のご協力をお願いする次第である。

2014年8月25日受付

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Global Collaboration in Engineering Education through Network of Networks

Yoichiro Matsumoto, President of JSEE
Executive vice-President, Professor, The University of Tokyo

History of Japanese Society for Engineering Education

- Founded in 1952, after the Engineering Education Mission to Japan by Dr. Hazen in 1951, when Japan regained independence after the World War II.
- The report emphasized “autonomous reform and multiformity in education: spirit of democracy” to recover engineering activities from the destruction.
- The JSEE was established on the basis of the report.
- Aim of JSEE is to promote the education for engineers by providing the common place for educational institutions and industries.
- We are collaborating with accreditation board (JABEE)

Professional Educator Qualification System

- Qualification system of Professional Engineering Educator in Higher Education have operated since 2005.
- A civilian license system to guarantee educational ability of teachers in engineering faculty or technical college.
- Educational ability includes presentation skill, engineer's ethics, counseling, mental health, introduction to pedagogy, laws of education and so on.
- Almost 1000 educators have been certified.

Why qualification System?

- In Japan, license is not required to teach in Higher Education organization such as university, though national license is indispensable for elementary or high-schools.
- Younger teaching staffs, such as assistant professors are recruited, qualified and promoted by record of academic researches in Universities.
- They have less time to pay attention on education how they teach their students.

Why qualification System?

- Most of them are excellent researchers but have less experience for education.
- They have not studied about education.
- Mass-Education in Higher Education.
- Almost 80% of 18 year old continue to study after graduation of high-school.
- Educators should have appropriate SKILL for teaching them.

What is Network of Networks?

The Network of Networks (NNs) is a comprehensive network linking existing networks which enables cooperation among universities and societies

Background and Objectives of “Knowledge Structuring”

- **Background: Explosion of Knowledge**
 - Increasing knowledge at an exponential rate.
 - Dividing research themes into increasingly smaller fields.
- An intelligent overall picture is needed to effectively use a massive volume of distributed knowledge and to link knowledge with value to develop innovation ecosystem.
- **What is “Knowledge Structuring” ?**
 - Systematizing areas of science and technology that are currently undergoing fragmentation.
 - Clarifying the relation between one element of knowledge and another.
 - Networking the knowledge to solve complicated problems.
 - Network of networks enables to develop innovation ecosystem for engineering education.

Role of Knowledge Structuring in Engineering Education

The Biggest Problem in Japan Trend of Population Pyramid in Japan

Japanese demographics is changing so rapidly and Japan is running forefront in the world. The big issue is how to support elderly people by the shrinking workforce. We need to solve the complicated one by fully utilizing "engineering" collaborating with other fields.

What will come after Long-term Stagnation Trend of Population Pyramid in Japan

Japan is one of the advanced countries on issues such as rapid aging. It is important for Japan to aggressively reap the benefits of global collaboration in many field; environment, life care, medicine, energy, mobility, by promoting technological and social innovations.

Trend of Japanese University Undergraduate Students and the Ratio of that in Engineering

About 20% of undergraduate students study engineering and science. The ratio is decreasing year by year.

JSEE's International Activities

IFEEs: International Federation of Engineering Education Societies

AESEAP: Association for Engineering Education in Southeast and East Asia and the Pacific

SEFI: European Society for Engineering Education

ASEE: American Society for Engineering Education

KSEE: Korean Society for Engineering Education

Engineering Education as an Open-Innovation under the Global Collaboration

- We are facing many complex, long-term and emerging problems such as global warming, energy issues, aging issues, loss of biodiversity and so on.
- We need to create sustainable society that functions in harmony with the natural environment.
- In order to create a sustainable society, it is necessary to promote socio-economic and technological evolution through an open-innovations under the collaboration of many stakeholders by fully utilizing engineering.
- We need to develop engineering talents, who will drive the open-innovation to overcome the challenges we are facing.
- Through global collaboration in engineering education, we can deliver a paradigm shift to realize the open innovation.
- The universities need to collaborate in engineering education with industries and governments internationally.

WECC2015 Kyoto

World Engineering Conference and Convention in Kyoto

Nov. 28~Dec. 4, 2015

Best week of the year to fully enjoy the gorgeous autumn of full color, culture of Japan and cutting edge Technologies and Innovation!

Visit:

<http://www.congre.co.jp/wecc2015>

WECC2015 Program Structure

I. Innovation for Sustainable Growth and Socioeconomic Development

- I-1 Innovation for a Resilient Society
- I-2 Green Innovation
- I-3 Life Innovation
- I-4 Innovation for Competitiveness

II. Engineering Research & Development for Innovation

- II-1 Mobility and Machinery
- II-2 Information and Communication Technology
- II-3 Chemicals, Materials and Resources
- II-4 Energy and Environment
- II-5 Urban development and Buildings

III. Engineering for Society and Engineering in Society

- III-1 Social Mission of Engineering and Ethics for Engineers
- III-2 Social Trust on Science and Technology and Communication between Society and Engineering
- III-3 Women in Engineering and Society
- III-4 Human Resources Development and Engineering Education

Main Theme III:

Engineering for Society and Engineering in Society

To organize this unique topics, some engineering organizations covering related disciplines and JFES's committee members have gathered. The following are the sessions to be organized.

- III-1 Social Mission of Engineering and Ethics for Engineers
- III-2 Social Trust on Science and Technology and Communication between Society and Engineering
- III-3 Women in Engineering and Society
- III-4 Human Resource Development and Engineering Education
- 4-1 Improvement of Engineering Education
- 4-2 Young Engineers Leading the Next

Note: Standing Technical Committee (STC) of WFEO is welcome to make a report of its activity at the related session of III-1~4. Each session organizer will do the best to incorporate the proposed report into the designing related session.