Welcome to the 2011 IEEE International Conference on Microelectronic Systems Education (MSE’11), the eighth MSE conference held in North America. Since its inception in 1997, MSE has become the prime site in the world to evaluate and assess the state of microelectronic systems education. More importantly, MSE has become the leading venue to discuss innovative concepts and to explore future directions in microelectronics education.

As we enter this year’s meeting, the landscape of microelectronics technology continues to change and evolve in new and interesting ways, some of which were predictable and others which continue to surprise. Silicon feature sizes have plunged a full order of magnitude from the time of our first meeting in 1997 (.25 micron) with 22nm devices expected this year. While the technology has scaled, the power has done anything but, leading to changes in performance metrics, vast changes in computer-aided design techniques particularly related to physical design, and led to a sudden reliance on parallel computing rather than clock scaling to produce performance gains.

However, as we face the “silicon wall” (which continues to get pushed back) there have been interesting developments in new technologies vying for the replacement of or coexistence with silicon. Many new nonvolatile memory technologies such as phase-change and magnetic memories have emerged. Of particular interest is the discovery or more accurately the fabrication and characterization of the long predicted fourth fundamental circuit element, the memristor, to join the well-known resistor, capacitor, and inductor. Many of these technologies have interesting proposals for producing logic in addition to non-volatile storage. We have also seen a rebirth in integrated optics both with waveguide and free space methodologies.

Three-dimensional integration has made it possible to join these technologies with traditional silicon to create all kinds of new directions in microelectronics. As a result, these and the many other new technologies continue to permeate our research laboratories and have started to reach our classrooms and educational programs. This year’s special topic of sensor networks embodies this trend, which will continue long into the future of Microelectronics System Education.

In terms of the MSE conference itself, the rigor of the publications continues to improve. This is the second meeting that we have focused primarily on 4-page papers (up from 2-page extended abstracts), which allows more technical content and assessment to be included in the presentation of the work. I am also pleased that at this year’s meeting we will be discussing the process of effective description and assessment of our education innovation, led by Tina Hudson. This will provide an enormous benefit to improving the evaluation of teaching methodologies and improve our ability to present our findings quantitatively in forums like MSE and IEEE TOE.

As we move forward with MSE I envision us taking on the continuous improvement and assessment concepts we apply to our educational offerings within our conference. We need to find increasingly innovative ways for educators who attend MSE to take back innovations presented in our meeting for use in their own teaching environments at their home institution and to assess the effectiveness of these methods. We are taking the initial steps towards this goal through Dr. Hudson’s workshop and the incorporation of more demonstrations into MSE. However, we can and should take this further.

Finally, I would like to thank the members of the program and organizing committees for their contributions that have made MSE possible. In particular, I would like to thank John Nestor for his leadership and efforts to keep us both on schedule and to take on numerous general conference tasks in addition to his program chair duties to ensure a successful meeting. I would also like to thank Don Bouldin (Steering Committee Chair) for his continued guidance and work towards a successful conference. This would not have been possible without the tireless work of the remaining organizers and in particular I’d like to single out Mark Johnson, Bob Klenke, and Tina Hudson whom I worked closely with.

Finally, I would like to thank our Industry sponsors who recognize that commitment to education benefits the entire Microelectronics community and in particular our Lead Platinum Sponsor, Mentor Graphics, as well as long-time sponsors, Altera and Xilinx. Please take advantage of their generosity and patronize their University Programs.

I hope that you enjoy MSE ’11 and enjoy San Diego while taking advantage of our collocated events.

General Chair
Alex K. Jones
University of Pittsburgh
Welcome to the 2011 IEEE International Conference on Microelectronic Systems Education (MSE’11). Our conference program includes 34 papers contributed by microelectronics educators and practitioners from around the world. These papers were selected from submitted manuscripts after rigorous review by our Program Committee. Papers were accepted either as four page full papers or two page “work in progress” papers that describe new ideas and emerging work.

The MSE Conference has a tradition of inviting most authors to present papers as posters while inviting a smaller number of authors of top papers to present papers orally. This year we selected 7 papers for oral presentation, and 27 papers for poster presentation. This year we will also invite selected authors to present demonstrations during the poster session.

Over the last four years MSE Conference has worked to encourage authors to further expand and develop work presented at MSE so that it is suitable for publications in journals such as IEEE Transactions on Education. One stumbling block has been while many of our authors have a strong technical background, they may not be familiar with the best practices of educational research and assessment that are required by these journals. To address this need, I am very pleased that Prof. Tina Hudson of Rose-Hulman has agreed to present a workshop on “Turning Great Ideas into Publishable Educational Research”.

The theme of this year’s conference is “Wireless Sensor Networks: Educational Opportunities and Challenges”. Wireless Sensor Networks (WSN) research has been fueled by ongoing improvements in microelectronics technology that provide both new sensors and smaller, more powerful processing hardware along with the growing ubiquity of wireless network technology. WSN research targets a number of applications, including environmental monitoring, health applications, and industrial control. The emergence of off-the-shelf products supporting WSNs provides opportunities to develop and use WSNs in education. At the same time, WSN-based education is challenging – it is inherently multi-disciplinary, covering topics from sensor technology to microelectronics design to network protocols. WSNs are subject to extreme constraints on power consumption and performance, and WSNs are necessarily complex.

Our Keynote Speaker will be Prof. Jan Rabaey of the University of California at Berkeley. His talk, entitled “The Swarm and What it Means to Microelectronics Education” will address the coming opportunities and challenges brought about by a coming revolution in WSNs when the growing world of interconnected mobile devices is augmented with sensors. We feel that this will be an excellent kickoff to the conference.

I would like to conclude by thanking our Program Committee for their efforts to rigorously review papers and ensure the high quality of our technical program, and the Organizing Committee for their efforts in putting together the entire conference. In particular I would like to thank Proceedings Chair Tina Hudson and Steering Committee member Mark Johnson for their help in taking the technical program from the initial call for papers to the assembled proceedings. Finally, I would like to thank General Chair Alex Jones and Steering Committee Chair Don Bouldin for giving me the opportunity to serve as Program Chair and for all of their efforts to make this conference a success.

Program Chair
John A. Nestor
Lafayette College