

Guest Editorial

The papers in this special issue of the *International Journal of Engineering Education* represent much of the proceedings of Mudd Design Workshop VI, “Design and Engineering Education in a Flat World,” which was held on the campus of Harvey Mudd College in Claremont, California, during 23–25 May 2007. Supported by Harvey Mudd College’s Department of Engineering and Center for Design Education, this workshop brought together engineers and designers—both educators and practitioners—over three very busy days to talk about how globalization issues are affecting engineering design education.

A broad variety of engineering education issues was discussed. The first formal session was a panel discussion on the two recent reports, *The Engineer of 2020* (NAE) and *The Gathering Storm* (NRC). Presided over by Professor John W. Prados, the panel discussion featured a brief introduction by Professor Dym and extended presentations of an industry perspective by Mr. Carl Carrera (HMC ‘75/76) of Boeing and an academic perspective by Berkeley’s Professor Alice M. Agogino. All of these presentations are on the CD. It is also worth noting that panelist Carrera was filling in for a longtime supporter and organizer of the MDW series, Dr. John McMasters. (Dr. McMasters could not be at MDW VI, but he was sorely missed and his presence was felt during the ensuing panel discussion and the rest of the workshop. The next six sessions were devoted to: assessing flat world skills; flat world teaching and design tools; cross-cultural considerations; multinational curricula; communication and teamwork; and social entrepreneurship and sustainable design. The eighth (and last) session focused on identifying themes that had emerged and actions that might be taken both individually and institutionally.

Major emergent themes included the need to identify the integrative skills that students need to acquire (and that graduates and their institutions can use to differentiate themselves in their respective market-places); that tools and techniques for assessment are available and are being improved; that the skill types and levels of graduates is changing—and needs to change—in response to external changes; that students should be exposed to foreign cultures, as well as languages, and that cross-cultural courses and experiences are increasingly valuable components of engineering education; that collaboration and communication are increasingly important; that engineering faculty must be committed to these new emphases; that systems-level engineers (i.e., those who can appreciate and configure systems) are hard to find in practice and on engineering faculties; and, finally, that engineers should be more aware not only that their actions need to be ethical, but also that they are in fact making political (in the broadest meaning of the word) statements with their work, by the very nature of the projects that they are willing to undertake and complete. Before leaving, participants converged on various goals that they would try to advance—both individually and collectively. These are summarized in the wrap-up paper by J. W. Wesner’s and C. L. Dym (below).

At the MDW VI opening lunch the keynote speaker, Christopher J. Scolese, Chief Engineer of the NASA, talked on, “Design and Engineering Education For Space Exploration in a Flat World.” Mr. Scolese described the history of international collaboration in many of NASA’s major endeavors, pointing out that space exploration has always been “globalized,” and also pointing to the educational demands made upon engineers practicing in this domain.

We were once again fortunate to have two outstanding after-dinner events. In the first, HMC’s President, Dr. Maria Klawe, led the evening audience in a colorful and stimulating discussion directed toward understanding of the meaning and implications of Thomas L. Friedman’s now-famous *flat world* phrase. At Thursday’s banquet, Professor Bernard Roth of Stanford gave us some personal “Reflections on Design Thinking.” Among many provocative points, he distinguished between *trying* to do something and (actually!) *doing* something, and reminded us that students are not just vessels to be filled by the teaching professor. Rather, they are students who need to experience their own experiences and to develop their own stories.

Following the long-established MDW tradition, the workshop sessions were constructed to give *everyone* a chance to participate, to be heard as well as to listen. Workshop sessions were typically scheduled for two hours, starting with brief presentations by three or four panelists in each session, and concluding with moderated, open discussion. Panelists were asked to reflect on ideas and attitudes about things to be done in the future, rather focusing on their own current research. The papers that appear here are (for the most part) the panelists’ research and position papers. Clearly, these papers represent a rich body of experience and knowledge that certainly advance our understanding of the many meanings of *learning* in the context of *engineering design*.

I want to acknowledge once again the support of the remaining members of MDW V’s Organizing Committee. They worked hard to maintain the MDW’s reputation for providing an informative,

stimulating and inspiring venue for discussing engineering education: Alice M. Agogino, *University of California at Berkeley*; Cindy J. Atman, *University of Washington*; J. Edward Colgate, *Northwestern University*; Philip E. Doepker, *University of Dayton*; John S. Lamancusa, *Pennsylvania State University*; Larry J. Leifer, *Stanford University*; John McMasters, *The Boeing Company*; Gregory B. Olson, *Northwestern University*; John W. Prados, *University of Tennessee, Knoxville*; Sheri D. Sheppard, *Stanford University*; and John W. Wesner, *Carnegie Mellon University*. The Organizing Committee's involvement once again led to an MDW that was stimulating, thought-provoking and interesting, as well as being serious, engaging and fun.

Finally, Harvey Mudd College continues to offer the MDWs a very supportive environment. Professors Anthony Bright and Ziyad H. Duron, respectively previous and current Chair(s) of the Department of Engineering, deserve my thanks, as do President Klawe and former Dean of Faculty Daniel L. Goroff. I *particularly* and *vigorously* and *cheerfully* thank Sue Lindley and Daniel Pereira of the Department of Engineering for unflagging organizational, logistical, editorial and administrative contributions. Mr. Kevin Mapp of HMC's Department of College Relations took many photos during MDW VI, three of which appear in my opening paper. Thanks as well to HMC's Cynthia Wheeler for ensuring that our vendors got paid and our books were balanced.

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Just as this Special Issue was going to press we learned that John McMasters had passed away. Many of John's colleagues and friends have paid homage to John's intelligence, vision, thoughtfulness, and vibrant and humorous style. John was not only a good friend to the Mudd Design Workshops, but also to me personally. I will miss him a lot, and I'm quite sure that every future MDW will follow this one in noting both sadly and fondly the void that his absence will create.