

Report of the Control Education Committee
May – November 2006

Prepared by **Bozenna Pasik-Duncan**, Chair
November 22, 2006

The Control Education Committee reports the following activities:

1. **“Math, Science and Technology in Control Education” – Evening Round Table Panel Session on Control Education**, 6:00 – 8:00 p.m., Thursday, June 15, 2006, Grand Ballroom Salon D, Minneapolis Hilton, ACC’06.

Panelists: John Baillieul, William Levine, Lucy Pao, Claire Tomlin.
Chair and Moderator: Bozenna Pasik-Duncan

Summary: Over 50 people attended the session. The group represented many countries. The session addressed important education issues of balancing math, science and technology in engineering education.

The session has been organized as a part of the ongoing national and international dialogue after some “alarming reports” have been issued. The panelists responded to the question, “What scientists and educators should do about cultivating student interest in math, science and engineering, in particular control systems engineering?”

The session generated important exchange of current status of ed
The session was a follow-up to the very popular session with over 100 participants at the CDC/ECC’05 in Seville, Spain.

Recommendations for the future: Continue this important dialogue at every major control conference in USA and around the world.

2. **“Rethinking Control Education in the Modern World” – IFAC Automatic Control Education’06: Invited Panel Session**, June 22, Madrid, Spain.

Organized by the IFAC, TC on Control Education, and the IEEE – CSS Technical Committee on Education, this Session was aimed at provoking discussion on numerous challenging questions that will influence the ways in which we will teach control topics in the future.

In an effort to make the discipline of control more attractive to students we often introduce this subject as an enabling technology in the context of embedded electronic systems, intelligent robots, mechatronic systems, advanced communication systems, space technology, etc. While this approach works well in promoting the field of control, it however raises numerous questions such as:

- a) how much of the advanced computing technology do we need to use in presenting the basic control topics?
- b) are we going to fall into the trap of being technology driven and thus, in the long term, start to lose analytical problem solving skills?
- c) are we about to change the way we teach control?
- d) are all of these approaches going to change the profile of the control discipline?

Do we need to worry about these changes or, maybe, even strongly support them?

Do we need to have a new kind of control textbooks to address new technologies?

More and more people want to access innovative course, preferably online. Do we need an online control course too?

The invited panelists: Pedro Albertos, Derek Atherton, Sebastian Dormido, Bjarne Foss, Alberto Leva, Christian Schmid responded to the questions listed above.

Their responses generated an important exchange of current situations about the engineering education in different countries in particular countries of the European Union.

3. "Power, Beauty and Excitement of Automatic Control," the Workshop for High School Students and Teachers, June 20, 2006, Madrid, Spain, IFAC ACE, 2006.

Organized jointly with the IFAC Technical Committee on Control Education.

The purpose of the Workshop was to promote the importance of control systems, to show that control systems is a vibrant and intellectually stimulating field and with its interdisciplinary nature can take you everywhere.

Presenters: Pedro Albertos, Sebastian Dormido, Karl Astrom, Bozena Pasik-Duncan and Ljubo Vlacic.

In preparation:

1. Workshop for 600 Middle and High School Students from the San Diego District will take place on December 13, 2006, at the CDC'06 in San Diego.

Speakers: Claire Tomlin, Mark W. Spong, Richard Murray, Katsuhisa Furuta,

Theodore Djaferis, Raffaello D'Andrea, P. R. Kumar, Christos G. Cassandras

Over 1200 students and teachers applied to participate. The response from teachers has been the most enthusiastic and impressive.

The Workshop is sponsored by the NSF, but because of the surprising and unexpected cost of lunches and the equipment, the committee is currently looking for additional support. The University of Kansas agreed generously to provide some support.

2. Developing a Power Point presentation with information about relatively new and emerging directions of research and graduate student training in the controls field, in a broad sense. The goal is to motivate graduate students and young faculty members to work in controls-related fields, to show them how many new and exciting potential applications do exist, and the opportunities of collaborative research with other communities like medical, biological, semiconductor/nanotechnology, mathematics, industrial engineering, economics and so on. The possibilities are endless! Yet, we hear many times that graduate students are losing interest in controls, departments are not hiring in controls, and so on. If we created such a presentation, we could deliver the talk in various departments - any CSS member could do it, with basically the same lecture - all over the world!

3. Preparing the article for the Special Issue on K-12 Education for the Control Systems Magazine.

4. Some collected Control Engineering History at this site. (submitted by Ebrahim Al-Gallaf)

<http://userspages.uob.edu.bh/ebgallaf/history.htm>

5. Control Education Committee is planning several control activities at the ACC'07 in New York. Those include the panel session, students poster session, round table discussion with the New York middle and high school teachers.

6. The Committee will meet on December 14, 2006, at the CDC'06 in San Diego.