

CACHE Himmelblau Award Winners Announced

The AIChE CAST Division Awards Committee selected Frank Doyle, Edward Gatzke, and Robert Parker as recipients of the 2011 David Himmelblau Award for Innovations on Computer-based Chemical Engineering Education given by the Computing and Systems Technology Division of the AIChE, for their development of Process Control Modules (PCM) that introduced a novel curricular tool for instructors in the area of process dynamics and control.

The award recognizes an individual or group making new and novel contributions to computer aids for chemical engineering education. The award will be presented at the CAST Division dinner, which will be held at the AIChE Annual Meeting this fall in Minneapolis, MN.

The Process Control Modules were initially developed in support of teaching undergraduate process control courses at Purdue University. The original laboratory exercises were improved and expanded to become a full text after the authors moved to the University of Delaware. The Process Control Modules provide high-fidelity chemical process simulations using Matlab/Simulink, allowing for students to participate in a simulated experimental laboratory. The modules were a novel contribution to the educational toolkit in that they were a standalone set of exercises that could complement any textbook, and could serve as a proxy for experimental laboratory experiments. Furthermore, the modules were designed to operate in a “real-time” mode (not as a fast simulation) in order to provoke student thinking about the consequences of control actions on the process response.

The basic outline of the text is fairly straightforward. Topics are divided into experimental laboratory sessions that can be accomplished by a student in a 1-2 hour laboratory period. Review topics are presented before the exercises to prepare the students for the experiments. The various modules cover a variety of topics, from dynamic modeling to Bode Plots to multivariable control to model predictive control. The modules were originally developed with a distillation and a furnace unit operations, but have been expanded to include a biomedical module (diabetes) and a biotechnology module (fermentor).

Numerous Universities around the world have adopted the Process Control Modules for use in conjunction with their process dynamics and control courses.