CACHE News
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CACHE Award for Excellence in Computing in Chemical Engineering Education

George Stephanopoulos was awarded the CACHE Award for Excellence in Computing in Chemical Engineering Education by the American Society for Engineering Education (ASEE). The award is presented at the Chemical Engineering Division awards banquet held at the ASEE Annual Conference for significant contributions in the development of computer aids for chemical engineering education. Dr. Stephanopoulos was recognized for his development of computer aids in chemical engineering education, through the generation of software packages and the writing and editing of associated learning materials and books in computer-aided chemical engineering education.

Dr. Stephanopoulos is the Arthur D. Little Professor of Chemical Engineering at Massachusetts Institute of Technology. He led the development of two influential computer-aided software systems: MODEL.LA and Batch Design Kit. MODEL.LA is a computer-aided phenomena-based modeling laboratory that supports synthesis, modeling, and analysis activities in chemical engineering (http://web.mit.edu/modella/). MODEL.LA enables process models to be constructed in terms of interacting physical and chemical phenomena written in an English-like syntax, not as sequences of hard-wired unit operation models or as sets of mathematical equations. Based on the assumed phenomena and structure, MODEL.LA then automatically derives the complete set of model equations from first principles. MODEL.LA was widely distributed and influential, as described in the 100+ citations to the key paper describing the MODEL.LA software.

Batch Design Kit was a computer-aided system of integrated set of software components for batch process development that included the (1) process sequence diagram as a two-dimensional depiction of the material flows in time and among processing facilities, (2) batch sheet as a textual description of the recipe with the various operations in a batch process, (3) materials model that constitutes the basis for the state-task network of materials transformations occurring in a batch process, (4) materials selection component that encompasses the methodologies for the selection of solvents for chemical reactions and separations, (5) materials assessment component of integrated set of expert systems that encompass the U.S. federal regulations for the environmental, health, and safety considerations by a chemical process, and (6) facilities allocation, which implements the feasible allocations of production equipment and estimates the corresponding batch cycles and costs. The architecture of Batch Design Kit was emulated by a series of software packages (including ForeSee, ModKit, BatchKit, KBDS) used to educate students in computer-aided design and the Batch Design Kit software was licensed to Gensym Inc. and then Hyprotech for further development and licensing to universities and businesses.

In addition to the direct development of computer-aided chemical engineering software, Dr. Stephanopoulos authored/edited more than a dozen books and monographs on computing in chemical engineering education. These books include his textbook on the analysis and design of analog and digital computer control systems that dominated the U.S. market for more than a decade and was highly used in other countries. Probably more undergraduate chemical engineers learned about digital computer control systems from George's textbook than any other single source during that time period. George edited both

the Knowledge-Based Systems in Process Engineering and Artificial Intelligence in Process Systems Engineering (AIPSE) monograph series. These monograph series pioneered the teaching of students in artificial intelligence in chemical engineering, with the first book in the AIPSE series discussing the concepts and approaches, relevant programming paradigms and computer technology, applications to chemical engineering problems, and a very large number of examples.

In addition, George encouraged his students and postdocs to develop computer aids in chemical engineering education, which is a practice imprinted on many of their students and postdocs. Computer-aided educational materials developed or co-developed by George's academic family include the CONSYD integrated software for computer aided control systems design and analysis, the Robex expert system for robust control design, the Model Predictive Control Toolbox, the Process Control Modules Software Laboratory for Control Design, and the CACHE Virtual Process Control Book. These numerous software packages, textbooks, and papers on computer-aided chemical engineering education would not have happened without George's leadership.