

Technical Committee on Control Education,

December 2011 – June 2012

Report prepared by **Bozenna Pasik-Duncan**, Chair
May, 2012

The Technical Committee on Control Education reports the Education Activities that were held during December 2011 and June 2012 and have been in preparation:

I. Ideas and Technology Control Systems Workshop

Orlando, FL, December 12, 2011

Organizer and Chair: Bozenna Pasik-Duncan

Sponsored by CSS TC on Control Education and Co-sponsored by AACC TC on Education

The Ideas and Technology Control Systems Workshop was held in conjunction with the 2011 50th IEEE Conference on Decision and Control and European Control Conference (CDC-ECC 2011) at the Hilton Orlando Bonnet Creek Hotel on December 12, 2011. Over 200 high school students and teachers from area schools participated in workshop activities that included presentations by control systems experts from our technical community, informal discussions, and the opportunity for teachers to meet passionate researchers and educators from academia and industry. The talks are designed to be educational and entertaining. Participating schools were Apopka High School, Celebration High School, Colonial High School, Cypress Creek High School, East Ridge High School, Freedom High School, Lake Highland Preparatory, and Silver Star Center.

The purpose of this workshop is to increase the general awareness among high school teachers and students of the importance of systems and control technology and its cross-disciplinary nature. The presentations demonstrate the power, beauty and excitement of a field that spans, science, technology, engineering, and mathematics (STEM).

The STEM workshop was sponsored by IEEE Control Systems Society's and American Automatic Control Council's Technical Committees on Control Education, and the University of Kansas. The Organizing and Program Committee included Bozenna Pasik-Duncan (Chair), University of Kansas; Richard Murray, California Institute of Technology; Angela Schoellig, Institute for Dynamic Systems and Control ETH Zurich, Switzerland; Jeannie Falcon, National Instruments; Mark Frei, Flint Hills Scientific, L.L.C.; and Tyrone Duncan, University of Kansas.

Presentations were:

- *Control Design of Unmanned Aerial Vehicles (UAVs)*, **Roberto Tempe**, Director of Research, IEIIT-CNR, Politecnico di Torino, Torino, Italy.
- *Joys and Perils of Automation: "Smart Parking" for All*, **Christos G. Cassandras**, Head, Division of Systems Engineering, Professor of Electrical and Computing Engineering, Center for Information and Systems Engineering (CISE), Boston University, President Elect, IEEE CSS.
- *LEGO Robotics Joins University and High School, Research and Control Education*, **Alexander L. Fradkov**, Head, Laboratory of Complex Systems Control, Institute for Problems of Mechanical Engineering, Russian Academy of Sciences.
- *Molecular Control Systems and Synthetic Biology*, **Elisa Franco**, Assistant Professor, Department of Mechanical Engineering, University of California, Riverside.
- *Autonomous Systems from Racing Cars to Robots to the Transformers*, **Ufuk Topcu**, Postdoctoral Scholar, Control and Dynamical Systems, California Institute of Technology.
- *Applications of Math and Control Theory to the Problem of Epilepsy*, **Mark Frei**, Flint Hills Scientific, L.L.C.
- *An Overview of Capstone Design Programs*, **Bahram Shafi**, Professor, Electrical and Computer Engineering and Director of the ECE Capstone Design Program, Northeastern University.
- *A Cube that Balances Itself on a Corner*, **Sebastian Trimpe**, Doctoral Student, Institute for Dynamic

Systems and Control, ETH Zurich, Switzerland.

- *Control Systems—from LEGO to Industrial Machines*, **Margaret Barrett**, Academic Marketing Engineer for Controls, Robotics, and Mechatronics, National Instruments.
- *How to Control Unmanned Vehicles*, **Leor Grebler**, Academic Solutions Advisor, Quanser.

The workshop ran from 9:30 am to 2:30 pm with a box lunch provided for participants and speakers. Bozenna Pasik-Duncan led a discussion following the presentations, held the workshop evaluations and gave closing remarks.

II. Special Control Education Session on “New Challenges and Opportunities in Control Education” and the Semiannual Meeting of Technical Committees on Control Education

12:00 – 1:30 pm, December 14, 2011

Organizer and Chair: Bozenna Pasik-Duncan

Sponsored by CSS TC on Control Education and Co-sponsored by AACC TC on Education

The Special Control Education Session and the Semiannual Meeting of Technical Committees on Control Education was held in conjunction with the 2011 50th IEEE Conference on Decision and Control and European Control Conference (CDC-ECC 2011) at the Hilton Orlando Bonnet Creek Hotel on December 14, 2011. An open forum on New Challenges and Opportunities in Control Education was held.

Richard Murray, co-author with Karl Astrom of “Feedback Systems”, the winning textbook of the 2011 IFAC Harold Chestnut Control Engineering Textbook Prize was the invited speaker. The session was joined by past winners of the IFAC Harold Chestnut Control Textbook Prize, current and potential authors of control textbooks, and students and educators who are customers of these textbooks. The expected output of the session was to come up with criteria for writing successfully or for selecting successfully control engineering textbook as well as for identifying other resources for using effectively and successfully in teaching and learning control systems ideas and technology. Lunch was provided.

III. The Committee proudly reports updating its web page: <http://www.math.ku.edu/ksacg/CSS/tcce.html> which has now the record of all activities since 2000 as well as some News and new Scope & Tasks:

Scope: University education and continuing education issues in control.

Methodology for improving the theory, practice and accessibility of control systems education.

Control education laboratories, experiments, computer aided design, distance and virtual education.

technologies. General awareness among pre-college students and teachers of the importance of systems and control technology and its cross-disciplinary nature

Tasks: To promote control with its cross-boundary nature as a field that spans science, technology, engineering and mathematics (STEM). To provide students at all levels, including pre-college, undergraduate, graduate, and post-graduate, the opportunity to explore the world of control engineering. To organize workshops and special sessions on education bringing academia and industry together to facilitate learning experiences to attract students to control engineering. To communicate to the public at large the control field. To engage all technical committee in control education issues and activities. To organize semiannual meetings of the committee and use them as a platform to promote the control field

IV. Bozenna Pasik-Duncan and Linda Bushnell, a newly appointed member of the Organizing and Program Committee for the next workshop for middle and high school students and teachers submitted the proposal to the CSS Outreach Fund for the Project: *Ideas and Technology of Control Systems Workshop for Middle and High School Students and Teachers* held in conjunction with the 2012 IEEE Conference on Decision and Control, Maui, Hawaii, December 2012.

V. The Committee will have its next meeting at ACC 2012 on Thursday, 4:30- 6:00 pm on June 29.