

## Keynote Speaker: Wei Yu



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Wei Yu, Academician of CAE, Director of Breach of Electronic and informatical Division, CAE, has a doctorate in Electronic Engineering from Aachen Technical University, Germany. After graduating from Nanjing Institute of Technology in 1965, she became a research fellow in the Institute of Electronics, NIT. She was selected as the one of the first groups to undertake further study in West Germany at 1979, becoming the first woman PhD in New China. After she returned to China she founded the Department of Biomedical Engineering and the Laboratory of Molecular and Bimolecular Electronics (LMBE) in Southeast University. From 1984 to 1993 she was the Director of LMBE and President of Southeast University. She has received honorary degrees from nine universities outside Mainland China.

During her long career as a teacher and researcher in electronics, her significant achievements included the development of bioelectronics and grounding molecular and bimolecular electronics. She also made important contributions to the reform of higher education and distance learning in China during 1993-2002 when she was the vice-minister in Ministry of Education.

Since 2001 Wei Yu has founded a new interdisciplinary research – the Science of Learning, the frontier area of Mind, Brain and Education in China – bridging neuroscience and education. At the same time she introduced Learning by Doing an inquiry-based approach to science education into China. In 2004, she won the Special Contribution Award issued by the United Nations Secretary General Kofi Annan, and was named “60 Women Contributing to the 60 Years of UNESCO”. Based on her contribution to Learning by Doing in 2006 she was awarded the international PuRkwa prize for innovative practices in science education. In 2007/8 she chaired the committee revising the National Standard of Science Education in Primary Schools in China, which were presented to ministry of education at the end of 2009. She was the top 1 prize-winner of the first grade prize for teaching achievements of course reformation of national elementary education in 2010.

## **Keynote Speech for STEM2012:**

### **Promoting Neuroeducation as a Trans-disciplinary Field**

**Abstract:** The Pilot Project “Learning By Doing (LBD)” is an Inquiry Based Science Education and Learning (IBSE) in Kindergartens and Primary Schools (5-12years) in China, which has been co-initiated by Ministry of Education and China Association for Science and Technology in Aug. 2001, aimed at promoting the children’s science education as well as their holistic development and wellbeing. After 10 years’ practice, LBD reach out to 22 provinces and benefiting over 200,000 students and Thousands teachers. LBD has become a sound foundation for revising the National Standard of Science Education in Primary Schools and promoting the national policy changing on early child development. LBD has got Parkway Price in 2006 and the First Class Award of Education Research from MOE, China in 2010.

The unique character of LBD is to apply the research of Neuroeducation to IBSE. Just one year later to initiating LBD, in 2002 Research Centre of Learning Science has been founded at Southeast University. The trans-disciplinary research on Neuroeducation not only can support the pedagogy of IBSE but also create scientific tools applying to measuring learning outcome in classroom practices. Four series of instruments and software are being developed in our centre: (1) Multiuser On-line Assessment and Record System for Inquiry-Based Education, its core technology includes Inquiry-Based Teaching Pedagogy, teaching and learning materials. The system can provide the response opportunity to over 40 learners (students or teachers in training, see the attached picture), the teacher can record the answers from all learners at same time and analysis it on-line in order to know the learners’ cognitive outcomes and learning progression to provide the prompt teaching and learning contents with suitable Inquiry-Based Education methods. (2) Social Emotional Competence Assessment System, in which the recent research will be focused on empathy and communication. In addition to the traditional questionnaire, this system will also utilize the physiological signal analysis, behaviour analysis and the facial expression recognition, such that the assessment of empathy as well as the related social emotional competence becomes more reliable. (3) Evaluating Executive Function System. Virtual reality created by computer and the wearable EEG sensor measuring connected to database form the major parts of the system. (4) Estimating key concept proficiency system. Virtual reality created by computer and the EEG/ERP technology are combined together.

All above measuring is aimed to support education pedagogy changing with evidence based data, which may record the development pathway of learners and reflect the progress of learners during IBSE activities. Such Systems can be accessed also via internet.