

CACHE Trustees Teach New ChE Educators at Summer School

The 2012 Chemical Engineering summer school was held July 21-27 at the University of Maine. It was a very well attended summer school, with 103 participants (mostly assistant professors) and 57 presenters. The summer school organizing committee consisted of:

- Joseph Shaeiwitz, West Virginia University
- Jennifer Curtis, University of Florida
- Randy Lewis, Brigham Young University
- Greg Ogden, University of Arizona
- Kim Ogden, University of Arizona
- Sundar Madihally, Oklahoma State University
- John Hwalek, University of Maine.

The summer school would not be possible without external financial support from the following organizations:

- National Science Foundation
- Merck
- Air Products
- BP
- Corning
- Exxon Mobil
- DuPont

As usual, the CACHE Trustees had several workshops at this meeting. This article provides a brief summary of the workshops from CACHE Trustees. For more information, please visit the ASEE CHED website and download the complete archive of presentations at the following page. Note this site is password protected, but instructions are provided for obtaining the password.

<http://www.engr.uky.edu/~aseeched/SummerSchool/2012/index.htm>

How to Introduce Your Students to Problem Solving, Troubleshooting, Entrepreneurship, and Making the Transition to the Workplace by H. Scott Fogler and Steven LeBlanc.

This workshop will introduce instructors to techniques to hone and enhance their students' problem solving, critical thinking, creative thinking, and troubleshooting skills. We will also discuss ways to help ease your students' transition from college to the workplace. Problem solving techniques such as Osborn's Vertical Thinking and DeBono's Lateral Thinking, Duncker Diagrams, Kepner-Tregoe, TRIZ and troubleshooting will be discussed. Participants will work in teams to

interact and solve several interesting problems and scenarios. After completion of the workshop, the participants will have enough information and take-home resources to incorporate this material in their own courses, or offer a problem solving course on their own.

Recent Advances in Numerical Problem Solving and Programming for Chemical Engineers by Michael Cutlip and Mordechai Shacham.

This hand-on workshop will introduce participants **with their own PC's** (sorry no MAC's) to the solution of chemical engineering problems requiring numerical solutions with POLYMATH, Excel and MATLAB. Also the use of a new interface to the DIPPR[®] Database will be introduced for problem solving. The participants will utilize the software during the workshop under direction/assistance from the presenters. Integration into the ChE curriculum will be discussed. POLYMATH and the DIPPR Database software will be provided to each participant from a CD, and a special website containing all the workshop materials and many examples for classroom use will be made available. Participants should have Excel (with the Solver Add-In) and MATLAB installed on their laptops if possible. Experience with POLYMATH and MATLAB is desirable but not required.

Teaching Design Using the CACHE Learning Resource Center by Warren Seider and Gavin Towler.

This workshop is intended to introduce design instructors to the new "CACHE Guide to Teaching Design with Internet Links." Over 180 Internet links are provided to teaching materials including textbooks, monographs, completed design case studies, design problem statements, design software, POWER POINT lectures, and related materials prepared by design instructors. Initially, the Guide focuses on product design. Then, it suggests materials for teaching process flowsheet synthesis, process simulation, process integration, equipment design, environment and sustainability, safety, optimization, and process modeling. In the workshop, the instructors and participants will use the Guide to help select the course focus – helping to balance the emphasis on product design, process synthesis, and plant design. Also, the Guide will be used to help participants select materials to cover on equipment design and safety and the environment, as well as to formulate design projects.

Course-Specific Applications of Active Learning Techniques by David Silverstein, Don Visco, Lisa Bullard, and Jason Keith.

By now, many new faculty members have heard the term “active learning”, and some might have even tried such approaches in their classes. However, though research studies have shown that faculty would like to add active learning elements into their courses, either through hands-on activities, in-class problems, etc., many feel that they do not have the time to develop this content. To address

that issue, this workshop will illustrate quick and effective methods for applying these techniques in core chemical engineering courses (Mass and Energy Balances, Introductory Thermo, Transport, Separations, Solution Thermo, Kinetics / Reaction Engineering, Process Control, and Senior Design). These strategies will be practiced by the workshop attendees through small-group breakout activities. Additionally, several resources will be provided to workshop attendees and include the following: PowerPoint slides used during the workshop, a list of pertinent papers from the literature (and copies when publisher permission is secured), instructions on how to develop and use the hands-on activities from the breakout sessions, and sample classroom materials used by the instructors in their courses.