Prof. Jason Keith to receive CAST Division Himmelblau Award

Dr. Jason M. Keith, Professor and Director of the Dave C. Swalm School of Chemical Engineering at Mississippi State University has been selected as the 2013 recipient of the David Himmelblau Award for Innovations in Computer-Based Chemical Engineering Education by the Computing and Systems Technology Division of the American Institute of Chemical Engineers. Jason's contributions to novel computer aids for chemical engineering education have been in the form of fuel cell and alternative energy related modules written for the sophomore, junior, and senior level chemical engineering curriculum. These modules transformed the educational experience for Michigan Tech and Mississippi State students and are currently doing the same for other students at the national and international levels. They have been distributed widely and complimentary problems have been developed for two mainstream chemical engineering texts.

Jason is recognized for three distinct efforts: outstanding chemical engineering instruction, unique and transformative educational materials, and widely disseminated educational materials.

1) Outstanding chemical engineering instruction:
Jason is a truly balanced faculty member whose active research program has enhanced his outstanding teaching. He is most enthusiastic when illustrating how to integrate practical applications of his research into his classes via the design of chemical reactors (including fuel cells) to reduce waste from industry and from cars, trucks, and buses. The theme of his career has been to emphasize solving problems in chemical engineering and materials science using numerical methods.

Jason has a passion for his students and for the learning process. This is evident in how he conducts his classes. Students in his class don't just learn chemical engineering, they *practice* chemical engineering. After an introductory lecture, the students work out a problem using the material they were just taught.

2) Unique and transformative educational materials:
Overall, there have been 41 chemical engineering modules with an additional 29 (including some cross-listed modules) for mechanical engineering and another 13 (including some cross- listed) for electrical engineering. Since arriving at Mississippi State, an additional 9 modules have been published on solar energy. The modules have been tested and assessed at over a dozen ABET accredited institutions and the feedback has been very positive. In addition, in 2012-2013, Jason develop an iPhone/iPad app in heat transfer for students, which has been downloaded >2500 times.

Jason also worked with his PhD student Daniel Lopez Gaxiola (MTU PhD '11) to develop hydrogen and fuel cell based on-line interactive materials for the text *Elementary Principles of Chemical Processes* by Felder & Rousseau (90 modules) and *Transport Processes and Separation Process Principles* by Geankoplis (75 modules).

3) Widely-disseminated educational materials:

The fuel cell modules that Jason has developed have had broad impact to chemical engineering education in the United States and also globally. Jason has published the results of these DOE funded modules in 8 peer-reviewed conference proceedings, and delivered 17 oral presentations.

Within the educational literature, Jason Keith has published 4 archival journal articles. Also notable are his 31 American Society for Engineering Education proceedings articles; he has given 34 talks at national conferences on his instructionally innovative activities. He was selected as a presenter for two sessions at both the 2007 and 2012 Chemical Engineering Summer School, which was very popular among attendees.

As a result of his efforts, Jason was recognized and elected to the CACHE Corporation board of trustees and concurrently led an effort within CACHE to expand the fuel cell course modules' scope to various forms of alternative energy technology. Each of these activities demonstrates his passion to disseminate and promote educational scholarship.

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