Ed Rosen Receives CACHE ASEE Award

Dr. Edward M. Rosen, a leading contributor to Monsanto's FLOWTRAN process simulator, was an early developer of "the new stoichiometry," a rigorous strategy for formulating and solving process system material and energy balance equations – documented with Ernest Henley in their first-of-its-kind Wiley text, Material and Energy Balance Computations. As an Industrial Trustee of the CACHE Corporation, over many years, he helped make FLOWTRAN available to universities and wrote articles for CACHE News to teach faculty and students to use EXCEL spreadsheets for problem solving and to use the latest computational fluid dynamics (CFD) packages.

As a young chemical engineer in the 1960s, Dr. Eddie Rosen was a leading contributor to the development of one of the first chemical process simulators, Monsanto's FLOWTRAN. He played an important role in perfecting the algorithms and FORTRAN subroutines that carried out material and energy balance calculations for many process units. These algorithms operated reliably, given a host of user specifications, including infeasible values for which solutions could not be found.

While Eddie worked on FLOWTRAN, he and Prof. Ernest J. Henley published one of the first textbooks on the systematic approach to writing and solving material and energy balances: Henley, E. J., and E. M. Rosen, Material and Energy Balance Computations, Wiley, 1969. In addition to providing chapters on stoichiometry and thermodynamic properties, this book was the first to focus on the latest algorithms for solving the associated equations. Of special note were the clarifying discussions of the distinctions between so-called equation-solving and optimization algorithms. At that time, practitioners were working with slow, batch (non-interactive) computers and the effectiveness and efficiency of these algorithms were key considerations. The Henley and Rosen book was the first to describe and compare the algorithms for the benefit of researchers in computer-aided process design and simulator developers. Its explanations were so clear that it was often used for graduate courses. It often introduced advanced algorithms, for example, for the calculation of phase equilibrium – including one of the earliest reliable algorithms for vapor-liquid-liquid equilibrium (in 3-phase flash vessels).

Then, in the 1970s, when CACHE made FLOWTRAN available to universities in the United States, Eddie contributed significantly as a CACHE Trustee. For approximately 30 years, Eddie's contributions to CACHE were a key to its success – especially from 1975 to the early 1990's, as the usage of FLOWTRAN at chemical engineering departments around the world increased substantially. Eddie helped CACHE make arrangements to distribute load modules that were installed on departmental

computers when they first became available in the early 1980s. Considering the many operating systems in use at that time, this alone was a substantial contribution.

Also, as a CACHE Trustee, Eddie contributed numerous articles to CACHE News, many of which helped chemical engineering educators better use spreadsheets to solve chemical engineering problems. Eventually, as a co-editor, he contributed two series of articles, one involving Visual BASIC applications in EXCEL spreadsheets and the second involving the CFD package, FEMLAB, which eventually became COMSOL. Eddie also served as chair of the CAST Division of AIChE. While chair, he continued to encourage the implementation of chemical processes simulators in chemical engineering design courses across the nation.

In summary, Eddie was a pioneering contributor to computing in chemical engineering education over 40 years through his textbook, his leading role in the CACHE Corporation, and his service in the CAST Division of AIChE. Few industrial practitioners have contributed so generously to computing in chemical engineering education.