Editorial

We feel we will be remiss if we do not reiterate our deep concern for the victims of Hurricanes Katrina, Rita, and Wilma. These have been disasters of major proportions, and on behalf of the Institute of STEM Education and Research we offer our sincere condolences to all who have lost family, friends and property. While the magnitude of the losses that have been incurred overwhelms us, we are confident and proud that STEM professionals will play a substantial role in planning and rebuilding in the years to come.

In this issue we present four articles and two case studies. In the first article, Ahmed Khoumsi and Brahim Hadjou discuss a new pedagogical approach based on competence development for problem based learning (PBL). They illustrate their approach with a PBL unit that aims to develop and assess competencies in applying probabilities in computer engineering.

Paul Lam, T. Srivatsan, Dennis Doverspike, John Vesalo and Ruby Mawasha have contributed a paper that highlights the findings of their ten year study of a Pre-Engineering Program aimed at dramatically improving both recruitment and retention of underrepresented students pursuing careers in STEM at the University of Akron. This paper will be of interest to all who are working to create a better social balance in our profession.

Raul Mihali and Tarek Sobh present a software simulation package designed to completely support a specific manipulator. This approach will allow STEM educators to fully explore the use of robots with their students in a virtual environment without incurring the considerable expenses involved in purchasing and operating a robot.

Levent Yilmaz and Shuo Wang discuss several ways to teach proper design verification skills to software engineering students. They suggest a strategy and tool support that has proven effective in promoting the attainment of the design evaluation skills that are in such demand by the companies that are our students' future employers.

An Industry case study is presented by Fred Ahrens and Rajendra Mistry of Siemens Energy and Automation. They highlight a study related to the development of a Visual Basic® application that can be used to solve journal bearing design problems in AC induction motor applications. Problems like this are addressed every day by professional engineers, and exposing our students to such case studies builds their confidence and expands their horizons.

Justin Cochran, P.K. Raju and Chetan Sankar present a case study that highlights the design modifications made at an electricity generating plant to improve the performance of the cooling towers. They include an instructor's manual which provides detailed guidelines describing how best to use the case study in engineering classrooms.

The innovative educational experiments and instructional materials reported by the authors in this issue provide us with a valuable information base that we can learn and improve upon to make us better teachers and excel in our profession. Please share your innovative instructional materials with us by sending us your contributions for future issues of our journal. We look forward to hearing your comments and thoughts.

We wish you and your family a Merry Christmas and a Happy New Year.

P.K. Raju and Chetan S. Sankar
Editors-in-Chief